

GEOLOGICAL SURVEY CIRCULAR 788-A



Earthquakes
in the United States,
January–March 1977



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By R. B. Simon, C. W. Stover, and B. G. Reagor

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United States Department of the Interior
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CONTENTS

| | Page |
|--|------|
| Introduction..... | A1 |
| Discussion of tables..... | 1 |
| Modified Mercalli Intensity Scale of 1931..... | 5 |
| Acknowledgments..... | 30 |
| References cited..... | 30 |

ILLUSTRATIONS

| | Page |
|---|------|
| FIGURE 1. "Earthquake Report" form..... | A2 |
| 2. Map showing standard time zones of the conterminous United States..... | 4 |
| 3. Map showing standard time zones of Alaska and Hawaii..... | 5 |
| 4. Map of the earthquake epicenters in the conterminous United States for January-March 1977..... | 6 |
| 5. Map of earthquake epicenters in Alaska for January-March 1977..... | 7 |
| 6. Map of earthquake epicenters in Hawaii for January-March 1977..... | 9 |
| 7. Isoseismal map for the central California earthquake of 8 January 1977..... | 18 |
| 8. Intensity map for the California-Nevada border earthquake of 22 February 1977..... | 20 |
| 9. Isoseismal map for the northwestern New Mexico earthquake of 5 March 1977..... | 27 |

TABLES

| | Page |
|--|------|
| TABLE 1. Summary of U.S. earthquakes for January-March 1977: | |
| Alaska..... | A10 |
| California..... | 11 |
| California--Off the coast..... | 12 |
| Delaware..... | 13 |
| Hawaii..... | 13 |
| Idaho..... | 14 |
| Missouri..... | 14 |
| Montana..... | 14 |
| Nevada..... | 14 |
| New Mexico..... | 14 |
| Ohio..... | 15 |
| Oregon--Off the coast..... | 15 |
| South Carolina..... | 15 |
| Utah..... | 15 |
| Virginia..... | 15 |
| Wyoming..... | 15 |

| | Page |
|---|------|
| 2. Summary of macroseismic data for U.S. earthquakes, January-March 1977: | |
| Alaska..... | A15 |
| Arizona..... | 16 |
| California..... | 16 |
| Colorado..... | 21 |
| Delaware..... | 21 |
| Hawaii..... | 21 |
| Idaho..... | 24 |
| Illinois..... | 24 |
| Michigan..... | 24 |
| Missouri..... | 24 |
| Montana..... | 24 |
| Nevada..... | 26 |
| New Mexico..... | 26 |
| Ohio..... | 28 |
| South Carolina..... | 28 |
| Utah..... | 28 |
| Virginia..... | 28 |
| Wyoming..... | 29 |

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INTRODUCTION

The earthquake information in this publication supplements that published in the NEIS (National Earthquake Information Service) publications, PDE ("Preliminary Determination of Epicenters") and "Preliminary Determination of Epicenters, Monthly Listing," to the extent of providing detailed felt and intensity data, as well as isoseismal maps for U.S. earthquakes. The purpose is to provide a complete listing of macroseismic effects of earthquakes, which can be used in risk studies, nuclear power plant site evaluations, seismicity studies, and answering inquiries by the public.

This publication contains two major sections. The first (table 1) is a tabular listing of earthquakes in chronological order by State, consisting of the following basic information: date, origin time, hypocenter, magnitude, maximum intensity, and computational source of the hypocenter. The second section consists of three maps and table 2, which lists detailed intensity information. The list of earthquakes in table 1 was compiled from those located in the United States or off the coasts that were published in the PDE; from hypocenters in California above magnitude 3.0, supplied by California Institute of Technology, Pasadena, the University of California, Berkeley, and other offices of the U.S. Geological Survey; from hypocenters in Hawaii supplied by the Hawaiian Volcano Observatory; and from any others that were felt or that caused damage, regardless of magnitude or availability of a hypocenter. Known or suspected explosions are also listed.

The intensities and macroseismic data were compiled from information obtained through questionnaires, from newspaper articles, and with the cooperation of other Government agencies, State institutions, local organizations, and individuals. (See "Acknowledgments" for a list of collaborators.) Figure 1 is the questionnaire in current use by the NEIS. Other versions of this questionnaire are used by State agencies, engineering firms, and other Government agencies to collect intensity data. Anyone wishing to submit felt or damage information on earthquakes

for inclusion in future reports should send it to the National Earthquake Information Service, Stop 967, Box 25046, Denver Federal Center, Denver, CO 80225. Copies of the current "Earthquake Report" questionnaire can be obtained at this address.

The primary method used by the NEIS to collect macroseismic information is a questionnaire canvass using the "Earthquake Report" forms, which are mailed to postmasters in the area affected by the earthquake. The postmasters complete the forms and return them to the NEIS, where they are evaluated and an intensity value is assigned. The intensity observations are mapped and contoured by isoseismals. Isoseismal contours present a generalization of intensity data and an extrapolation of these data to regions from which there are no observations; they do not necessarily account for every individual observation.

The data in table 2 will be included in the "Earthquake Description" section of "United States Earthquakes," an annual publication, to which later data from other sources may be added for the purpose of updating and completeness. "United States Earthquakes" is published jointly by the U.S. Geological Survey, Department of the Interior, and the Environmental Data Service, NOAA, Department of Commerce.

DISCUSSION OF TABLES

The parameters for the earthquakes in table 1 and table 2 include the date, origin time, hypocenter (epicenter and focal depth), magnitude, intensity, and hypocenter source. The origin time and date are listed in Universal Coordinated Time (UTC) and local standard time based on the time-zone maps in figures 2 and 3. The epicenters, which were taken from those published in the PDE, or from other sources as noted, are listed here to two decimals. The accuracy of the epicenters is that claimed by the institution supplying the hypocenter and is not necessarily the accuracy indicated by the number of decimals listed. The epicenters located by the NEIS have a varying degree of accuracy, usually two-tenths of

U.S. DEPARTMENT OF THE INTERIOR
 GEOLOGICAL SURVEY
EARTHQUAKE REPORT

Form Approved
 OMB No. 42-R1700

Please answer this questionnaire carefully and return as soon as possible.

1. Was an earthquake felt by anyone in your town or zip code area recently?

- Not felt: Please refold and tape for return mail.
 Felt: Date _____ Time _____ AM Standard time
 PM Daylight time

Name of person filling out form _____

Address _____

City _____ County _____

State _____ Zip code _____

If you felt the earthquake, complete the following section. If others felt the earthquake but you did not, skip the personal report and complete the community report.

PERSONAL REPORT

- 2a. Did you personally feel the earthquake? 1 Yes No
 b. Were you awakened by the earthquake? 2 Yes No
 c. Were you frightened by the earthquake? 3 Yes No
 d. Were you at 4 Home 5 Work 6 Other?
 e. Town and zip code of your location at time of earthquake _____
- f. Check your activity when the earthquake occurred:
 7 Walking 8 Sleeping 9 Lying down 10 Standing
 11 Driving (car in motion) 12 Sitting 13 Other
 g. Were you 14 Inside or 15 Outside?
 h. If inside, on what floor were you? 16 _____
 Continue on to next section which should include personal as well as reported observations.

COMMUNITY REPORT

- Check one box for each question that is applicable.
- 3a. The earthquake was felt by No one 17 Few 18 Several 19 Many 20 All?
 b. This earthquake awakened No one 21 Few 22 Several 23 Many 24 All?
 c. This earthquake frightened No one 25 Few 26 Several 27 Many 28 All?
4. What outdoor physical effects were noted in your community?
- | | | | |
|---|---|--|--|
| Parapets or cornices fallen | 29 <input type="checkbox"/> Yes | <input type="checkbox"/> No | |
| Trees and bushes shaken | 30 <input type="checkbox"/> Slightly | 31 <input type="checkbox"/> Moderately | 32 <input type="checkbox"/> Strongly |
| Standing vehicles rocked | 33 <input type="checkbox"/> Slightly | 34 <input type="checkbox"/> Moderately | 35 <input type="checkbox"/> Strongly |
| Moving vehicles rocked | 36 <input type="checkbox"/> Slightly | 37 <input type="checkbox"/> Moderately | 38 <input type="checkbox"/> Strongly |
| Ground cracks | 39 <input type="checkbox"/> Wet | 40 <input type="checkbox"/> Steep slopes | 41 <input type="checkbox"/> Dry and level ground |
| Landslides | 42 <input type="checkbox"/> Small | 43 <input type="checkbox"/> Large | |
| Underground pipes | 44 <input type="checkbox"/> Broken | 45 <input type="checkbox"/> Out of service | |
| Water splashed onto sides of lakes, ponds, swimming pools | 46 <input type="checkbox"/> Yes | <input type="checkbox"/> No | |
| Elevated water tanks | 47 <input type="checkbox"/> Cracked | 48 <input type="checkbox"/> Twisted | 49 <input type="checkbox"/> Fallen (thrown down) |
| Air coolers | 50 <input type="checkbox"/> Displaced | 51 <input type="checkbox"/> Rotated | 52 <input type="checkbox"/> Fallen |
| Railroad tracks bent | 53 <input type="checkbox"/> Slightly | 54 <input type="checkbox"/> Greatly | |
| Stone or brick fences | 55 <input type="checkbox"/> Cracked | 56 <input type="checkbox"/> Fallen | 57 <input type="checkbox"/> Destroyed |
| Tombstones | 58 <input type="checkbox"/> Displaced | 59 <input type="checkbox"/> Cracked | 60 <input type="checkbox"/> Rotated |
| Chimneys | 61 <input type="checkbox"/> Fallen | 62 <input type="checkbox"/> Cracked | 63 <input type="checkbox"/> Twisted |
| | 64 <input type="checkbox"/> Broken at roof line | 65 <input type="checkbox"/> Cracked | 66 <input type="checkbox"/> Bricks fallen |
| Highways or streets | 67 <input type="checkbox"/> Cracked slightly | 68 <input type="checkbox"/> Large cracks | 69 <input type="checkbox"/> Displaced |
| Sidewalks | 70 <input type="checkbox"/> Cracked slightly | 71 <input type="checkbox"/> Large cracks | 72 <input type="checkbox"/> Displaced |

Continued on the reverse side

FIGURE 1.--Example of the "Earthquake Report" form used for evaluating the intensities of earthquakes. A, front side.

5. What indoor physical effects were noted in your community?

| | | |
|--------------------------------|---|--|
| Windows, doors, dishes rattled | 73 <input type="checkbox"/> Yes | <input type="checkbox"/> No |
| Buildings creaked | 74 <input type="checkbox"/> Yes | <input type="checkbox"/> No |
| Building trembled (shook) | 75 <input type="checkbox"/> Yes | <input type="checkbox"/> No |
| Hanging pictures | 76 <input type="checkbox"/> Swung | 77 <input type="checkbox"/> Out of place |
| Water in small containers | 79 <input type="checkbox"/> Spilled | 80 <input type="checkbox"/> Slightly disturbed |
| Windows | 81 <input type="checkbox"/> Few cracked | 82 <input type="checkbox"/> Some broken |
| | | 83 <input type="checkbox"/> Many broken |

6a. Did hanging objects, doors swing? No

| | |
|---------------------------------------|--|
| 84 <input type="checkbox"/> Slightly | 85 <input type="checkbox"/> Moderately |
| 86 <input type="checkbox"/> Violently | |

b. Can you estimate direction? No

| | |
|---|---------------------------------------|
| 87 <input type="checkbox"/> North/South | 88 <input type="checkbox"/> East/West |
| 89 <input type="checkbox"/> Other | |

7a. Were small objects (dishes, knick-knacks, pictures) Unmoved

| | | |
|--|--|-------------------------------------|
| 91 <input type="checkbox"/> Overturned | 92 <input type="checkbox"/> Fallen, not broken | 93 <input type="checkbox"/> Broken? |
| 94 <input type="checkbox"/> Shifted | | |

b. Was light furniture Unmoved

| | | |
|--|--|-------------------------------------|
| 95 <input type="checkbox"/> Overturned | 96 <input type="checkbox"/> Fallen, not broken | 97 <input type="checkbox"/> Broken? |
| 98 <input type="checkbox"/> Overturned | | |

c. Were heavy furniture or appliances Unmoved

| | |
|-------------------------------------|--------------------------------------|
| 99 <input type="checkbox"/> Shifted | 100 <input type="checkbox"/> Broken? |
|-------------------------------------|--------------------------------------|

8. Indicate effects of the following types to interior walls if any:

| | | |
|---------------|--------------------------------------|-----------------------------------|
| Plaster | 101 <input type="checkbox"/> Cracked | 102 <input type="checkbox"/> Fell |
| Dry wall | 103 <input type="checkbox"/> Cracked | 104 <input type="checkbox"/> Fell |
| Ceiling tiles | 105 <input type="checkbox"/> Cracked | 106 <input type="checkbox"/> Fell |

9a. Check below any damage to buildings or structures.

| | | |
|----------------|--|---|
| Foundation | 107 <input type="checkbox"/> Cracked | 108 <input type="checkbox"/> Destroyed |
| Interior walls | 109 <input type="checkbox"/> Split | 110 <input type="checkbox"/> Fallen |
| Exterior walls | 112 <input type="checkbox"/> Hairline cracks | 113 <input type="checkbox"/> Large cracks |
| | 115 <input type="checkbox"/> Partial collapse | 116 <input type="checkbox"/> Total collapse |
| Building | 117 <input type="checkbox"/> Moved on foundation | 118 <input type="checkbox"/> Shifted off foundation |

b. What type of construction was the building that showed this damage?

| | | | |
|------------------------------------|--|--|------------------------------------|
| 119 <input type="checkbox"/> Wood | 120 <input type="checkbox"/> Stone | 121 <input type="checkbox"/> Brick veneer | 122 <input type="checkbox"/> Other |
| 123 <input type="checkbox"/> Brick | 124 <input type="checkbox"/> Cinderblock | 125 <input type="checkbox"/> Reinforced concrete | |

c. What was the type of ground under the building?

| | | | |
|---|---|--|-----------------------------------|
| 126 <input type="checkbox"/> Don't know | 127 <input type="checkbox"/> Sandy soil | 128 <input type="checkbox"/> Marshy | 129 <input type="checkbox"/> Fill |
| 130 <input type="checkbox"/> Hard rock | 131 <input type="checkbox"/> Clay soil | 132 <input type="checkbox"/> Sandstone, limestone, shale | |

d. Was the ground: 133 Level 134 Sloping 135 Steep?

e. Check the approximate age of the building:

| | | |
|--|--|---|
| 136 <input type="checkbox"/> Built before 1935 | 137 <input type="checkbox"/> Built 1935-65 | 138 <input type="checkbox"/> Built after 1965 |
|--|--|---|

10a. What percentage of buildings were damaged?

| | | |
|---------------------------------------|---|---|
| Within 2 city blocks of your location | <input type="checkbox"/> None | 139 <input type="checkbox"/> Few (about 5%) |
| | 140 <input type="checkbox"/> Many (about 50%) | 141 <input type="checkbox"/> Most (about 75%) |

b. In area covered by your zip code None

| | | |
|---|---|---|
| 142 <input type="checkbox"/> Few (about 5%) | 143 <input type="checkbox"/> Many (about 50%) | 144 <input type="checkbox"/> Most (about 75%) |
|---|---|---|

11a. Were springs or well water disturbed? 145 Level changed 146 Flow disturbed

| | |
|--------------------------------------|-------------------------------------|
| 147 <input type="checkbox"/> Muddied | <input type="checkbox"/> Don't know |
|--------------------------------------|-------------------------------------|

b. Were rivers or lakes changed? 148 Yes No Don't know

12a. Was there earth noise? No 149 Faint 150 Moderate 151 Loud

b. Direction of noise 152 North 153 South 154 East 155 West

c. Estimated duration of shaking 156 Sudden, sharp (less than 10 secs) 157 Long (30-60 secs)

| | |
|---|------------------------------------|
| 158 <input type="checkbox"/> Short (10-30 secs) | 159 <input type="checkbox"/> Other |
|---|------------------------------------|

13. What is the approximate population of your city/town? Or are you in a

| | | |
|--|--|--|
| 160 <input type="checkbox"/> Less than 1,000 | 161 <input type="checkbox"/> 10,000 to 100,000 | 164 <input type="checkbox"/> Rural area? |
| 162 <input type="checkbox"/> 1,000 to 10,000 | 163 <input type="checkbox"/> Over 100,000 | |

This community report is associated with what town or zip code? _____

Thank you for your time and information. Refold this card and tape for return mail.

FIGURE 1.--Example of the "Earthquake Report" form used for evaluating the intensities of earthquakes. B, reverse side.

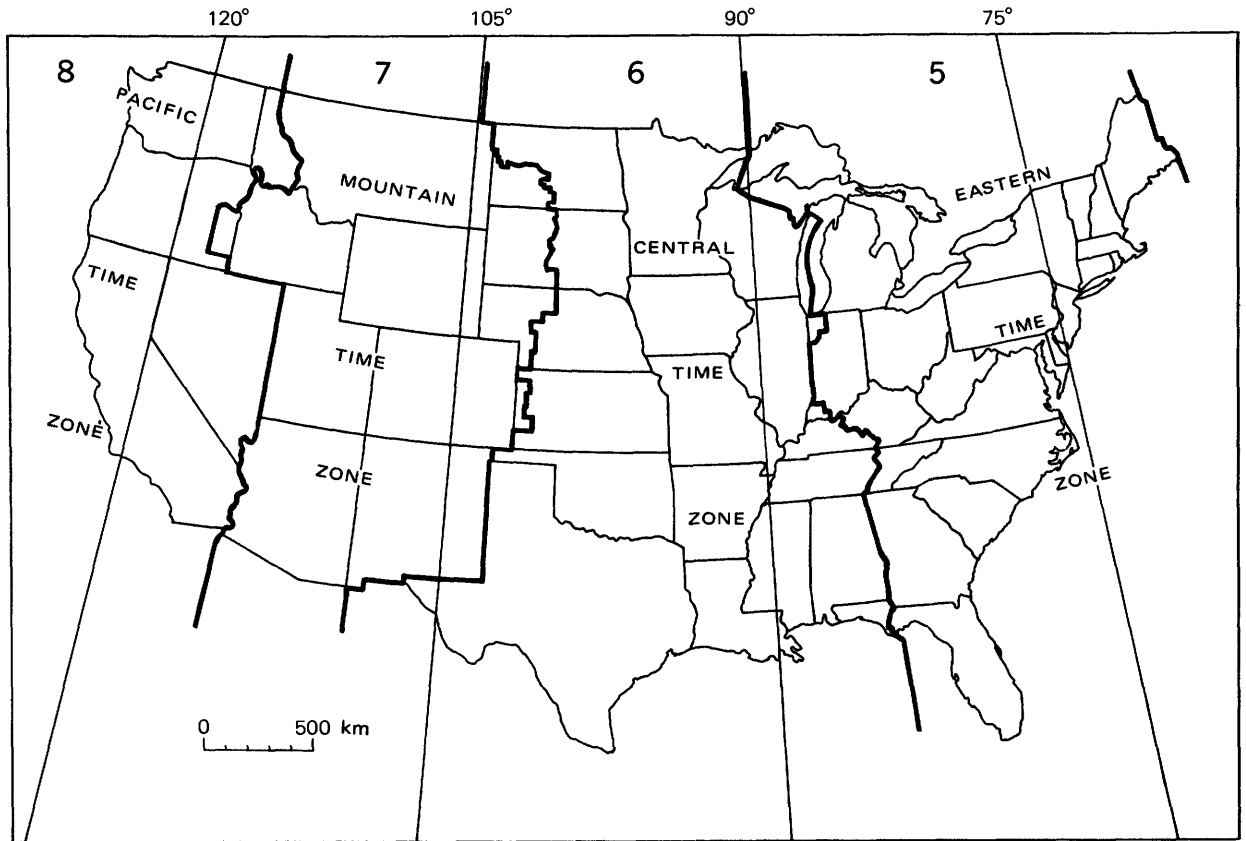


FIGURE 2.--Standard time zones of the conterminous United States. The number in each zone shows the number of hours to be subtracted from Universal Coordinated Time to convert to local standard time. (Subtract 1 hour less for local daylight-saving time.)

a degree or less, depending on their continental or oceanic location. The oceanic hypocenters are less accurate than those on the continent, even though both are listed to two decimals. Depths are listed to the nearest whole kilometer.

Figures 4-6 are maps summarizing the earthquake activity for the conterminous United States, Alaska, and Hawaii for the period January-March 1977. The magnitudes plotted in these figures are based on ML or mbLg; if neither was computed, then on MS; and finally on mb, when it was the only magnitude computed.

The magnitude values listed in tables 1 and 2 were furnished by cooperating institutions or determined by the NEIS. The computational sources are labeled according to the assigned letter codes shown in headnotes to tables 1 and 2; the letter follows the value listed under the column heading "Magnitude." In table 1 the absence of a letter code indicates that the NEIS is the source. In table 2 the magnitude source is the same as the location source unless indicated otherwise, by an alphabetic character to the right of the magnitude

value. The magnitude values calculated by the NEIS are based on the following formulas:

$$MS = \log(A/T) + 1.66 \log D + 3.3, \quad (1)$$

as adopted by the International Association of Seismology and Physics of the Earth's Interior (IASPEI; Bath, 1966, p. 153), where A is the maximum horizontal surface-wave ground amplitude, in micrometers; T is the period, in seconds, and $18 \leq T \leq 22$; and D is the distance, in geocentric degrees (station to epicenter), and $20^\circ \leq D \leq 160^\circ$. No depth correction is made for depths less than 50 km.

$$mb = \log(A/T) + Q(D, h), \quad (2)$$

as defined by Gutenberg and Richter (1956), except that T, the period in seconds, is restricted to $0.1 \leq T \leq 3.0$, and A, the ground amplitude in micrometers, is not necessarily the maximum of the P-wave group. Q is a function of distance D and depth h, where $D \geq 5^\circ$.

$$ML = \log A - \log A_0, \quad (3)$$

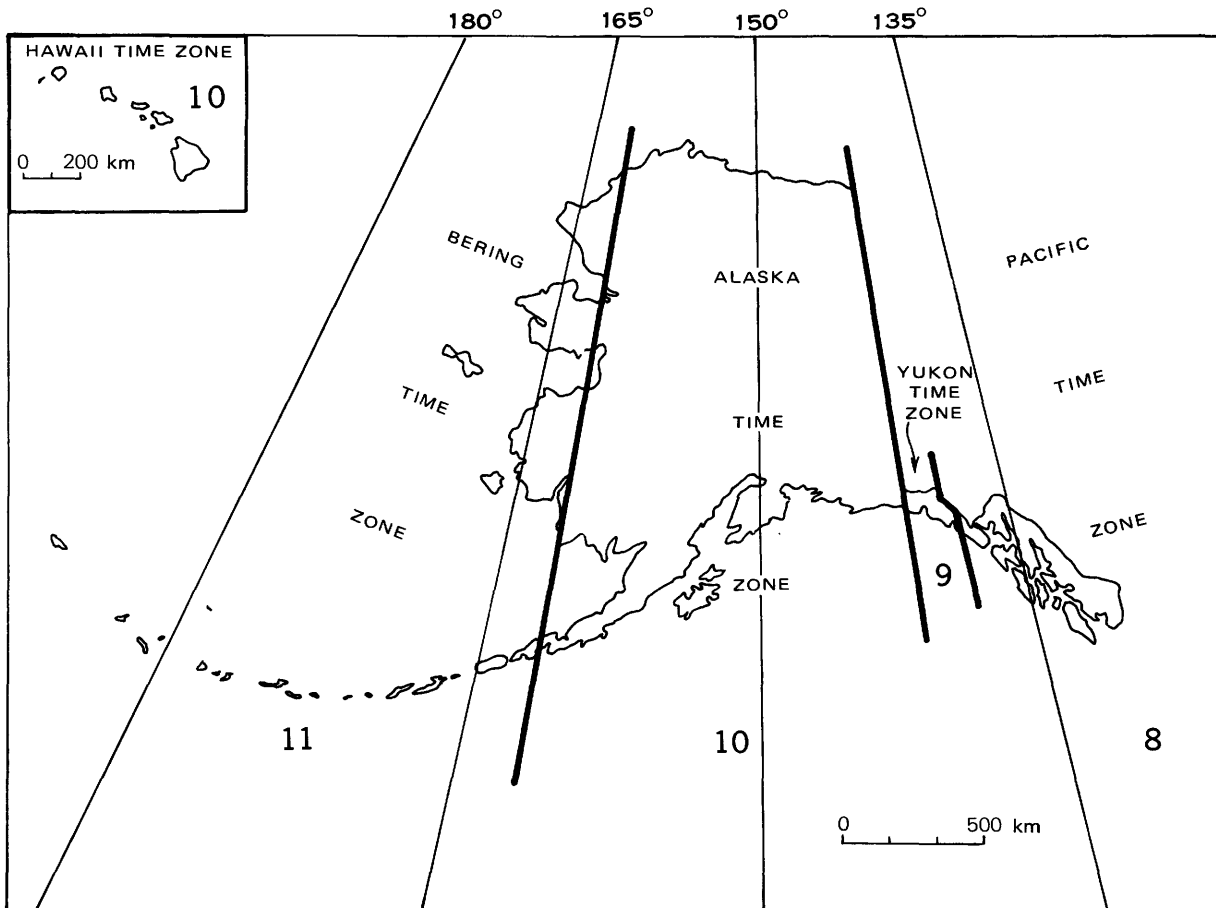


FIGURE 3.--Standard time zones of Alaska and Hawaii. The number in each zone shows the number of hours to be subtracted from Universal Coordinated Time to convert to local standard time. (Subtract 1 hour less for local daylight-saving time.)

as defined by Richter (1958, p. 340), where A is the maximum trace amplitude in millimeters, written by a Wood-Anderson torsion seismometer, and $\log A_0$ is a standard value as a function of distance, where the distance is ≤ 600 km. ML values are also calculated from other seismometers by conversion of recorded ground motion to the expected response of the torsion seismometer.

$$mbLg = 3.75 + 0.90(\log D) + \log(A/T) \quad (4)$$

$$0.5^\circ \leq D \leq 4^\circ,$$

$$mbLg = 3.30 + 1.66(\log D) + \log(A/T)$$

$$4^\circ \leq D \leq 30^\circ,$$

as proposed by Nuttli (1973), where A/T is expressed in micrometers per second, calculated from the vertical-component 1-second Lg waves, and D is the distance in geocentric degrees.

All of the intensity values (indicated by Roman numerals) listed in this summary were derived, using the Modified Mercalli Intensity Scale of 1931 (Wood and Neumann, 1931) shown

below, from the evaluation of "Earthquake Report" forms; from field reports by U.S. Geological Survey personnel, engineering firms, or universities; and from detailed macroseismic data communicated to the NEIS by people in the area affected by the earthquake. All earthquake reports received which contain minimal information are assigned an Intensity II. These reports are filed in the offices of the NEIS or in government archives and are available for detailed study.

MODIFIED MERCALLI INTENSITY SCALE OF 1931

Adapted from Sieberg's Mercalli-Cancani scale, modified and condensed.

- I. Not felt - or, except rarely under especially favorable circumstances. Under certain conditions, at and outside the boundary of the area in which a great shock is felt: sometimes birds, animals, reported uneasy or disturbed; sometimes

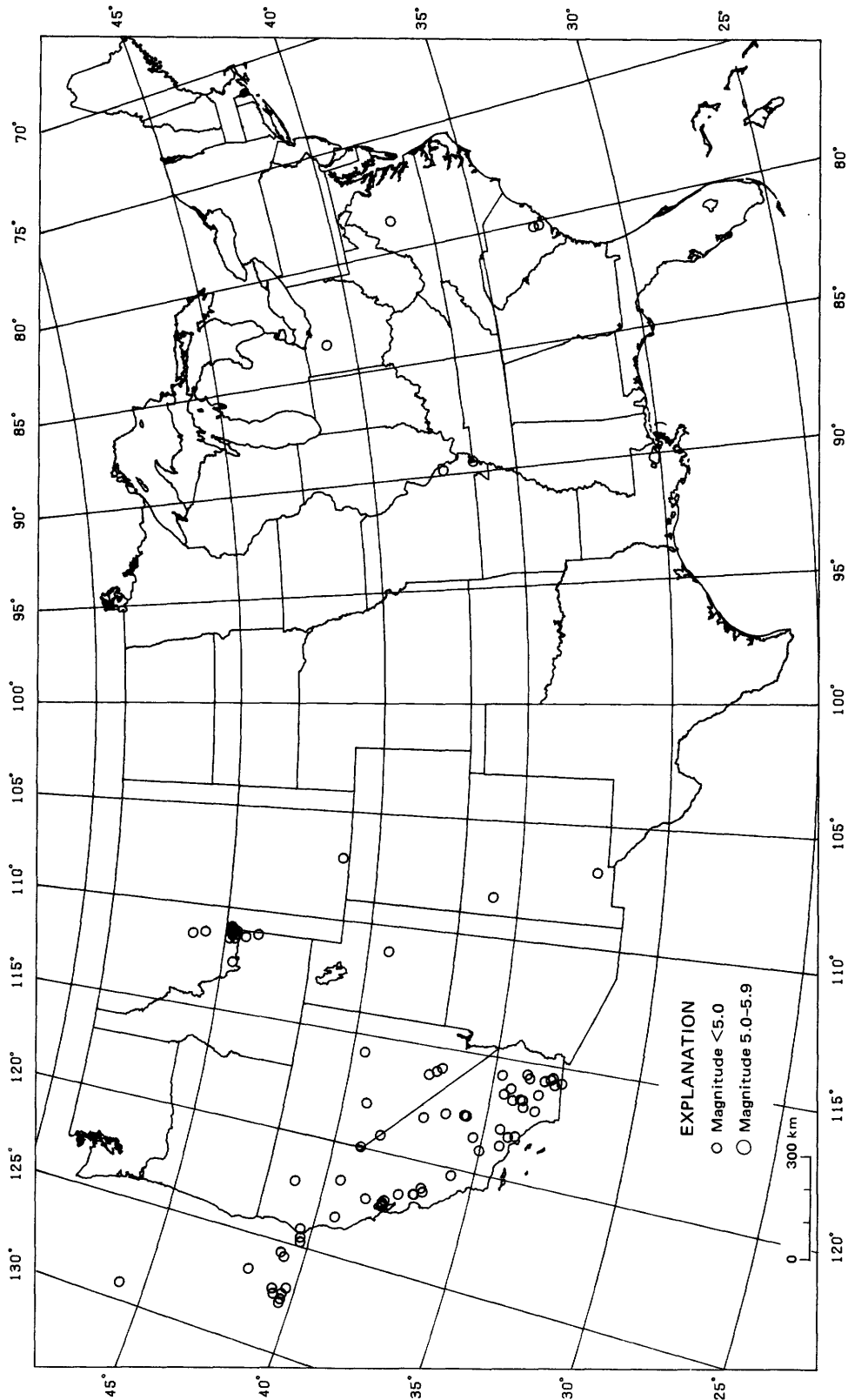


FIGURE 4.--Earthquake epicenters in the conterminous United States for January-March 1977, plotted from table 1.

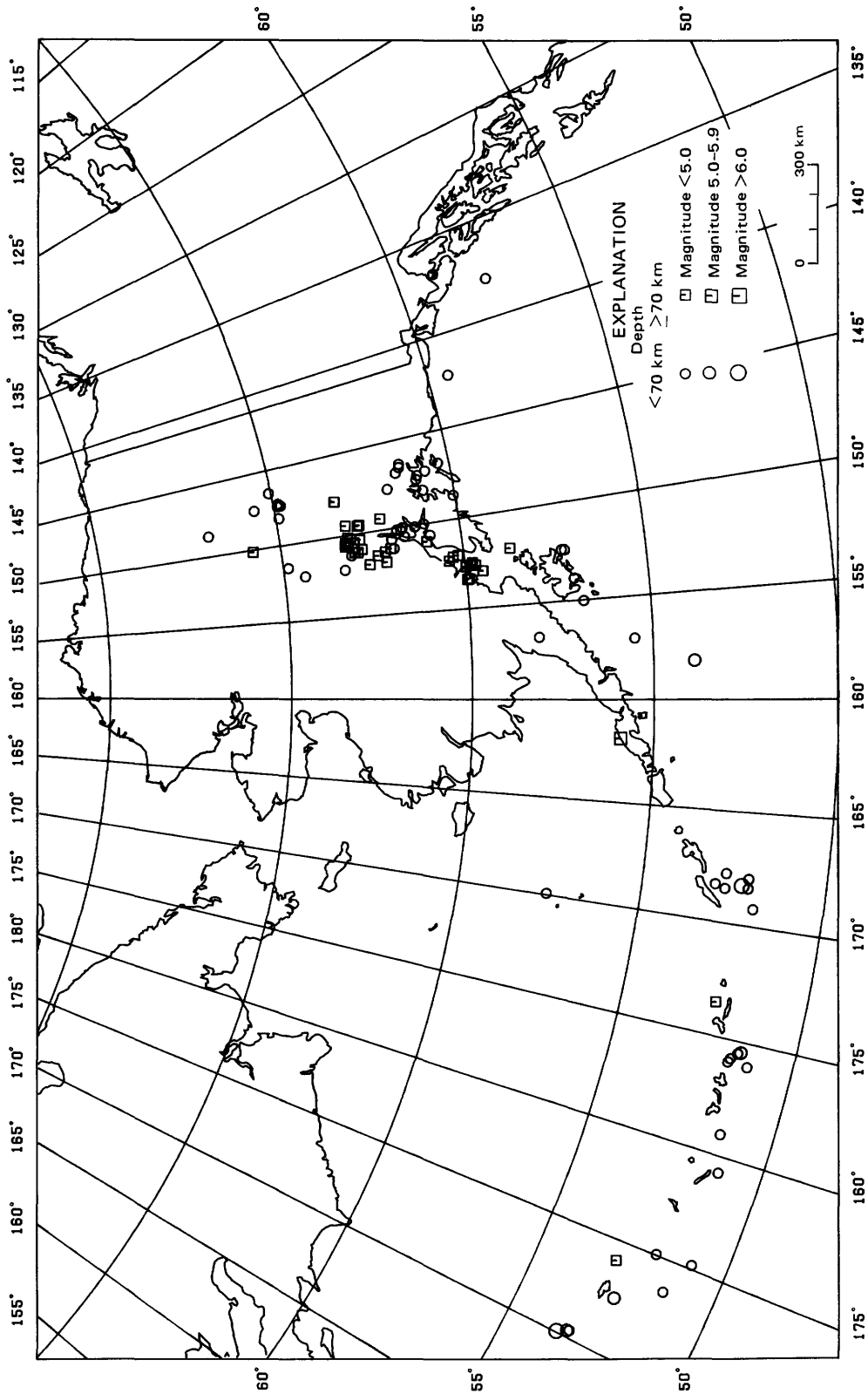


FIGURE 5.--Earthquake epicenters in Alaska for January-March 1977, plotted from table 1.

dizziness or nausea experienced; sometimes trees, structures, liquids, bodies of water, may sway--doors may swing, very slowly.

- II. Felt indoors by few, especially on upper floors, or by sensitive, or nervous persons. Also, as in grade I, but often more noticeably: sometimes hanging objects may swing, especially when delicately suspended; sometimes trees, structures, liquids, bodies of water, may sway, doors may swing, very slowly; sometimes birds, animals, reported uneasy or disturbed; sometimes dizziness or nausea experienced.
- III. Felt indoors by several, motion usually rapid vibration. Sometimes not recognized to be an earthquake at first. Duration estimated in some cases. Vibration like that due to passing of light, or lightly loaded trucks, or heavy trucks some distance away. Hanging objects may swing slightly. Movements may be appreciable on upper levels of tall structures. Rocked standing motor cars slightly.
- IV. Felt indoors by many, outdoors by few. Awakened few, especially light sleepers. Frightened no one, unless apprehensive from previous experience. Vibration like that due to passing of heavy or heavily loaded trucks. Sensation like heavy body striking building or falling of heavy objects inside. Rattling of dishes, windows, doors; glassware and crockery clink and clash. Creaking of walls, frame, especially in the upper range of this grade. Hanging objects swung, in numerous instances. Disturbed liquids in open vessels slightly. Rocked standing motor cars noticeably.
- V. Felt indoors by practically all, outdoors by many or most: outdoors direction estimated. Awakened many, or most. Frightened few--slight excitement, a few ran outdoors. Buildings trembled throughout. Broke dishes, glassware, to some extent. Cracked windows--in some cases, but not generally. Overturned vases, small or unstable objects, in many instances, with occasional fall. Hanging objects, doors, swing generally or considerably. Knocked pictures against walls, or swung them out of place. Opened, or closed, doors, shutters, abruptly. Pendulum clocks stopped, started or ran fast, or slow. Moved small objects, furnishings, the latter to slight extent. Spilled liquids in small amounts from well-filled open containers. Trees, bushes, shaken slightly.
- VI. Felt by all, indoors and outdoors. Frightened many, excitement general, some

alarm, many ran outdoors. Awakened all. Persons made to move unsteadily. Trees, bushes, shaken slightly to moderately. Liquid set in strong motion. Small bells rang--church, chapel, school, etc. Damage slight in poorly built buildings. Fall of plaster in small amount. Cracked plaster somewhat, especially fine cracks chimneys in some instances. Broke dishes, glassware, in considerable quantity, also some windows. Fall of knick-knacks, books, pictures. Overturned furniture in many instances. Moved furnishings of moderately heavy kind.

- VII. Frightened all--general alarm, all ran outdoors. Some, or many, found it difficult to stand. Noticed by persons driving motor cars. Trees and bushes shaken moderately to strongly. Waves on ponds, lakes, and running water. Water turbid from mud stirred up. Incaving to some extent of sand or gravel stream banks. Rang large church bells, etc. Suspended objects made to quiver. Damage negligible in buildings of good design and construction, slight to moderate in well-built ordinary buildings, considerable in poorly built or badly designed buildings, adobe houses, old walls (especially where laid up without mortar), spires, etc. Cracked chimneys to considerable extent, walls to some extent. Fall of plaster in considerable to large amount, also some stucco. Broke numerous windows, furniture to some extent. Shook down loosened brickwork and tiles. Broke weak chimneys at the roof-line (sometimes damaging roofs). Fall of cornices from towers and high buildings. Dislodged bricks and stones. Overturned heavy furniture, with damage from breaking. Damage considerable to concrete irrigation ditches.
- VIII. Fright general--alarm approaches panic. Disturbed persons driving motor cars. Trees shaken strongly--branches, trunks, broken off, especially palm trees. Ejected sand and mud in small amounts. Changes: temporary, permanent; in flow of springs and wells; dry wells renewed flow; in temperature of spring and well waters. Damage slight in structures (brick) built especially to withstand earthquakes. Considerable in ordinary substantial buildings, partial collapse: racked, tumbled down, wooden houses in some cases; threw out panel walls in frame structures, broke off decayed piling. Fall of walls. Cracked, broke, solid stone walls seriously. Wet ground to some extent, also ground on steep slopes. Twisting, fall, of chimneys, columns, monuments, also factory stacks, towers. Moved conspicuously, overturned, very heavy furniture.

IX. Panic general. Cracked ground conspicuously. Damage considerable in (masonry) structures built especially to withstand earthquakes: Threw out of plumb some wood-frame houses built especially to withstand earthquakes; great in substantial (masonry) buildings, some collapse in large part; or wholly shifted frame buildings off foundations, racked frames; serious to reservoirs; underground pipes sometimes broken.

X. Cracked ground, especially when loose and wet, up to widths of several inches; fissures up to a yard in width ran parallel to canal and stream banks. Landslides considerable from river banks and steep coasts. Shifted sand and mud horizontally on beaches and flat land. Changed level of water in wells. Threw water on banks of canals, lakes, rivers, etc. Damage serious to dams, dikes, embankments. Severe to well-built wooden structures and bridges, some destroyed. Developed dangerous cracks in excellent brick walls. Destroyed most masonry and frame structures, also their foundations. Bent railroad rails slightly. Tore apart, or crushed endwise, pipe lines buried in earth. Open cracks and broad wavy folds in cement pavements and asphalt road surfaces.

XI. Disturbances in ground many and widespread, varying with ground material. Broad fissures, earth slumps, and land slips in soft, wet ground. Ejected water in large amounts charged with sand and mud. Caused sea-waves ("tidal" waves) of significant magnitude. Damage severe to wood-frame structures, especially near shock centers. Great to dams, dikes, embankments often for long distances. Few, if any (masonry) structures remained standing. Destroyed large well-built bridges by the wrecking of supporting piers, or pillars. Affected

yielding wooden bridges less. Bent railroad rails greatly, and thrust them endwise. Put pipe lines buried in earth completely out of service.

XII. Damage total--practically all works of construction damaged greatly or destroyed. Disturbances in ground great and varied, numerous shearing cracks. Landslides, falls of rock of significant character, slumping of river banks, etc., numerous and extensive. Wrenched loose, tore off, large rock masses. Fault slips in firm rock, with notable horizontal and vertical offset displacements. Water channels, surface and underground, disturbed and modified greatly. Dammed lakes, produced waterfalls, deflected rivers, etc. Waves seen on ground surfaces (actually seen, probably, in some cases). Distorted lines of sight and level. Threw objects upward into the air.

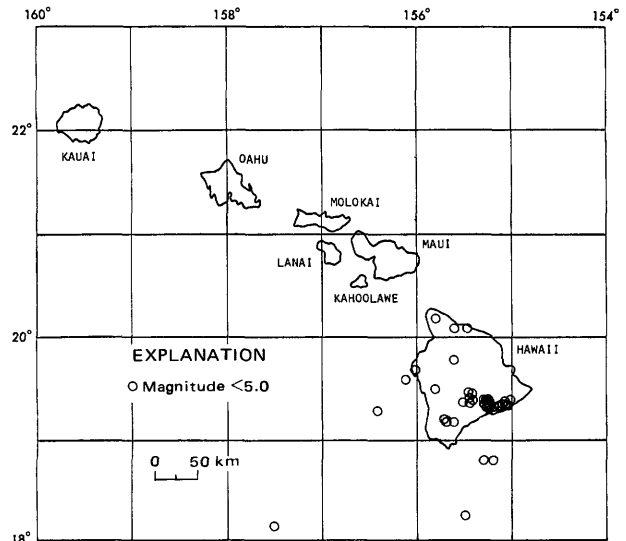


FIGURE 6.--Earthquake epicenters in Hawaii for January-March 1977, plotted from table 1.

Table 1.—Summary of U.S. earthquakes for January–March 1977

[Sources of the hypocenter and magnitudes: (A) U.S. Energy Research and Development Administration; (B) University of California, Berkeley; (D) University of Montana, Missoula; (F) USGS Open-File Report 78-672 (Fuis and others, 1978). (G) U.S. Geological Survey, National Earthquake Information Service; (H) U.S. Geological Survey, Hawaiian Volcano Observatory; (M) NOAA, Alaska Tsunami Warning Center, Palmer; (P) California Institute of Technology, Pasadena; (S) St. Louis University, St. Louis, Missouri; (U) University of Utah, Salt Lake City; (V) Virginia Polytechnic Institute and State University, Blacksburg. N, Normal depth; UTC, Universal Coordinated Time. For names of local time zones, see figures 2 and 3. Leaders (...) indicate no information available]

| Date (1977) | Origin time (UTC) | | | Lat | Long | Depth (km) | Magnitude | | | Maximum intensity | Hypocenter source | Local time | | | |
|----------------|----------------------|-------|------|----------|-----------|---------------|-----------|-----|---------------|----------------------|----------------------|------------|------|---------|-----|
| | hr | min | s | | | | mb | MS | ML or mbLg | | | Date | Hour | | |
| ALASKA | | | | | | | | | | | | | | | |
| JAN. | 2 | 12 59 | 21.4 | 63.12 N. | 150.14 W. | 113 | 3.8 | ... | ... | ... | G | JAN. | 2 | 02 A.M. | AST |
| JAN. | 2 | 16 04 | 41.0 | 60.84 N. | 150.67 W. | 64 | ... | ... | ... | ... | G | JAN. | 2 | 06 A.M. | AST |
| JAN. | 2 | 17 15 | 30.1 | 60.97 N. | 151.03 W. | 75 | ... | ... | ... | ... | G | JAN. | 2 | 07 A.M. | AST |
| JAN. | 3 | 01 34 | 34.2 | 51.43 N. | 179.08 W. | 33N | 4.8 | ... | ... | II | G | JAN. | 2 | 02 P.M. | BST |
| JAN. | 4 | 14 56 | 40.5 | 59.53 N. | 152.99 W. | 119 | 4.2 | ... | ... | ... | G | JAN. | 4 | 04 A.M. | AST |
| JAN. | 4 | 15 45 | 54.7 | 59.79 N. | 152.50 W. | 119 | ... | ... | ... | ... | G | JAN. | 4 | 05 A.M. | AST |
| JAN. | 6 | 16 02 | 07.6 | 51.48 N. | 175.48 W. | 38 | 5.2 | 5.3 | ... | IV | G | JAN. | 6 | 05 A.M. | BST |
| JAN. | 6 | 17 44 | 37.3 | 60.42 N. | 152.28 W. | 98 | ... | ... | ... | ... | G | JAN. | 6 | 07 A.M. | AST |
| JAN. | 7 | 18 06 | 27.5 | 63.13 N. | 149.41 W. | 82 | ... | ... | ... | ... | G | JAN. | 7 | 08 A.M. | AST |
| JAN. | 9 | 03 53 | 24.6 | 59.93 N. | 153.36 W. | 132 | 4.2 | ... | ... | ... | G | JAN. | 8 | 05 P.M. | AST |
| JAN. | 12 | 18 01 | 25.8 | 59.98 N. | 152.66 W. | 129 | ... | ... | ... | ... | G | JAN. | 12 | 08 A.M. | AST |
| JAN. | 13 | 00 27 | 42.1 | 62.60 N. | 151.92 W. | 109 | ... | ... | ... | ... | G | JAN. | 12 | 02 P.M. | AST |
| JAN. | 13 | 06 54 | 29.6 | 61.88 N. | 151.15 W. | 68 | ... | ... | ... | ... | G | JAN. | 12 | 08 P.M. | AST |
| JAN. | 13 | 21 10 | 16.7 | 51.96 N. | 175.03 E. | 51 | 5.0 | ... | 4.5M | ... | G | JAN. | 13 | 10 A.M. | BST |
| JAN. | 13 | 22 05 | 59.3 | 59.43 N. | 142.23 W. | 33N | ... | ... | 4.5M | III | G | JAN. | 13 | 12 P.M. | AST |
| JAN. | 15 | 03 01 | 06.6 | 52.90 N. | 174.09 E. | 114 | 4.3 | ... | ... | ... | G | JAN. | 14 | 04 P.M. | BST |
| JAN. | 15 | 21 00 | 43.2 | 62.80 N. | 150.37 W. | 100 | 4.3 | ... | ... | ... | G | JAN. | 15 | 11 A.M. | AST |
| JAN. | 16 | 09 03 | 46.4 | 62.75 N. | 149.49 W. | 71 | ... | ... | ... | ... | G | JAN. | 15 | 11 P.M. | AST |
| JAN. | 17 | 09 42 | 25.6 | 53.87 N. | 158.21 W. | 22 | 5.1 | ... | ... | ... | G | JAN. | 16 | 11 P.M. | AST |
| JAN. | 18 | 17 07 | 10.8 | 61.39 N. | 146.56 W. | 28 | ... | ... | 3.2M | III | G | JAN. | 18 | 07 A.M. | AST |
| JAN. | 18 | 21 47 | 34.6 | 59.98 N. | 152.69 W. | 127 | ... | ... | ... | ... | G | JAN. | 18 | 11 A.M. | AST |
| JAN. | 19 | 02 10 | 14.7 | 56.84 N. | 155.05 W. | 45 | 4.4 | ... | ... | ... | G | JAN. | 18 | 04 P.M. | AST |
| JAN. | 19 | 07 36 | 36.9 | 62.15 N. | 149.33 W. | 81 | 3.8 | ... | ... | ... | G | JAN. | 18 | 09 P.M. | AST |
| JAN. | 19 | 19 16 | 07.3 | 60.03 N. | 148.67 W. | 68 | 3.8 | ... | ... | ... | G | JAN. | 19 | 09 A.M. | AST |
| JAN. | 20 | 12 19 | 06.0 | 51.71 N. | 175.80 W. | 46 | 4.3 | ... | ... | ... | G | JAN. | 20 | 01 A.M. | BST |
| JAN. | 20 | 15 45 | 21.6 | 57.64 N. | 138.02 W. | 36 | 4.5 | ... | ... | ... | G | JAN. | 20 | 06 A.M. | YST |
| JAN. | 21 | 00 59 | 13.8 | 62.14 N. | 151.90 W. | 141 | ... | ... | ... | ... | G | JAN. | 20 | 02 P.M. | AST |
| JAN. | 25 | 17 08 | 14.0 | 60.94 N. | 147.23 W. | 62 | 4.2 | ... | ... | ... | G | JAN. | 25 | 07 A.M. | AST |
| JAN. | 25 | 17 12 | 19.1 | 60.98 N. | 149.99 W. | 37 | ... | ... | 3.5M | III | G | JAN. | 25 | 07 A.M. | AST |
| JAN. | 26 | 21 38 | 45.0 | 61.23 N. | 150.13 W. | 52 | ... | ... | ... | II | G | JAN. | 26 | 11 A.M. | AST |
| JAN. | 28 | 23 29 | 00.0 | 58.96 N. | 136.84 W. | 33N | 3.8 | ... | ... | ... | G | JAN. | 28 | 03 P.M. | PST |
| JAN. | 29 | 09 24 | 14.1 | 63.19 N. | 150.58 W. | 126 | ... | ... | ... | ... | G | JAN. | 28 | 11 P.M. | AST |
| JAN. | 30 | 03 02 | 50.6 | 51.57 N. | 175.53 W. | 44 | 4.1 | ... | ... | II | G | JAN. | 29 | 04 P.M. | BST |
| FEB. | 1 | 08 51 | 45.7 | 62.15 N. | 151.28 W. | 83 | 4.0 | ... | ... | ... | G | JAN. | 31 | 10 P.M. | AST |
| FEB. | 1 | 19 43 | 39.4 | 62.97 N. | 151.06 W. | 122 | ... | ... | ... | ... | G | FEB. | 1 | 09 A.M. | AST |
| FEB. | 2 | 07 52 | 37.7 | 57.23 N. | 152.42 W. | 68 | ... | ... | ... | ... | G | FEB. | 1 | 09 P.M. | AST |
| FEB. | 2 | 15 38 | 23.5 | 57.32 N. | 152.38 W. | 70 | ... | ... | ... | ... | G | FEB. | 2 | 05 A.M. | AST |
| FEB. | 2 | 21 41 | 19.6 | 61.82 N. | 147.70 W. | 64 | ... | ... | ... | ... | G | FEB. | 2 | 11 A.M. | AST |
| FEB. | 8 | 16 18 | 11.4 | 61.63 N. | 150.17 W. | 52 | ... | ... | ... | ... | G | FEB. | 8 | 06 A.M. | AST |
| FEB. | 11 | 23 16 | 59.7 | 61.38 N. | 146.41 W. | 56 | ... | ... | ... | ... | G | FEB. | 11 | 01 P.M. | AST |
| FEB. | 13 | 21 06 | 35.9 | 60.30 N. | 146.76 W. | 33N | ... | ... | 3.0M | ... | G | FEB. | 13 | 11 A.M. | AST |
| FEB. | 13 | 22 50 | 32.8 | 65.06 N. | 146.47 W. | 19 | ... | ... | ... | ... | G | FEB. | 13 | 12 P.M. | AST |
| FEB. | 13 | 23 45 | 37.9 | 63.20 N. | 150.48 W. | 129 | ... | ... | ... | ... | G | FEB. | 13 | 01 P.M. | AST |
| FEB. | 14 | 07 01 | 22.8 | 64.87 N. | 151.52 W. | 39 | ... | ... | ... | ... | G | FEB. | 13 | 09 P.M. | AST |
| FEB. | 16 | 16 27 | 30.9 | 52.11 N. | 168.39 W. | 31 | 4.3 | ... | 4.0M | ... | G | FEB. | 16 | 05 A.M. | BST |
| FEB. | 16 | 23 38 | 35.1 | 64.85 N. | 147.28 W. | 10 | ... | ... | 3.3M | ... | G | FEB. | 16 | 01 P.M. | AST |
| FEB. | 17 | 20 53 | 43.3 | 66.92 N. | 148.58 W. | 33N | ... | ... | ... | ... | G | FEB. | 17 | 10 A.M. | AST |
| FEB. | 17 | 22 46 | 34.4 | 64.91 N. | 148.24 W. | 5 | ... | ... | 3.1M | ... | G | FEB. | 17 | 12 P.M. | AST |
| FEB. | 18 | 08 57 | 41.7 | 62.35 N. | 151.46 W. | 95 | ... | ... | ... | ... | G | FEB. | 17 | 10 P.M. | AST |
| FEB. | 18 | 17 35 | 00.0 | 60.16 N. | 152.02 W. | 83 | ... | ... | ... | ... | G | FEB. | 18 | 07 A.M. | AST |

Table 1.—Summary of U.S. earthquakes for January–March 1977—Continued

| Date (1977) | Origin time (UTC) | | | Lat | Long | Depth (km) | Magnitude | | | Maximum intensity | Hypocenter source | Local time | | | |
|-------------------|----------------------|-----|------|----------------|-----------|---------------|-----------|-----|---------------|----------------------|----------------------|------------|------|------|-----|
| | hr | min | s | | | | mb | MS | ML or mbLg | | | Date | Hour | | |
| | | | | | | | | | | | | | | | |
| ALASKA--Continued | | | | | | | | | | | | | | | |
| FEB. 19 | 00 | 34 | 13.8 | 64.79 N. | 147.40 W. | 5 | ... | ... | ... | ... | G | FEB. 18 | 02 | P.M. | AST |
| FEB. 19 | 22 | 34 | 04.1 | 53.57 N. | 170.03 E. | 33N | 6.2 | 6.7 | ... | IV | G | FEB. 19 | 11 | A.M. | BST |
| FEB. 19 | 22 | 47 | 39.1 | 53.33 N. | 170.29 E. | 30 | 5.1 | ... | ... | ... | G | FEB. 19 | 11 | A.M. | BST |
| FEB. 20 | 02 | 28 | 06.9 | 60.30 N. | 152.05 W. | 97 | ... | ... | ... | ... | G | FEB. 19 | 04 | P.M. | AST |
| FEB. 20 | 02 | 53 | 04.2 | 59.84 N. | 152.61 W. | 89 | ... | ... | ... | ... | G | FEB. 19 | 04 | P.M. | AST |
| FEB. 20 | 07 | 02 | 20.4 | 57.04 N. | 153.88 W. | 51 | 4.7 | ... | ... | ... | G | FEB. 19 | 09 | P.M. | AST |
| FEB. 20 | 08 | 00 | 58.4 | 53.27 N. | 170.34 E. | 42 | 4.9 | ... | ... | ... | G | FEB. 19 | 09 | P.M. | BST |
| FEB. 20 | 08 | 21 | 46.0 | 64.42 N. | 152.16 W. | 53 | ... | ... | ... | ... | G | FEB. 19 | 10 | P.M. | AST |
| FEB. 21 | 06 | 42 | 31.0 | 62.88 N. | 151.09 W. | 124 | ... | ... | ... | ... | G | FEB. 20 | 08 | P.M. | AST |
| FEB. 21 | 20 | 02 | 06.0 | 55.91 N. | 161.89 W. | 167 | 5.0 | ... | ... | ... | G | FEB. 21 | 09 | A.M. | BST |
| FEB. 21 | 21 | 19 | 17.6 | 63.08 N. | 151.26 W. | 56 | ... | ... | ... | ... | G | FEB. 21 | 11 | A.M. | AST |
| FEB. 24 | 05 | 56 | 09.6 | 64.89 N. | 147.43 W. | 14 | ... | ... | 3.0M | ... | G | FEB. 23 | 07 | P.M. | AST |
| FEB. 24 | 14 | 59 | 27.0 | 61.98 N. | 151.15 W. | 108 | ... | ... | ... | ... | G | FEB. 24 | 04 | A.M. | AST |
| FEB. 25 | 03 | 20 | 36.5 | 58.70 N. | 152.00 W. | 81 | 4.8 | ... | ... | ... | G | FEB. 24 | 05 | P.M. | AST |
| FEB. 25 | 23 | 01 | 49.0 | 62.77 N. | 150.97 W. | 98 | ... | ... | ... | ... | G | FEB. 25 | 01 | P.M. | AST |
| FEB. 26 | 20 | 11 | 28.8 | 64.85 N. | 147.33 W. | 9 | ... | ... | ... | ... | G | FEB. 26 | 10 | A.M. | AST |
| FEB. 27 | 16 | 21 | 56.2 | 51.91 N. | 169.27 W. | 33N | 4.3 | ... | ... | ... | G | FEB. 27 | 05 | A.M. | BST |
| FEB. 27 | 21 | 13 | 40.8 | 64.86 N. | 147.33 W. | 14 | ... | ... | 3.2M | ... | G | FEB. 27 | 11 | A.M. | AST |
| FEB. 28 | 05 | 14 | 52.5 | 63.12 N. | 150.65 W. | 137 | ... | ... | ... | ... | G | FEB. 27 | 07 | P.M. | AST |
| MAR. 2 | 00 | 17 | 24.5 | 61.91 N. | 150.63 W. | 25 | 3.7 | ... | 3.4M | ... | G | MAR. 1 | 02 | P.M. | AST |
| MAR. 3 | 10 | 14 | 02.3 | 51.75 N. | 175.97 W. | 63 | 4.1 | ... | ... | III | G | MAR. 2 | 11 | P.M. | BST |
| MAR. 4 | 02 | 58 | 21.4 | 62.97 N. | 150.50 W. | 112 | ... | ... | ... | ... | G | MAR. 3 | 04 | P.M. | AST |
| MAR. 4 | 09 | 27 | 53.9 | 63.31 N. | 147.81 W. | 94 | ... | ... | ... | ... | G | MAR. 3 | 11 | P.M. | AST |
| MAR. 4 | 13 | 46 | 59.2 | 50.97 N. | 175.14 E. | 11 | 4.7 | ... | ... | ... | G | MAR. 4 | 02 | A.M. | BST |
| MAR. 5 | 06 | 13 | 01.1 | 63.22 N. | 150.51 W. | 122 | 4.2 | ... | ... | ... | G | MAR. 4 | 08 | P.M. | AST |
| MAR. 6 | 22 | 40 | 42.9 | 59.71 N. | 152.66 W. | 106 | 4.1 | ... | ... | ... | G | MAR. 6 | 12 | P.M. | AST |
| MAR. 8 | 04 | 27 | 18.0 | 65.54 N. | 147.45 W. | 15 | ... | ... | 3.0M | ... | G | MAR. 7 | 06 | P.M. | AST |
| MAR. 8 | 10 | 35 | 31.9 | 60.70 N. | 147.05 W. | 32 | ... | ... | 3.2M | ... | G | MAR. 8 | 00 | A.M. | AST |
| MAR. 9 | 06 | 06 | 30.4 | 52.76 N. | 167.79 W. | 33N | 4.7 | ... | ... | ... | G | MAR. 8 | 07 | P.M. | BST |
| MAR. 10 | 02 | 56 | 09.4 | 63.21 N. | 150.45 W. | 133 | 3.5 | ... | ... | ... | G | MAR. 9 | 04 | P.M. | AST |
| MAR. 12 | 20 | 11 | 32.8 | 65.76 N. | 150.14 W. | 172 | ... | ... | ... | ... | G | MAR. 12 | 10 | A.M. | AST |
| MAR. 13 | 02 | 41 | 33.3 | 51.41 N. | 173.61 E. | 33N | 4.7 | ... | ... | ... | G | MAR. 12 | 03 | P.M. | BST |
| MAR. 14 | 07 | 46 | 02.9 | 62.81 N. | 149.52 W. | 123 | ... | ... | ... | ... | G | MAR. 13 | 09 | P.M. | AST |
| MAR. 14 | 18 | 01 | 42.0 | 63.22 N. | 150.65 W. | 140 | ... | ... | ... | ... | G | MAR. 14 | 08 | A.M. | AST |
| MAR. 15 | 05 | 43 | 53.7 | 61.55 N. | 150.57 W. | 57 | ... | ... | 3.0M | ... | G | MAR. 14 | 07 | P.M. | AST |
| MAR. 15 | 11 | 03 | 15.0 | 51.18 N. | 179.27 E. | 52 | 4.6 | ... | ... | ... | G | MAR. 15 | 00 | A.M. | BST |
| MAR. 16 | 06 | 22 | 17.7 | 55.49 N. | 157.04 W. | 18 | 5.1 | 3.9 | ... | ... | G | MAR. 15 | 08 | P.M. | AST |
| MAR. 18 | 02 | 56 | | NEAR FAIRBANKS | | | ... | ... | ... | III | | MAR. 17 | 04 | P.M. | AST |
| MAR. 19 | 04 | 47 | 27.6 | 61.76 N. | 150.14 W. | 28 | ... | ... | ... | ... | G | MAR. 18 | 06 | P.M. | AST |
| MAR. 20 | 13 | 46 | 45.7 | 60.99 N. | 147.47 W. | 40 | ... | ... | 3.1M | ... | G | MAR. 20 | 03 | A.M. | AST |
| MAR. 24 | 16 | 13 | 01.0 | 59.96 N. | 153.38 W. | 149 | 4.4 | ... | ... | ... | G | MAR. 24 | 06 | A.M. | AST |
| MAR. 25 | 13 | 39 | 45.2 | 60.84 N. | 148.14 W. | 55 | 4.6 | ... | ... | V | G | MAR. 25 | 03 | A.M. | AST |
| MAR. 26 | 04 | 36 | 14.7 | 52.30 N. | 168.26 W. | 38 | 5.7 | 6.0 | ... | IV | G | MAR. 25 | 05 | P.M. | BST |
| MAR. 26 | 11 | 32 | 42.2 | 52.75 N. | 168.49 W. | 59 | 4.1 | ... | ... | ... | G | MAR. 26 | 00 | A.M. | BST |
| MAR. 26 | 14 | 09 | 28.4 | 53.02 N. | 168.31 W. | 47 | 4.7 | ... | ... | ... | G | MAR. 26 | 03 | A.M. | BST |
| MAR. 26 | 16 | 29 | 36.3 | 52.13 N. | 167.95 W. | 29 | 4.5 | ... | ... | ... | G | MAR. 26 | 05 | A.M. | BST |
| MAR. 27 | 16 | 46 | 57.8 | 61.59 N. | 150.02 W. | 50 | ... | ... | 3.0M | ... | G | MAR. 27 | 06 | A.M. | AST |
| MAR. 27 | 18 | 41 | 57.8 | 57.57 N. | 169.94 W. | 33N | 4.2 | ... | ... | ... | G | MAR. 27 | 07 | A.M. | BST |
| MAR. 27 | 20 | 11 | 26.2 | 63.30 N. | 152.08 W. | 33N | ... | ... | 3.2M | ... | G | MAR. 27 | 10 | A.M. | AST |
| MAR. 27 | 20 | 43 | 28.1 | 61.50 N. | 146.85 W. | 35 | ... | ... | 3.1M | ... | G | MAR. 27 | 10 | A.M. | AST |
| MAR. 28 | 03 | 28 | 35.5 | 51.22 N. | 176.01 W. | 33N | 4.3 | ... | ... | ... | G | MAR. 27 | 04 | P.M. | BST |
| MAR. 28 | 03 | 37 | 54.4 | 58.12 N. | 156.77 W. | 61 | 4.5 | ... | ... | ... | G | MAR. 27 | 05 | P.M. | AST |
| MAR. 29 | 17 | 30 | 44.6 | 52.44 N. | 173.53 W. | 77 | 4.2 | ... | ... | ... | G | MAR. 29 | 06 | A.M. | BST |
| MAR. 30 | 17 | 41 | 38.0 | 52.55 N. | 172.52 E. | 31 | 5.0 | ... | ... | IV | G | MAR. 30 | 06 | A.M. | BST |
| CALIFORNIA | | | | | | | | | | | | | | | |
| JAN. 6 | 07 | 54 | 39.0 | 36.82 N. | 115.88 W. | 5 | ... | ... | 3.8B | ... | G | JAN. 5 | 11 | P.M. | PST |
| JAN. 6 | 09 | 28 | 01.4 | 36.62 N. | 121.27 W. | 3 | ... | ... | 3.1B | ... | B | JAN. 6 | 01 | A.M. | PST |
| JAN. 7 | 12 | 33 | 19.1 | 33.25 N. | 115.67 W. | 13 | ... | ... | 3.1P | ... | P | JAN. 7 | 04 | A.M. | PST |
| JAN. 8 | 07 | 17 | 33.9 | 37.90 N. | 122.19 W. | 9 | ... | ... | 3.0B | III | B | JAN. 7 | 11 | P.M. | PST |
| JAN. 8 | 08 | 58 | 13.9 | 37.90 N. | 122.18 W. | 10 | ... | ... | 4.0B | IV | B | JAN. 8 | 00 | A.M. | PST |
| JAN. 8 | 09 | 38 | 07.5 | 37.90 N. | 122.18 W. | 9 | 4.8 | ... | 4.3B | V | B | JAN. 8 | 01 | A.M. | PST |
| JAN. 8 | 09 | 39 | 40.7 | 37.90 N. | 122.20 W. | 9 | ... | ... | 3.8B | III | B | JAN. 8 | 01 | A.M. | PST |

Table 1.—Summary of U.S. earthquakes for January–March 1977—Continued

| Date (1977) | Origin time (UTC) | | | Lat | Long | Depth (km) | Magnitude | | | Maximum intensity | Hypocenter source | Local time | | | | | |
|---------------------------|----------------------|-----|----|------|----------|---------------|-----------|-----|---------------|----------------------|----------------------|------------|------|----|----|------|-----|
| | hr | min | s | | | | mb | MS | ML or mbLg | | | Date | Hour | | | | |
| | | | | | | | | | | | | | | | | | |
| CALIFORNIA--Continued | | | | | | | | | | | | | | | | | |
| JAN. | 8 | 09 | 43 | 59.0 | 37.90 N. | 122.20 W. | 9 | ... | ... | 3.0B | ... | B | JAN. | 8 | 01 | A.M. | PST |
| JAN. | 8 | 09 | 51 | 55.6 | 37.91 N. | 122.19 W. | 8 | ... | ... | 3.0B | III | B | JAN. | 8 | 01 | A.M. | PST |
| JAN. | 8 | 11 | 03 | 00.0 | 34.22 N. | 116.67 W. | 5 | ... | ... | 3.1P | ... | P | JAN. | 8 | 03 | A.M. | PST |
| JAN. | 9 | 05 | 34 | 16.7 | 37.89 N. | 122.19 W. | 9 | ... | ... | 3.2B | III | B | JAN. | 8 | 09 | P.M. | PST |
| JAN. | 9 | 23 | 24 | 39.5 | 39.50 N. | 121.64 W. | 2 | ... | ... | 3.3B | V | B | JAN. | 9 | 03 | P.M. | PST |
| JAN. | 10 | 05 | 06 | 58.4 | 34.55 N. | 116.50 W. | 1 | ... | ... | 3.8P | ... | P | JAN. | 9 | 09 | P.M. | PST |
| JAN. | 10 | 05 | 08 | 07.9 | 37.91 N. | 122.30 W. | 3 | ... | ... | 2.9B | III | B | JAN. | 9 | 09 | P.M. | PST |
| JAN. | 13 | 07 | 19 | 00.8 | 35.03 N. | 119.03 W. | 8 | ... | ... | 3.3P | ... | P | JAN. | 12 | 11 | P.M. | PST |
| JAN. | 13 | 20 | 09 | 53.5 | 41.02 N. | 122.15 W. | 2 | ... | ... | 3.7B | III | B | JAN. | 13 | 12 | P.M. | PST |
| JAN. | 16 | 22 | 28 | 23.9 | 36.44 N. | 117.77 W. | 12 | ... | ... | 3.9P | ... | G | JAN. | 16 | 02 | P.M. | PST |
| JAN. | 17 | 00 | 39 | 15.4 | 34.37 N. | 118.67 W. | 14 | ... | ... | 3.4P | III | P | JAN. | 16 | 04 | P.M. | PST |
| JAN. | 18 | 11 | 35 | 47.6 | 33.05 N. | 115.59 W. | 3 | ... | ... | 3.1F | ... | F | JAN. | 18 | 03 | A.M. | PST |
| JAN. | 18 | 12 | 54 | 34.3 | 33.83 N. | 116.90 W. | 8 | ... | ... | 3.0P | ... | P | JAN. | 18 | 04 | A.M. | PST |
| JAN. | 18 | 21 | 05 | 46.6 | 36.92 N. | 121.49 W. | 9 | ... | ... | 3.5B | IV | B | JAN. | 18 | 01 | P.M. | PST |
| JAN. | 19 | 02 | 12 | 19.8 | 36.93 N. | 121.49 W. | 4 | ... | ... | 4.0B | V | B | JAN. | 18 | 06 | P.M. | PST |
| JAN. | 19 | 03 | 39 | 27.9 | 35.33 N. | 118.53 W. | 6 | ... | ... | 3.3P | ... | P | JAN. | 18 | 07 | P.M. | PST |
| JAN. | 21 | 20 | 38 | 26.4 | 33.87 N. | 115.52 W. | 1 | ... | ... | 3.0P | ... | P | JAN. | 21 | 12 | P.M. | PST |
| JAN. | 22 | 10 | 44 | 55.6 | 35.77 N. | 117.70 W. | 7 | ... | ... | 3.1P | ... | P | JAN. | 22 | 02 | A.M. | PST |
| JAN. | 23 | 17 | 45 | 50.3 | 37.86 N. | 122.25 W. | 9 | ... | ... | 2.7B | IV | B | JAN. | 23 | 09 | A.M. | PST |
| JAN. | 24 | 11 | 35 | 16.5 | 33.92 N. | 118.13 W. | 27 | ... | ... | 2.7P | III | P | JAN. | 24 | 03 | A.M. | PST |
| JAN. | 24 | 15 | 55 | 46.4 | 37.86 N. | 122.24 W. | 8 | ... | ... | 2.7B | III | B | JAN. | 24 | 07 | A.M. | PST |
| JAN. | 24 | 18 | 05 | 15.1 | 35.79 N. | 120.31 W. | 5 | ... | ... | 3.7B | ... | G | JAN. | 24 | 10 | A.M. | PST |
| FEB. | 1 | 18 | 47 | 57.5 | 39.06 N. | 120.00 W. | 2 | ... | ... | 3.9B | V | B | FEB. | 1 | 10 | A.M. | PST |
| FEB. | 3 | 13 | 49 | 38.8 | 33.88 N. | 116.60 W. | 8 | ... | ... | 2.8P | III | P | FEB. | 3 | 05 | A.M. | PST |
| FEB. | 3 | 23 | 59 | 48.2 | 32.87 N. | 115.77 W. | 12 | ... | ... | 3.1P | ... | P | FEB. | 3 | 03 | P.M. | PST |
| FEB. | 10 | 12 | 10 | 47.7 | 33.97 N. | 116.58 W. | 8 | ... | ... | 3.3P | IV | P | FEB. | 10 | 04 | A.M. | PST |
| FEB. | 14 | 13 | 58 | 40.3 | 35.72 N. | 117.70 W. | 3 | ... | ... | 3.2P | V | P | FEB. | 14 | 05 | A.M. | PST |
| FEB. | 14 | 13 | 58 | 51.8 | 35.72 N. | 117.70 W. | 3 | ... | ... | 3.7P | V | P | FEB. | 14 | 05 | A.M. | PST |
| FEB. | 21 | 11 | 09 | 15.3 | 39.37 N. | 123.30 W. | 20 | ... | ... | 3.2B | V | B | FEB. | 21 | 03 | A.M. | PST |
| FEB. | 22 | 06 | 24 | 06.5 | 38.48 N. | 119.29 W. | 5 | 5.0 | ... | 4.8B | VI | B | FEB. | 21 | 10 | P.M. | PST |
| FEB. | 24 | 03 | 12 | 12.5 | 33.78 N. | 115.67 W. | 4 | ... | ... | 3.2P | ... | P | FEB. | 23 | 07 | P.M. | PST |
| FEB. | 25 | 03 | 57 | 37.1 | 40.42 N. | 124.22 W. | 18 | ... | ... | 3.4B | ... | B | FEB. | 24 | 07 | P.M. | PST |
| FEB. | 26 | 22 | 09 | 38.2 | 34.15 N. | 118.23 W. | 13 | ... | ... | 3.1P | III | P | FEB. | 26 | 02 | P.M. | PST |
| MAR. | 1 | 21 | 08 | 46.1 | 37.84 N. | 122.06 W. | 9 | ... | ... | 3.0B | V | B | MAR. | 1 | 01 | P.M. | PST |
| MAR. | 6 | 00 | 32 | 33.7 | 36.70 N. | 121.12 W. | 6 | ... | ... | 2.9B | ... | B | MAR. | 5 | 04 | P.M. | PST |
| MAR. | 7 | 11 | 04 | 35.2 | 34.47 N. | 117.97 W. | 8 | ... | ... | 3.0P | III | P | MAR. | 7 | 03 | A.M. | PST |
| MAR. | 7 | 21 | 52 | 24.0 | 35.73 N. | 117.70 W. | 12 | ... | ... | 3.0P | V | P | MAR. | 7 | 01 | P.M. | PST |
| MAR. | 7 | 23 | 21 | 30.7 | 35.73 N. | 117.70 W. | 12 | ... | ... | 3.2P | III | P | MAR. | 7 | 03 | P.M. | PST |
| MAR. | 12 | 09 | 19 | 06.7 | 36.89 N. | 121.49 W. | 2 | ... | ... | 3.7B | III | B | MAR. | 12 | 01 | A.M. | PST |
| MAR. | 14 | 13 | 54 | 47.8 | 34.35 N. | 116.20 W. | 4 | ... | ... | 3.4P | ... | P | MAR. | 14 | 05 | A.M. | PST |
| MAR. | 14 | 23 | 41 | 04.8 | 34.35 N. | 116.20 W. | 5 | ... | ... | 3.1P | ... | P | MAR. | 14 | 03 | P.M. | PST |
| MAR. | 16 | 07 | 54 | 56.2 | 36.93 N. | 121.49 W. | 9 | ... | ... | 3.6B | ... | B | MAR. | 15 | 11 | P.M. | PST |
| MAR. | 18 | 18 | 32 | 47.6 | 33.38 N. | 116.28 W. | 13 | ... | ... | 3.1P | ... | P | MAR. | 18 | 10 | A.M. | PST |
| MAR. | 19 | 10 | 37 | 49.7 | 35.70 N. | 117.72 W. | 2 | ... | ... | 3.0P | III | P | MAR. | 19 | 02 | A.M. | PST |
| MAR. | 19 | 22 | 56 | 47.4 | 37.43 N. | 121.64 W. | 6 | ... | ... | 3.4B | ... | B | MAR. | 19 | 02 | P.M. | PST |
| MAR. | 24 | 06 | 24 | 14.1 | 34.73 N. | 115.73 W. | 4 | ... | ... | 3.0P | ... | P | MAR. | 23 | 10 | P.M. | PST |
| MAR. | 25 | 11 | 23 | 55.7 | 33.97 N. | 116.60 W. | 11 | ... | ... | 2.8P | III | P | MAR. | 25 | 03 | A.M. | PST |
| MAR. | 25 | 15 | 20 | 55.7 | 32.97 N. | 115.50 W. | 11 | ... | ... | 3.0P | ... | P | MAR. | 25 | 07 | A.M. | PST |
| MAR. | 25 | 15 | 43 | 58.8 | 32.97 N. | 115.50 W. | 13 | ... | ... | 3.4P | III | P | MAR. | 25 | 07 | A.M. | PST |
| MAR. | 26 | 07 | 08 | 19.3 | 32.65 N. | 115.67 W. | 10 | ... | ... | 3.2P | ... | P | MAR. | 25 | 11 | P.M. | PST |
| MAR. | 26 | 14 | 35 | 12.8 | 37.15 N. | 118.15 W. | 5 | ... | ... | 3.3B | ... | G | MAR. | 26 | 06 | A.M. | PST |
| MAR. | 26 | 19 | 13 | 05.9 | 38.48 N. | 122.19 W. | 2 | ... | ... | 3.0B | ... | B | MAR. | 26 | 11 | A.M. | PST |
| MAR. | 31 | 13 | 30 | 29.0 | 33.40 N. | 116.97 W. | 3 | ... | ... | 3.3P | III | P | MAR. | 31 | 05 | A.M. | PST |
| CALIFORNIA--OFF THE COAST | | | | | | | | | | | | | | | | | |
| JAN. | 1 | 07 | 20 | 51.0 | 40.40 N. | 127.30 W. | 2 | ... | ... | 3.8B | ... | B | DEC. | 31 | 11 | P.M. | PST |
| JAN. | 16 | 03 | 09 | 53.0 | 40.70 N. | 127.40 W. | 15 | ... | ... | 3.6B | ... | B | JAN. | 15 | 07 | P.M. | PST |
| JAN. | 21 | 17 | 52 | 02.1 | 41.77 N. | 126.63 W. | 10 | 4.9 | ... | 3.5B | ... | G | JAN. | 21 | 09 | A.M. | PST |
| JAN. | 30 | 14 | 48 | 21.9 | 40.78 N. | 127.20 W. | 15 | 4.0 | ... | 3.6B | ... | G | JAN. | 30 | 06 | A.M. | PST |
| FEB. | 1 | 14 | 33 | 12.0 | 40.31 N. | 127.01 W. | 15 | 5.1 | ... | 4.8B | ... | G | FEB. | 1 | 06 | A.M. | PST |
| FEB. | 1 | 15 | 25 | 43.3 | 40.39 N. | 127.56 W. | 15 | ... | ... | 4.1B | ... | G | FEB. | 1 | 07 | A.M. | PST |
| FEB. | 3 | 05 | 35 | 13.6 | 40.69 N. | 125.67 W. | 15 | 4.3 | ... | 4.1B | ... | G | FEB. | 2 | 09 | P.M. | PST |

Table 1.--Summary of U.S. earthquakes for January-March 1977--Continued

| Date (1977) | Origin time (UTC) | | | Lat | Long | Depth (km) | Magnitude | | | Maximum intensity | Hypocenter source | Local time | | | |
|--------------------------------------|----------------------|-------|------|-----------------|-----------|---------------|-----------|-----|---------------|----------------------|----------------------|------------|------|---------|------|
| | hr | min | s | | | | mb | MS | ML or mblg | | | Date | Hour | PST | |
| | | | | | | | | | | | | | | | Date |
| CALIFORNIA--OFF THE COAST--Continued | | | | | | | | | | | | | | | |
| FEB. | 5 | 19 25 | 54.1 | 40.34 N. | 124.60 W. | 33 | 4.9 | ... | 3.9B | ... | G | FEB. | 5 | 11 A.M. | PST |
| FEB. | 17 | 09 58 | 33.0 | 40.30 N. | 124.80 W. | 15 | ... | ... | 3.6B | ... | B | FEB. | 17 | 01 A.M. | PST |
| FEB. | 22 | 00 57 | 33.3 | 40.84 N. | 125.50 W. | 15 | 4.9 | ... | 4.6B | ... | B | FEB. | 21 | 04 P.M. | PST |
| MAR. | 17 | 09 14 | 42.5 | 40.41 N. | 127.76 W. | 15 | ... | ... | 4.2B | ... | G | MAR. | 17 | 01 A.M. | PST |
| DELAWARE | | | | | | | | | | | | | | | |
| FEB. | 10 | 19 14 | 25 | NEAR WILMINGTON | | | . | ... | ... | 2.0Z | VI | FEB. | 10 | 02 P.M. | EST |
| HAWAII | | | | | | | | | | | | | | | |
| JAN. | 1 | 14 26 | 35.3 | 19.34 N. | 155.12 W. | 9 | ... | ... | 3.7H | II | H | JAN. | 1 | 04 A.M. | HST |
| JAN. | 4 | 03 05 | 51.6 | 19.40 N. | 155.26 W. | 5 | ... | ... | 3.1H | ... | H | JAN. | 3 | 05 P.M. | HST |
| JAN. | 4 | 11 57 | 10.1 | 19.40 N. | 155.28 W. | 5 | ... | ... | 3.0H | ... | H | JAN. | 4 | 01 A.M. | HST |
| JAN. | 4 | 20 23 | 38.1 | 20.10 N. | 155.60 W. | 13 | ... | ... | 3.2H | ... | H | JAN. | 4 | 10 A.M. | HST |
| JAN. | 5 | 00 25 | 13.2 | 19.39 N. | 155.25 W. | 5 | ... | ... | 3.6H | III | H | JAN. | 4 | 02 P.M. | HST |
| JAN. | 8 | 10 02 | 38.0 | 19.33 N. | 155.13 W. | 10 | ... | ... | 4.1H | III | H | JAN. | 8 | 00 A.M. | HST |
| JAN. | 12 | 13 05 | 59.3 | 19.40 N. | 155.29 W. | 16 | ... | ... | 3.9H | IV | H | JAN. | 12 | 03 A.M. | HST |
| JAN. | 13 | 18 34 | 32.3 | 19.39 N. | 155.25 W. | 5 | ... | ... | 3.0H | ... | H | JAN. | 13 | 08 A.M. | HST |
| JAN. | 14 | 23 26 | 42.3 | 19.34 N. | 155.12 W. | 9 | 4.2 | ... | 4.7H | IV | H | JAN. | 14 | 01 P.M. | HST |
| JAN. | 20 | 12 20 | 27.8 | 19.33 N. | 155.19 W. | 9 | ... | ... | 3.4H | III | H | JAN. | 20 | 02 A.M. | HST |
| JAN. | 22 | 17 32 | 42.5 | 19.36 N. | 155.25 W. | 10 | ... | ... | 3.6H | III | H | JAN. | 22 | 07 A.M. | HST |
| JAN. | 22 | 18 02 | 44.2 | 19.39 N. | 155.25 W. | 6 | ... | ... | 3.6H | III | H | JAN. | 22 | 08 A.M. | HST |
| JAN. | 22 | 22 36 | 28.5 | 20.94 N. | 160.26 W. | 33N | 4.7 | ... | 5.0H | ... | G | JAN. | 22 | 12 P.M. | HST |
| JAN. | 23 | 06 02 | 00.1 | 19.40 N. | 155.25 W. | 5 | ... | ... | 3.0H | ... | H | JAN. | 22 | 08 P.M. | HST |
| JAN. | 23 | 20 49 | 01.7 | 19.34 N. | 155.20 W. | 9 | 4.8 | ... | 4.0H | IV | H | JAN. | 23 | 10 A.M. | HST |
| JAN. | 27 | 23 58 | 09.1 | 19.37 N. | 155.11 W. | 9 | ... | ... | 3.0H | ... | H | JAN. | 27 | 01 P.M. | HST |
| JAN. | 29 | 21 25 | 43.4 | 19.35 N. | 155.10 W. | 9 | ... | ... | 3.3H | ... | H | JAN. | 29 | 11 A.M. | HST |
| JAN. | 30 | 08 48 | 49.7 | 19.37 N. | 155.08 W. | 8 | ... | ... | 4.1H | IV | H | JAN. | 29 | 10 P.M. | HST |
| JAN. | 31 | 02 28 | 56.1 | 19.18 N. | 155.61 W. | 10 | ... | ... | 3.2H | ... | H | JAN. | 30 | 04 P.M. | HST |
| FEB. | 2 | 07 28 | 00.2 | 19.21 N. | 155.71 W. | 8 | ... | ... | 3.0H | ... | H | FEB. | 1 | 09 P.M. | HST |
| FEB. | 2 | 18 11 | 29.3 | 19.39 N. | 155.07 W. | 8 | ... | ... | 3.0H | III | H | FEB. | 2 | 08 A.M. | HST |
| FEB. | 4 | 01 20 | 49.7 | 19.36 N. | 155.08 W. | 9 | 4.5 | ... | 4.5H | V | H | FEB. | 3 | 03 P.M. | HST |
| FEB. | 4 | 14 25 | 11.7 | 20.11 N. | 155.47 W. | 1 | ... | ... | 3.7H | IV | H | FEB. | 4 | 04 A.M. | HST |
| FEB. | 4 | 16 52 | 21.5 | 17.40 N. | 154.50 W. | 47 | ... | ... | 3.7H | ... | H | FEB. | 4 | 06 A.M. | HST |
| FEB. | 9 | 00 47 | 02.2 | 19.39 N. | 155.25 W. | 3 | ... | ... | 3.1H | III | H | FEB. | 8 | 02 P.M. | HST |
| FEB. | 9 | 04 51 | 20.2 | 19.39 N. | 155.23 W. | 3 | ... | ... | 3.4H | III | H | FEB. | 8 | 06 P.M. | HST |
| FEB. | 9 | 05 02 | 22.2 | 19.39 N. | 155.24 W. | 7 | ... | ... | 3.5H | III | H | FEB. | 8 | 07 P.M. | HST |
| FEB. | 9 | 05 23 | 31.8 | 19.39 N. | 155.25 W. | 5 | ... | ... | 3.5H | III | H | FEB. | 8 | 07 P.M. | HST |
| FEB. | 9 | 05 28 | 30.0 | 19.39 N. | 155.25 W. | 5 | ... | ... | 3.4H | III | H | FEB. | 8 | 07 P.M. | HST |
| FEB. | 9 | 05 54 | 26.5 | 19.37 N. | 155.24 W. | 0 | ... | ... | 3.0H | III | H | FEB. | 8 | 07 P.M. | HST |
| FEB. | 9 | 06 44 | 06.1 | 19.38 N. | 155.25 W. | 1 | ... | ... | 3.1H | III | H | FEB. | 8 | 08 P.M. | HST |
| FEB. | 9 | 07 27 | 35.4 | 19.39 N. | 155.26 W. | 1 | ... | ... | 3.2H | III | H | FEB. | 8 | 09 P.M. | HST |
| FEB. | 9 | 19 22 | 01.0 | 19.39 N. | 155.08 W. | 8 | ... | ... | 3.3H | III | H | FEB. | 9 | 09 A.M. | HST |
| FEB. | 10 | 07 14 | 47.0 | 19.39 N. | 155.25 W. | 5 | ... | ... | 3.0H | III | H | FEB. | 9 | 09 P.M. | HST |
| FEB. | 14 | 07 26 | 05.5 | 19.42 N. | 155.45 W. | 10 | ... | ... | 3.0H | ... | H | FEB. | 13 | 09 P.M. | HST |
| FEB. | 14 | 12 04 | 22.9 | 19.50 N. | 155.80 W. | 8 | ... | ... | 3.0H | ... | H | FEB. | 14 | 02 P.M. | HST |
| FEB. | 15 | 23 47 | 19.1 | 19.46 N. | 155.42 W. | 9 | ... | ... | 3.1H | ... | H | FEB. | 15 | 01 A.M. | HST |
| FEB. | 21 | 03 29 | 42.8 | 19.33 N. | 155.27 W. | 10 | ... | ... | 3.7H | IV | H | FEB. | 20 | 05 P.M. | HST |
| FEB. | 21 | 21 59 | 49.1 | 19.36 N. | 155.44 W. | 8 | ... | ... | 3.1H | ... | H | FEB. | 21 | 11 A.M. | HST |
| FEB. | 24 | 03 23 | 25.7 | 20.20 N. | 155.80 W. | 36 | ... | ... | 3.5H | III | H | FEB. | 23 | 05 P.M. | HST |
| FEB. | 26 | 03 50 | 51.9 | 19.35 N. | 155.05 W. | 6 | ... | ... | 3.1H | ... | H | FEB. | 25 | 05 P.M. | HST |
| FEB. | 28 | 00 07 | 53.7 | 19.37 N. | 155.08 W. | 8 | ... | ... | 3.0H | ... | H | FEB. | 27 | 02 P.M. | HST |
| FEB. | 28 | 04 59 | 22.8 | 19.47 N. | 155.46 W. | 10 | ... | ... | 3.0H | ... | H | FEB. | 27 | 06 P.M. | HST |
| FEB. | 28 | 07 49 | 51.9 | 19.41 N. | 155.02 W. | 8 | ... | ... | 3.0H | ... | H | FEB. | 27 | 09 P.M. | HST |
| MAR. | 3 | 00 36 | 00.0 | 18.80 N. | 155.20 W. | 45 | ... | ... | 3.1H | ... | H | MAR. | 2 | 02 P.M. | HST |
| MAR. | 3 | 02 39 | 09.7 | 19.37 N. | 155.08 W. | 8 | ... | ... | 3.0H | ... | H | MAR. | 2 | 04 P.M. | HST |
| MAR. | 4 | 08 32 | 22.9 | 19.39 N. | 155.41 W. | 9 | ... | ... | 3.1H | ... | H | MAR. | 3 | 10 P.M. | HST |
| MAR. | 4 | 11 15 | 41.5 | 19.60 N. | 156.10 W. | 24 | ... | ... | 3.5H | ... | H | MAR. | 4 | 01 A.M. | HST |
| MAR. | 8 | 01 10 | 51.8 | 19.40 N. | 155.29 W. | 16 | ... | ... | 3.2H | ... | H | MAR. | 7 | 03 P.M. | HST |
| MAR. | 9 | 10 29 | 16.5 | 19.40 N. | 155.50 W. | 53 | ... | ... | 4.1H | V | H | MAR. | 9 | 00 A.M. | HST |

Table 1.—Summary of U.S. earthquakes for January–March 1977—Continued

| Date (1977) | Origin time (UTC) | | | Lat | Long | Depth (km) | Magnitude | | | Maximum intensity | Hypocenter source | Local time | | | |
|-------------------|----------------------|-----|------|------------------|-----------|---------------|-----------|-----|---------------|----------------------|----------------------|------------|------|------|-----|
| | hr | min | s | | | | mb | MS | ML or mblg | | | Date | Hour | | |
| HAWAII--Continued | | | | | | | | | | | | | | | |
| MAR. 9 | 20 | 46 | 18.9 | 18.80 N. | 155.30 W. | 48 | ... | ... | 3.1H | ... | H | MAR. 9 | 10 | A.M. | HST |
| MAR. 10 | 13 | 17 | 15.6 | 19.34 N. | 155.23 W. | 9 | ... | ... | 3.0H | ... | H | MAR. 10 | 03 | A.M. | HST |
| MAR. 13 | 14 | 13 | 26.4 | 19.32 N. | 155.23 W. | 9 | ... | ... | 3.1H | ... | H | MAR. 13 | 04 | A.M. | HST |
| MAR. 14 | 18 | 41 | 52.5 | 18.15 N. | 157.48 W. | 8 | ... | ... | 4.1H | ... | H | MAR. 14 | 08 | A.M. | HST |
| MAR. 18 | 23 | 33 | 07.2 | 19.36 N. | 155.30 W. | 34 | ... | ... | 3.2H | III | H | MAR. 18 | 01 | P.M. | HST |
| MAR. 21 | 00 | 07 | 39.6 | 19.80 N. | 155.60 W. | 26 | ... | ... | 3.4H | ... | H | MAR. 20 | 02 | P.M. | HST |
| MAR. 21 | 14 | 59 | 24.7 | 19.37 N. | 155.07 W. | 8 | ... | ... | 3.4H | III | H | MAR. 21 | 04 | A.M. | HST |
| MAR. 25 | 05 | 37 | 00.3 | 19.35 N. | 155.14 W. | 8 | ... | ... | 3.6H | IV | H | MAR. 24 | 07 | P.M. | HST |
| MAR. 26 | 13 | 08 | 00.4 | 19.30 N. | 156.40 W. | 49 | ... | ... | 3.5H | ... | H | MAR. 26 | 03 | A.M. | HST |
| MAR. 26 | 13 | 49 | 47.8 | 18.25 N. | 155.49 W. | 41 | ... | ... | 3.2H | ... | H | MAR. 26 | 03 | A.M. | HST |
| MAR. 27 | 14 | 37 | 58.6 | 19.36 N. | 155.25 W. | 10 | ... | ... | 3.5H | ... | H | MAR. 27 | 04 | A.M. | HST |
| MAR. 29 | 22 | 56 | 40.0 | 19.18 N. | 155.68 W. | 6 | ... | ... | 3.3H | III | H | MAR. 29 | 12 | P.M. | HST |
| MAR. 31 | 01 | 17 | 37.7 | 19.70 N. | 156.00 W. | 9 | ... | ... | 3.6H | IV | H | MAR. 30 | 03 | P.M. | HST |
| IDAHO | | | | | | | | | | | | | | | |
| JAN. 12 | 14 | 12 | 22.2 | 44.63 N. | 112.60 W. | 5 | ... | ... | 3.5D | IV | G | JAN. 12 | 07 | A.M. | MST |
| MAR. 1 | 19 | 52 | 41.5 | 43.87 N. | 111.15 W. | 5 | ... | ... | 2.9A | ... | G | MAR. 1 | 12 | P.M. | MST |
| MISSOURI | | | | | | | | | | | | | | | |
| JAN. 3 | 22 | 56 | 48.5 | 37.55 N. | 89.79 W. | 5 | ... | ... | 3.4S | VI | S | JAN. 3 | 04 | P.M. | CST |
| MAR. 28 | 11 | 17 | 14.2 | 36.48 N. | 89.54 W. | 10 | ... | ... | ... | II | S | MAR. 28 | 05 | A.M. | CST |
| MONTANA | | | | | | | | | | | | | | | |
| JAN. 26 | 10 | 23 | 35.8 | 44.63 N. | 111.13 W. | 5 | ... | ... | 2.5A | IV | G | JAN. 24 | 03 | A.M. | MST |
| FEB. 13 | 21 | 27 | 57.7 | 44.68 N. | 111.46 W. | 5 | ... | ... | 3.2A | ... | G | FEB. 13 | 02 | P.M. | MST |
| MAR. 4 | 10 | 05 | 59.6 | 44.83 N. | 111.04 W. | 5 | 3.9 | ... | 3.8G | IV | G | MAR. 4 | 03 | A.M. | MST |
| MAR. 4 | 11 | 01 | 50.2 | 44.80 N. | 111.08 W. | 5 | 3.9 | ... | 3.6G | IV | G | MAR. 4 | 04 | A.M. | MST |
| MAR. 4 | 11 | 33 | 06.9 | 44.84 N. | 111.13 W. | 5 | 3.7 | ... | 3.6G | IV | G | MAR. 4 | 04 | A.M. | MST |
| MAR. 4 | 13 | 00 | 58.9 | 44.80 N. | 111.08 W. | 5 | 4.1 | ... | 4.1G | IV | G | MAR. 4 | 06 | A.M. | MST |
| MAR. 4 | 13 | 04 | 21.4 | 44.82 N. | 111.10 W. | 5 | 4.0 | ... | 3.7G | IV | G | MAR. 4 | 06 | A.M. | MST |
| MAR. 4 | 13 | 12 | | NEAR HEBGEN LAKE | | | | ... | ... | III | . | MAR. 4 | 06 | A.M. | MST |
| MAR. 4 | 14 | 19 | 48.8 | 44.78 N. | 111.05 W. | 5 | 4.0 | ... | 4.0G | IV | G | MAR. 4 | 07 | A.M. | MST |
| MAR. 4 | 14 | 26 | | NEAR HEBGEN LAKE | | | | ... | ... | III | . | MAR. 4 | 07 | A.M. | MST |
| MAR. 4 | 14 | 58 | 05.5 | 44.75 N. | 111.35 W. | 5 | ... | ... | 3.7D | III | G | MAR. 4 | 07 | A.M. | MST |
| MAR. 4 | 15 | 00 | 20.1 | 44.82 N. | 111.05 W. | 5 | ... | ... | 3.8D | ... | G | MAR. 4 | 08 | A.M. | MST |
| MAR. 4 | 16 | 12 | 28.2 | 44.79 N. | 111.05 W. | 5 | ... | ... | 3.4G | III | G | MAR. 4 | 09 | A.M. | MST |
| MAR. 4 | 16 | 47 | 43.5 | 44.77 N. | 111.12 W. | 5 | ... | ... | 3.7G | III | G | MAR. 4 | 09 | A.M. | MST |
| MAR. 4 | 16 | 51 | 48.3 | 44.77 N. | 111.21 W. | 5 | ... | ... | 4.0D | IV | G | MAR. 4 | 09 | A.M. | MST |
| MAR. 4 | 17 | 10 | 40.6 | 44.76 N. | 111.01 W. | 5 | 4.0 | ... | 3.8G | IV | G | MAR. 4 | 10 | A.M. | MST |
| MAR. 4 | 17 | 17 | | NEAR HEBGEN LAKE | | | | ... | 3.4D | III | . | MAR. 4 | 10 | A.M. | MST |
| MAR. 5 | 00 | 32 | | NEAR HEBGEN LAKE | | | | ... | 3.3D | III | . | MAR. 4 | 05 | P.M. | MST |
| MAR. 6 | 05 | 01 | 04.0 | 44.74 N. | 111.13 W. | 5 | ... | ... | 2.9A | V | G | MAR. 5 | 10 | P.M. | MST |
| MAR. 6 | 06 | 10 | 12.7 | 44.71 N. | 111.21 W. | 5 | ... | ... | 3.0A | V | G | MAR. 5 | 11 | P.M. | MST |
| MAR. 11 | 05 | 09 | 37.2 | 46.13 N. | 111.48 W. | 5 | 4.6 | ... | 4.8G | VI | G | MAR. 10 | 10 | P.M. | MST |
| MAR. 11 | 12 | 17 | 51.9 | 44.85 N. | 111.50 W. | 5 | 5.2 | ... | 4.1G | IV | G | MAR. 11 | 05 | A.M. | MST |
| MAR. 11 | 22 | 22 | 15.1 | 44.30 N. | 111.33 W. | 12 | ... | ... | 3.2A | ... | G | MAR. 11 | 03 | P.M. | MST |
| MAR. 24 | 13 | 20 | 11.9 | 45.71 N. | 111.31 W. | 5 | ... | ... | 3.2A | IV | G | MAR. 24 | 06 | A.M. | MST |
| NEVADA | | | | | | | | | | | | | | | |
| JAN. 3 | 14 | 20 | 00.1 | 39.59 N. | 115.81 W. | 6 | ... | ... | 3.4G | III | G | JAN. 3 | 06 | A.M. | PST |
| FEB. 9 | 07 | 24 | 04.6 | 39.21 N. | 118.02 W. | 5 | ... | ... | ... | ... | G | FEB. 8 | 11 | P.M. | PST |
| FEB. 9 | 07 | 24 | 08.3 | 39.20 N. | 118.04 W. | 5 | ... | ... | 3.7B | ... | G | FEB. 8 | 11 | P.M. | PST |
| FEB. 16 | 17 | 53 | 00.2 | 37.00 N. | 116.04 W. | 5 | 4.8 | ... | 4.1B | ... | G | FEB. 16 | 09 | A.M. | PST |
| MAR. 8 | 14 | 24 | 01.9 | 37.24 N. | 116.26 W. | 5 | ... | ... | 3.2G | ... | G | MAR. 8 | 06 | A.M. | PST |
| NEW MEXICO | | | | | | | | | | | | | | | |
| JAN. 4 | 18 | 31 | 37.6 | 32.36 N. | 106.92 W. | 5 | ... | ... | 3.2G | V | G | JAN. 4 | 11 | A.M. | MST |
| MAR. 5 | 03 | 00 | 54.7 | 35.91 N. | 108.29 W. | 22 | 4.6 | ... | 4.2G | VI | G | MAR. 4 | 08 | P.M. | MST |

Table 1.—Summary of U.S. earthquakes for January-March 1977—Continued

| Date (1977) | Origin time (UTC) | | | Lat | Long | Depth (km) | Magnitude | | | Maximum intensity | Hypocenter source | Local time | | | | | |
|----------------------|----------------------|-----|----|------|----------|---------------|-----------|-----|---------------|----------------------|----------------------|------------|------|----|------|------|-----|
| | hr | min | s | | | | mb | MS | ML or mblg | | | Date | Hour | | | | |
| OHIO | | | | | | | | | | | | | | | | | |
| MAR. | 9 | 08 | 48 | 17.1 | 40.96 N. | 83.50 W. | 0 | ... | ... | ... | V X | MAR. | 9 | 02 | A.M. | CST | |
| OREGON—OFF THE COAST | | | | | | | | | | | | | | | | | |
| FEB. | 10 | 04 | 48 | 20.7 | 45.88 N. | 129.18 W. | 15 | 4.8 | ... | ... | ... | G | FEB. | 9 | 08 | P.M. | PST |
| SOUTH CAROLINA | | | | | | | | | | | | | | | | | |
| JAN. | 18 | 18 | 29 | 13.5 | 33.07 N. | 80.20 W. | 5 | ... | ... | 3.0V | VI G | JAN. | 18 | 01 | P.M. | EST | |
| MAR. | 30 | 08 | 27 | 46.9 | 32.88 N. | 80.20 W. | 10 | ... | ... | 1.5G | V G | MAR. | 30 | 03 | A.M. | CST | |
| UTAH | | | | | | | | | | | | | | | | | |
| FEB. | 9 | 00 | 42 | 16.4 | 39.31 N. | 111.15 W. | 7 | ... | ... | 3.4U | VI U | FEB. | 8 | 05 | P.M. | MST | |
| VIRGINIA | | | | | | | | | | | | | | | | | |
| FEB. | 27 | 20 | 05 | 34.6 | 37.90 N. | 78.63 W. | 5 | ... | ... | 2.4V | V G | FEB. | 27 | 03 | P.M. | EST | |
| WYOMING | | | | | | | | | | | | | | | | | |
| MAR. | 3 | 17 | 50 | 28.0 | 41.24 N. | 107.15 W. | 5 | 4.2 | ... | 3.5G | V G | MAR. | 3 | 10 | A.M. | MST | |
| MAR. | 4 | 14 | 39 | 23.5 | 44.84 N. | 110.92 W. | 5 | ... | ... | 3.8D | III G | MAR. | 4 | 07 | A.M. | MST | |

Table 2.—Summary of macroseismic data for U.S. earthquakes, January-March 1977

[Sources of the hypocenter and magnitudes: (A) U.S. Energy Research and Development Administration; (B) University of California, Berkeley; (D) University of Montana, Missoula; (G) U.S. Geological Survey, National Earthquake Information Service; (H) U.S. Geological Survey, Hawaiian Volcano Observatory; (J) Weston Observatory, Massachusetts; (M) NOAA, Alaska Tsunami Warning Center, Palmer; (P) California Institute of Technology, Pasadena; (S) St. Louis University, St. Louis, Missouri; (U) University of Utah, Salt Lake City; (V) Virginia Polytechnic Institute and State University, Blacksburg; (X) University of Michigan, Ann Arbor; (Z) Delaware Geological Survey, Newark. Dates and origin times are listed in Universal Coordinated Time (UTC) giving the hour, minute, and second. Epicenters are shown in decimal degrees. Only earthquakes with intensity data and explosions are listed]

| Alaska | Alaska--Continued |
|--|--|
| 3 January (G) Andreanof Islands, Aleutian Islands Origin time: 01 34 34.2 Epicenter: 51.43 N., 179.08 W. Depth: Normal. Magnitude: 4.8 mb Intensity II: Adak. | Epicenter: 51.48 N., 175.48 W. Depth: 38 km Magnitude: 5.2 mb, 5.3 MS, 5.2 MS(B) Intensity IV: Adak. |
| 6 January (G) Andreanof Islands, Aleutian Islands Origin time: 16 02 07.6 | 13 January (G) Gulf of Alaska Origin time: 22 05 59.3 Epicenter: 59.43 N., 142.23 W. Depth: Normal. Magnitude: 4.5 ML(M) Intensity III: Valdez. |

Table 2.—Summary of macroseismic data for U.S. earthquakes,
January-March 1977—Continued

| Alaska--Continued | |
|--|---|
| 18 January (G) Southern Alaska | |
| Origin time: | 17 07 10.8 |
| Epicenter: | 61.39 N., 146.56 W. |
| Depth: | 28 km |
| Magnitude: | 3.2 ML(M) |
| <u>Intensity III:</u> | Valdez. |
| 25 January (G) Southern Alaska | |
| Origin time: | 17 12 19.1 |
| Epicenter: | 60.98 N., 149.99 W. |
| Depth: | 37 km |
| Magnitude: | 3.5 ML(M) |
| <u>Intensity III:</u> | Valdez. |
| 26 January (G) Southern Alaska | |
| Origin time: | 21 38 45.0 |
| Epicenter: | 61.23 N., 150.13 W. |
| Depth: | 52 km |
| Magnitude: | None computed. |
| <u>Intensity II:</u> | Eagle River, Palmer. |
| 30 January (G) Andreanof Islands, Aleutian Islands | |
| Origin time: | 03 02 50.6 |
| Epicenter: | 51.57 N., 175.53 W. |
| Depth: | 44 km |
| Magnitude: | 4.1 mb |
| <u>Intensity II:</u> | Adak. |
| 19 February (G) Near Islands, Aleutian Islands | |
| Origin time: | 22 34 04.1 |
| Epicenter: | 53.57 N., 170.03 E. |
| Depth: | Normal. |
| Magnitude: | 6.2 mb, 6.7 MS, 6.8 MS(B), 6.6 MS(P) |
| <u>Intensity IV:</u> | Attu, Shemya. |
| 3 March (G) Andreanof Islands, Aleutian Islands | |
| Origin time: | 10 14 02.3 |
| Epicenter: | 51.75 N., 175.97 W. |
| Depth: | 63 km |
| Magnitude: | 4.1 mb |
| <u>Intensity III:</u> | Adak. |
| 18 March Central Alaska | |
| Origin time: | 02 56 |
| Epicenter: | Not located. |
| Depth: | None computed. |
| Magnitude: | 3.6 ML(M) |
| <u>Intensity III:</u> | Fairbanks. |
| 25 March (G) Kenai Peninsula, Alaska | |
| Origin time: | 13 39 45.2 |
| Epicenter: | 60.84 N., 148.14 W. |
| Depth: | 55 km |
| Magnitude: | 4.6 mb |
| <u>Intensity V:</u> | Anchorage (pictures crooked, awakened and frightened many); Chugiak (buildings trembled, water in small |

Table 2.—Summary of macroseismic data for U.S. earthquakes,
January-March 1977—Continued

| Alaska--Continued | |
|---|---|
| | containers disturbed); Cordova (awakened and frightened several); Eagle River (pictures out of place, water in small containers disturbed); Girdwood (buildings trembled, many awakened and frightened); Seward (few awakened and frightened); Whittier (many awakened and frightened, loud "earth noises" heard). |
| | <u>Intensity IV:</u> Moose Pass, Palmer, Valdez. |
| | <u>Intensity III:</u> Spenard Station (Anchorage area). |
| 26 March (G) Fox Islands, Aleutian Islands | |
| Origin time: | 04 36 14.7 |
| Epicenter: | 52.30 N., 168.26 W. |
| Depth: | 38 km |
| Magnitude: | 5.7 mb, 6.0 MS, 5.9 MS(B) |
| <u>Intensity IV:</u> | Nikolski. |
| 30 March (G) Near Islands, Aleutian Islands | |
| Origin time: | 17 41 38.0 |
| Epicenter: | 52.55 N., 172.52 E. |
| Depth: | 31 km |
| Magnitude: | 5.0 mb |
| <u>Intensity IV:</u> | Shemya. |
| Arizona | |
| 17 January (P) Baja California, Mexico | |
| Origin time: | 11 13 19.4 |
| | See California listing. |
| 5 March (G) Northwestern New Mexico | |
| Origin time: | 03 00 54.7 |
| | See New Mexico listing. |
| California | |
| 8 January (B) Central California | |
| Origin time: | 07 17 33.9 |
| Epicenter: | 37.90 N., 122.19 W. |
| Depth: | 9 km |
| Magnitude: | 3.0 ML |
| <u>Intensity III:</u> | Berkeley. |
| 8 January (B) Central California | |
| Origin time: | 08 58 13.9 |
| Epicenter: | 37.90 N., 122.18 W. |
| Depth: | 10 km |
| Magnitude: | 4.0 ML |
| <u>Intensity IV:</u> | Walnut Creek. |
| <u>Intensity III:</u> | Throughout the San Francisco Bay area. |

Table 2.—Summary of macroseismic data for U.S. earthquakes,
January–March 1977—Continued

California--Continued

8 January (B) Central California
 Origin time: 09 38 07.5
 Epicenter: 37.90 N., 122.18 W.
 Depth: 9 km
 Magnitude: 4.8 mb(G), 4.3 ML

Fifty-eight shocks were reported in the 3 days following this earthquake. Epicenters are all located near the Briones Dam (press reports). This earthquake was felt over an area of approximately 7,000 sq km (fig. 7).

Intensity VI: Berkeley (windows broken on university campus, displacement in previously cracked walls increased 1 cm); Crockett (cracked plaster); El Cerrito (one brick dislodged from chimney, retaining wall cracked); El Granada (cracked plaster); Napa (cracked plaster); Oakland (new cracks); Olema; San Francisco (ceilings cracked, one chandelier knocked down, burglar alarms set off in financial district--press report); Walnut Creek (dry wall cracked).

Intensity V: Alameda, Alamo, Brisbane, Burlingame, Clayton, Concord, Daly City, Danville, Davenport, Dillon Beach, Forestville, Fremont, Hayward, Kensington, Lafayette (press report), La Honda, Loma Mar, Madera, Martinez, Marshall, Mill Valley, Monte Rio, Moraga, Moss Beach, Nicasio, North Berkeley, Novato, Occidental, Orinda Downs (press report), Pinole, Pleasant Hill, Port Costa, Rodeo, San Bruno, San Jose, San Lorenzo, San Mateo, San Pablo, Santa Cruz, South San Francisco, Sunol, Vallejo.

Intensity IV: Fairfax, Freestone, Half Moon Bay, Larkspur, Orinda, Oroville (telephone service interrupted--press report), Pacifica, Palo Alto, Petaluma, Point Reyes Station, Santa Rosa, Stinson Beach, Union City, Villa Grande.

Intensity III: El Verano, Millbrae, Newark, Saint Helena, San Anselmo.

8 January (B) Central California
 Origin time: 09 39 40.7
 Epicenter: 37.90 N., 122.20 W.
 Depth: 9 km
 Magnitude: 3.8 ML
Intensity III: Berkeley.

8 January (B) Central California
 Origin time: 09 51 55.6
 Epicenter: 37.91 N., 122.19 W.
 Depth: 8 km
 Magnitude: 3.0 ML
Intensity III: Berkeley.

Table 2.—Summary of macroseismic data for U.S. earthquakes,
January–March 1977—Continued

California--Continued

9 January (B) Central California
 Origin time: 05 34 16.7
 Epicenter: 37.89 N., 122.19 W.
 Depth: 9 km
 Magnitude: 3.2 ML
Intensity III: Berkeley.

9 January (B) Northern California
 Origin time: 23 24 39.5
 Epicenter: 39.50 N., 121.64 W.
 Depth: 2 km
 Magnitude: 3.3 ML
Intensity V: Dobbins.
Intensity IV: Gold Run, Gridley, Marysville, Oroville (police reported that several burglar alarms went off and telephone service was disrupted for a short time--press report), Palermo, Rackerby.
Intensity III: Brownsville.

10 January (B) Central California
 Origin time: 05 08 07.9
 Epicenter: 37.91 N., 122.30 W.
 Depth: 3 km
 Magnitude: 2.9 ML
Intensity III: Berkeley.

13 January (B) Northern California
 Origin time: 20 09 53.5
 Epicenter: 41.02 N., 122.15 W.
 Depth: 2 km
 Magnitude: 3.7 ML
Intensity III: Dunsmuir-McCloud area (telephone report), vicinity of Mt. Shasta (press report).

17 January (P) Southern California
 Origin time: 00 39 15.4
 Epicenter: 34.37 N., 118.67 W.
 Depth: 14 km
 Magnitude: 3.4 ML
Intensity III: Saugus to Northridge (telephone report).

17 January (P) Baja California, Mexico
 Origin time: 11 13 19.4
 Epicenter: 32.47 N., 115.18 W.
 Depth: 25 km
 Magnitude: 4.6 mb(G), 4.2 ML
Intensity V:
 Arizona--Gadsden, San Luis, Wellton, Yuma.
 California--Calexico, Seeley, Winterhaven.
Intensity IV:
 Arizona--Martinez Lake.
 California--Bard, Heber, Imperial, Plaster City.

18 January (B) Central California
 Origin time: 21 05 46.6
 Epicenter: 36.92 N., 121.49 W.

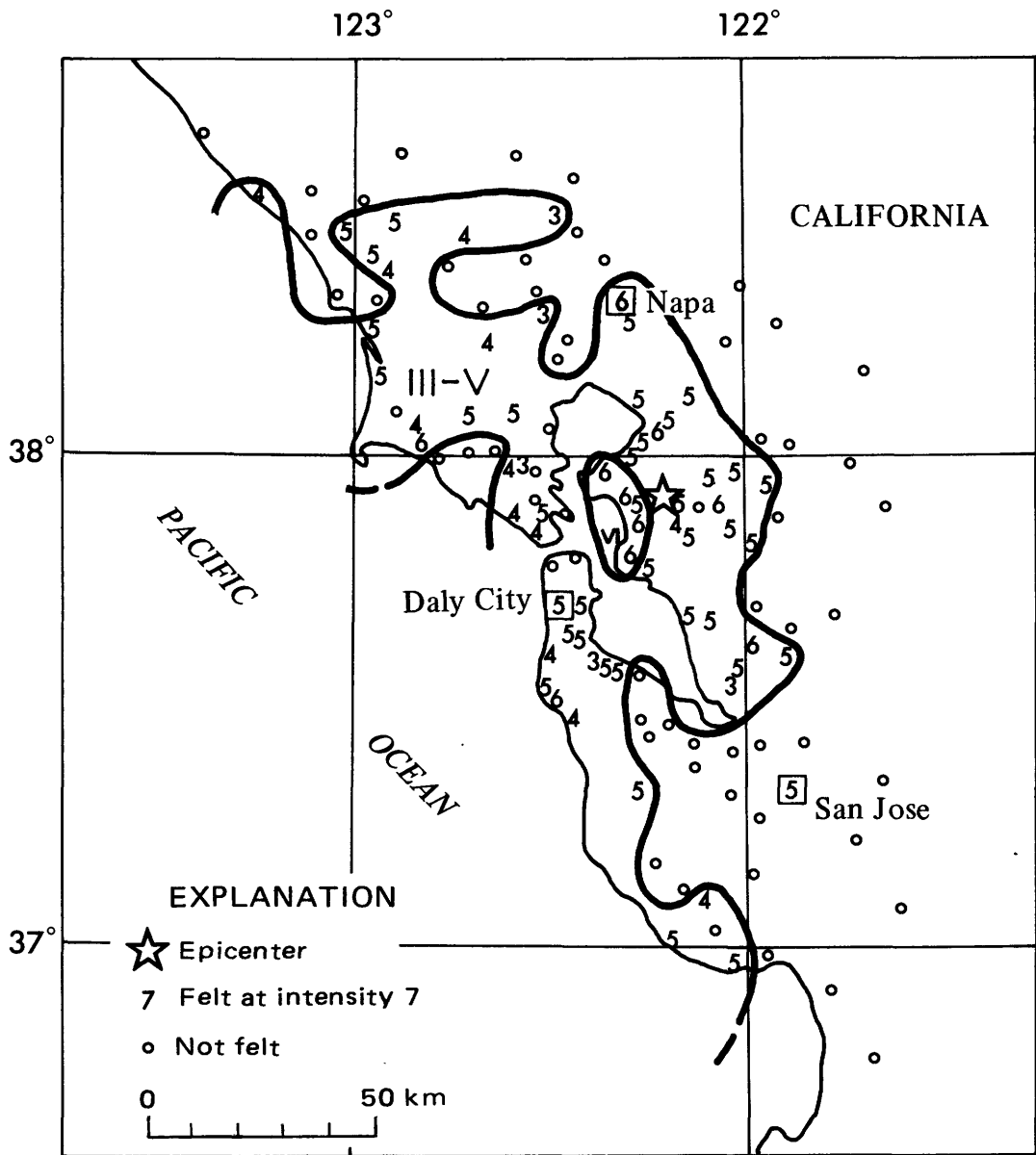


FIGURE 7.--Isoseismal map for the central California earthquake of 8 January 1977, 09 38 07.5 UTC. Roman numerals represent Modified Mercalli intensities between isoseismals; Arabic numerals are used to represent these intensities at specific sites.

Table 2.--Summary of macroseismic data for U.S. earthquakes, January-March 1977--Continued

| California--Continued | |
|-----------------------|---------|
| Depth: | 9 km |
| Magnitude: | 3.5 ML |
| <u>Intensity IV:</u> | Gilroy. |

19 January (B) Central California
 Origin time: 02 12 19.8
 Epicenter: 36.93 N., 121.49 W.

Table 2.--Summary of macroseismic data for U.S. earthquakes, January-March 1977--Continued

| California--Continued | |
|-----------------------|----------------------------|
| Depth: | 4 km |
| Magnitude: | 4.0 ML |
| <u>Intensity V:</u> | Hollister. |
| <u>Intensity IV:</u> | Gilroy, San Juan Bautista. |

23 January (B) Central California
 Origin time: 17 45 50.3
 Epicenter: 37.86 N., 122.25 W.

Table 2.--Summary of macroseismic data for U.S. earthquakes,
January-March 1977--Continued

| California--Continued | |
|-------------------------------------|---|
| Depth: | 9 km |
| Magnitude: | 2.7 ML |
| <u>Intensity IV:</u> | Berkeley (press report), Oakland. |
| <u>Intensity III:</u> | San Francisco Bay area. |
| 24 January (P) Southern California | |
| Origin time: | 11 35 16.5 |
| Epicenter: | 33.92 N., 118.13 W. |
| Depth: | 27 km |
| Magnitude: | 2.7 ML |
| <u>Intensity III:</u> | Downey. |
| 24 January (B) Central California | |
| Origin time: | 15 55 46.4 |
| Epicenter: | 37.86 N., 122.24 W. |
| Depth: | 8 km |
| Magnitude: | 2.7 ML |
| <u>Intensity III:</u> | Berkeley and the San Francisco Bay area. |
| 1 February (B) Lake Tahoe region | |
| Origin time: | 18 47 57.5 |
| Epicenter: | 39.06 N., 120.00 W. |
| Depth: | 2 km |
| Magnitude: | 3.9 ML |
| <u>Intensity V:</u> | California--Markleeville, Mount Aukum, Tahoma, Twin Bridges. Nevada--Carson City, Genoa, Stateline, Stewart, Zephyr Cove. |
| <u>Intensity IV:</u> | California--Grizzly Flats, Kings Beach, Pacific House, Placerville (press report), Pollock Pines, South Lake Tahoe, Tahoe City, Topaz. Nevada--Gardnerville, Minden, Silver City. |
| <u>Intensity III:</u> | California--Grass Valley. Nevada--Glenbrook, Incline (press report). |
| 3 February (P) Southern California | |
| Origin time: | 13 49 38.8 |
| Epicenter: | 33.88 N., 116.60 W. |
| Depth: | 8 km |
| Magnitude: | 2.8 ML |
| <u>Intensity III:</u> | Palm Springs. |
| 10 February (P) Southern California | |
| Origin time: | 12 10 47.7 |
| Epicenter: | 33.97 N., 116.58 W. |
| Depth: | 8 km |
| Magnitude: | 3.3 ML |
| <u>Intensity IV:</u> | Morongo Valley. |
| <u>Intensity III:</u> | Palm Springs (telephone report). |
| 14 February (P) Central California | |
| Origin time: | 13 58 40.3 |
| Epicenter: | 35.72 N., 117.70 W. |
| Depth: | 3 km |
| Magnitude: | 3.2 ML |
| <u>Intensity V:</u> | China Lake. |
| <u>Intensity IV:</u> | Ridgecrest (press report). |

Table 2.--Summary of macroseismic data for U.S. earthquakes,
January-March 1977--Continued

| California--Continued | |
|--|--|
| 14 February (P) Central California | |
| Origin time: | 13 58 51.8 |
| Epicenter: | 35.72 N., 117.70 W. |
| Depth: | 3 km |
| Magnitude: | 3.7 ML |
| <u>Intensity V:</u> | China Lake. |
| <u>Intensity IV:</u> | Ridgecrest (press report). |
| 21 February (B) Northern California | |
| Origin time: | 11 09 15.3 |
| Epicenter: | 39.37 N., 123.30 W. |
| Depth: | 20 km |
| Magnitude: | 3.2 ML |
| <u>Intensity V:</u> | Willits (small objects shifted, awakened many and frightened a few in the community, dogs restless the night before). |
| 22 February (B) California-Nevada border | |
| Origin time: | 06 24 06.5 |
| Epicenter: | 38.48 N., 119.29 W. |
| Depth: | 5 km |
| Magnitude: | 5.0 mb(G), 4.8 ML |
| | This earthquake was felt over an area of approximately 22,300 sq km of California and Nevada (fig. 8). |
| <u>Intensity VI:</u> | California--Bridgeport. |
| <u>Intensity V:</u> | California--Bear Valley, Big Oak Flat, Big Trees Village, Coleville, El Portal, Emigrant Gap, Grizzly Flats, Long Barn, Mariposa, Murphys, Pioneer, Sonora, Soulsbyville, Topaz. Nevada--Carson City, Cave Rock, Minden, Schurz, Wellington. |
| <u>Intensity IV:</u> | California--Arnold, Chinese Camp, Glencoe, Pinecrest, Standard, Strawberry, Tuolumne, Twain Harte, Volcano, Wawona, Wilseyville. Nevada--Babbitt, Hawthorne, Silver City, Virginia City, Yerington, Zephyr Cove. |
| <u>Intensity III:</u> | California--Pine Grove. Nevada--Genoa, Reno (press report). |
| <u>Intensity II:</u> | California--Floriston. Nevada--Fernley, Sparks. |
| 26 February (P) Southern California | |
| Origin time: | 22 09 38.2 |
| Epicenter: | 34.15 N., 118.23 W. |
| Depth: | 13 km |
| Magnitude: | 3.1 ML |
| <u>Intensity III:</u> | Felt in central Los Angeles County, Burbank, Hollywood (press reports). |

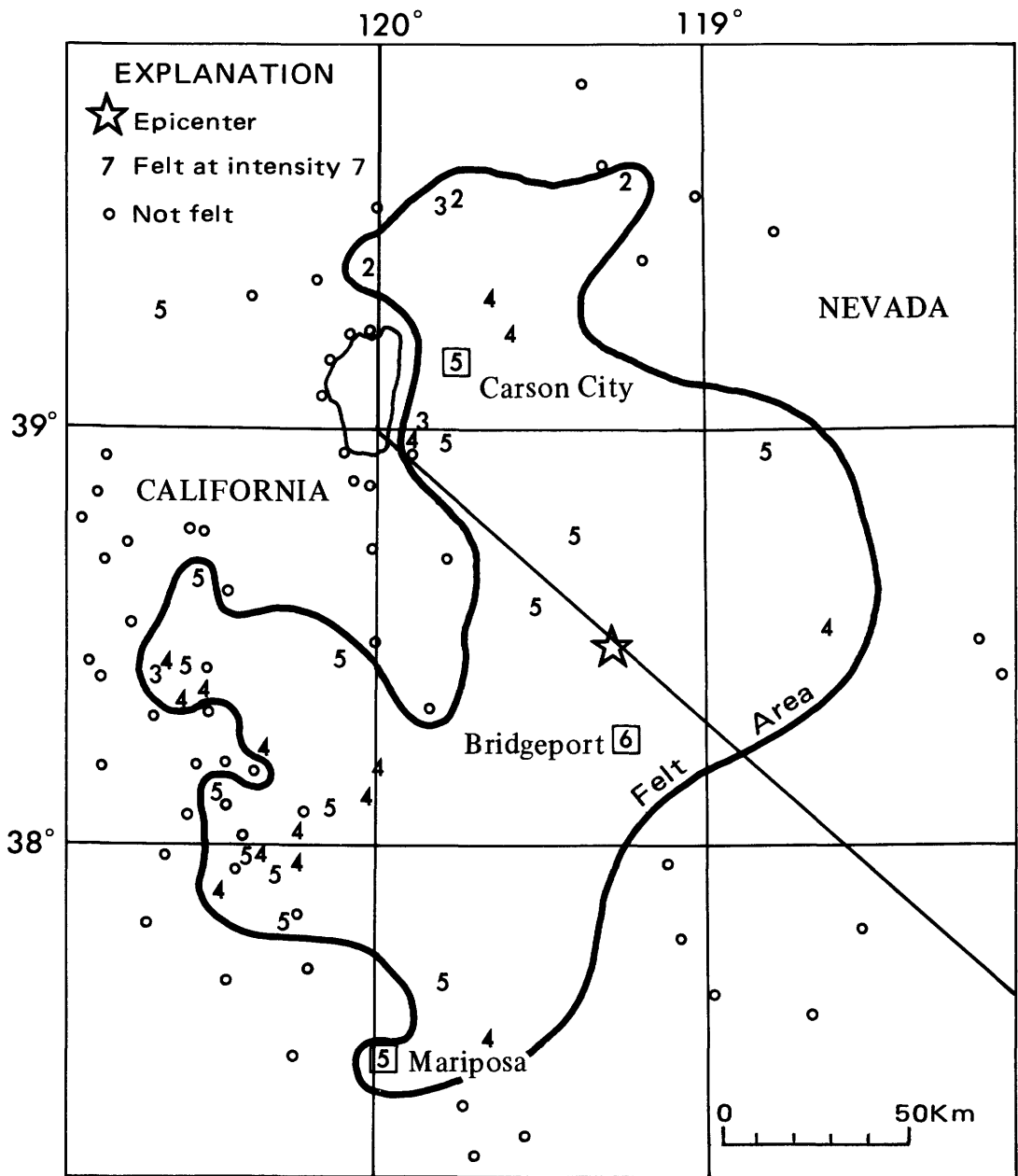


FIGURE 8.--Intensity map for the California-Nevada border earthquake of 22 February 1977, 06 24 06.5 UTC. Arabic numerals are used to represent Modified Mercalli intensities at specific sites.

Table 2.--Summary of macroseismic data for U.S. earthquakes, January-March 1977--Continued

Table 2.--Summary of macroseismic data for U.S. earthquakes, January-March 1977--Continued

California--Continued

California--Continued

1 March (B) Central California

Origin time: 21 08 46.1
 Epicenter: 37.84 N., 122.06 W.
 Depth: 9 km
 Magnitude: 3.0 ML

Intensity V: Moraga.
Intensity IV: Kensington, Lafayette.
Intensity III: Albany, San Leandro
 (telegraphic report).

Table 2.--Summary of macroseismic data for U.S. earthquakes,
January-March 1977--Continued

California--Continued

7 March (P) Southern California
 Origin time: 11 04 35.2
 Epicenter: 34.47 N., 117.97 W.
 Depth: 8 km
 Magnitude: 3.0 ML
Intensity III: Palmdale.

7 March (P) Central California
 Origin time: 21 52 24.0
 Epicenter: 35.73 N., 117.70 W.
 Depth: 12 km
 Magnitude: 3.0 ML
Intensity V: China Lake Weather Station
 (all frightened, objects rattled, doors and
 windows shaken).
Intensity III: Ridgecrest.

7 March (P) Central California
 Origin time: 23 21 30.7
 Epicenter: 35.73 N., 117.70 W.
 Depth: 12 km
 Magnitude: 3.2 ML
Intensity III: China Lake, Ridgecrest.

12 March (B) Central California
 Origin time: 09 19 06.7
 Epicenter: 36.89 N., 121.49 W.
 Depth: 2 km
 Magnitude: 3.7 ML
Intensity III: Hollister area (telephone
 report).

19 March (P) Central California
 Origin time: 10 37 49.7
 Epicenter: 35.70 N., 117.72 W.
 Depth: 2 km
 Magnitude: 3.0 ML
Intensity III: Ridgecrest.

25 March (P) Southern California
 Origin time: 11 23 55.7
 Epicenter: 33.97 N., 116.60 W.
 Depth: 11 km
 Magnitude: 2.8 ML
Intensity III: Palm Springs.

25 March (P) Southern California
 Origin time: 15 43 58.8
 Epicenter: 32.97 N., 115.50 W.
 Depth: 13 km
 Magnitude: 3.4 ML
Intensity III: Brawley.

31 March (P) Southern California
 Origin time: 13 30 29.0
 Epicenter: 33.40 N., 116.97 W.
 Depth: 3 km
 Magnitude: 3.3 ML
Intensity III: Escondido.

Table 2.--Summary of macroseismic data for U.S. earthquakes,
January-March 1977--Continued

Colorado

3 March (G) Southern Wyoming
 Origin time: 17 50 28.0
 See Wyoming listing.

5 March (G) Northwestern New Mexico
 Origin time: 03 00 54.7
 See New Mexico listing.

Delaware

10 February Northern Delaware
 Origin time: 19 14 25
 Epicenter: Not located.
 Depth: None computed.
 Magnitude: 2.0 mbLg(Z)

The following information has been obtained
 from a canvass conducted by the Delaware
 Geological Survey and the University of
 Delaware, Newark, DE 19711. The
 questionnaires were re-evaluated by the
 U.S. Geological Survey; only a few of 70
 replies are listed below. All of the
 reports are from the Wilmington
 metropolitan area.

Intensity VI: Lancaster Village (cracked
 plaster), Stratford (cracked plaster).
Intensity V: Cedar and Rodney St.
 (frightened all, ran outside), North Broom
 St. (patients and staff of nursing home all
 frightened--press report).
Intensity IV: Bellevue Manor--Brandywine
 Blvd., Delaware and North Scott St., Eighth
 and Rodney St., Elsmere, Maple St., Market
 and Tatnal St., Milltown, Seventh and Union
 St., Sherwood Park, Wilmington Bureau
 Police Office--Tenth and French St. (75
 calls received), Woodcrest.

Intensity III: Dupont, Fire Department
 dispatchers' office, City Hall, Fourth and
 Clayton St., Jackson and Third St. (public
 school building), Morehouse Dr. and
 Dunleith, Motor Vehicle Department--South
 Heald St., Van Buren and Monroe, Vilone
 Village--Richard Ave.

Intensity II: Baynard Blvd., Beech and
 Rodney St., Broom and Cedar St.

Hawaii

The locations shown below followed by (H)
 designate intensity values assigned by the
 Hawaiian Volcano Observatory.

Table 2.—Summary of macroseismic data for U.S. earthquakes,
January–March 1977—Continued

| Hawaii—Continued | |
|------------------|---|
| 1 | January (H) Island of Hawaii Origin time: 14 26 35.3 Epicenter: 19.34 N., 155.12 W. Depth: 9 km Magnitude: 3.7 ML <u>Intensity II</u> : Hilo (H). |
| 5 | January (H) Island of Hawaii Origin time: 00 25 13.2 Epicenter: 19.39 N., 155.25 W. Depth: 5 km Magnitude: 3.6 ML <u>Intensity III</u> : Hawaiian Volcano Observatory (H), Volcano (H). |
| 8 | January (H) Island of Hawaii Origin time: 10 02 38.0 Epicenter: 19.33 N., 155.13 W. Depth: 10 km Magnitude: 4.1 ML <u>Intensity III</u> : Puna District (H), Volcano (H). |
| 12 | January (H) Island of Hawaii Origin time: 13 05 59.3 Epicenter: 19.40 N., 155.29 W. Depth: 16 km Magnitude: 3.9 ML <u>Intensity IV</u> : Hilo (H), Mountain View (H), Volcano (H). <u>Intensity III</u> : Kau District (H), Kona District (H), Red Hill (H). |
| 14 | January (H) Island of Hawaii Origin time: 23 26 42.3 Epicenter: 19.34 N., 155.12 W. Depth: 9 km Magnitude: 4.2 mb(G), 4.7 ML Felt islandwide. <u>Intensity IV</u> : Hilo (H), Honomu, Kahului (H), Keaau, Lahaina, Naalehu, Pahala, Papaikou, Volcano. <u>Intensity III</u> : Ookala. <u>Intensity II</u> : Papaaloa. |
| 20 | January (H) Island of Hawaii Origin time: 12 20 27.8 Epicenter: 19.33 N., 155.19 W. Depth: 9 km Magnitude: 3.4 ML <u>Intensity III</u> : Hilo (H), Mountain View (H), Volcano (H). |
| 22 | January (H) Island of Hawaii Origin time: 17 32 42.5 Epicenter: 19.36 N., 155.25 W. Depth: 10 km Magnitude: 3.6 ML <u>Intensity III</u> : Hawaii Volcanoes National Park (H), Hilo (H), Volcano (H). |

Table 2.—Summary of macroseismic data for U.S. earthquakes,
January–March 1977—Continued

| Hawaii—Continued | |
|------------------|---|
| 22 | January (H) Island of Hawaii Origin time: 18 02 44.2 Epicenter: 19.39 N., 155.25 W. Depth: 6 km Magnitude: 3.6 ML <u>Intensity III</u> : Hawaii Volcanoes National Park (H), Volcano (H). |
| 23 | January (H) Island of Hawaii Origin time: 20 49 01.7 Epicenter: 19.34 N., 155.20 W. Depth: 9 km Magnitude: 4.8 mb(G), 4.0 ML <u>Intensity IV</u> : Hilo (H). <u>Intensity III</u> : Puna District (H), Volcano (H). |
| 30 | January (H) Island of Hawaii Origin time: 08 48 49.7 Epicenter: 19.37 N., 155.08 W. Depth: 8 km Magnitude: 4.1 ML <u>Intensity IV</u> : Hilo (H). <u>Intensity III</u> : Glenwood (H), Volcano (H). |
| 2 | February (H) Island of Hawaii Origin time: 18 11 29.3 Epicenter: 19.39 N., 155.07 W. Depth: 8 km Magnitude: 3.0 ML <u>Intensity III</u> : Hilo (H). |
| 4 | February (H) Island of Hawaii Origin time: 01 20 49.7 Epicenter: 19.36 N., 155.08 W. Depth: 9 km Magnitude: 4.5 mb(G), 4.5 ML <u>Intensity V</u> : Hilo, Keaau, Kurtistown. <u>Intensity IV</u> : Hamakua District (H), Pahoa, Papaikou, Puna District (H), Volcano. <u>Intensity III</u> : Kona (H), Mountain View. |
| 4 | February (H) Island of Hawaii Origin time: 14 25 11.7 Epicenter: 20.11 N., 155.47 W. Depth: 1 km Magnitude: 3.7 ML <u>Intensity IV</u> : Honokaa (H), Waimea (H). <u>Intensity III</u> : Kohala (H), Kona District (H), Pepeekeo (H). |
| 9 | February (H) Island of Hawaii Origin time: 00 47 02.2 Epicenter: 19.39 N., 155.25 W. Depth: 3 km Magnitude: 3.1 ML <u>Intensity III</u> : Hawaii Volcanoes National Park (H). |
| 9 | February (H) Island of Hawaii Origin time: 04 51 20.2 Epicenter: 19.39 N., 155.23 W. |

Table 2.—Summary of macroseismic data for U.S. earthquakes,
January–March 1977—Continued

Hawaii--Continued

Depth: 3 km
 Magnitude: 3.4 ML
Intensity III: Hawaii Volcanoes National Park (H), Volcano (H).

9 February (H) Island of Hawaii
 Origin time: 05 02 22.2
 Epicenter: 19.39 N., 155.24 W.
 Depth: 7 km
 Magnitude: 3.5 ML
Intensity III: Hawaii Volcanoes National Park (H), Volcano (H).

9 February (H) Island of Hawaii
 Origin time: 05 23 31.8
 Epicenter: 19.39 N., 155.25 W.
 Depth: 5 km
 Magnitude: 3.5 ML
Intensity III: Hawaii Volcanoes National Park (H), Volcano (H).

9 February (H) Island of Hawaii
 Origin time: 05 28 30.0
 Epicenter: 19.39 N., 155.25 W.
 Depth: 5 km
 Magnitude: 3.4 ML
Intensity III: Hawaii Volcanoes National Park (H), Volcano (H).

9 February (H) Island of Hawaii
 Origin time: 05 54 26.5
 Epicenter: 19.37 N., 155.24 W.
 Depth: 0 km
 Magnitude: 3.0 ML
Intensity III: Hawaii Volcanoes National Park (H), Volcano (H).

9 February (H) Island of Hawaii
 Origin time: 06 44 06.1
 Epicenter: 19.38 N., 155.25 W.
 Depth: 1 km
 Magnitude: 3.1 ML
Intensity III: Hawaii Volcanoes National Park (H), Volcano (H).

9 February (H) Island of Hawaii
 Origin time: 07 27 35.4
 Epicenter: 19.39 N., 155.26 W.
 Depth: 1 km
 Magnitude: 3.2 ML
Intensity III: Hawaii Volcanoes National Park (H), Volcano (H).

9 February (H) Island of Hawaii
 Origin time: 19 22 01.0
 Epicenter: 19.39 N., 155.08 W.
 Depth: 8 km
 Magnitude: 3.3 ML
Intensity III: Hilo (H).

10 February (H) Island of Hawaii
 Origin time: 07 14 47.0

Table 2.—Summary of macroseismic data for U.S. earthquakes,
January–March 1977—Continued

Hawaii--Continued

Epicenter: 19.39 N., 155.25 W.
 Depth: 5 km
 Magnitude: 3.0 ML
Intensity III: Hawaii Volcanoes National Park (H), Volcano (H).

21 February (H) Island of Hawaii
 Origin time: 03 29 42.8
 Epicenter: 19.33 N., 155.27 W.
 Depth: 10 km
 Magnitude: 3.7 ML
Intensity IV: Hilo (H).
Intensity III: Glenwood (H), Volcano (H).
Intensity II: Papaikou (H), Pepeekeo (H), Kona District.

24 February (H) Island of Hawaii
 Origin time: 03 23 25.7
 Epicenter: 20.20 N., 155.80 W.
 Depth: 36 km
 Magnitude: 3.5 ML
Intensity III: Kahua Ranch (H).

9 March (H) Island of Hawaii
 Origin time: 10 29 16.5
 Epicenter: 19.40 N., 155.50 W.
 Depth: 53 km
 Magnitude: 4.1 ML
Intensity V: Kamuela (H).
Intensity IV: Hilo (H), Volcano (H).
Intensity III: Glenwood (H), Hakalau (H), Kau District (H), Kona District (H).
Intensity II: Holualoa (H).

18 March (H) Island of Hawaii
 Origin time: 23 33 07.2
 Epicenter: 19.36 N., 155.30 W.
 Depth: 34 km
 Magnitude: 3.2 ML
Intensity III: Volcano, Waimea.

21 March (H) Island of Hawaii
 Origin time: 14 59 24.7
 Epicenter: 19.37 N., 155.07 W.
 Depth: 8 km
 Magnitude: 3.4 ML
Intensity III: Hilo (H), Keaau (H), Mountain View (H), Pepeekeo (H).

25 March (H) Island of Hawaii
 Origin time: 05 37 00.3
 Epicenter: 19.35 N., 155.14 W.
 Depth: 8 km
 Magnitude: 3.6 ML
Intensity IV: Hilo.
Intensity III: Hawaii Volcanoes National Park (H), Volcano (H).

29 March (H) Island of Hawaii
 Origin time: 22 56 40.0
 Epicenter: 19.18 N., 155.68 W.
 Depth: 6 km

Table 2.—Summary of macroseismic data for U.S. earthquakes,
January-March 1977—Continued

| Hawaii--Continued | |
|---|---|
| Magnitude: | 3.3 ML |
| <u>Intensity III:</u> | Captain Cook (H), Oceanview (H). |
| 31 March (H) Island of Hawaii | |
| Origin time: | 01 17 37.7 |
| Epicenter: | 19.70 N., 156.00 W. |
| Depth: | 9 km |
| Magnitude: | 3.6 ML |
| <u>Intensity IV:</u> | Holualoa (H), Kalua (H), Kona District (H). |
| <u>Intensity III:</u> | Hualalai Ranch (H), Huehue Ranch (H), Kamuela (H), Kalaua (H). |
| Idaho | |
| 12 January (G) Eastern Idaho | |
| Origin time: | 14 12 22.2 |
| Epicenter: | 44.63 N., 112.60 W. |
| Depth: | 5 km |
| Magnitude: | 3.5 ML(D), 3.3 ML(A) |
| <u>Intensity IV:</u> | Dell, Lima. |
| Illinois | |
| 3 January (S) New Madrid, Missouri region | |
| Origin time: | 22 56 48.5 |
| | See Missouri listing. |
| Michigan | |
| 9 March (X) Northwestern Ohio | |
| Origin time: | 08 48 17.1 |
| | See Ohio listing. |
| Missouri | |
| 3 January (S) Southeast Missouri region | |
| Origin time: | 22 56 48.5 |
| Epicenter: | 37.55 N., 89.79 W. |
| Depth: | 5 km |
| Magnitude: | 3.4 ML |
| <u>Intensity VI:</u> | Missouri--Old Appleton (some cracked plaster). |
| <u>Intensity V:</u> | Missouri--Burfordville, Farrar, Millersville, Pocahontas. |
| <u>Intensity IV:</u> | Illinois--Anna, Millcreek, Rockwood, Wolf Lacey. |
| | Missouri--Altenburg, Brazeau, Cape Girardeau (press report), Chaffee, |

Table 2.—Summary of macroseismic data for U.S. earthquakes,
January-March 1977—Continued

| Missouri--Continued | |
|---|---|
| | Friedheim, Frohna, Gordonville, Jackson, Oak Ridge, Patton, Perryville, Uniontown. |
| <u>Intensity III:</u> | Illinois--Ava. |
| | Missouri--Daisy, Knob Lick. |
| 28 March (S) New Madrid region | |
| Origin time: | 11 17 14.2 |
| Epicenter: | 36.48 N., 89.54 W. |
| Depth: | 10 km |
| Magnitude: | None computed. |
| <u>Intensity II:</u> | Marston. |
| Montana | |
| 26 January (G) Hebgen Lake region | |
| Origin time: | 10 23 35.8 |
| Epicenter: | 44.63 N., 111.13 W. |
| Depth: | 5 km |
| Magnitude: | 2.5 ML(A) |
| <u>Intensity IV:</u> | Mary Mountain patrol cabin, Yellowstone National Park, 14.4 km southeast of Norris Geyser Basin (dishes rattled). |
| 4 March (G) Hebgen Lake region | |
| Origin time: | 10 05 59.6 |
| Epicenter: | 44.83 N., 111.04 W. |
| Depth: | 5 km |
| Magnitude: | 3.9 mb, 3.8 ML, 4.1 ML(A), 4.2 ML(D) |
| <u>Intensity IV:</u> | Montana--West Yellowstone. |
| | Wyoming--Old Faithful, Yellowstone National Park. |
| 4 March (G) Hebgen Lake region | |
| Origin time: | 11 01 50.2 |
| Epicenter: | 44.80 N., 111.08 W. |
| Depth: | 5 km |
| Magnitude: | 3.9 mb, 3.6 ML, 4.1 ML(D) |
| The most interesting effect of the tremors at Old Faithful was the abnormal behavior of a herd of 14 bison. The bison will usually avoid the developed area, except when moving from an area where they have bedded down to a different meadow for grazing. During the morning hours of March 4, at the time of the most frequent strong seismic activity, the herd milled back and forth between the Old Faithful Lodge, Visitor Center, and Old Faithful Inn parking areas no less than six times. They behaved in a very restless and nervous manner, bolting in unison on at least one occasion, only to return later. In the mall area outside the Visitor Center, two lodgepole pines had virtually all their bark and lower branches | |

Table 2.—Summary of macroseismic data for U.S. earthquakes,
January-March 1977—Continued

Montana--Continued

stripped off by bison rubbing their horns or heads, and all of the rope fence behind the Visitor Center was taken out as the herd moved through. The herd settled down by afternoon, when the number of tremors had diminished significantly, and moved into the fringe of the wooded area south of Myriad Group (R. A. Hutchinson, Park Geologist, Yellowstone National Park, written commun., 1977).

Intensity IV:
Montana--Gardiner, West Yellowstone.
Wyoming--Old Faithful, Yellowstone National Park.

Intensity III:
Wyoming--Mammoth.

4 March (G) Hebgen Lake region
Origin time: 11 33 06.9
Epicenter: 44.84 N., 111.13 W.
Depth: 5 km
Magnitude: 3.7 mb, 3.6 ML, 4.3 ML(D)
Intensity IV:
Montana--West Yellowstone.
Wyoming--Old Faithful, Yellowstone National Park.

Intensity III:
Wyoming--Mammoth.

4 March (G) Hebgen Lake region
Origin time: 13 00 58.9
Epicenter: 44.80 N., 111.08 W.
Depth: 5 km
Magnitude: 4.1 mb, 4.1 ML, 4.3 ML(D)
Intensity IV:
Montana--Gardiner, West Yellowstone.
Wyoming--Old Faithful, Yellowstone National Park.

Intensity III:
Wyoming--Madison Junction, Mammoth, Nez Perce patrol cabin, Yellowstone National Park.

4 March (G) Hebgen Lake region
Origin time: 13 04 21.4
Epicenter: 44.82 N., 111.10 W.
Depth: 5 km
Magnitude: 4.0 mb, 3.7 ML, 4.0 ML(D)
Intensity IV:
Montana--West Yellowstone.

Intensity III:
Wyoming--Nez Perce patrol cabin, Yellowstone National Park.

4 March Hebgen Lake region
Origin time: 13 12
Epicenter: Not located.
Depth: None computed.
Magnitude: None computed.
Intensity III: West Yellowstone.

Table 2.—Summary of macroseismic data for U.S. earthquakes,
January-March 1977—Continued

Montana--Continued

4 March (G) Hebgen Lake region
Origin time: 14 19 48.8
Epicenter: 44.78 N., 111.05 W.
Depth: 5 km
Magnitude: 4.0 mb, 4.0 ML, 4.3 ML(D)
Intensity IV:
Montana--Gardiner, West Yellowstone.
Wyoming--Old Faithful, Yellowstone National Park.

Intensity III:
Wyoming--Madison Junction, Mammoth, Nez Perce patrol cabin, Yellowstone National Park.

4 March Hebgen Lake region
Origin time: 14 26
Epicenter: Not located.
Depth: None computed.
Magnitude: None computed.
Intensity III: Old Faithful, Yellowstone National Park.

4 March (G) Hebgen Lake region
Origin time: 14 58 05.5
Epicenter: 44.75 N., 111.35 W.
Depth: 5 km
Magnitude: 3.7 ML(D)
Intensity III:
Montana--West Yellowstone.
Wyoming--Mammoth.

4 March (G) Hebgen Lake region
Origin time: 16 12 28.2
Epicenter: 44.79 N., 111.05 W.
Depth: 5 km
Magnitude: 3.4 ML, 3.7 ML(D)
Intensity III:
Montana--West Yellowstone.
Wyoming--Mammoth, Old Faithful, Yellowstone National Park.

4 March (G) Hebgen Lake region
Origin time: 16 47 43.5
Epicenter: 44.77 N., 111.12 W.
Depth: 5 km
Magnitude: 3.7 ML, 4.0 ML(D)
Intensity III:
Montana--West Yellowstone.
Wyoming--Madison Junction.

4 March (G) Hebgen Lake region
Origin time: 16 51 48.3
Epicenter: 44.77 N., 111.21 W.
Depth: 5 km
Magnitude: 4.0 ML(D)
Intensity IV:
Wyoming--Old Faithful, Yellowstone National Park.

Intensity III:
Montana--West Yellowstone.
Wyoming--Madison Junction, Nez Perce patrol cabin, Yellowstone National Park.

Table 2.--Summary of macroseismic data for U.S. earthquakes,
January-March 1977--Continued

| Montana--Continued | |
|-----------------------------------|--|
| 4 March (G) Hebgen Lake region | |
| Origin time: | 17 10 40.6 |
| Epicenter: | 44.76 N., 111.01 W. |
| Depth: | 5 km |
| Magnitude: | 4.0 mb, 3.8 ML(D) |
| <u>Intensity IV:</u> | |
| | Montana--West Yellowstone. |
| <u>Intensity III:</u> | |
| | Wyoming--Madison Junction, Old Faithful, Yellowstone National Park. |
| 4 March Hebgen Lake region | |
| Origin time: | 17 17 |
| Epicenter: | Not located. |
| Depth: | None computed. |
| Magnitude: | 3.4 ML(D) |
| <u>Intensity III:</u> | West Yellowstone. |
| 5 March Hebgen Lake region | |
| Origin time: | 00 32 |
| Epicenter: | Not located. |
| Depth: | None computed. |
| Magnitude: | 3.3 ML(D) |
| <u>Intensity III:</u> | West Yellowstone. |
| 6 March (G) Hebgen Lake region | |
| Origin time: | 05 01 04.0 |
| Epicenter: | 44.74 N., 111.13 W. |
| Depth: | 5 km |
| Magnitude: | 2.9 ML(A) |
| <u>Intensity V:</u> | West Yellowstone (awakened all residents, buildings creaked and objects rattled). |
| 6 March (G) Hebgen Lake region | |
| Origin time: | 06 10 12.7 |
| Epicenter: | 44.71 N., 111.21 W. |
| Depth: | 5 km |
| Magnitude: | 3.0 ML(A) |
| <u>Intensity V:</u> | West Yellowstone (awakened all residents, buildings creaked and objects rattled). |
| 11 March (G) Southwestern Montana | |
| Origin time: | 05 09 37.2 |
| Epicenter: | 46.13 N., 111.48 W. |
| Depth: | 5 km |
| Magnitude: | 4.6 mb, 4.8 ML |
| <u>Intensity VI:</u> | |
| | Montana--Harrison (cracked plaster). |
| <u>Intensity V:</u> | |
| | Montana--Boulder, Hudson, Maudlow, Radersburg, Three Forks, Trident, Willow Creek. |
| <u>Intensity IV:</u> | |
| | Montana--Broadview, Jefferson City, Manhattan. |
| | Wyoming--Yellowstone National Park. |
| <u>Intensity III:</u> | |
| | Montana--Toston (telephone report). |
| <u>Intensity II:</u> | |
| | Montana--Melstone, Missoula, Molt. |

Table 2.--Summary of macroseismic data for U.S. earthquakes,
January-March 1977--Continued

| Montana--Continued | |
|--|---|
| 11 March (G) Hebgen Lake region | |
| Origin time: | 12 17 51.9 |
| Epicenter: | 44.85 N., 111.50 W. |
| Depth: | 5 km |
| Magnitude: | 5.2 mb, 4.1 ML |
| <u>Intensity IV:</u> | |
| | Wyoming--Old Faithful, Yellowstone National Park (a few employees and guests awakened). |
| 24 March (G) Southwestern Montana | |
| Origin time: | 13 20 11.9 |
| Epicenter: | 45.71 N., 111.31 W. |
| Depth: | 5 km |
| Magnitude: | 3.2 ML(A) |
| <u>Intensity IV:</u> | Bozeman (objects on shelves rattled, roaring sounds heard, one sleeper awakened). |
| Nevada | |
| 3 January (G) Central Nevada | |
| Origin time: | 14 20 00.1 |
| Epicenter: | 39.59 N., 115.81 W. |
| Depth: | 6 km |
| Magnitude: | 3.4 ML |
| <u>Intensity III:</u> | Eureka. |
| 1 February (B) Lake Tahoe region | |
| Origin time: | 18 47 57.5 |
| | See California listing. |
| 22 February (B) California-Nevada border | |
| Origin time: | 06 24 06.5 |
| | See California listing. |
| New Mexico | |
| 4 January (G) Southern New Mexico | |
| Origin time: | 18 31 37.6 |
| Epicenter: | 32.36 N., 106.92 W. |
| Depth: | 5 km |
| Magnitude: | 3.2 ML |
| <u>Intensity V:</u> | Dona Ana. |
| <u>Intensity IV:</u> | Las Cruces, Organ, Radium Springs. |
| <u>Intensity III:</u> | Rincon. |
| 5 March (G) Northwestern New Mexico | |
| Origin time: | 03 00 54.7 |
| Epicenter: | 35.91 N., 108.29 W. |
| Depth: | 22 km |
| Magnitude: | 4.6 mb, 4.2 ML |
| | This earthquake occurred in the same epicentral region as the magnitude 5.0 shock of January 4, 1976 (Simon and others, |

Table 2.—Summary of macroseismic data for U.S. earthquakes, January-March 1977—Continued

Table 2.—Summary of macroseismic data for U.S. earthquakes, January-March 1977—Continued

New Mexico--Continued

New Mexico--Continued

1977). It was felt over an area of approximately 51,400 sq km of Arizona, Colorado, and New Mexico (fig. 9).

Intensity VI:

New Mexico--Crownpoint (fences displaced slightly), Prewitt (existing cracks widened considerably).

Intensity V:

Arizona--Chinle, Houck.
 Colorado--Cortez, Durango.
 New Mexico--Blanco, Chaco Canyon, Gallup, Lake Valley Navajo School (40 km north of Crownpoint), Mexican Springs, San Rafael,

Ship Rock, Navajo Dam, Toadlena, Zuni.

Intensity IV:

Arizona--Fort Defiance, Leupp, Lupton.
 Colorado--Mesa Verde National Park, Pagosa Springs, Towaoc.
 Los Ojos, Ramah, Thoreau, Tohatchi.

Intensity III:

New Mexico--Waterflow.

Intensity II:

Arizona--Sanders.
 New Mexico--Seboyeta.
 New Mexico--Aztec, Bloomfield, Bluewater, Church Rock, Farmington, Jemez Springs,

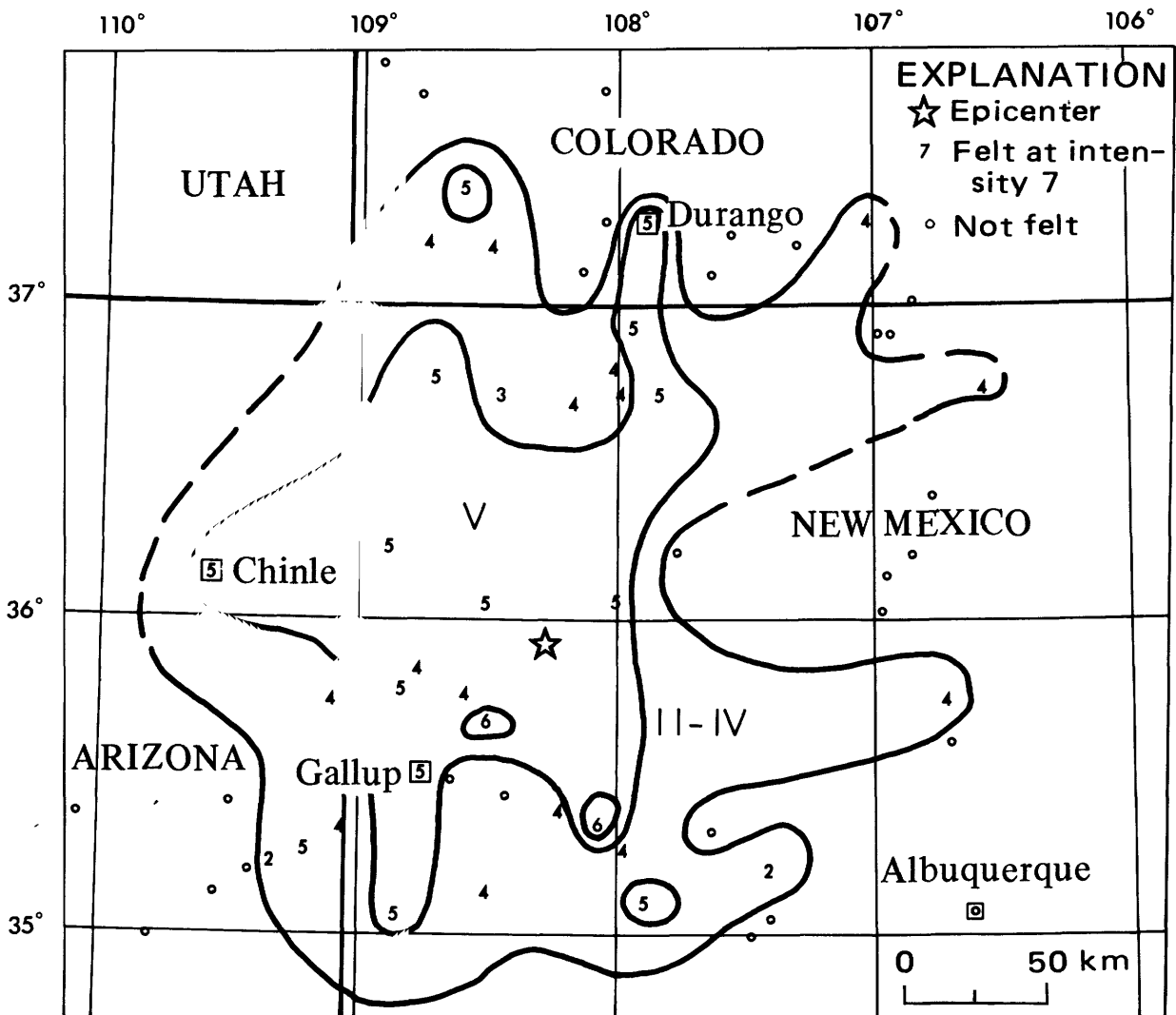


FIGURE 9.—Isoseismal map for the northwestern New Mexico earthquake of 5 March 1977, 03 00 54.7 UTC. Roman numerals represent Modified Mercalli intensities between isoseismals; Arabic numerals are used to represent these intensities at specific sites.

Table 2.—Summary of macroseismic data for U.S. earthquakes,
January-March 1977—Continued

Ohio

9 March (X) Northwestern Ohio
 Origin time: 08 48 17.1
 Epicenter: 40.96 N., 83.50 W.
 Depth: 0 km
 Magnitude: None computed.

Explosives totaling 22.6 metric tons were detonated near Caro, 88 km south of Toledo. The data were provided by F. Mauk, University of Michigan, Ann Arbor.

Intensity V:
 Michigan--Southfield (all awakened and frightened).

Intensity IV:
 Michigan--Farmington Hills, Oak Park, Selfridge Air Force Base (windows and doors rattled over wide area).

South Carolina

18 January (G) Southeastern South Carolina
 Origin time: 18 29 13.5
 Epicenter: 33.07 N., 80.20 W.
 Depth: 5 km
 Magnitude: 3.0 mbLg(V)

Many of the data listed below are the result of a questionnaire canvass by Dr. Joyce Bagwell, Baptist College of Charleston, which was evaluated by the U.S. Geological Survey.

Intensity VI: Summerville and suburban subdivisions--College Park (sidewalk cracked), Millwood Estates (sidewalk cracked), Rantoueles (near State Highways 17 and 165).

Intensity V: Summerville and suburban subdivisions--Alston Junior High School, Ashley Forest, Country Club Estates, Greenhurst, Knightsville, Old Trolley Rd., Quail Arbor, Salisbury Acres, Sangaree Homes, Tall Pines, Tranquil Acres, Twin Oaks.

Intensity IV: Goose Creek, Ladson, Meggett, North Charleston (Pepperhill), Summerville and suburban subdivisions (Corey Woods, State Highway 61 southwest of Summerville, Honey's Restaurant, Pine Hill Acres, Summerville High School).

Intensity III: Summerville and suburban subdivisions--Ashborough St., Central Ave., Coastal Center, Dorchester Rd., Kings Grant, Quail Inn.

Intensity II: Hollywood.

Table 2.—Summary of macroseismic data for U.S. earthquakes,
January-March 1977—Continued

South Carolina--Continued

30 March (G) Southeastern South Carolina
 Origin time: 08 27 46.9
 Epicenter: 32.88 N., 80.20 W.
 Depth: 10 km
 Magnitude: 1.5 ML(G)
Intensity V: Summerville (awakened many and frightened a few; buildings trembled; objects rattled; windows, dishes, and doors shaken).

Utah

9 February (U) Central Utah
 Origin time: 00 42 16.4
 Epicenter: 39.31 N., 111.15 W.
 Depth: 7 km
 Magnitude: 3.4 ML
Intensity VI: Elmo. (Mine seals to worked-out areas cracked at American Coal Mine Company, located approximately 12 km northwest of Orangeville, Utah. Several miners felt the earthquake strongly and were frightened, thinking there might be a cave-in. None occurred.)

Virginia

27 February (G) Central Virginia
 Origin time: 20 05 34.6
 Epicenter: 37.90 N., 78.63 W.
 Depth: 5 km
 Magnitude: 2.4 mbLg(V)

The intensities listed below are values assigned by the U.S. Geological Survey using the results of a newspaper canvass conducted by Dr. James L. Calver, Virginia Division of Mineral Resources, Charlottesville. They do not represent the total canvass, only those that could be located geographically.

Intensity V:
 Charlottesville--2526 Jefferson Park Ave. (hanging objects swung slightly; windows, doors, dishes rattled; and building creaked); 439 Mosley Dr. (knocked bulletin board from wall, jammed storm door so it would not open, pictures displaced); 126 Observatory Ave. (chinaware broken due to 13.4-cm fall from shelf to rangetop), Beau Pre Farm, Garth Rd. (windows and doors rattled, hanging objects swung slightly, and several were awakened).
 Covesville--Window shaken out, house trembled.

Table 2.—Summary of macroseismic data for U.S. earthquakes,
January-March 1977—Continued

Virginia--Continued

Estmont--All were frightened, house swayed,
and windows rattled.

North Garden on State Route 692--Ham rolled
off shelf in freezer, several houses were
reported shaken violently, pictures fell
from walls.

Schuyler on State Route 6, 6.4 km east of
U.S. Highway 29--Heavy table and small
objects moved, many reports of houses
trembling, pictures fell from walls.

Intensity IV: Alberne, Afton, Amhurst,
Charlottesville (Albemarle Airport, 901
Altavista Ave., 1219 Augusta St., 1208
Bland Circle, 1609 Center Ave., Glenaire
subdivision, 2031 Hesson Rd., 1281
Kenwood Lane, 107 Linda Court, 2740
McElroy Dr., 118 Monte Vista Ave.,
Montvue subdivision, 1103 Pau St.,
Sherwood Manor subdivision, Thornton
Hall, University of Virginia, 700 Wilden
Dr., 1001 5th St., 313 6th St.), Crozet,
Farmington, Frys Springs, Ivy Depot,
North Garden, Rio Rd. (1.9 km north of
Charlottesville), Schuyler, Scottsville,
Shipman, South Garden, Yancy Mills near
Crozet, State Route 708 (4 km northwest
of U.S. Highway 29), State Route 20 (6 km
south of Interstate 64), State Route 631
(11.2 km south of Old Lynchburg Rd.),
near the intersection of State Routes 637
and 708, end of State Route 698 (35.4 km
south of Coveseville), near the
intersection of State Routes 683 and 250.

Intensity III: Charlottesville (113 Alderman
Rd., 117 Altamont Circle, 1610 Amhurst
St., 105 Apple Tree Rd., 111 Appleton
Dr., 126 Azalea Dr., 201 Azalea Dr., 1930
Barracks Rd., 2627 Barracks Rd., 1207
Bellevue Ave., 514 Brandon Ave., Buford
Elementary School, Cabell Hall,
University of Virginia, 337 Carrsbrook
Dr., Clark Hall, University of Virginia,
263 Colonade Dr., 1609 Concord Dr., 2306
Crestmont Ave., 2320 Crestmont Ave., 308
Farm Lane, 1844 Fendall Ave., 411 North
First St., 2312 Fontaine Ave., 1414
Forest Ridge Rd., 1025 Forest Hills Ave.,
1413 Foxbrook Lane, Health Sciences
Library, University of Virginia, sixth
floor of the Holiday Inn at 5th St. and
Interstate 64, 1603 Inglewood Dr.,
Jefferson Park Pl. and Woodrow St., 2028
Minor Rd., 413 Mobile Lane, Page
Dormitory, University of Virginia, 2005
Pine Top Rd., 2315 Price Ave., 1814 Rugby
Pl., 111 Scarborough Pl., 2520 Smithfield
Rd., 2050 Spottswood Rd., 1940 Thompson
Rd., 1625 Trailbridge Rd., 2211 Wayne
Ave., 1430 Westwood Dr., 1864 Winston
Rd., 800 Second St., NE.), State Route

Table 2.—Summary of macroseismic data for U.S. earthquakes,
January-March 1977—Continued

Virginia--Continued

635 about 4.3 km southwest of Batesville,
Estmont, 17.7 km south of Charlottesville
city limits on U.S. Highway 29, Old
Ballard Rd. (1.6 km northwest of State
Routes 250W and 677), 8 km north of
Schuyler at State Routes 6 and 630, 9.7
km east of Scottsville at the end of
State Route 611, near the intersection of
State Route 708 and U.S. Highway 29, 4.9
km east of Scottsville on State Route
637, Hatton Ferry (4.9 km west of
Scottsville).

Intensity II: Bumpass, Charlottesville (1661
Brandywine Dr., 1613 Cedar Hill Rd., 105
Chaucer Rd., 3310 Clark Lane, 701
Elizabeth Ave., 2002 Jefferson Park, 2728
Jefferson Park, 35 Old Farm Rd., 113
Porters Ave., 612A Preston Pl., 746
Prospect Ave., 2412 Smithfield Rd.,
Southwood subdivision, 10 University
Circle, 720 Village Rd., University
Airport, 1856 Winston Rd., Woodbrook
subdivision, 109 Woodrow St., 113
Woodstock Dr., 307 15th St., NW.).

Wyoming

3 March (G) Southern Wyoming
Origin time: 17 50 28.0
Epicenter: 41.24 N., 107.15 W.
Depth: 5 km
Magnitude: 4.2 mb, 3.5 ML

The following information was received from
H. W. Oliver, U.S. Geological Survey
(written commun., 1977):

Intensity V:
Colorado--Slater (plant fell from window
sill).

Intensity IV:
Wyoming--Encampment, Riverside, Savery
(dishes and doors rattled at several
ranch homes--press report).

4 March (G) Hebgen Lake region, Montana
Origin time: 10 05 59.6

See Montana listing.

4 March (G) Hebgen Lake region, Montana
Origin time: 11 01 50.2

See Montana listing.

4 March (G) Hebgen Lake region, Montana
Origin time: 11 33 06.9

See Montana listing.

Table 2.—*Summary of macroseismic data for U.S. earthquakes, January-March 1977—Continued*

| Wyoming--Continued | |
|--|--|
| 4 March (G) Hebgen Lake region, Montana | Origin time: 13 00 58.9 See Montana listing. |
| 4 March (G) Hebgen Lake region, Montana | Origin time: 13 04 21.4 See Montana listing. |
| 4 March (G) Hebgen Lake region, Montana | Origin time: 14 19 48.8 See Montana listing. |
| 4 March (G) Hebgen Lake region, Montana | Origin time: 14 26 See Montana listing. |
| 4 March (G) Yellowstone National Park, Wyoming | Origin time: 14 39 23.5 Epicenter: 44.84 N., 110.92 W. Depth: 5 km Magnitude: 3.8 ML(D) <u>Intensity III:</u> Montana--West Yellowstone. Wyoming--Old Faithful, Yellowstone National Park. |
| 4 March (G) Hebgen Lake region, Montana | Origin time: 14 58 05.5 See Montana listing. |
| 4 March (G) Hebgen Lake region, Montana | Origin time: 16 12 28.2 See Montana listing. |
| 4 March (G) Hebgen Lake region, Montana | Origin time: 16 47 43.5 See Montana listing. |
| 4 March (G) Hebgen Lake region, Montana | Origin time: 16 51 48.3 See Montana listing. |
| 4 March (G) Hebgen Lake region, Montana | Origin time: 17 10 40.6 See Montana listing. |
| 11 March (G) Southwestern Montana | Origin time: 05 09 37.2 See Montana listing. |
| 11 March (G) Hebgen Lake region, Montana | Origin time: 12 17 51.9 See Montana listing. |

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| | |
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