DEPARTMENT OF THE INTERIOR

U.S. GEOLOGICAL SURVEY

United States Earthquakes, 1972

By

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Preface

Operations of the National Earthquake Information Center (NEIC) and Seismological Field Survey (SFS) of NOAA's Environmental Research Laboratories, contributors to this volume, were terminated by NOAA in 1973 and were absorbed by the U.S. Department of the Interior, Geological Survey. NEIC and SFS will operate under the new titles *National Earthquake Information Service* and *Seismic Engineering,* respectively. Because this report covers earthquake investigations in 1972, prior to these changes, references in the text refer to the agency that actually performed the work, i.e., NOAA Environmental Research Laboratories.

The NOAA Environmental Data Service, National Geophysical and Solar-Terrestrial Data Center, will continue to collect and publish earthquake data in annual and periodic reports, including the *United States Earthquakes* series and *Publication 41–1, Earthquake History of the United States.* Future issues of *United States Earthquakes* will be published jointly with the Geological Survey.

The Environmental Data Service does not approve, recommend, or endorse any proprietary product or proprietary material mentioned in this publication. No reference shall be made to the Environmental Data Service, or to this publication furnished by the Environmental Data Service, in any advertising or sales promotion which would indicate or imply that the Environmental Data Service approves, recommends, or endorses any proprietary product or proprietary material mentioned herein, or which has as its purpose an intent to cause directly or indirectly the advertised product to be used or purchased because of this Environmental Data Service publication.

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Introduction

United States Earthquakes, prepared annually since 1928, describes all earthquakes that were felt in the United States and nearby territories during the year. Earthquakes are listed chronologically in 11 regions: Northeastern Region, Eastern Region, Central Region, Western Mountain Region, California and Western Nevada, Washington and Oregon, Alaska, Hawaii, Panama Canal Zone, Puerto Rico, and Virgin Islands. In addition, table 1 contains epicenters of instrumentally determined earthquakes that *were not* felt by residents; table 4 lists principal earthquakes of the world for the year with brief accounts of their effects.

Sources of noninstrumental information used in this compilation include reports received from computer questionnaire canvasses and seismology collaborators; newspaper clippings; bulletins of the Seismological Society of America; special reports of other organizations; and data from the National Weather Service of NOAA whose observers prepare periodic reports on local seismic activity.

Instrumental data utilized in computing earthquake epicenters, depths, magnitudes, and times of occurrence are obtained from NOAA and cooperating seismological observatories, both domestic and foreign.

NATIONAL GEOPHYSICAL AND SOLAR-TERRESTRIAL DATA CENTER

The National Geophysical and Solar-Terrestrial Data Center (NGSDC) is one of the five major facilities of NOAA's Environmental Data Service. NGSDC's Solid Earth and Marine Geophysical Data Services Division is responsible for data activities in the field of seismology.

NGSDC is a focal point for the dissemination of historical seismic information for both technical and general users. Its services include preparing local and regional seismic histories for engineers, actuaries, and other scientists; answering direct inquiries from the public on all aspects of historical earthquakes; publishing annual earthquake summaries and revised historical earthquake reports; and making available at a nominal fee copies of seismograms, accelerograms, displacement meter records, digitized strong-motion seismograms (on punched cards), and epicenter lists. Information concerning services and products of NGSDC may be obtained from the National Geophysical and Solar-Terrestrial Data Center, NOAA/EDS, Boulder, Colo. 80302. Some of the seismological services and products are described in the following paragraphs.

Earthquake Hypocenter Data

The earthquake hypocenter data file contains hypocenters listed geographically and chronologically from 1900–December 1973. It is available on magnetic tape and 16-mm microfilm. The data also may be obtained in punched card format from 1968. The file lists date, origin time, geographic location, focal depth, magnitude, and intensity (Modified Mercalli) for each event when available.

Strong-Motion Earthquake Data

All records in the strong-motion file, dating from the initial accelerograms recorded in 1932, are available in full-size paper copies

or as 70-mm film chips. A chronological listing (1932–1971) may be purchased on seven reels of 35-mm microfilm. Digitized accelerograms may be obtained on magnetic tape or punched cards. The same information is described in geographic arrangement in *Key to Geophysical Records Documentation No. 2* (see description below).

Other Data

The *Preliminary Determination of Epicenters Monthly Listing,* a chronological listing of earthquakes located throughout the world, may be purchased on 16-mm microfilm for 1969–July 1973. It contains for each earthquake the time of occurrence, geographic coordinates, region, felt and damage data, depth, magnitude, and other useful data.

The *Earthquake Data Report,* a twice-weekly compilation of data used in the computation of the report described above, is now available on 16-mm microfilm for 1968–1973. It contains station arrival times, individual distances, azimuths, and travel-time residuals.

The *Reid Earthquake Catalog,* compiled by the late Professor Harry F. Reid, is a comprehensive collection of earthquake and volcano data on 3 by 5 cards and augmented by newspaper clippings of principal earthquakes. The catalog, which is in chronological sequence and cross-indexed by geographical regions, covers from the time before Christ to 1931. It is available on five reels of 16-mm microfilm.

Seismograms from Worldwide Network

All stations in the Worldwide Network of Standard Seismograph Stations operate with identical instruments and produce six seismograms daily. In addition, records from ten high-gain, long-period stations are available from January 1971. Seismograms from some other stations—foreign, Canadian, and U.S. Geological Survey networks—may be obtained. Requests for these records should include time, date, station, components, and type of copies desired. A list of formats available and prices will be supplied upon request.

Publications

Publications issued periodically by NGSDC include the following:

C&GS Special Publication 282, Earthquake Investigation in the United States, Revised (1969) Edition. This semitechnical booklet explains important facts about earthquakes and discusses major historical shocks of the United States and nearby territories. It contains tables that list the number of fatalities and dollar damage that have resulted from major United States earthquakes.

Publication 41–1, Earthquake History of the United States, Revised Edition (Through 1970). This report describes prominent earthquakes (generally of intensity V and above) in the United States (including Puerto Rico) from historical times. It contains regional tables that list earthquake epicenters or probable locations, intensity, and extent of felt area.

Seismological Publications and Services. This pamphlet describes earthquake data and services available from several sources within the Federal Government.

NGSDC, The National Geophysical and Solar-Terrestrial Data Center (NOAA/PA 70214). This leaflet defines the function of NGSDC and describes briefly its products and services.

Key to Geophysical Records Documentation No. 1, Marine Geophysical Data Catalog. It lists marine geophysical data now available from NGSDC. The catalog includes bathymetric, magnetic, gravimetric, and seismic data and indicates types of records and data formats available.

Key to Geophysical Records Documentation No. 2, Catalog of Strong-Motion Seismograph Stations and Records. This catalog lists all strong-motion seismographs which either have produced records or are presently operational. Also given are dates and times of all records written and the formats in which copies are available. Several maps show locations of strong-motion stations in the United States and Central and South America.

EARTHQUAKE EARLY REPORTING SYSTEM

The Environmental Research Laboratories National Earthquake Information Center (NEIC)* maintains an earthquake reporting system that provides accurate and rapid epicenter locations and magnitude values to the press and other interested groups. These results are available within 2 to 3 hours for earthquakes of magnitude 6½ or larger. Locations and magnitudes of smaller events are computed on request or on receipt of a press report. NEIC relies on NOAA and cooperating observatories worldwide to provide data for the earthquake reporting system.

Both NOAA and cooperating seismic observatories throughout the world furnish data for the epicenter program of the National Earthquake Information Center. During 1972, the locations of 4,661 epicenters were announced in the twice-weekly *Preliminary Determination of Epicenters* (PDE) list. Epicenters are published when sufficient information has accumulated to insure a reasonable degree of accuracy. The results are preliminary and do not always agree with later epicenters determined from additional seismic readings or from new data with critical azimuths and distances. For special studies, an inquiry should be made to the NEIC office for possible recomputation of epicenters of interest.

NEIC coordinates the collection of all types of earthquake information, with the special objective of correlating instrumentally determined earthquake locations with noninstrumental reports received from private and Government earthquake observers. This correlation is achieved through intensive regional investigations of earthquakes by local organizations and NEIC. Primary data are gathered by a canvass of the epicentral area using questionnaire cards. Cities to receive questionnaire cards are selected by a computer, based upon an analysis of the earthquake magnitude and projected felt area. When returned and analyzed, this information is used to map the seismic areas of the country in order to promote public safety through a better understanding of earthquake phenomena. Because the success of this data collection program depends largely on the cooperation of local officials and citizens, all who receive earthquake questionnaire cards are urged to complete and return them to the office indicated.

NEIC issued the following technical seismological reports and maps in 1972:

Preliminary Determination of Epicenters. These twice-weekly reports list the approximate epicentral locations of all earthquakes recorded throughout the world. They contain origin time, geographic coordinates, region of occurrence, felt and damage data, depth, magnitude, and other related information on each earthquake. *The Preliminary Determination of Epicenters Monthly Listing,* a chronological listing of the twice-weekly data, is available to the general public on subscription to the Government Printing Office.

Earthquake Data Report. This twice-weekly report contains data used in the computation of the report above. It lists station arrival times, individual distances, azimuths, and traveltime residuals. Microfilm copies are available for 1968–73 from NGSDC.

Regional Seismicity Maps. These are 20-by 30-inch maps with buff-colored land areas that show patterns of regional seismicity of the Earth for the period 1962–1969. The maps pinpoint earthquakes which have at least 10 observations employed in their locations from the year 1962. An index map also is available. The maps, by region, are as follows: Southwest Pacific (NEIC 3008); Southeast Asia (NEIC 3009); Japan and Kuril Islands (NEIC 3010); Alaska (NEIC 3011); The United States (NEIC 3012); Middle America (NEIC 3013); South America (NEIC 3014); Europe and the Middle

* *Editors' note.*—See Preface, p. iii, for organizational change in 1973.

East (NEIC 3015); Central Asia (NEIC 3016); North Atlantic Ocean (NEIC 3017); South Atlantic Ocean (NEIC 3018); Indian Ocean (NEIC 3019); Arctic Region (NEIC 3020); and Antarctic Region (NEIC 3021).

World Seismicity. This is a five-color map, 49 by 32 inches, that depicts patterns of global earthquake activity for the period July 1, 1963, through December 31, 1972. The map covers the Earth on a Mercator projection. The three principal depth-of-focus classes (0 to 70 km, 71 to 300 km, and 301 to 700 km) are shown in different colors ($1.50 each). An earlier map (*World Seismicity 1961–1969)* is available through NGSDC.

In addition to these publications, ERL published in 1972 a bimonthly *Earthquake Information Bulletin,* which contains information on past and continuing studies in seismology and describes techniques used in the investigation of earthquakes and related phenomena. This two-color magazine has regular departments for new publications, meetings, and earthquake descriptions. Beginning in July 1973, the *Bulletin* will be published by the U.S. Geological Survey.

SEISMOLOGY COLLABORATORS

Active cooperation in earthquake investigations in the Pacific Coast and Western Mountain States is provided by the University of California Seismographic Station at Berkeley, the California Institute of Technology Seismological Laboratory at Pasadena, and by several seismology collaborators. The following served as collaborators to NOAA during 1972:

Arizona.—Richard T. Moore, Arizona Bureau of Mines, University of Arizona, Tucson.

Colorado.—Warren L. Longley, University of Colorado, Boulder.

Idaho.—Melvin W. Jackson, Argonne National Laboratory, Idaho Falls.

Montana.—Stephen W. Nile, 320 Ranch, Gallatin Gateway.

Nevada.—David B. Slemmons, University of Nevada, Reno.

New Mexico.—Stuart A. Northrop, University of New Mexico, Albuquerque.

Utah.—J. Stewart Williams, Utah State University, Logan.

Washington.—Howard A. Coombs, University of Washington, Seattle.

Commercial agencies on the West Coast that provide valuable services to NOAA include telephone, power, oil, railroad, and insurance companies. Agencies interested in the manufacture of earthquake-resistive building materials also are active, as are several organizations of structural engineers and architects.

Earthquake information was collected in other parts of the country by the following:

Northeastern Region.—Dae-Hyun Chung and Daniel J. Linehan, S.J., Weston College, Weston, Mass.

Eastern Region.—Gilbert A. Bollinger, Virginia Polytechnic Institute and State University, Blackburg (for earthquakes in Virginia).

Central Region.—William J. Stauder, S.J., St. Louis University (for earthquakes in the central Mississippi Valley area); E. J. Walter, John Carroll University, Cleveland (for earthquakes in Ohio); and Berlen C. Moneymaker, Tennessee Valley Authority, Knoxville (for earthquakes in Tennessee).

Hawaii.—Hawaiian Volcano Observatory, Geological Survey, U.S. Department of the Interior, Hawaii National Park.

EPICENTER MAPS

Figure 1 shows the locations of damaging earthquakes (intensity VII and above) known to have occurred in the United States from historical times through 1972. Small numerals beside a plotted point indicate the number of shocks that have occurred at that point.

Figure 2 is a plot of 1972 earthquakes by intensity. In some instances where instrumental control was not satisfactory or where

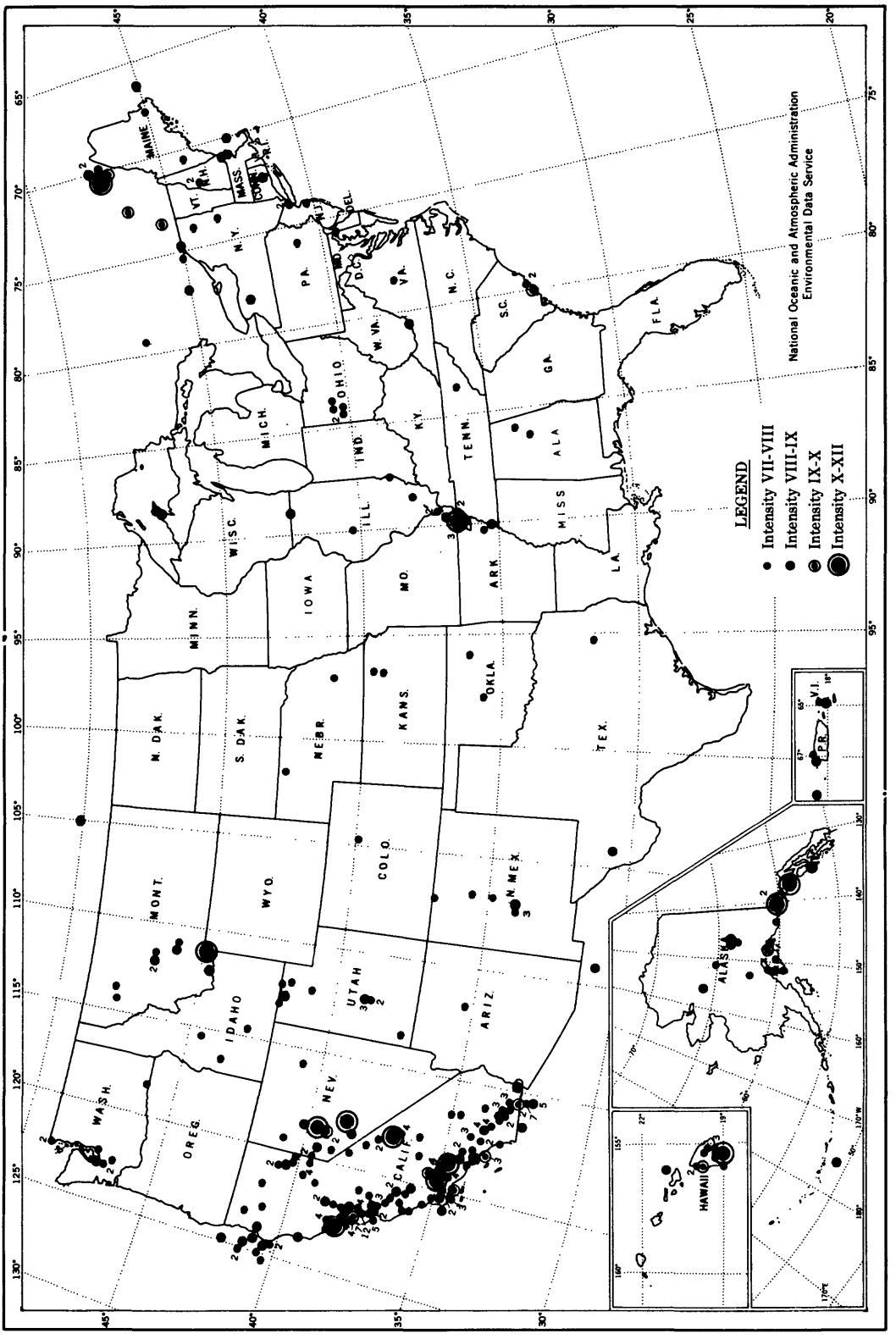

FIGURE 1.—Damaging earthquakes in the United States from earliest history through 1972.

results of investigations were inadequate, the plotted epicenters show the existence, rather than the precise locations, of the earthquakes. Earthquakes in the California and western Nevada areas are plotted on figure 2 when felt reports are received from several towns. Feeble earthquakes and minor aftershocks of large earthquakes usually are not shown on this map. A numeral beside a dot indicates the number of shocks reported at that location. Bulletins of the University of California Seismographic Station at Berkeley and the California Institute of Technology Seismological Laboratory at Pasadena should be consulted for additional details on epicenters in California.

The selection of intensity or "felt area" maps (figs. 3–7) is governed largely by the size of the area affected, the minimum radius generally being about 80 km (50 miles). This means that sharp, localized shocks of intensity VI (mostly in California) may not be shown on such maps, whereas others of intensity IV and V (largely in the Eastern and Central States) often will be illustrated. Numerals on these computer-plotted maps represent the location of and Mercalli intensity at each town.

MAGNITUDE AND INTENSITY RATINGS

Magnitude, stated according to the Richter scale, is a measure of the energy release at the focus of an earthquake as determined by the amplitudes produced on a seismogram. Although the magnitude scale has neither "top" nor "bottom" values, the highest ever recorded was magnitude 8.9 and the lowest about —3. On this logarithmic scale, a magnitude 8 earthquake represents recorded amplitudes 10 times larger than those for a magnitude 7 earthquake, 100 times larger than a shock of magnitude 6, etc.

Intensity, expressed on the Modified Mercalli Intensity Scale of 1931 (see next section), is a measure of the effects of an earthquake on people and objects, as determined by experienced observers. It is a result of many factors, including magnitude of the earthquake, distance from its epicenter, local geological conditions, and structural properties of buildings. An earthquake in a populated city will have several intensities, depending on the local factors mentioned.

MODIFIED MERCALLI INTENSITY SCALE OF 1931

NOAA's National Geophysical and Solar-Terrestrial Data Center and National Earthquake Information Center report all intensities on the Modified Mercalli Intensity Scale of 1931.[1] The abridged version of this scale is given below. Values in parentheses are equivalent intensities in the Rossi-Forel Scale, still used by some countries to evaluate earthquake effects.

I. Not felt except by a very few under specially favorable circumstances. (I)

II. Felt only by a few persons at rest, especially on upper floors of buildings. Delicately suspended objects may swing. (I to II)

III. Felt quite noticeably indoors, especially on upper floors of buildings, but many people do not recognize it as an earthquake. Standing motorcars may rock slightly. Vibration like passing of truck. Duration estimated. (III)

IV. During the day, felt indoors by many, outdoors by few. At night, some awakened. Dishes, windows, doors disturbed; walls make creaking sound. Sensation like heavy truck striking building. Standing motorcars rocked noticeably. (IV to V)

V. Felt by nearly everyone, many awakened. Some dishes, windows, etc., broken; a few instances of

[1] Harry O. Wood and Frank Neumann, Modified Mercalli Intensity Scale of 1931, *Bulletin of the Seismological Society of America*, Vol. 21, No. 4, pp. 277–283, December 1931.

cracked plaster; unstable objects overturned. Disturbances of trees, poles, and other tall objects sometimes noticed. Pendulum clocks may stop. (V to VI)

VI. Felt by all, many frightened and run outdoors. Some heavy furniture moved; a few instances of fallen plaster or damaged chimneys. Damage slight. (VI to VII)

VII. Everybody runs outdoors. Damage *negligible* in buildings of good design and construction; *slight* to *moderate* in well-built ordinary structures; *considerable* in poorly built or badly designed structures; some chimneys broken. Noticed by persons driving motorcars. (VIII—)

VIII. Damage *slight* in specially designed structures; *considerable* in ordinary, substantial buildings, with partial collapse; *great* in poorly built structures. Panel walls thrown out of frame structures. Fall of chimneys, factory stacks, columns, monuments, walls. Heavy furniture overturned. Sand and mud ejected in small amounts. Changes in well water. Persons driving motorcars disturbed. (VIII+ to IX)

IX. Damage *considerable* in specially designed structures; well-designed frame structures thrown out of plumb; *great* in substantial buildings, with partial collapse. Buildings shifted off foundations. Ground cracked conspicuously. Underground pipes broken. (IX+)

X. Some well-built wooden structures destroyed; most masonry and frame structures destroyed with their foundations; ground badly cracked. Rails bent. Landslides considerable from river banks and steep slopes. Shifted sand and mud. Water splashed (slopped) over banks. (X)

XI. Few, if any, (masonry) structures remain standing. Bridges destroyed. Broad fissures in ground. Underground pipelines completely out of service. Earth slumps and land slips in soft ground. Rails bent greatly.

XII. Damage *total*. Waves seen on ground surfaces. Lines of sight and level distorted. Objects thrown upward into air.

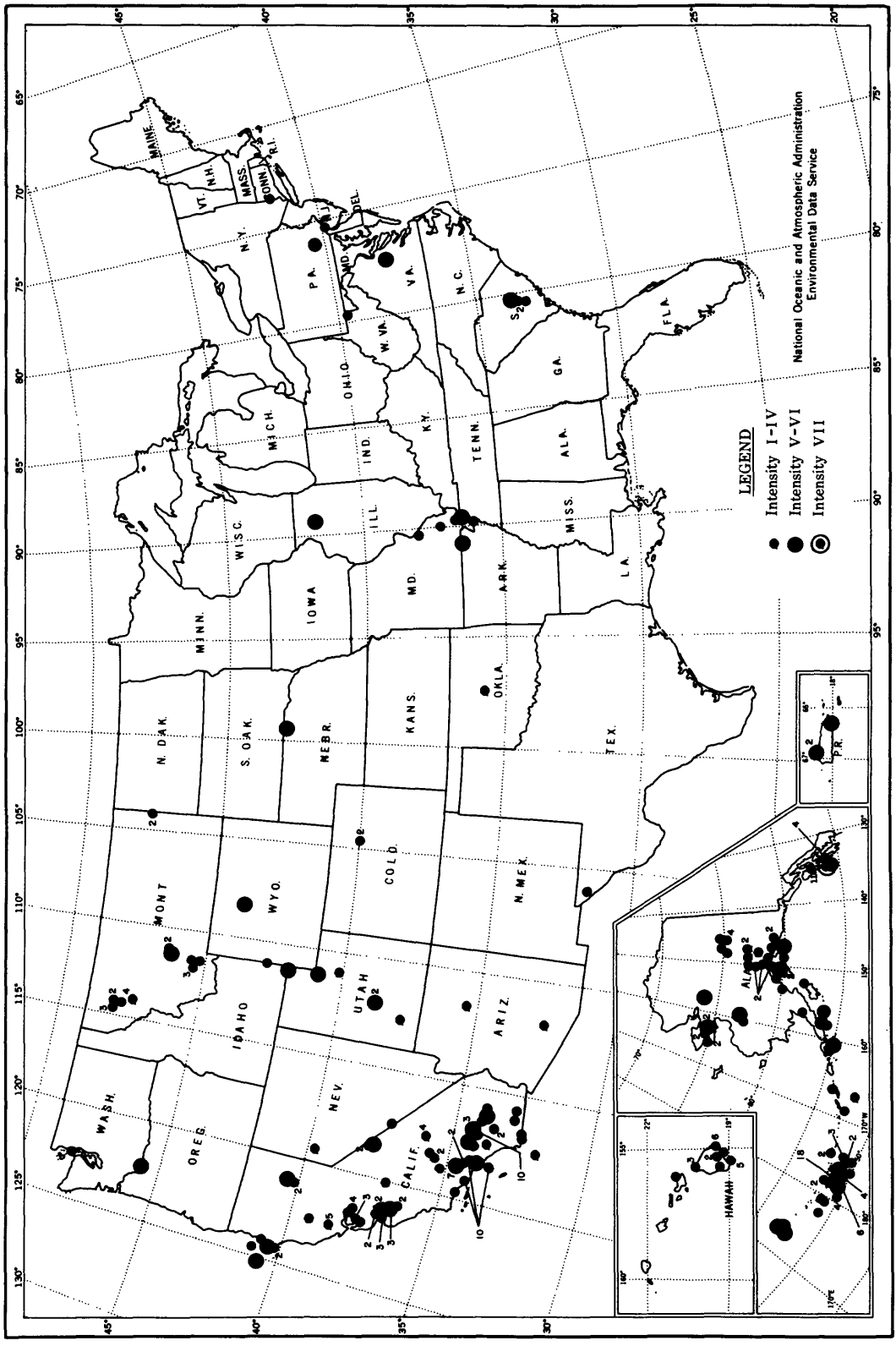

FIGURE 2.—Locations of earthquakes that were felt or caused damage in the United States during 1972.

Earthquake Descriptions

INTRODUCTION

The times of earthquake occurrences in he regions that follow are given in standard time. Times are expressed continuously from midnight to midnight, or 0 to 24 hours. Greenwich mean times are given in parentheses, following standard times, for earthquakes with instrumental epicenters.

The following symbols are used to indicate authority for arrival or origin time, epicenters, and/or magnitudes. If no symbol is given, the authority is the National Earthquake Information Center of NOAA's Environmental Research Laboratories (ERL).

ADK—ERL Adak Observatory, Adak, Alaska.

ATL—Georgia Institute of Technology, Atlanta.

B—Seismographic Station, University of California, Berkeley.

BHP—Panama Canal Company, Balboa Heights, C. Z.

BLA—Virginia Polytechnic Institute and State University, Blacksburg.

BUT—Montana School of Mines, Butte.

COL—ERL College Observatory, College, Alaska.

CSC—University of South Carolina, Columbia.

GOL—Colorado School of Mines, Golden.

JSA—Jesuit Seismological Association, Saint Louis, Mo.

LDM—Bureau of Reclamation, Libby Dam, Mont.

LSM—Little Saanich Mountain Observatory, British Columbia, Canada.

MRG—Seismographic Station, Morgantown, W. Va.

NESA—Northeastern Seismological Association, Weston, Mass.

P—Seismological Laboratory, California Institute of Technology, Pasadena.

PAL—Columbia University, Lamont-Doherty Geological Observatory, Palisades, N.Y.

PMR—ERL Palmer Observatory, Palmer, Alaska.

SJP—ERL San Juan Observatory, San Juan, P.R.

SLC—University of Utah, Salt Lake City.

SNM—New Mexico Institute of Mining and Technology, Socorro.

TUC—ERL Tucson Observatory, Tucson, Ariz.

Magnitude values in the descriptions that follow are either surface wave (M_S), body wave (m_b), or local (M_L). Each represents an average of individual station magnitudes determined from reported periods and amplitudes of representative seismic waves. All magnitudes in the regions which follow are M_L (local) unless otherwise noted. The local magnitude is determined using a formula developed by Charles F. Richter for southern California earthquakes. Surface wave magnitude is determined using a formula recommended by the International Committee on Magnitudes. Body wave magnitude is computed from *P* (primary) phases only, in the manner defined by Gutenberg and Richter. Magnitude values are preceded by the abbreviation mag. in the regional earthquake descriptions.

Roman numerals in the earthquake descriptions refer to the Modified Mercalli Intensity Scale of 1931 (see page 6), which gives about equal weight to the disturbance of inanimate objects and to personal reac-

tions. When more than one degree of intensity is reported from a town, the town is assigned the highest intensity reported. Omission of an intensity rating indicates insufficient data. For brevity, intensity is abbreviated int. in the regions that follow.

SUMMARY OF EARTHQUAKE ACTIVITY

This is a summary of earthquake intensity data for the regions that follow. Where no intensity is given, data were insufficient to rate the effects on the Modified Mercalli Intensity Scale.

Northeastern Region

New York: Feb. 15.

Eastern Region

Delaware: January (several tremors). Feb. 10; 11.

Georgia: Felt South Carolina earthquake of Feb. 3, V.

Maryland: Felt Delaware earthquake of Feb. 10.

New Jersey: Felt Delaware earthquake of Feb. 10.

North Carolina: Felt South Carolina earthquake of Feb. 3, IV.

Pennsylvania: Dec. 7, V.

South Carolina: Feb. 3, IV; 3 (2); 6. Aug. 14, I–III.

Virginia: Sept. 5, V.

West Virginia: Sept. 12.

Central Region

Arkansas: Felt Missouri earthquakes of Jan. 31, V, and Mar. 29, V. May 6, IV.

Illinois: Felt Missouri earthquake of Mar. 29, IV. Sept. 14, VI.

Indiana: Felt Missouri earthquake of Sept. 14, V. Dec. 3.

Iowa: Felt Missouri earthquake of Sept. 14, V.

Kentucky: Felt Missouri earthquakes of Jan. 31, I–III and Mar. 29, V.

Michigan: Felt Missouri earthquake of Sept. 14, I–III.

Minnesota: Felt Missouri earthquake of Sept. 14, I–III.

Mississippi: Felt Missouri earthquake of Mar. 29, IV.

Missouri: Jan. 31, IV. Mar. 29, V. June 9; 18, IV. Sept. 5.

Nebraska: Oct. 15, V.

Ohio: Felt Missouri earthquake of Sept. 14, IV.

Oklahoma: Mar. 10.

Tennessee: Felt Missouri earthquake of Mar. 29, V.

Wisconsin: Felt Missouri earthquake of Sept. 14, V.

Western Mountain Region

Arizona: Apr. 20, IV.

Colorado: Nov. 12; 29, IV.

Idaho: Felt Utah earthquake of Mar. 6, V. Nov. 23, IV.

Montana: Jan. 5, IV; 13, IV; 18; 23. Feb. 5; 20; 25. Mar. 4, IV (2); 28, IV. Apr. 9; 16. May 18, IV; 20. Aug. 29, IV; 30; 31, V. Sept. 29, IV (2). Nov. 1, V; 2, IV, 2; 24, IV.

Texas: Dec. 8.

Utah: Jan. 3, VI. Mar. 6, V. June 1, V. Oct. 1, VI; 16. Nov. 15.

Wyoming: Dec. 8, V.

California and Western Nevada

California: Int. V and above. Jan. 10, V; 21, V; 30, V. Feb. 2, V; 7, V; 24, VI; 25, V; 27, V. Mar. 1, V. July 16, V; 16; 26, V. Aug. 27, V. Sept. 4, VI; 11, V; 20, V; 23, V. Oct. 2, VI; 2; 8, V. Nov. 13, V.

Nevada: Jan. 21.

Washington and Oregon

Oregon: May 25, V.

Washington: June 24. Felt British Columbia earthquake of Nov. 7.

Alaska

Int. V and above. Feb. 21, V (2). Apr. 6, V (2); 20, V. May 6, V; 11, V. June 18, V; 18. July 27, V; 30, VII. Aug. 2, VI; 4, V; 15, V. Sept. 1, V. Oct. 3, V; 19, V. Nov. 21, V. Dec. 26, VI.

Hawaii

Dec. 23, V. Several additional earthquakes occurred but none had intensity designations.

Puerto Rico

Feb. 2, V. May 22, V. Sept. 3, V.

NORTHEASTERN REGION

[The time is eastern standard. This region includes Connecticut, Maine, Massachusetts, New Hampshire, New York, Rhode Island, and Vermont.]

Feb. 15: 18:52. New York. The press reported that telephone calls were received from Goldens Bridge, Lake Kitchawan, Truesdale Lake, and Waccabuc. Calls also came from Cross River and from an observer on Route 35 near the Connecticut border. At a home in North Salem, observer thought his furnace had exploded.

EASTERN REGION

[All times are eastern standard. If an epicenter is quoted, Greenwich mean time is given in parentheses. This region includes Alabama, Delaware, Florida, Georgia, Kentucky (eastern), Maryland, Mississippi (southeastern), New Jersey, North Carolina, Pennsylvania, South Carolina, Tennessee (eastern), Virginia, Washington, D.C., and West Virginia.]

Feb. 3: 18:11:08.4 (23:11), 21:46, 21:53. Epicenter 33.5° N., 80.4° W., South Carolina, at a depth of 5 km, mag. 4.5 (m_b)[1]. Felt over an area of approximately 67,600 km² (26,000 mi²) of South Carolina and adjoining areas of Georgia and North Carolina (fig. 3). Two slight aftershocks were felt

[1] See section entitled "Magnitude and Intensity Ratings" (p. 6) for definition.

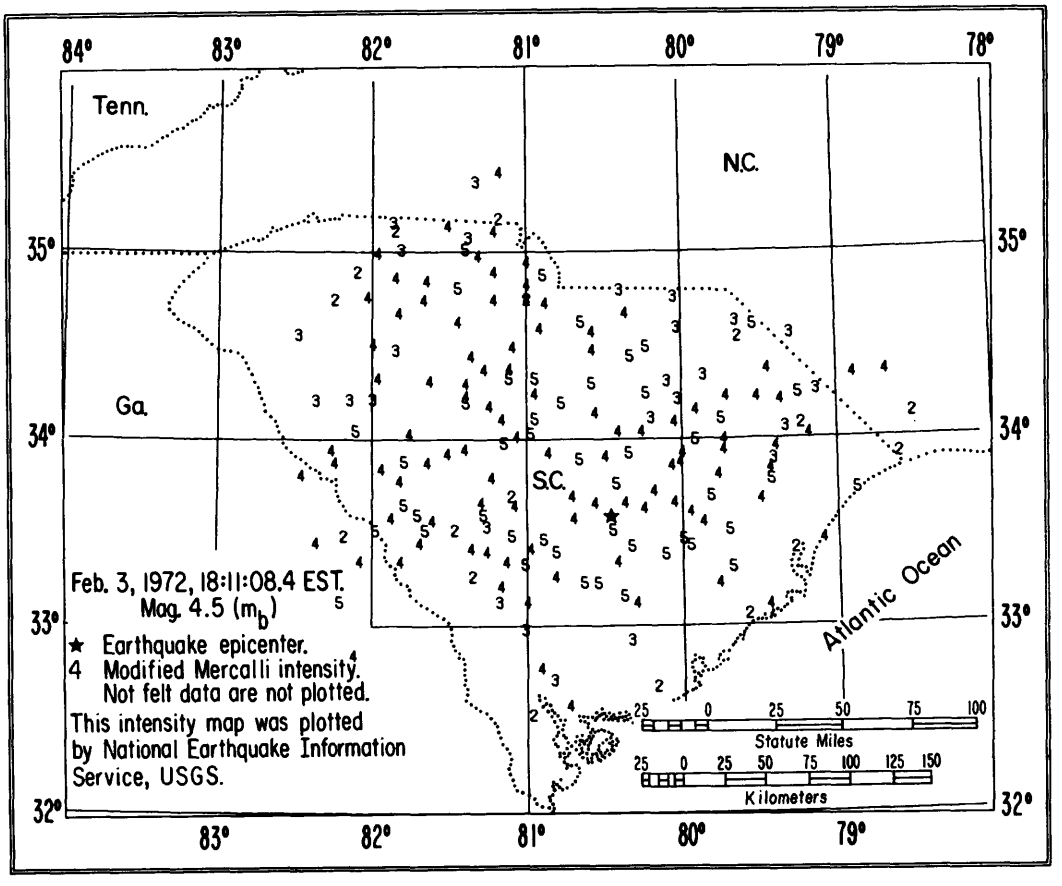

FIGURE 3.—Area affected by South Carolina earthquake of February 3.

at 21:46 and 21:53. Int. **V.** Light damage occurred at Hemingway, McBee, Pineville, Swansea (and north of), and Trio, S.C., and at Augusta and Gough, Ga. Felt information from the questionnaire canvass conducted by NEIC was supplemented by data from G. A. Bollinger, Virginia Polytechnic and State University, Blacksburg, Va.

INTENSITY V IN SOUTH CAROLINA:

Aiken.—Felt by all in building. Windows and dishes rattled; mild creaking of building. Hanging objects swung moderately. Small objects shifted.

Bamberg.—Felt by all in community; frightened few. Windows, dishes, and doors rattled. Slight creaking of building. Moderate earth noises.

Bethune.—Felt by all in community; frightened many. Hanging objects swung. Small objects shifted, overturned, and fell.

Bishopville.—Felt by many; awakened and frightened few. Doors and dishes rattled. Moderate earth noises preceded shake. Hanging objects swung moderately. Small objects shifted.

Bowman.—Felt by and frightened all in building. Windows, doors, dishes, etc., rattled. Moderate earth noises. Lamp fell off piano.

Callison.—Felt by three or more. Small objects shifted on shelves.

Camden.—Felt by and frightened all. Rather severe rattling of windows, doors, dishes, etc. Moderate rumbling. Hanging objects swung moderately. Furniture vibrated. Small objects shifted.

Catawba.—Felt by several; awakened and frightened few. Windows and dishes rattled. Room shook. Moderate earth noises. Small objects shifted.

Cayce.—Felt by and frightened all in building. Windows and doors rattled. Trees and bushes shook.

Chapin.—Felt by all and frightened many in community. Windows, doors, dishes, etc., rattled. House shook slightly. Moderate noises. Trees and bushes shook slightly. Hanging objects swung moderately. Small objects shifted slightly.

Clio.—Felt by several. Door was knocked open. Furniture shifted.

Columbia.—Felt by all in community; frightened few. Windows, doors, dishes, etc., rattled. Faint earth noises. Hanging objects swung. Felt by everyone on duty at the NOAA Weather Service Forecast Office, Columbia Metropolitan Airport, in West Columbia. Console rattled. "Floor seemed to undulate. Earth rumble apparently moving from northwest to southeast."

Cordova.—Felt by all in community. Windows, doors, dishes, etc., rattled. Moderate earth noises.

Cross.—Felt by and frightened all in community; general panic. Windows, doors, dishes, etc., rattled. Small objects shifted.

Dorchester.—Felt by all in community. Windows rattled. Moderate earth noises. Small objects shifted.

Eastover (McEntire Air National Guard Base).—Felt by all and frightened few in community. Building shook. Moderate rumble. "Unconfirmed report of buildings shifting, one fire."

Effingham.—Felt by many in community; frightened few. Windows, dishes, metal carrier cases, and letter-sorting cases rattled. Small objects shifted.

Elgin.—Felt by and frightened many in community. Windows, doors, dishes, etc., rattled. Moderate earth noises. Hanging objects swung.

Eutawville.—Felt by all in community; frightened many. Windows, doors, dishes, etc., rattled. Building creaked. Earth noises sounded much like a train. Hanging objects swung moderately. Trees and bushes shook; vehicles rocked. "One person standing on the ground at the time said he did not feel the quake although it shook persons out of trees around him."

Heath Springs.—Felt by many in community. Slight creaking of building. Loud earth noises. Small objects shifted.

Hemingway.—Felt by many in community.

Windows, doors, dishes, etc., rattled. Hanging objects swung moderately. Small objects shifted. Plaster cracked.

Hickory Grove.—Felt by all in community. Whole house rattled. House creaked, shook, and moved. Moderate earth noises. Trees quivered. Small objects shifted.

Jamestown.—Felt by and frightened many in community. Windows, doors, dishes, etc., rattled.

Johnston.—Felt by few in community. Faint earth noises. Doors shook. Hanging objects swung moderately. Small objects shifted.

Kingstree.—Felt by all in community. "Up and down motion, variation of 2 inches."

Liberty Hill.—Felt by and awakened all in community; frightened few. "Noise like a large plane."

Lockhart.—Felt by many in community; awakened and frightened few. Windows and dishes rattled. Some faint earth noise. Trees and bushes shook. Hanging objects swung back and forth. Small objects shifted.

Lugoff.—Felt by all in community. Windows, doors, dishes, etc., rattled. Building creaked. Moderate earth noises. Slight damage.

McBee.—Felt by several; awakened few. In several homes and buildings, windows, doors, dishes, etc., rattled. Slight tremors of floors, etc. Faint earth noises. Small objects shifted. Windows cracked. Light bulb in ceiling shattered. Damage very slight.

Mullins.—Felt by all in community; frightened few. Lights (prisms) rattled. Faint earth noises. "Lasted about 3 seconds. Large portrait fell from wall a few days later. Could be result of earthquake."

Myrtle Beach Air Force Base.—Felt by all in building; frightened few. Book shelves rattled. Small objects shifted.

Norway.—Felt over entire community; frightened few. Windows rattled. Lounge chair rocked. Loud earth noises. Trees and bushes shook; vehicles rocked.

Olanta.—Felt by all in community. Windows, doors, dishes, etc., rattled.

Parr.—Felt by all in community. Windows rattled. House shook. Moderate rumbling earth noises.

Pineville.—Felt by several in community. Windows, doors, dishes, etc., rattled. Windows cracked. "A shake was also felt at about 2 a.m. on February 1. Several tremors have been felt since February 3."

Pinewood.—Felt by and frightened many in community. Windows and dishes rattled. Small objects shifted.

Reevesville.—Felt by all in community. Windows and dishes rattled.

Ridgeway.—Felt by all in community; frightened many. Dishes rattled. Very loud (explosionlike) earth noises. Small objects shifted.

Rion.—Felt by all in community. Windows, doors, dishes, etc., rattled. Moderate creaking of building. Moderate earth noises.

Rowesville.—Felt by all in community. Windows, doors, dishes, etc., rattled. Floor vibrated. Loud earth noises.

Russellville.—Felt by all in community. Windows and doors rattled. Faint earth noises.

Saint George.—Felt by and frightened many. Moderate earth noises. Furniture moved across floor.

Salley.—Felt by all in community; frightened many. Windows, doors, and dishes rattled. Loud earth noises. Hanging objects swung moderately. Trees and bushes shook.

Santee.—Felt by and frightened few in community. Faint earth noises. Hanging objects swung back and forth. Small objects shifted. "Washer and dryer walked."

State Park.—Felt by all in community; frightened many. Windows, doors, dishes, etc., rattled. Moderate earth noises. Hanging objects swung moderately.

Sumter.—Felt by many in community. Windows, doors, dishes, etc., rattled. Building shook. Hanging objects swung moderately. Small objects shifted. "Know of one case where wall paper allegedly cracked."

Swansea (and north of).—Felt by all in community; frightened few. Loud rumbling

noise; everything shook and rattled. "Windows broke about 9 miles north."

Trio.—Felt by all in community; frightened few. Windows, doors, dishes, etc., rattled. Moderate earth noises. "My crystal shook hard; only one piece broke. Others saw objects on walls moving. Glass windows shook very hard."

Vance.—Felt by and frightened all. Windows, doors, dishes, etc., rattled. Definite movement of building. Moderate earth noises. Hanging objects swung moderately.

Vaucluse.—Felt by all in community; frightened few. Windows and doors rattled. Moderate earth noises. Hanging objects swung moderately.

INTENSITY V IN GEORGIA:

Augusta.—Felt by all in home; frightened many in community. Dishes rattled. Plaster cracked.

Gough.—Felt by and frightened many in community. Windows rattled. Trees and bushes shook; vehicles rocked. Windows cracked.

INTENSITY IV IN SOUTH CAROLINA:

Allendale, Arcadia, Aynor, Ballentine, Batesburg, Bath, Bethera, Blacksburg, Blackstock, Blackville, Blair, Blythewood, Boykin, Branchville, Buffalo, Cades, Cameron, Carlisle, Chester, Clearwater, Clover, Cope, Coward, Cross Anchor, Cross Hill, Dalzell, Davis Station, Denmark, Early Branch, Edgefield, Edgemoor, Ehrhardt, Elko, Elliott, Elloree, Florence, Foreston, Fort Lawn, Gadsden, Gilbert, Gloverville, Graniteville, Great Falls, Greeleyville, Gresham, Hartsville, Holly Hill, Hopkins, Horatio, Irmo, Jackson, Jefferson, Johnsonville, Jonesville, Kershaw, Lake City, Lane, Latta, Laurens, Leesville, Little Mountain, Lobeco, Lone Star, Lynchburg, McClellanville, McConnells, McCormick, Manning, Marion, Mayesville, Monticello, Montmorenci, Nesmith, Newberry, New Ellenton, New Zion, North, North Augusta, Olar, Orangeburg, Oswego, Pacolet Mills, Pamplico, Pauline, Pawleys Island, Peak, Peedee, Pelion, Perry, Plum Branch, Pomaria, Rembert, Richburg, Ridge Spring, Ridgeville, Rock Hill, Saint Matthews, Saint Stephen, Saluda, Sardinia, Scranton, Sellers, Sharon, Shaw Air Force Base, Spartanburg, Summerton, Surfside Beach, Timmonsville, Trenton, Turbeville, Union, Wagener, Ward, Warrenville, Wedgefield, West Columbia, Westville, White Oak, White Pond, White Rock, Williston, Winnsboro, and Woodruff.

INTENSITY IV IN GEORGIA:

Dearing, Hephzibah, Herndon, Lincolnton, and Monticello.

INTENSITY IV IN NORTH CAROLINA:

Cerro Gordo, Fair Bluff, High Shoals, and Whiteville.

INTENSITY I–III IN SOUTH CAROLINA:

Abbeville, Andrews, Awendaw, Barnwell, Belton, Bennettsville, Blenheim, Bowling Green, Centenary, Chesnee, Chesterfield, Clinton, Converse, Cowpens, Darlington, Duncan, Fountain Inn, Galivants Ferry, Georgetown, Greenwood, Hamer, Jenkinsville, Joanna, Lamar, Lando, Little River, Lowrys, Lydia, Mayo, Miley, Moncks Corner, Monetta, Nichols, Ninety Six, North Myrtle Beach, Pageland, Patrick, Poston, Reidville, Ridgeland, Saint Charles, Simpsonville, Smoaks, Smyrna, Springfield, Startex, Ulmers, Wadmalaw Island, Walterboro, Ware Shoals, Wellford, Whitmire, Windsor, Woodford, and Yemassee.

INTENSITY I–III IN GEORGIA:

Grovetown and Harlem.

INTENSITY I–III IN NORTH CAROLINA:

Freeland, Mooresville, Rowland, and Spindale.

Feb. 6: p.m. Saint George, S.C. Observer reported: "On Sunday night, February 6, we had a light quake—light compared to the one on Thursday [Feb. 3]."

Feb. 10: 19:16:30. Wilmington, Del., area. Police and radio stations in the area received reports of apparent widespread tremors. They were felt at Wilmington, Smyrna, and Glasgow, Del., Carneys Point,

N.J., and Elkton, Md. A shock of less intensity was felt in the Hockessin–Talleyville, Del., area on **February 11** between 10:00 and 11:00 a.m. Jordan et al. (1972)[2] report the following:

Some residents report remembering minor tremors felt in 1944 near Wilmington. Others report "vibrations" for the last several years which were dismissed as "sonic booms," "blasting," or "testing at Aberdeen Proving Grounds." A few reports in 1972 from the seashore area of Sussex County and Salem County, N.J., have been received. The intensity [magnitude] in all cases is apparently less than 2.5.

Hundreds of reports were received by the Department of Public Works, the Fire Department, and others from the same area of southwestern Wilmington on December 29, 1971, January 2, 6, 22, and 23, 1972. The "booms" felt like "a truck hitting the house," "furnace blowing up," "distant thunder," "shore batteries." No damage to houses was reported, although the vibrations accompanying the "booms" rattled windowpanes and crockery.

Gas was again believed to be a possible cause. No trace of gas was found by Public Works officials, although the smell of gas was reported by a few residents preceding the January 6 events.

The epicenter of all events seemed to be along the Fall Zone within a few miles of the Newark–Wilmington area. . . .

Aug. 14: 10:05:19. Mag. 3.0 (ATL)[3]. Southern South Carolina. Felt over an area of approximately 6,500 km² (2,500 mi²). Int. **I–III** effects were noted at Barnwell, Bowman, Cordova, Horatio, North, Springfield, and Summerton. The questionnaire canvass was conducted by G. A. Bollinger, Virginia Polytechnic Institute and State University, Blacksburg, Va.

Sept. 5: 11:00:10.9 (16:00). Epicenter 37.6° N., 77.7° W., Richmond, Va., area, mag. 3.3, BLA[3]. Int. **V.** Felt over approximately 5,980 km² (2,300 mi²) of Richmond, Powhatan, and Goochland Counties. The press reported fresh plaster cracks in one house in Richmond's Lakeside area. The questionnaire canvass was conducted by G. A. Bollinger, Virginia Polytechnic Institute and State University, Blacksburg, Va. Ayers (1972)[4] reported:

The latest seismic event in the Central Virginia Seismic Zone occurred about noon (EDST) on September 5, 1972, some 20 miles northwest of Richmond, Virginia. The Central Virginia Seismic Zone trends east-west along the James River from Richmond westward and is located primarily in the Piedmont province. . . . The latest event is located in the Piedmont just west of the Fall Zone, the contact between the Piedmont province and the Coastal Plain province.

INTENSITY V:

Oilville.—Felt by all in community. Ground shook. Building rattled. Loud rumbling. "Frightening."

Richmond (Lakeside area).—An article in the Richmond, Va., *News Leader* (dated Sept. 6, 1972) stated that the quake moved glasses around and put some fresh cracks in plaster in a house on Notre Dame Drive. The article noted that this family "hears" tremors about once a month, but the September 5 shock was the sharpest ever.

INTENSITY IV:

Blackstone, Crozier, Hadensville, Mannboro, Powhatan, and Rockville.

INTENSITY I–III:

Ashland, Cartersville, Chester, Cumberland, Dinwiddie, Madison, Manakin Sabot, Montpelier, Moseley, North Richmond area, and West Richmond area.

Sept. 12: 15:17:13.7 (MRG)[3]. Morgantown, W. Va. Felt about 2 miles from the Morgantown Seismograph Station.

Dec. 7: 22:00:32.6 (Dec. 8, 03:00). Epicenter 40.14° N., 76.22° W., southeastern Pennsylvania, at a depth of 4 km. Int. **V.** Felt over approximately 1,200 km² (460 mi²) of Lancaster and Berks Counties. Slight damage was reported, but not described, at New Holland.

INTENSITY V:

Akron.—Awakened and frightened few.

[2] Jordan, R. R., Pickett, T. T., and Woodruff, K. D., *Preliminary Report on Seismic Events in Northern Delaware*, Open File Report, Delaware Geological Survey, State of Delaware, University of Delaware, Newark, Del., April 1972, 15 pp.

[3] Abbreviations used to indicate authority for arrival or origin times, epicenters, and/or magnitudes are defined on page 9.

[4] Ayers, Robert L., "A Note on the Richmond, Virginia, Earthquake of September 5, 1972," *Earthquake Notes*, Vol. XLIII, No. 4, December 1972, pp. 17–21.

Windows, doors, dishes, etc., rattled. Loud earth noises. Hanging objects swung. Furniture shifted.

New Holland.—Felt by and awakened all in community; frightened many. Windows rattled. "Sounded like strong sonic boom." Slight damage.

Penryn.—Felt by many in community. Windows and dishes rattled. All pictures on wall tilted in one home. Pendulum clock stopped. "Sharp jar. Muffled blast or heavy thump." Hanging objects swung moderately.

Talmage.—Felt by all in community; frightened all in home. Windows, doors, dishes, etc., rattled. Building creaked. Loud earth noises.

INTENSITY IV:

East Earl, Elm, Goodville, Martindale, Mount Joy, Reamstown, Rothsville, Smoketown, Stevens, and Wernersville.

INTENSITY I–III:

Atglen, Blue Ball, Denver, Lancaster, Lewisville, and Lititz.

CENTRAL REGION

[All times are central standard. If an epicenter is quoted, Greenwich mean time is given in parentheses. This region includes Arkansas, Colorado (eastern), Illinois, Indiana, Iowa, Kansas, Kentucky (western), Louisiana, Michigan, Minnesota, Mississippi (western), Missouri, Nebraska, North Dakota, Ohio, Oklahoma, South Dakota, Tennessee (western), Texas (eastern), and Wisconsin.]

Jan. 31: 23:42:10 (Feb. 1, 05:42). Epicenter 36.4° N., 90.8° W., northeast Arkansas region, at a depth of 12 km, mag. 3.9 (m_b), JSA. Int. **V.** At Delaplaine, Ark., cracks appeared in foundation of a building. Concrete wall cracked at Biggers, Ark. The questionnaire canvass was conducted by the Jesuit Seismological Association, Saint Louis University, Saint Louis, Mo.

INTENSITY V IN ARKANSAS:

Biggers.—Walls cracked in concrete block building. Loud, explosivelike noise.

Delaplaine.—"Caused one end of house to settle. Caused foundation to crack under a concrete floor and caused cracks between building blocks."

Knobel.—Felt by all in area. "Sounded like an explosion with pronounced reverberation."

Maynard.—Felt by all. Loud explosion.

INTENSITY IV IN ARKANSAS:

Black Rock, Paragould, Pocahontas, Ravenden, Reyno, and Walnut Ridge.

INTENSITY IV IN MISSOURI:

Harviell, Naylor, and Thayer.

INTENSITY I–III IN ARKANSAS:

Beech Grove, Cave City, Corning, Greenway, Guion, Hoxie, Imboden, Lafe, McArthur, Mammoth Springs, Monette, Peach Orchard, Piggott, Smithville, Strawberry, and Swifton.

INTENSITY I–III IN KENTUCKY:

Hickman and Louisville.

INTENSITY I–III IN MISSOURI:

Alton, Arcadia, Broseley, Cardwell, Des Arc, Doniphan, Ellington, Essex, Fairdealing, Fisk, Fredericktown, Grandin, Greenville, Ironton, Koshkonong, Lilbourn, Marquand, Myrtle, Neelyville, Puxico, Qulin, Silva, Van Buren, Wardell, and Winona.

Mar. 10: 15:00. Oklahoma City, Okla. A swaying motion was felt by very few at the Presbyterian Hospital.

Mar. 29: 14:38:31.9 (20:38). Epicenter 36.20° N., 89.61° W., New Madrid, Mo., region, at a depth of 10 km, mag. 3.7 (m_b), JSA. Int. **V.** Felt over 171,000 km² (65,800 mi²) of Arkansas, Illinois, Kentucky, Mississippi, Missouri, and Tennessee (fig. 4). The press reported broken windows and buckled floors at Cooter, Mo. Plaster cracked at Newman, Ky. The NEIC questionnaire canvass was supplemented by data from the Jesuit Seismological Association, Saint Louis University, Saint Louis, Mo.

INTENSITY V IN KENTUCKY:

Newman.—Felt by many. Windows rattled. Loud earth noises. Plaster cracked. Damage slight.

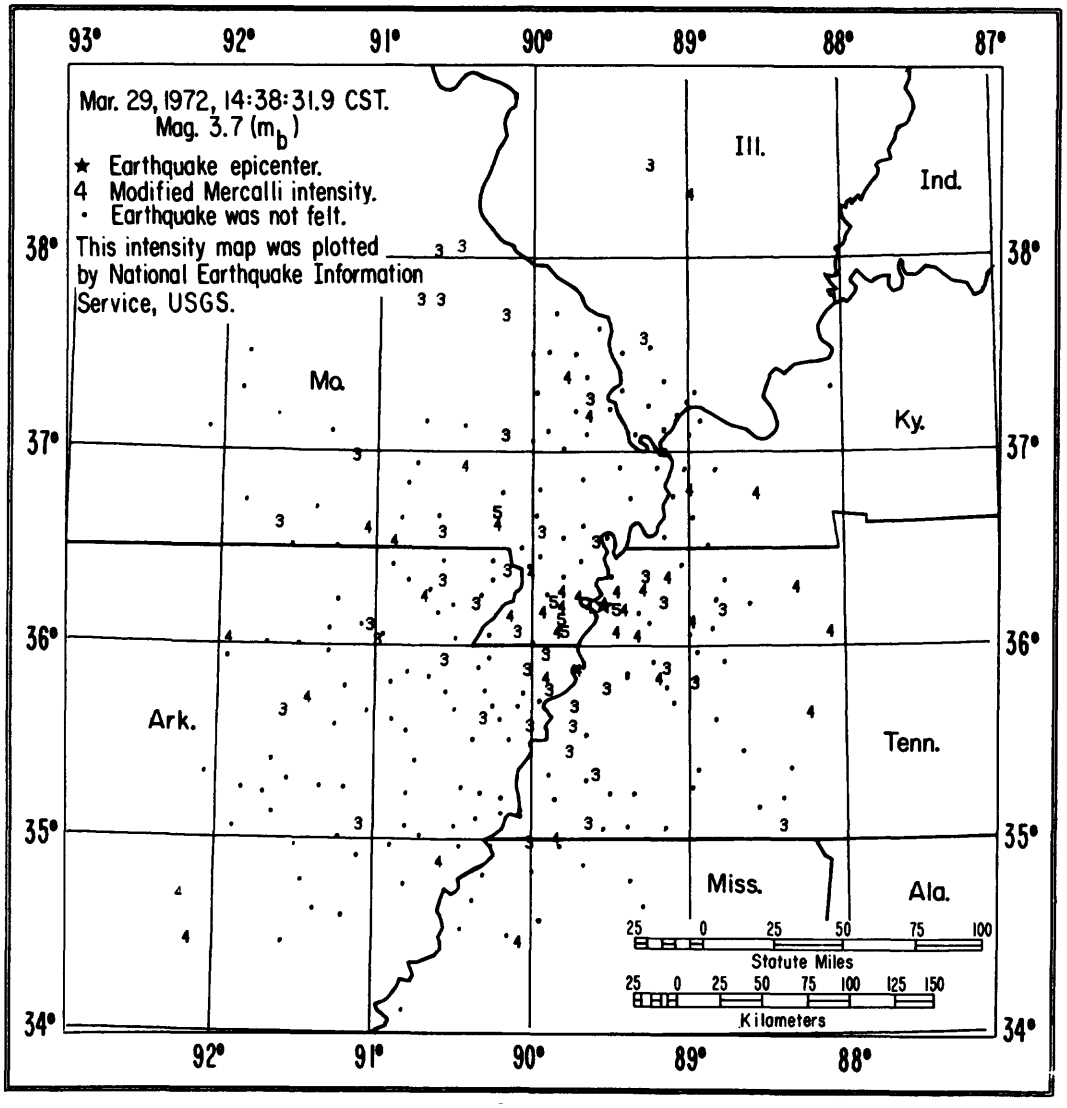

FIGURE 4.—Area affected by Missouri earthquake of March 29.

INTENSITY V IN MISSOURI:

Broseley.—Felt by several; frightened many. Windows, doors, and dishes rattled; building creaked slightly. Earth noises, like sonic boom. Hanging objects swung slightly. Some small objects shifted, overturned, and fell.

Cooter.—Felt by several in community. Windows, doors, and dishes rattled; building creaked. Moderate earth noises. Small objects shifted and fell. The Springfield, Ill., *Register* (dated Mar. 30, 1972) reported broken windows and buckled floors in this town. "Sounded like an explosion or thunder in the distance."

Deering.—Felt by all in community. Building shook slightly. Moderate earth noises.

Kennett.—Felt by several. Windows, doors, and dishes rattled. Small objects shifted, overturned, and fell.

Steele.—Felt by all in community; fright-

ened many. Metal cabinets rattled. Loud earth noises. Small objects fell.

INTENSITY V IN TENNESSEE:

Miston.—Felt by many in community. Windows, doors, and dishes rattled. Loud earth noises, like logs rolling under the building. Small objects shifted, overturned, and fell; standing pictures fell. "I knew it was an earthquake when I heard it coming. Not as hard as the one we had a year ago."

INTENSITY IV IN ARKANSAS:

Armorel, Brickeys, Burdette, Delaplaine, Newark, Redfield, Sweet Home, and Tomato.

INTENSITY IV IN ILLINOIS:

Hecker and Tamms.

INTENSITY IV IN KENTUCKY:

Arlington, Bybee, Center, and Mayfield.

INTENSITY IV IN MISSISSIPPI:

Hillhouse, Mineral Wells, and Pleasant Grove.

INTENSITY IV IN MISSOURI:

Braggadocio, Burfordville, Caruthersville, Chaffee, Gatewood, Gobler, Hayti, Hendrickson, Holland, Loose Creek, Pascola, Poynor, Qulin, Rives, Senath, Whiteoak, and Willow Springs.

INTENSITY IV IN TENNESSEE:

Bogota, Camden, Chesterfield, Dyersburg, Elbridge, Finley, Lenox, Maury City, Paris, Ridgely, and Troy.

INTENSITY I–III IN ARKANSAS:

Blytheville, Blytheville Air Force Base, Brookland, Dell, Gosnell, Huff, Hunter, Knobel, Lepanto, Luxora, Marmaduke, Piggott, Portia, and Wilson.

INTENSITY I–III IN ILLINOIS:

Alto Pass and Hoyleton.

INTENSITY I–III IN KENTUCKY:

Marion.

INTENSITY I–III IN MISSISSIPPI:

Horn Lake.

INTENSITY I–III IN MISSOURI:

Blackwell, Caledonia, Dutchtown, Fremont, Hornersville, Koshkonong, Malden, Marston, McGee, Naylor, Tiff, Valles Mines, Van Buren, and Womack.

INTENSITY I–III IN TENNESSEE:

Atoka, Brownsville, Burlison, Collierville, Crockett Mills, Fort Pillow, Gadsden, Gallaway, Greenfield, Hornbeak, Mitchie, Ripley, and Trimble.

May 6: 20:12:08.0 (May 7, 02:12). Epicenter 35.88° N., 89.97° W., Arkansas, at a depth of 4 km. Int. **IV** at Blytheville and Lepanto, Ark., and Finley, Tenn.

June 9: 13:15:18.8 (19:15). Epicenter 37.70° N., 90.41° W., eastern Missouri, at a depth of 20 km. Felt at Deslodge, Gumbo, and North Deslodge.

June 18: 23:46:15.3 (June 19, 05:46). Epicenter 37.00° N., 89.08° W., Cape Girardeau, Mo., region, at a depth of 13 km, mag. 4.5 (m_b). Int. **IV** at Wickliffe, Ky. Also felt at Kevil, Ky.

Sept. 5: 20:28:12 (Sept. 6, 02:28). Epicenter 36.4° N., 89.9° W., Missouri, mag. about 2½, JSA (poor epicenter). The press reported one person called and said he felt the earthquake but did not note where the call originated.

Sept. 14: 23:22:15.7 (Sept. 15, 05:22). Epicenter 41.59° N., 89.42° W., Illinois, at a depth of 5 km, mag. 3.7 (m_b). Int. **VI.** Felt over approximately 650,000 km² (250,000 mi²) of Illinois, Indiana, Iowa, Michigan, Minnesota, Missouri, Ohio, and Wisconsin (fig. 5). Minor damage occurred at Amboy, Holcomb, and Rock Falls, Ill. Light damage was noted at several towns in Illinois, Iowa, Indiana, and Wisconsin.

INTENSITY VI IN ILLINOIS:

Amboy.—Felt by, awakened, and frightened many in community. Windows, doors, dishes, etc., rattled. Building creaked. Moderate earth noises. Chimneys, tombstones, elevated water tanks, etc., cracked; plaster cracked. Small objects shifted. Damage slight.

Holcomb.—Felt by all in community; awakened and frightened many. Windows, doors, dishes, etc., rattled. Moderate, rum-

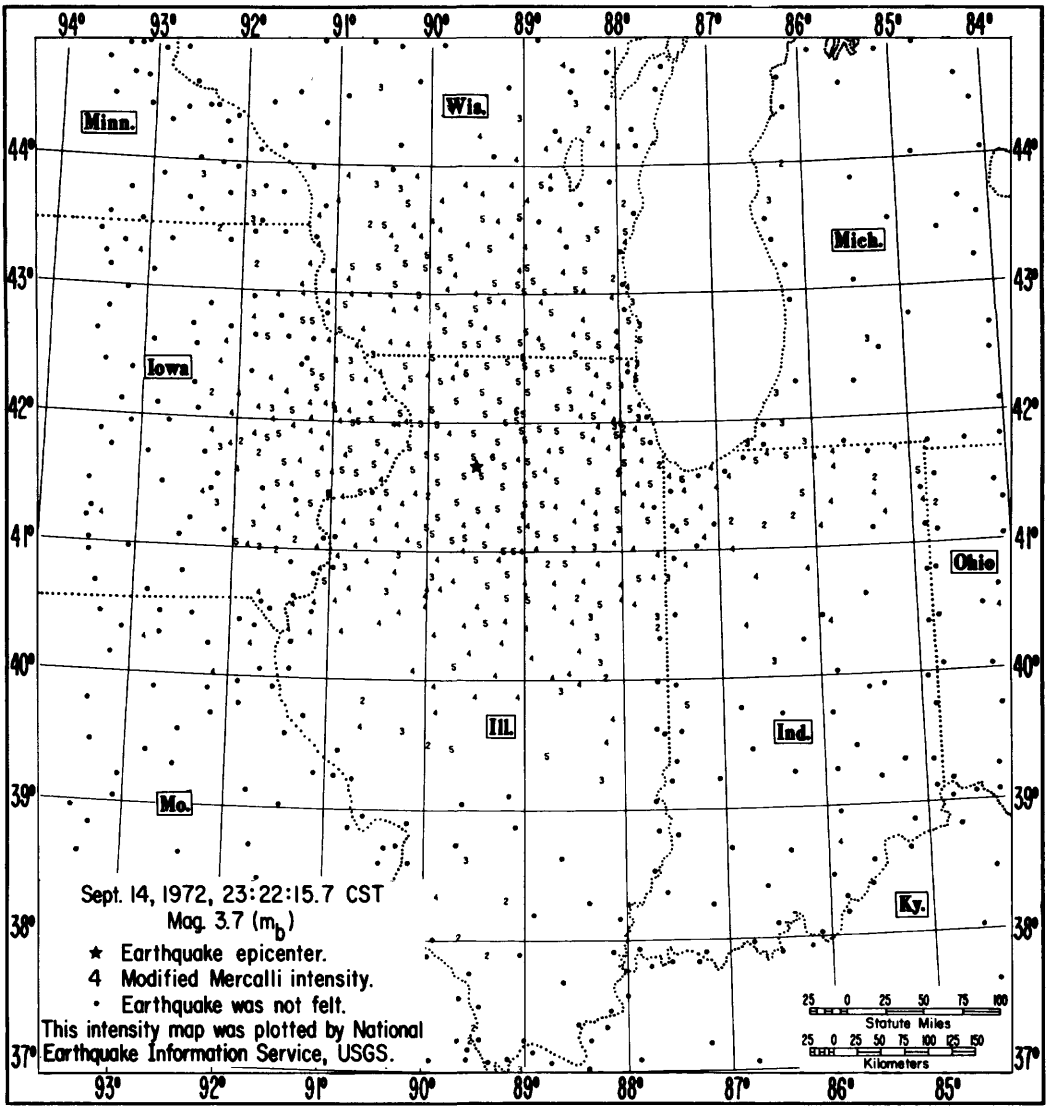

FIGURE 5.—Area affected by Illinois earthquake of September 14.

bling earth noises. Trees and bushes shook. Some reports of cracked chimneys. Plaster cracked. Small objects shifted, overturned, and fell. "Street lights burned bright and some went out."

Rock Falls.—Felt in community. Windows, doors, dishes, etc., rattled. Moderate earth noises. Hanging objects swung. Small objects shifted. "Broken waterpipes reported in house next door. Baby bed rolled across room."

INTENSITY V IN ILLINOIS:

Albany, Andalusia, Annawan, Antioch, Argo (dishes broke and plaster cracked), Arlington, (plaster cracked), Ashton, Aurora, Baileyville, Barstow, Benson, Big Rock, Blackstone, Braidwood (plaster cracked), Brookfield, Byron (plaster cracked), Caledonia, Camp Grove, Capron, Carbon Cliff, Carman, (plaster fell; damage slight), Cedarville, Chana, Channahon, Cherry, Cherry Valley, Chicago (one window cracked; chandeliers

broke; walls cracked in area), Chillicothe, Clare, Coal Valley, Congerville, Cordova (plaster cracked), Cortland, Crescent City, Creston, Dalzell, Davis, Davis Junction, Deer Grove, Depue, Des Plaines, Dixon, Dover, Durand (damage slight), Earlville, Egan, Eldena, Elgin, Elizabeth, Elk Grove Village, Elwood, Erie, Esmond, Essex, Fairbury, Fenton, Forreston, Franklin Grove (windows cracked), Freeport, Fulton (plaster cracked in few instances), Galena, Galva, Garden Prairie, Genoa, German Valley, Gilberts (window cracked), Glen Ellyn, Golf, Grant Park, Grayslake, Greenview (small cracks on inside walls of house), Hamilton, Hampton, Harmon, Hebron, Henry, Hillsdale, Hinckley, Holder, Hooppole (windows cracked), Hopedale, Hudson, Ingleside, Joliet, Kasbeer, Kent, Kewanee, Kings, Kirkland, Lafayette, Lafox, La Moille, Lanark, La Rose (windows cracked), La Salle, Lee, Lee Center, Lemont, Lindenwood, Lisle, Lockport, Lostant, Lyndon (plaster cracked), McNabb, Magnolia, Malden, Malta, Manlius, Mark, Mazon, Melvin, Mendota (plaster cracked), Metamora, Midlothian, Millbrook, Milledgeville, Millington, Minooka (plaster cracked), Monroe Center, Montgomery, Morris (plaster loose), Morrison, Mount Carroll, Mount Morris, Nachusa, Nelson, Neponset, Newark, New Bedford, Normandy (damage slight), Northbrook, North Chicago, Oak Lawn, Oglesby, Ohio, Orangeville, Oregon, Oswego, Ottawa, Pawpaw (some cracked plaster), Pecatonica, Peru, Plano, Pontiac, Poplar Grove, Port Byron, Posen, Princeton, Prophetstown, Richmond, Richton Park (plaster cracked), Ridott, River Grove, Riverside, Roanoke, Robbins, Rochelle, Rockdale, Rock Falls, Rockford (plaster cracked), Rockton (window cracked), Roscoe (damage slight), Saint Charles, Sandwich, Seatonville, Shabbona, Shannon, Sheffield, Shelbyville, Sheridan, Shirland, Silvis, South Beloit, South Wilmington, Sparland, Spring Valley, Standard, Steger, Sterling, Steward, Stillman Valley, Streator (plaster cracked), Sublette, Tampico, Thomson (window cracked), Tiskilwa, Toluca, Tonica, Triumph, Troy Grove, Union, Utica, Van Orin, Varna, Victoria, Viola, Virden, Wapella, Warren, Warrenville, Washington, Wauconda, Waukegan, Westchester, Western Springs, Westmont, Willow Springs, Wilmington, Winnebago, Wonder Lake (windows cracked), Woosung, Wyoming, and Yorkville.

INTENSITY V IN INDIANA:

Dyer, Hillsdale (plaster and windows cracked), Rolling Prairie, Shelby, South Bend (northwest section), and Whiting (windows cracked).

INTENSITY V IN IOWA:

Atalissa, Aurora (plaster cracked), Bernard, Big Rock, Cascade, Clinton, Delmar, DeWitt, Dixon, Donahue, Durant, Eldridge, Elwood, Ely, Fairfield, Garber, Grand Mound, Hopkinton, Iowa City, Letts, Littleport (plaster cracked), Long Grove, Lost Nation (plaster cracked), Luzerne, Maquoketa, Miles, Monticello, Muscatine, North Buena Vista, Onslow, Preston, Riverside, Sabula, Springville (fine cracks in plaster), Sunbury, Swisher (house foundation cracked), Tiffin, Toronto (damage slight), Walcott, Welton, and Wheatland.

INTENSITY V IN WISCONSIN:

Afton, Arena, Argyle, Arlington, Belleville, Beloit, Benton, Bloomington, Blue River, Brodhead, Browntown (waterpipes leaked), Cambridge, Camp Lake, Clinton, Cottage Grove, Cross Plains, Deerfield, Dodgeville (windows cracked), Dousman, Evansville, Footville, Franksville, Fredonia, Friesland, Genoa City, Gotham, Gratiot, Green Lake, Hanover, Helenville, Highland, Hollandale, Honey Creek, Janesville, Jefferson, Juda, Kansasville, Kewaskum (plaster cracked and broke), Lake Mills, LaValle, Livingston, Lodi, Lyons, McFarland, Milton (some plaster cracked, broke, and fell), Milton Junction, Monona, Monroe, Monticello, Nashotah (plaster cracked), New Munster, North Lake, Oregon, Pell Lake, Plain, Portage, Prairie du Sac, Richfield (some plaster cracks), Ripon, Sauk City (windows and

plaster cracked), Sharon, Silver Lake, Sinsinawa, Somers, South Wayne, Springfield (one crack in plaster), Spring Green, Steuben, Trevor, Union Center, Waterloo, West Lima, Whitewater, Williams Bay, Windsor (plaster cracked), Wonewoc, Woodford, and Zenda (plaster cracked).

INTENSITY IV IN ILLINOIS:

Abingdon, Adair, Aledo, Alexis, Alpha, Altona, Arlington Heights, Arrowsmith, Atlanta, Aurora, Basco, Batavia, Beaverville, Belvidere, Braceville, Bradford, Bryant, Buckingham, Buckley, Buda, Buffalo Prairie, Bureau, Bushnell, Cambridge, Canton, Carpentersville (another shock at 12:35 a.m.), Castleton, Cedar Point, Cerro Gordo, Chandlerville, Charleston, Chebanse, Chenoa, Chicago Heights, Cissna Park, Clifton, Clinton, Coal City, Coleta, Colmar, Colona, Colusa, Compton, Cooksville, Cornell, Country Club Hills, Creve Coeur, Crystal Lake, Cuba, Cullom, Dakota, Dana, Deerfield, Delavan, Detroit, Dewitt, Downers Grove, Downs, Dundee, Dwight, Easton, East Peoria, Edelstein, Edwards, Eleroy, El Paso, Emden, Eureka, Farmington, Flanagan, Forrest, Fox Lake, Frankfort, Franklin Park, Gardner, Geneseo, Grand Ridge, Grayville, Green Valley, Gridley, Groveland, Hanna City, Hanover, Hanover Park, Harristown, Harvard, Hazel Crest, Herscher, Heyworth, Hindsboro, Homewood, Huntley, Illinois City, Island Lake, Itasca, Ivesdale, Joy, Kaneville, Kempton, Kingston, Kinsman, Kirkwood, Lacon, Ladd, La Harpe, Laura, Leland, Leonore, Le Roy, Lexington, Little York, Liverpool, Lombard, Long Point, Lowpoint, Lyons, McConnell, McHenry, Mackinaw, Manhattan, Manville, Maple Park, Marengo, Marietta, Marseilles, Matherville, Medinah, Middlegrove, Middletown, Mineral, Minonk, Moline, Momence, Monee, Monmouth, Montgomery, Monticello, Morris, Mount Prospect, Mount Pulaski, Mundelein, Naperville, Nauvoo, New Athens, New Berlin, New Lenox, New Windsor, Niota, Nora, Norris, Olympia Fields, Onarga, Oneida, Opheim, Oquawka, Osco, Peotone, Plato Center, Preemption, Princeville, Putnam, Ransom, Rapids City, Raritan, Reddick, Red Oak, Reynolds, Riverton, Rock Island, Rutland, Savanna, Saybrook, Scales Mound, Schaumburg (press), Scioto Mills, Secor, Sherrard, Shirley, Solon Mills, South Holland, South Pekin, Speer, Stanford, Stockton, Strawn, Streamwood (press), Sugar Grove, Sweetwater, Tallula, Techny, Thornton, Tinley Park, Topeka, Toulon, Towanda, Tremont, Trivoli, Union Hill, Urbana, Verona, Wadsworth, Warsaw, Wasco, Washburn, Waterman, Watseka, Wayne, West Brooklyn, Winfield, Woodhull, and Worth.

INTENSITY IV IN INDIANA:

Beverly Shores, Bristol, Brook, Burket, Chesterton, Churubusco, Crown Point, Dayton, Demotte, Fair Oaks, Francesville, Gary (press), Goshen, Griffith, Hebron, Idaville, Lafayette (press), Lake Village, La Porte, Leesburg, Leroy, Little York, Mexico, Milford, Munster, New Carlisle, Orland, Scherville (press), Spencerville, Valparaiso, Westville, and Wheeler.

INTENSITY IV IN IOWA:

Amber, Anamosa, Andover, Atkins, Baldwin, Batavia, Belle Plaine, Bellevue, Bettendorf, Blairstown, Bryant, Burlington, Calamus, Camanche, Cedar Rapids, Center Junction, Central City, Clarence, Columbus Junction, Davenport, Delta, Dunkerton, Durango, Elgin, Elkader, Epworth, Fairfax, Farley, Farmersburg, Farmington, Gilbertville, Gooselake, Green Island, Hale, Hayesville, Hiawatha, Holy Cross, Lacona, Lansing, Le Claire, Lisbon, Lone Tree, Low Moor, Luxemburg, McCausland, Marengo, Marion, Martelle, Maynard, Mechanicsville, Monona, Montpelier, Morley, Mount Vernon, New Liberty, Nichols, Oakdale, Olds, Olin, Oxford Junction, Palo, Parnell, Pleasant Valley, Plymouth, Princeton, Saint Donatus, Shellsburg, Sherrill, Spragueville, Springbrook, Stockton, Tipton, Toddville, Troy Mills, Van Horne, Vinton, Viola, Walford, Washington, Waterville, Wayland, West

Branch, West Liberty, What Cheer, Whittier, Wilton Junction, Wyoming, Yarmouth, and Zwingle.

INTENSITY IV IN MISSOURI:

Green Castle and Williamstown.

INTENSITY IV IN OHIO:

Botkins.

INTENSITY IV IN WISCONSIN:

Albany, Avalon, Avoca, Bagley, Bassett, Belmont, Benet Lake, Black Earth, Blanchardville, Bloom City, Blue Mounds, Bristol, Brooks, Burlington, Cambria, Cazenovia, Columbus, Coon Valley, Cuba City, Darien, Darlington, De Forest, Delavan, Doylestown, East Troy, Elkhorn, Fennimore, Fontana, Fort Atkinson, Genoa, Gillingham, Hilbert, Hillpoint, Horicon, Ixonia, Kenosha, Kieler, Kingston, Lake Geneva, Larsen, Lebanon, Loganville, Lone Rock, Lyndon Station, Manchester, Markesan, Marshall, Mazomanie, Merrimac, Milwaukee, Mineral Point, Montfort, Mount Hope, Mount Horeb, New Lisbon, North Freedom, Okauchee, Orfordville, Packwaukee, Palmyra, Pardeeville, Patch Grove, Pickett, Plainfield, Platteville, Pleasant Prairie, Potosi, Potter, Poy Sippi, Princeton, Redgranite, Reedsburg, Rewey, Rio, Rockland, Rock Springs, Saukville, Shawano, Shullsburg, Stitzer, Stoughton, Union Grove, Verona, Wales, Walworth, Wauzeka, Westfield, Winneconne, and Wyocena.

INTENSITY I–III IN ILLINOIS:

Addison, Andover, Atkinson, Aviston, Avon, Bensenville, Biggsville, Bloomingdale, Bonfield, Cabery, Campus, Chadwick, Chambersburg, Champaign, Coello, Cropsey, Dewey, Dolton, Donovan, East Dubuque, East Galesburg, Elmwood, Gibson City, Graymont, Hampshire, Hoffman Estates, Hoopeston, Jewett, La Grange Park, Lake Bluff, Lomax, Milmine, Modesto, Morton Grove, Murrayville, North Henderson, Odell, Oraville, Park Ridge, Pearl City, Radom, Roselle (press), Rossville, Round Lake, Seymour, Sheldon, Spring Grove, Steeleville, Winthrop Harbor, and Zion.

INTENSITY I–III IN INDIANA:

Argos, Highland, Monticello, Ora, Rome City, San Pierre, and Sumava Resorts.

INTENSITY I–III IN IOWA:

Brighton, Calmar, Dysart, Fruitland, Ladora, Lime Springs, Lockridge, Middle, Moscow, Mount Pleasant, Mount Union, Oxford, Peosta, Robins, Sigourney, and West.

INTENSITY I–III IN MICHIGAN:

Benton Harbor, Berrien Center, Berrien Springs, Buchanan, Custer, Edwardsburg, Harbert, Hart, Lakeside, New Buffalo, Niles, and Riverside.

INTENSITY I–III IN MINNESOTA:

Canton, Stewartville, and Whalan.

INTENSITY I–III IN MISSOURI:

Cape Girardeau and Scott City.

INTENSITY I–III IN OHIO:

Hicksville.

INTENSITY I–III IN WISCONSIN:

Allenton, Black Creek, Butler, Colgate, Delafield, Hartland, Ironton, Kendall, Little Chute, Middleton, Morrisonville, Mukwonago, Neillsville, Norwalk, Poynette, Racine, Randolph, Richland Center, South Milwaukee, Sullivan, Twin Lakes, Viola, Waldo, and Waupaca.

Oct. 15: 23:47:33.1 (Oct. 16, 05:47). Epicenter 42.34° N., 99.59° W., Nebraska, at a depth of 23 km, mag. 3.7 (m_b). Int. **V** at Bassett, but no damage occurred. Int. IV at Ainsworth and Newport.

Dec. 3: a.m. Auburn, Ind. *The Evening Star* (Auburn, Ind., dated Dec. 4, 1972) reported that a possible earthquake broke four water mains and knocked doors ajar. Seismic activity was recorded at 04:08, December 3, by the seismograph at Indiana University at Bloomington. However, this activity could not be pinpointed as a local disturbance.

WESTERN MOUNTAIN REGION[5]

[All times are mountain standard. If an epicenter is quoted, Greenwich mean time is given in parentheses. This region includes Arizona, Colorado (western), Idaho, Montana, Nevada (eastern), New Mexico, Texas (western), Utah, and Wyoming.]

Jan. 3: 03:20:38.4 (10:20). Epicenter 38.6° N., 112.1° W., Utah, at a depth of 5 km, mag. 4.3. Int. **VI.** The press reported chimneys toppled, walls cracked, and considerable damage occurred to contents of homes at Elsinore. Int. V at Central (plaster cracked; damage slight), Glenwood, Marysvale (cracks opened in walls; aftershocks felt), Sevier, about 13 km north of (plaster cracked), and Sigurd. Int. IV at Meadow and Venice; I–III at Fillmore.

Jan. 5: 03:32:26.6 (10:32). Epicenter 47.8° N., 114.2° W., Montana, at a depth of 5 km, mag. 4.4 (m_b). Int. **IV** at Polson.

Jan. 13: 21:34:22.7 (Jan. 14, 04:34). Epicenter 45.0° N., 111.6° W., Hebgen Lake region, Mont., at a depth of 5 km. Int. **IV** at Virginia City.

Jan. 18: 00:06. Slight shock at Virginia City, Mont.

Jan. 23: 08:37:14.0 (LDM). Felt as a quick jerk and thud at Polson, Mont.

Feb. 5: 22:50. Slight shock felt at Virginia City, Mont.

Feb. 20: 23:09:07 (TUC). Felt in airport control tower at Tucson, Ariz.

Feb. 25: 20:50. Slight shock felt at Virginia City, Mont.

Mar. 4: 05:26:13.0 (12:26), 05:42:04.5 (12:42). Epicenter 47.8° N., 114.4° W., Montana, both at a depth of 5 km, mag. 3.7 and 3.2, respectively. Int. **IV** at Polson.

Mar. 6: 06:33:24.5 (13:33). Epicenter 41.9° N., 111.6° W., Utah, at a depth of 5 km, mag. 4.6 (m_b). Int. **V.** Felt over about 2,600 km² (1,000 mi²) of the Utah–Idaho border region. An observer at Lewiston, Utah, observed a small crack in basement ceiling. At Smithfield, the shock awakened and frightened many in community; small objects and furniture shifted. Felt by and awakened many at Weston, Idaho. Int. IV at Clarkston, Fielding, and Garden City, Utah, and at Fish Haven and Preston, Idaho; II at Logan, Utah.

Mar. 28: 03:40:52.0 (10:40). Epicenter 47.8° N., 114.4° W., Montana, at a depth of 5 km, mag. 4.4 (m_b). Int. **IV** at Polson.

Apr. 9: 14:19:25.2 (21:19). Epicenter 48.1° N., 114.1° W., Montana, at a depth of 5 km, mag. 4.5 (m_b). Felt at Bigfork and Woodsbay. The jolt at Woodsbay was followed by a roaring sound.

Apr. 16: 08:04:55.2 (BUT). Felt in the Dayton, Mont., area. Press described it as a "good" shock.

Apr. 20: 06:28:16.3 (13:28). Epicenter 35.3° N., 111.6° W., eastern Arizona, at a depth of 5 km, mag. 3.7 (m_b). Press reported about a 156-km² area (60 mi²) was rocked. Int. **IV** at Flagstaff. Also felt at Sunset Crater. Reported as the largest of a series of minor shocks which have been detected in Arizona in recent months.

May 18: 05:09:03.6 (LDM). Int. **IV** at West Shore, a community near Polson, Mont.

May 20: 11:55:54.4 (LDM). Felt in the Dayton, Mont., area. Described as a noisy, snappy shock.

June 1: 20:15:48.2 (June 2, 03:15). Epicenter 38.6° N., 112.2° W., Utah, at a depth of 5 km, mag. 4.6 (m_b). Int. **V.** Felt over about 1,820 km² (700 mi²), principally in southwest Sevier County. The press re-

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[5] Prepared by N. H. Scott, NOAA, Environmental Research Laboratories, Seismological Field Survey, San Francisco, Calif. Scott also prepared the sections entitled California and Western Nevada, p. 25, and Washington and Oregon, p. 40.

Editors' note.—See Preface, p. iii, for organizational change in 1973.

ported there was minor cracking of plaster in some homes at Monroe; a few dishes were broken, and a large mirror fell and broke. Felt by all and frightened few in community at Elsinore. At Sevier, felt by, awakened, and frightened all in community; vehicles rocked; picture overturned. Moderate earth noises. Int. IV at Central, Koosharem, Meadow, and Venice. Also felt at Fillmore and Richfield (press).

Aug. 29: 21:41. Int. **IV** at Ennis, Mont.

Aug. 30: 06:50. Mild shock felt at Kerr Dam, Mont. (about 8 km southwest of Polson).

Aug. 31: 03:38. Int. **V** at Kerr Dam, Mont., where all in home were awakened. Windows rattled. Moderate earth noises.

Sept. 29: 07:09, 08:12. Int. **IV** at Kerr Dam, Mont.

Oct. 1: 12:42:29.2 (19:42). Epicenter 40.6° N., 111.3° W., Utah, at a depth of about 5 km, mag. 4.7 (m_b). Int. **VI.** Felt over about 6,500 km² (2,500 mi²), principally in northwest Wasatch and southwest Summit Counties in the area southeast of Salt Lake City. Only minor damage was reported. ERL field investigators from Boulder, Colo., reported only minimal damage was observed in the Heber and Midway areas. They also reported: "The main shock is believed to have been a dual event; the two events appear to be separated in time by approximately 1½ minutes. The epicenter of the second event is thought to be near Kimball Junction, Utah, about 25 miles east of Salt Lake City. Minor damage and a large number of felt reports along the East Bench of Salt Lake City support the hypothesis." A Pleasant Grove observer reported a shock was also felt about 20 minutes after the shock of 12:42.

INTENSITY VI:

Midway.—Felt by all and frightened many in community. The press reported some bricks were shaken from chimneys and plaster was cracked at two schools. Other observers reported: Plaster cracked. Trees and bushes shook. Water was disturbed. Small objects and furniture shifted. "I was out in the mountains working sheep in a corral. I didn't hear any noise, but I sure felt the shake." Also near Midway: "I thought the house would collapse." Three explosivelike jolts felt.

INTENSITY V:

Heber City, Holladay, Kamas, Peoa, Salt Lake City (some hairline plaster cracks; few windows broke; damage slight), Sandy, and Wallsburg (very slight plaster cracking; damage very slight).

INTENSITY IV:

American Fork, Farmington, Orem, Park City, Parley's Canyon area, and West Jordan.

INTENSITY I–III:

Bountiful (press), Draper, Layton, Lehi, Midvale, Oakley (5 km east of), Pleasant Grove, Saltair, and Woods Cross.

Oct. 16: 14:49:32.4 (21:49). Epicenter 40.4° N., 111.0° W., Utah, at a depth of 10 km, mag. 4.1 (m_b). Gentle rocking was felt throughout much of Salt Lake Valley (press).

Nov. 1: 20:41:31.3 (Nov. 2, 03:41). Epicenter 46.1° N., 111.5° W., Montana, at a depth of about 5 km, mag. 4.5. Int. **V.** Generally felt over about 3,120 km² (1,200 mi²), principally in the Three Forks area of northwest Gallatin County. Outside this region, the shock was reported felt in the Bridger Canyon area east of Bozeman, Helena, and Sheridan. A questionable felt report was received from Buffalo about 161 km northeast of Three Forks. At Three Forks, the shock was felt by most people. A crack in concrete outside one home opened up about 7 cm. Trailer houses shook very strongly; table swayed north-south for about 4 seconds. Int. IV at Manhattan and Trident; I–III in Bridger Canyon area, Buffalo, Helena, Radersburg, and Sheridan. Also reported felt about 24 km up the Madison

River south of Three Forks and in the Lewis and Clark Caverns area.

Nov. 2: 00:27:52.0 (07:27), 03:40:52.4 (10:40). Epicenter (1) 46.2° N., 111.4° W., (2) 46.2° N., 111.5° W., Montana, both at a depth of about 5 km, mag. 3.5, both shocks. Aftershocks of November 1. Int. **IV** (00:27) at Trident; also felt at Manhattan and about 1 km north of Three Forks. The shock at 03:40 was felt in the Three Forks area.

Nov. 12: 11:32 (GOL). Mag. 2.9. The press reported this tremor shook the Denver, Colo., area. Int. **III** at Commerce City.

Nov. 15: 19:17:46.8 (Nov. 16, 02:17). Epicenter 37.7° N., 112.9° W., Utah, at a depth of about 10 km. Felt in the Cedar City area.

Nov. 23: 22:36:06.9 (Nov. 24, 05:36). Epicenter 42.5° N., 111.2° W., eastern Idaho, at a depth of about 33 km, mag. 4.4 (m_b). Int. **IV** at Georgetown (two shocks about 1 minute apart), Montpelier, and Ovid; II at Dingle.

Nov. 24: 16:18:32.7 (23:18). Epicenter 47.2° N., 114.0° W., Montana, at a depth of 33 km. Int. **IV** at Seeley Lake. Felt slightly about 37 km from Seeley Lake on the Lindbergh Lake Road.

Nov. 29: 15:15. Colorado. Int. **IV** in Brighton (south area), Broomfield, Commerce City, Denver (northeast area), Dupont, Eastlake, Henderson, Irondale, Northglenn, Thornton, and Westminster.

Dec. 8: 11:47:39.4 (18:47). Epicenter 43.7° N., 108.4° W., Wyoming, at a depth of 20 km, mag. 4.1 (m_b). Int. **V.** The press reported that the concrete floor of a lumber yard building at Thermopolis settled about 7.6 cm. Ceiling was cracked at a rest home. Dishes fell from shelves at two restaurants. Felt by all and frightened few at the post office. At Boysen Peak south of Thermopolis, a coffee cup was knocked off a table. Felt by all in community of Grass Creek. Int. IV at Hamilton Dome and Hudson; I–III at Booneville, Ethete, Kirby, and Pavillion. The press reported that the shock also was felt at Boysen Dam Power Station, Fort Washakie, Kinnear, Lander, and at other places in Fremont County. There was at least one report in Fremont County of an aftershock about 90 minutes after the main shock (press).

Dec. 8: 22:58:44.3 (SNM). Felt at El Paso, Tex.

CALIFORNIA AND WESTERN NEVADA

[All times are Pacific standard. If an epicenter is quoted, Greenwich mean time is given in parentheses. All towns are in California unless otherwise noted.]

Jan. 2: 07:25:47 (15:25). Epicenter 40°15′ N., 124°40′ W., off coast of northern California, at a depth of about 10 km, mag. 2.6, B. Int. **II** at Ferndale.

Jan. 5: 23:19. Int. **IV** at Santa Rosa and in the Terra Linda district of San Rafael. A Terra Linda observer stated that five minor shocks were "heard" between 23:20 on January 5 and 01:25 on January 6. (Not recorded at Berkeley. Probably not earthquakes.)

Jan. 6: 02:10:35.3 (10:10). Epicenter 35°42.4′ N., 118°19.3′ W., central California, at a depth of 8 km, mag. 3.6, P. Felt at Isabella.

Jan. 6: 22:10, and later in the night. Int. **IV** at Woodside. (Not recorded at Berkeley.)

Jan. 10: 17:34:11.8 (Jan. 11, 01:34), 17:47:33.6 (Jan. 11, 01:47), 17:56:22.1 (Jan. 11, 01:56), 18:17:09.1 (Jan. 11, 02:17; main shock), 20:23:43.5 (Jan. 11, 04:23), 22:13:43.8 (Jan. 11, 06:13). Epicenter (1) 33°52.3′ N., 116°18.1′ W., (2) 33°48.7′ N., 116°20.3′ W., (3) 33°49.3′ N., 116°16.2′ W., (4) 33°49.7′ N., 116°17.0′

W., (5) 33°53.3′ N., 116°17.6′ W., (6) 33°54.6′ N., 116°18.6′ W., southern California, all at a depth of about 8 km, mag. 3.1, 3.5, 2.5, 3.4, 3.7, and 3.5, respectively, P. Int. **V.** Six small earthquakes jolted a large portion of the Coachella Valley in Riverside County (press). Riverside County sheriff's deputies and Indio police said they received numerous telephone calls concerning the tremors at 18:17 and 20:23. The main shock was felt by all in community at Thousand Palms. Int. IV at Cathedral City and Palm Desert. Also felt in the Sky Valley area (press).

Jan. 12: 04:31:09.6 (12:31). Epicenter 32°55.9′ N., 115°47.9′ W., southern California, at a depth of 8 km, mag. 4.0, P. Int. **IV** at Ocotillo; II at Brawley.

Jan. 18: 05:22:06.0 (13:22), 05:31:07.8 (13:31). Epicenter (1) 36°56.9′ N., 121°26.7′ W., (2) 36°57.1′ N., 121°25.9′ W., central California, at depths of 8 and 6 km, respectively, mag. 3.3 and 2.8, respectively, B. Int. **IV** about 16 km north of Hollister at 2370 Shore Road.

Jan. 20: 10:15:39.4 (18:15). Epicenter 34°26.9′ N., 118°29.2′ W., southern California, at a depth of about 12 km, mag. 3.1, P. Int. **IV** in the Sylmar–San Fernando area.

Jan. 21: 18:57:19.9 (Jan. 22, 02:57). Epicenter 37°34.1′ N., 118°22.0′ W., California–Nevada border region, at a depth of 2 km, mag. 4.5, B. Int. **V.** Felt by all at the Control Gorge Powerplant (about 24 km northwest of Bishop, at junction of Owens River Gorge and Rock Creek). Very loud earth noises. Small objects shifted slightly. Moderate to strong shaking, with one violent lurch of buildings. Lasted about 15 seconds. "Many rocks on road to Pleasant Valley Dam. Not much indication of activity at Middle Gorge Powerplant about 6 km south of Owens River Gorge. Most violent shake in my 4½ years of residence here." Felt by all in community at Long Valley Dam (Crowley Lake, about 40 km northwest of Bishop); rather mild motion; lasted several seconds. Felt by and frightened all in home at Bishop; small objects shifted. Int. IV at Big Pine and Dyer, Nev.; III at Deep Springs.

Jan. 30: 17:55:04.2 (Jan. 31, 01:55). Epicenter 34°18.7′ N., 116°52.8′ W., southern California, at a depth of about 8 km, mag. 4.0, P. Int. **V.** At Big Bear Lake, felt by all in community; frightened many in home. Loud earth noises, like a sonic boom. Felt by all and frightened few in community at Fawnskin. Trees and bushes shook; vehicles rocked. At Lucerne Valley, felt by all in home. Small objects fell. Int. IV at Angelus Oaks, Green Valley Lake, Lytle Creek, Pioneertown, Running Springs, and Sunnymead; II at Apple Valley.

Feb. 2: 08:56:26.2 (16:56). Epicenter 34°24.5′ N., 118°26.0′ W., southern California, at a depth of about 12 km, mag. 3.7, P. Int. V. The press noted that Sunland and Tujunga residents, as well as those in the San Fernando Valley, had pictures and other items shaken from walls. One Tujunga resident said tremors had been felt throughout the past week.

Feb. 7: 18:49:11.8 (Feb. 8, 02:49). Epicenter 34°24.2′ N., 118°24.7′ W., southern California, at a depth of about 9 km, mag. 3.6, P. Int. **V.** The press reported that two lamps toppled and broke in the Sylmar area. Door could not be closed at one home. Bottles rattled in liquor stores. Many telephone calls were made to police stations.

Feb. 13: 07:18:45.6 (15:18). Epicenter 37°45.1′ N., 122°09.0′ W., central California, at a depth of 2 km, mag. 3.2, B. Int. **IV** in Lake Chabot area; III at Oakland and San Leandro. Also felt at Castro Valley.

Feb. 15: 16:32. Felt at Palm Springs.

Feb. 16: 23:55:33.0 (Feb. 17, 07:55). Epicenter 37°10′ N., 117°29′ W., California–Nevada border region, at a depth of 5 km, mag. 3.6, B. Felt in Crowley Lake and Independence areas.

Feb. 17: 03:09:59 (11:09). Epicenter 37°34′ N., 118°22′ W., California–Nevada border region, at a depth of 5 km, mag. 3.8, B. Int. **IV** at the Control Gorge Powerplant (about 24 km northwest of Bishop, at junction of Owens River Gorge and Rock Creek). Also felt in Crowley Lake and Independence areas.

Feb. 17: 07:54:30.0 (15:54). Epicenter 34°02.6′ N., 116°28.2′ W., southern California, at a depth of 8 km, mag. 3.4, P. Int. **IV** at Morongo Valley.

Feb. 17: 21:55:03.4 (Feb. 18, 05:55). Epicenter 36°45.3′ N., 121°31.3′ W., central California, at a depth of 10 km, mag. 3.4, B. Int. **IV** in west section of Salinas; **III** at Carmel.

Feb. 23: 06:43:42.9 (14:43). Epicenter 33°51.9′ N., 118°23.4′ W., southern California, at a depth of about 2 km, mag. 2.4, P. The press reported that residents called police stations in several Torrance area communities. Int. **IV** in Torrance area. Also felt at Hawthorne, Manhattan Beach, and Redondo Beach.

Feb. 24: 07:56:16.6 (15:56), 07:56:51.3 (15:56; main shock), 12:21:48.7 (20:21). Epicenter (1) 36°36.0′ N., 121°12.0′ W., (2) 36°35.2′ N., 121°11.8′ W., (3) 36°37.0′ N., 121°13.6′ W., central California, at depths of 8, 6, and 8 km, respectively, mag. 3.2, 5.1, and 3.6, respectively, B. Int. **VI.** The epicenter of the main shock is located in the San Andreas fault zone, about 37 km southeast of Hollister in the vicinity of Bear Valley and the Melendy Ranch. Fourteen aftershocks of mag. 2.5 to 3.6 were recorded from 08:08 to 19:04 on the 24th. Numerous aftershocks were recorded for several days thereafter. It was reported that at least nine of the aftershocks on the 24th were felt at NOAA's Stone Canyon Geophysical Observatory (101 Ranch, about 5 km northwest of Melendy Ranch). The press reported that Bear Valley residents felt a foreshock; an aftershock was felt about 20 minutes after the main shock. Also, a "stiff" jolt was felt at Hollister at 12:21. An observer in the area south of Paicines (340 Live Oak Rd.) reported that by 13:00 or 14:00, six aftershocks had been felt; a very sharp shock was felt at about 10:00 or 11:00. An observer about 14.5 km east-northeast of Gonzales felt slight aftershocks until the afternoon of February 28. The strongest aftershock, mag. 4.7, occurred on February 27 at 14:13:08.7.

The "generally" felt area of the main shock was about 18,200 km² (7,000 mi²). Beyond this area there were a few scattered reports of the shock being felt very slightly: in the San Francisco Bay area at Berkeley, Moraga, and San Francisco; at Wishon in Madera County; at Biola in Fresno County; and near Arroyo Grande in San Luis Obispo County.

Only very minor damage was observed by field investigators or reported by other observers. Principal ground disturbances were the numerous rockfalls from steep banks along the San Benito River (in the epicentral area) and the renewed movement of an old landslide on the Hall Ranch, about 6.5 km east of Paicines on Panoche Road. Considerable ground cracking was observed on or near the old slide.

The following was excerpted from a report received from the California Division of Mines and Geology (CDMG): *"Fault Displacement Data*: Right-lateral displacement of 1.7 mm on USGS creepmeter at Melendy Ranch across active trace of San Andreas fault zone (occurred 5 to 10 minutes after main earthquake). Right-lateral displacement of <1 mm on NOAA creepmeter at Melendy Ranch across active trace of the San Andreas fault zone (located ¼ mile south of USGS creepmeter). These displacements were interpreted by Robert Nason (NOAA) to be due to seismic shaking rather than to true tectonic fault slippage. No evident displacement of ground or road pavement at San Andreas fault (active trace) crossing State Highway 25 at 0.5 mile northwest of Melendy Ranch, and at 7.5 miles south of Melendy Ranch. No displacement

recorded on San Andreas fault (active trace) at Almaden Winery (NOAA creepmeter; 16 miles northwest of Melendy Ranch) and at San Juan Bautista (USGS creepmeter; 27 miles northwest of Melendy Ranch). No displacement recorded on Calaveras fault (active trace) at Hollister (22 miles northwest of Melendy Ranch; CDMG resurvey of nail line—surveyed previously the day before, Feb. 23)."

INTENSITY VI:

Bear Valley Fire Control Station (about 2 km south of Melendy Ranch).—CDMG reported: "No one at the station at 07:56. Inspection crew arrived later in a.m. Hot water heater moved about ½ inch southeastward, crushing and powdering ceiling sheetrock where plumbing passed through ceiling; amount of movement also measurable from hard water stain on floor. Glass lamp fixture (resting in series of drawers stacked on floor) was thrown to floor and broken. Mouldings separated slightly from walls with resulting cracking of paint. Additional cracking of fresh dry paint (applied on Feb. 25) was noted after the February 27 shock."

Melendy Ranch (about 2 km north of Bear Valley Fire Control Station).—CDMG reported: "No one at home at 07:56. Two ranch hands in pickup truck on dirt road did not feel the shock. These same ranch hands saw clouds of dust rising from San Benito Valley (result of rockfalls). Brick chimney on Melendy Ranch house severely damaged—one brick sticking out several inches, other bricks displaced less. This damage was not nearly as intense before quake according to ranch owner. During the 4.5 magnitude aftershock on February 27, two bricks fell from the chimney—one down the chimney inside the house, and the other down onto the roof outside in a southeasterly direction; the chimney was then dismantled. Prominent east-west motion was noted during the 4.5 magnitude aftershock. Numerous rockfalls along east side of San Benito River at near-vertical road cuts into semiconsolidated marine siltstone and sandstone of the Etchegoin Formation (Pliocene); rockfalls extend from 0.3 mile north to 2.0 miles south of Melendy Ranch house. This rock debris was not in road earlier in the week, according to observer. Additional rockfalls in the same locations were noted after the 4.5 magnitude aftershock of February 27. At the 101 Ranch (on San Andreas fault zone, 3 miles northwest of Melendy Ranch), the shock was felt as a violent, shaking, circular motion, seemingly composed of several separate events. Man on telephone (connection to San Juan Bautista) felt first motion noticeably before San Juan party felt it."

Hall Ranch (about 12 km northwest of Melendy Ranch; about 6 km east of Paicines on Panoche Road).—CDMG reported: "Movement of a large landslide complex was rejuvenated when a prominent zone of open cracks appeared near, and sometimes at the top of, a hummocky slope (approximately 2,000 feet long, 500 feet wide, and with a maximum relief of 300 feet). The crack zone is 10 to 20 feet wide, and is composed of a complex braided network of individual open fractures forming local grabens, horsts, and irregular slump blocks. Often the zone is dominated by one large open fracture up to 6 feet deep and 1 to 3 feet wide. Numerous additional smaller open cracks occur locally throughout the hummocky slope and along the top of the slope where the prominent zone is located below the top. According to the ranch owner, this cracking was not present before the main event on February 24. Additional cracking was noted after the 4.5 magnitude aftershock on February 27. According to another observer, similar cracking occurred in this area in April 1961, after the 5.5 and 5.6 twin earthquakes on the San Andreas fault zone 13 miles south of Hollister."

INTENSITY V:

Chittenden Pass area (about 16 km east of Watsonville), Chualar, Cienega Road area south of Hollister (13150, 12500, 9970 (Almaden Winery), 7800 (Harris Ranch), and

7391 Cienega Rd.), Corralitos (north of Watsonville), Felton (windowpane cracked), Gonzales, Hernandez Valley (about 2.4 km above Hernandez Dam on San Benito River), Hollister, Jamesburg area (south of Carmel Valley), King City, Moss Landing, Paicines and vicinity, Panoche Road (about 3.2 km east of Panoche Summit), Salinas, San Lucas, Soledad, Soquel, Spreckels, and Tres Pinos.

INTENSITY IV:

Arroyo Seco (about 21 km southwest of Soledad), Big Sur, Boulder Creek (about 6 km north of), Brookdale, Capitola, Carmel Valley, Castroville, Coalinga, Coyote, Dos Palos, Fort Ord, Freedom, Gilroy, Gonzales (about 14.5 km east-northeast of), Greenfield, Holy City area, Idria, Lockwood, Lonoak area (Mee Ranch at intersection of Highways 25 and 198 and Lonoak–Hollister Rd.), Monterey, Pacific Grove, San Benito, San Jose, San Juan Bautista, Santa Cruz, Seaside, and Watsonville.

INTENSITY I–III:

Aptos, Arroyo Grande (about 5 km east-northeast of), Atascadero, Berkeley and Kensington district of Berkeley, Biola, Carmel, Hollister (about 16 km north of), La Honda, Los Banos, Marina, Milpitas (about 4 km east of), Moraga, Mount Hermon, Panoche (33320 Panoche Rd.), Paso Robles, San Ardo, San Francisco, San Gregorio (about 5 km east of), South Dos Palos, Valleton (Indian Valley area about 12 km northeast of Bradley), and Wishon.

Feb. 25: 11:06:55.0 (19:06). Epicenter 34°26.0′ N., 118°25.9′ W., southern California, at a depth of about 13 km, mag. 3.8, P. Int. **V.** Felt by all in home at Sepulveda. Objects bounced on TV; small objects shifted. Hanging objects swung moderately south-north. Int. IV at West Los Angeles. Also reported felt at Hollywood, Los Angeles (downtown area), Pasadena, and San Fernando. Press reported the shock jolted a large part of the San Fernando Valley.

Feb. 26: 20:05. Slight shock felt at Search Ranch, near Jamesburg, south of Carmel Valley.

Feb. 27: 11:52:44.9 (19:52). Epicenter 36°38.2′ N., 121°14.7′ W., central California, at a depth of about 6 km, mag. 3.4, B. Aftershock of February 24. Slight shock felt at Search Ranch, near Jamesburg, south of Carmel Valley.

Feb. 27: 14:13:08.6 (22:13). Epicenter 36°33.2′ N., 121°05.6′ W., central California, at a depth of about 10 km, mag. 4.7, B. Strongest aftershock of February 24. Int. **V.** At the Melendy Ranch, two bricks fell from a chimney which had been damaged by the February 24 shock. Rockfalls occurred along the San Benito River (in the same areas as in Feb. 24 shock). At the Bear Valley Fire Control Station (about 2 km south of Melendy Ranch), fresh dry paint was cracked (From CDMG). Int. V effects also were noted at Hernandez (about 2.3 km northwest of) and Salinas, but no damage was reported. Int. IV in Chittenden Pass area (about 16 km east of Watsonville), Fort Ord, Harris Ranch (about 11 km south of Hollister; shock also felt short time later), Hollister and about 14 km southwest of, Hunter Liggett Military Reservation (about 8 km northwest of Jolon), and King City. Int. I–III at Atascadero, Carmel, Jolon, and Valleton (Indian Valley area, about 12 km northeast of Bradley).

Feb. 29: 13:07. Int. **III** at Etiwanda.

Mar. 1: 01:28:42 (09:28). Epicenter 40°40′ N., 125°15′ W., off coast of northern California, at a depth of about 10 km, mag. 5.2, B. Int. **V.** Felt in scattered communities of the coastal area of northern California, from Trinidad (Humboldt County) south to Fort Bragg (Mendocino County). Awakened many in community at Ferndale. Awakened many and frightened few at Honeydew and Rio Dell. Brief, rolling, quivering motion. Int. IV at Arcata, Eureka, Fields Landing, Kneeland, Miranda, and Petrolia; I–III at Blue Lake, Branscomb, Fort Bragg, and Trinidad.

Mar. 3: 02:33:20.1 (10:33). Epicenter 37°45.3′ N., 122°10.3′ W., central California, at a depth of about 10 km, mag. 2.0, B. Felt in San Leandro area.

Mar. 3: 21:57:26.6 (Mar. 4, 05:57). Epicenter 36°32.9′ N., 121°06.1′ W., central California, at a depth of 10 km, mag. 3.5, B. Aftershock of February 24. Int. **II** at Carmel.

Mar. 5: 07:10:02 (15:10). Epicenter 39°19′ N., 122°43′ W., northern California, at a depth of 9 km, mag. 3.5, B. Int. **III** at Comptche; II at Upper Lake.

Mar. 9: 23:14:51 (Mar. 10, 07:14). Epicenter 40°35′ N., 124°21′ W., northern California, at a depth of about 10 km, mag. 3.7, B. Int. **IV** at Eureka; II at Ferndale.

Mar. 14: 12:34:31.3 (20:34), 14:28:07.5 (22:28). Epicenter (1) 36°55.0′ N., 121°42.1′ W., (2) 36°55.4′ N., 121°42.1′ W., central California, at depths of 11 and 9 km, respectively, mag. 3.3 both shocks, B. The shock at 12:34 was felt at Moss Landing Powerplant and Salinas Substation of the Pacific Gas and Electric Company. Also, a small shock was felt between San Juan Bautista and Watsonville (press). Int. **III** (14:28) at Harris Ranch (about 11 km south of Hollister); also felt at Moss Landing Powerplant.

Mar. 16: 16:29:01.2 (Mar. 17, 00:29). Epicenter 32°21.2′ N., 115°35.6′ W., California–Mexico border region, at a depth of 8 km, mag. 4.5, P. Felt at El Centro.

Mar. 17: 00:45. Int. **IV** at Scotia. Felt slightly at Rio Dell.

Mar. 17: 11:48:08.1 (19:48). Epicenter 34°00.1′ N., 117°09.9′ W., southern California, at a depth of 8 km, mag. 3.0, P. Felt at Riverside.

Mar. 22: 04:54:03.9 (12:54). Epicenter 34°02.5′ N., 117°14.9′ W., southern California, at a depth of 8 km, mag. 2.6, P. Felt in Riverside–San Bernardino area.

Mar. 22: 19:45:29.6 (Mar. 23, 03:45). Epicenter 37°22.8′ N., 122°15.6′ W., central California, at a depth of about 6 km, mag. 3.2, B. Int. **III** about 3 km west of Portola Valley where a sharp, blastlike sound was heard. Reported as mildly felt at Atherton, Los Altos, Menlo Park, and Palo Alto (press).

Mar. 30: 13:45:18 (21:45). Epicenter 40°55′ N., 124°40′ W., off coast of northern California, at a depth of about 10 km, mag. 3.0, B. Int. **IV** at Eureka (Humboldt Hill); III at Ferndale. Also felt at Fortuna and Petrolia.

Mar. 31: 13:14:05.6 (21:14). Epicenter 36°51.8′ N., 120°00.4′ W., central California, at a depth of 2 km, mag. 3.7, B. Reported felt throughout the Fresno–Madera area. The press reported that Fresno and Madera police received some telephone calls. Described as a sharp, jolting shock.

Apr. 6: 22:20. Int. **IV** about 3 km west of Portola Valley. Loud, explosivelike earth noises. Also, a shock was felt later on in the night. "These 'explosions' have been felt periodically here, both day and night, for the past year."

Apr. 7: 09:26:02.8 (17:26). Epicenter 37°34.0′ N., 121° 49.6′ W., central California, at a depth of about 11 km, mag. 2.9, B. Felt at Fremont.

Apr. 11: 14:27:59 (22:27), 15:03:43 (23:03). Epicenter (1) 40°05′ N., 121°19′ W., (2) 40°02′ N., 121°24′ W., northern California, both at a depth of 5 km, mag. 3.3 and 3.1, respectively, B. Int. **IV** at Belden, Caribou (shock also felt at 15:03), and Storrie. Also felt at the Pacific Gas and Electric Company's Caribou and Rock Creek Powerhouses.

Apr. 14: 00:05:03.1 (08:05). Epicenter 34°17.8′ N., 119°52.2′ W., southern California, at a depth of about 8 km, mag. 3.4, P. The press reported this shock "jiggled" the Goleta Valley area. There were several telephone calls to the Santa Barbara police.

Apr. 23: 17:10:44.4 (Apr. 24, 01:10). Epicenter 34°00.2′ N., 118°23.2′ W., southern California, at a depth of about 1 km, mag. 1.6, P. Felt in the Baldwin Hills area.

Apr. 26: 20:45:16.8 (Apr. 27, 04:45). Epicenter 34°04.1′ N., 118°59.6′ W., southern California, at a depth of about 10 km, mag. 3.2, P. Felt at Thousand Oaks.

May 1: 17:00 (about). Int. **IV** at Santee.

May 5: 05:49:29.5 (13:49). Epicenter 34°19.6′ N., 118°15.3′ W., southern California, at a depth of about 1 km, mag. 2.8, P. Felt at Burbank and Glendale.

May 7: 02:14:05.1 (10:14). Epicenter 34°21.0′ N., 118°17.5′ W., southern California, at a depth of about 1 km, mag. 2.1, P. Felt in San Fernando Valley.

May 7: 05:13:44.7 (13:13). Epicenter 33°59.1′ N., 118°29.0′ W., southern California, at a depth of about 7 km, mag. 2.4, P. A mild earthquake awakened numerous Los Angeles coastal area residents. Concerned citizens called Santa Monica and Venice police stations (press).

May 10: 11:49:36.6 (19:49). Epicenter 38°30.2′ N., 122°42.7′ W., central California, at a depth of about 5 km, mag. 2.6, B. Felt at Santa Rosa.

May 15: 07:52:39.1 (15:52). Epicenter 34°25.2′ N., 118°25.5′ W., southern California, at a depth of about 8 km, mag. 2.5, P. Felt at Saugus.

May 19: 15:23:10.5 (23:23). Epicenter 34°22.9′ N., 118°23.8′ W., southern California, at a depth of about 8 km, mag. 3.3, P. Felt in San Fernando area.

May 19: 16:40. Int. **II** at Eureka (Humboldt Hill).

May 20: 09:59:31.8 (17:59). Epicenter 34°13.1′ N., 118°11.1′ W., southern California, at a depth of about 8 km, mag. 1.3, P. Felt at La Canada.

June 19: 08:08:26.7 (16:08). Epicenter 34°04.6′ N., 117°26.8′ W., southern California, at a depth of about 5 km, mag. 3.0, P. Int. **IV** at Fontana and Rubidoux (near Riverside). Also felt at Colton, Riverside, San Bernardino, Santa Ana, and Sunnyslope Ranch (press).

June 28: 18:01:52.4 (June 29, 02:01). Epicenter 33°59.2′ N., 118°21.1′ W., southern California, at a depth of about 2 km, mag. 2.7, P. Felt at La Cienega and North Hollywood.

June 30: 01:54:21.0 (09:54). Epicenter 34°05.8′ N., 117°26.4′ W., southern California, at a depth of about 2 km, mag. 2.7, P. Felt at Fontana and Rialto.

July 4: 21:31:23.4 (July 5, 05:31). Epicenter 34°03.8′ N., 117°26.7′ W., southern California, at a depth of about 2 km, mag. 2.6, P. Felt at San Bernardino. (It is very unlikely that this shock is related to the following event.)

July 4: (no time given). "A magnitude 2.7 earthquake sheared two water wells in the Alta Loma and Burnt Mountain districts near Joshua Tree, Calif., on July 4. Hundreds of families were without water for 4 days until 8 miles of pipe could be laid connecting the community to undamaged wells." (This is quoted from the *Earthquake Information Bulletin,* U.S. Department of Commerce, NOAA, Nov.-Dec. 1972. The preceding shock of July 4 is the only one on that date listed by the Seismological Laboratory at Pasadena. It seems very unlikely that this shock of only 2.6 magnitude is related to the Joshua Tree event, since Joshua Tree is located 104 km east of the July 4 epicenter.)

July 5: 11:57:39.7 (19:57). Epicenter 34°24.7′ N., 118°22.5′ W., southern California, at a depth of about 9 km, mag. 3.4, P. Felt at Los Angeles (Silver Lake district), Sherman Oaks, and Sylmar.

July 6: 14:38:08.9 (22:38). Epicenter 34°24.3′ N., 118°21.7′ W., southern Califor-

nia, at a depth of about 6 km, mag. 3.3, P. Felt at Glendale, North Hollywood, Pasadena, and San Fernando.

July 7: 04:53:58.9 (12:53). Epicenter 34°04.9′ N., 117°26.8′ W., southern California, at a depth of about 2 km, mag. 3.1, P. Int. **IV** at Etiwanda, Fontana, Mira Loma, and Rialto; I–III at Chino and Lytle Creek.

July 16: 06:42:09.1 (14:42), 08:50:39.8 (16:50). Epicenter (1) 40°04.7′ N., 121°16.0′ W., (2) 39°58.8′ N., 121°56.7′ W., northern California, both at a depth of about 10 km, mag. 4.1 and 2.8, respectively, B. Int. **V.** Awakened many and frightened few at Belden where loud earth noises were heard, like an explosion. Awakened many and frightened few at Berry Creek. Awakened all at Caribou (much lighter shock felt at 08:50). At Storrie, felt by and awakened all in community. "Lots of rocks fell on highway." Very loud, blastlike earth noises were heard. Small objects shifted. Vehicles rocked. "Some said they felt two aftershocks." Int. **IV** at Bucks Lake (near Storrie), Canyondam, Meadow Valley, Mountain House, Quincy, and Silver Lake (about 16 km northeast of Storrie); I–III at Forest Ranch, Keddie, and Mill Creek.

July 21: (no time given). Slight tremors were felt at Manhattan Beach.

July 22: 05:30:27.8 (13:30). Epicenter 33°53.0′ N., 118°21.4′ W., southern California, at a depth of about 8 km, mag. 2.4, P. A sharp jolt was felt in two homes at Manhattan Beach.

July 23: 23:40. Int. **IV** at Mira Loma (about 11 km northwest of Riverside).

July 26: 16:31:17.4 (July 27, 00:31). Epicenter 34°47.0′ N., 118°54.1′ W., southern California, at a depth of about 8 km, mag. 4.4, P. Int. **V.** Felt in scattered areas of Kern, Los Angeles, and Ventura Counties. Felt by all and frightened some at Chuchupate Ranger Station (about 16 km due west of Gorman) and Lebec (about 6 km north of Gorman). Int. IV at Fairmont Reservoir (near Lake Hughes), Fillmore, Frazier Park, Newhall, Ojai, and Simi Valley; I–III at Lake Hughes, Maricopa, Moorpark, Piru, Santa Paula, and Saugus. Also felt at Agoura and San Fernando.

Aug. 3: 08:13:09.1 (16:13). Epicenter 34°11.4′ N., 118°18.3′ W., southern California, at a depth of about 3 km, mag. 2.3, P. Felt at Burbank and Glendale.

Aug. 4: 04:44:26.5 (12:44). Epicenter 34°26.0′ N., 118°24.7′ W., southern California, at a depth of about 11 km, mag. 3.1, P. Felt at Saugus.

Aug. 6: 08:29:21.6 (16:29). Epicenter 34°11.5′ N., 118°18.5′ W., southern California, at a depth of about 3 km, mag. 2.5, P. Felt at Burbank and North Hollywood.

Aug. 22: 05:31:41.7 (13:31). Epicenter 34°27.6′ N., 118°25.6′ W., southern California, at a depth of about 8 km, mag. 2.5, P. Felt at Saugus.

Aug. 23: 14:03:34.8 (22:03). Epicenter 37°56.9′ N., 121°43.7′ W., central California, at a depth of about 2 km, mag. 2.9, B. Int. III near Antioch (38°00′ N., 121°45′ W.).

Aug. 27: 00:49:27.0 (08:49). Epicenter 34°03.3′ N., 118°23.1′ W., southern California, at a depth of about 8 km, mag. 3.2, P. Int. **V.** Felt by all, awakened most, and frightened few in community near southwest city limits of Beverly Hills. "Much of the plaster on walls and ceilings was cracked, especially near doorways; some fell from a wall which was damaged during the February 9, 1971, earthquake. Total damage was very slight." In the area just east of Beverly Hills, felt by all; awakened and frightened many in community. Small objects shifted. One swaying jolt, lasting about 20 seconds. Press reported many were awakened in the West Los Angeles area. Residents of Culver City–Centinela Valley area jammed police switchboards with calls. Also reported felt in the Civic Center area of downtown Los Angeles.

Aug. 31: 22:13:04.8 (Sept. 1, 06:13). Epicenter 35°24.9′ N., 118°24.1′ W., central California, at a depth of about 8 km, mag. 3.7, P. Felt at Isabella.

Sept. 4: 10:04:40.6 (18:04), 12:00, 20:30. Epicenter 36°38.2′ N., 121°17.2′ W., central California, at a depth of about 2 km, mag. 4.6, B. The epicenter is about 24 km southeast of Hollister in the Paicines–Bear Valley area of San Benito County. Int. **VI.** Felt over an area (fig. 6) of about 14,300 km² (5,500 mi²). Principal effects were the numerous rockfalls which occurred along steep banks of the San Benito River, causing

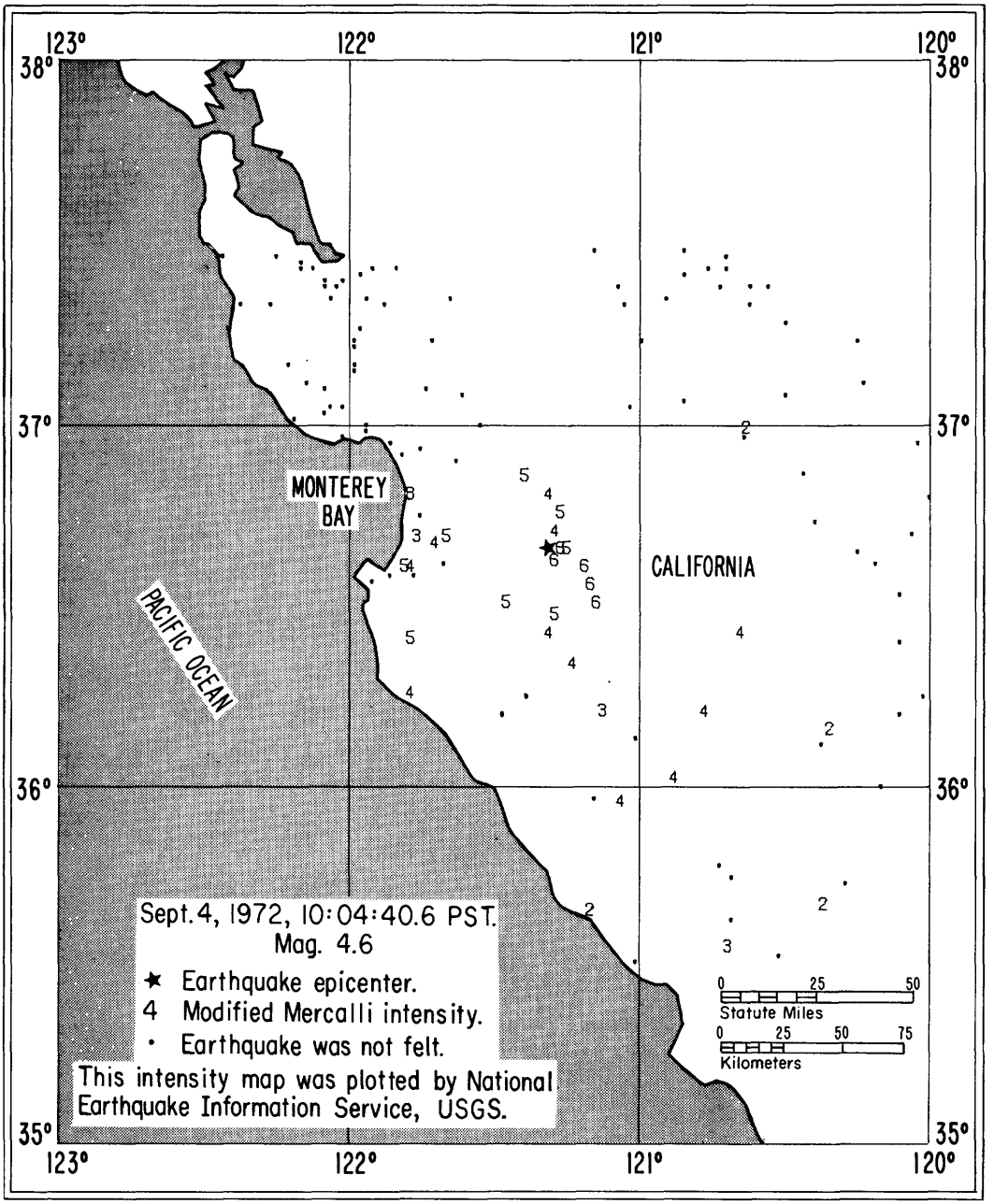

FIGURE 6.—Area affected by central California earthquake of September 4.

very noticeable dust clouds. Only slight damage was reported, this occurring at the Bear Valley Fire Control Station about 39 km southeast of Hollister. The following was excerpted from a report received from the California Division of Mines and Geology (CDMG): "No surface fault displacement was observed at several points where State Highway 25 crosses the San Andreas fault zone. NOAA creepmeters at Stone Canyon (20 miles southeast of Hollister) and at Melendy Ranch (22 miles southeast of Hollister) showed no displacement. A creep event (3 mm) did occur at the Melendy Ranch creepmeter 20 hours before the earthquake. The epicentral area along the San Benito River Valley from Paicines to Bear Valley experienced numerous rockfalls which resulted in large dust clouds rising from the river valley." The press reported aftershocks were felt at about 12:00 and 20:30. An observer about 14 km east-northeast of Gonzales reported a slight aftershock was felt in the late afternoon or evening of September 4.

INTENSITY VI:

Baker Ranch, Jungle Inn, and Browns Valley (about 29, 35, and 48 km, respectively, southeast of Hollister).—Rockfalls. At Jungle Inn: "The dust was so thick you couldn't see the sky." (From CDMG)

Bear Valley Fire Control Station (about 39 km southeast of Hollister, on Airline Highway; sec. 3, T.16S., R.7E.).—Felt by all; frightened few. Plaster cracked; some slight cracks in brick and mortar. Landslides. Oil cans overturned. Vehicles rocked. Loud earth noises. CDMG reported: "Many small dust columns developed into a continuous dust curtain along the river valley. Slight damage at the Bear Valley Fire Station where cinder-block walls developed fine cracks across and between the blocks, mostly east-west oriented walls. A fire truck was rocked noticeably from side to side (north-south). Two oil cans (stacked) were thrown southward off storage shelves. Closet and kitchen cabinet doors swung open. A vertical pipe (from a water heater) extending through the ceiling moved eastward, crushing the sheetrock. A soap dish (loosely attached to the wall) was thrown southward off the wall. Miscellaneous cracks occurred on painted cinder-block walls at corners of windows."

Chalone Peak Fire Lookout (52 km southeast of Hollister).—Rockfalls. Large dust clouds. (From CDMG)

Melendy Ranch (35 km southeast of Hollister).—Felt by all in home. Man working on roof thought the house would collapse. Small landslides, causing dust. Small objects fell. Trees and bushes shook; vehicles rocked. CDMG reported that in the vicinity of the Melendy Ranch, rockfalls were observed at the same localities as in the February 24 earthquake.

Paicines (about 10 km south of, on Live Oak Rd.).—Felt by practically all and frightened many in community. Ground cracked; landslides. Water in pool was not disturbed much. Small objects shifted; glasses, etc., fell north-south.

INTENSITY V:

Gonzales (about 14 km east-northeast of), Hall Ranch (about 13 km northwest of Melendy Ranch on Panoche Rd.), Hernandez area (about 32 km southeast of Pinnacles National Monument), Hollister, Paicines, Pinnacles National Monument, Salinas, Seaside.

INTENSITY IV:

Big Sur, Fort Ord, Greenfield, Idria, Jamesburg area (Search Ranch), Libby Ranch (about 4 km southwest of Paicines), Lockwood, Lonoak area (Mee Ranch, intersection of Highways 25 and 198), Panoche, San Ardo, Smith Ranch (about 19 km south of Hollister on Cienega Rd.), Soledad, and Tres Pinos.

INTENSITY I–III:

Ben Lomond, Coalinga, Dos Palos, King City, Marina, Moss Landing, San Simeon, Shandon, and Templeton.

Sept. 9: 21:19:06.2 (Sept. 10, 05:19). Epicenter 34°02.8′ N., 118°21.2′ W., south-

ern California, at a depth of about 8 km, mag. 2.7, P. The press reported that police at West Los Angeles received more than 20 telephone calls from persons feeling the slight earthquake which "rumbled" through the area. Authorities at Beverly Hills and Santa Monica also received several calls.

Sept. 11: 01:40:28.7 (09:40). Epicenter 34°05.1′ N., 117°14.1′ W., southern California, at a depth of about 8 km, mag. 3.8, P. Int. **V.** Felt by and awakened many at Mira Loma (immediate aftershock). Awakened all and frightened few in home south of Rubidoux (near Riverside). Int. IV at Etiwanda and Norton Air Force Base. Press reported the shock was felt in San Bernardino County as a gentle rolling motion and in Riverside County as a brief, sharp jolt.

Sept. 18: 13:50:51.1 (21:50). Epicenter 37.6° N., 118.5° W., California–Nevada border region, at a depth of about 8 km, mag. 3.6, P. Int. **III** at Control Gorge Powerplant (about 24 km northwest of Bishop).

Sept. 20: 09:48:12.6 (17:48). Epicenter 34°07.4′ N., 117°26.6′ W., southern California, at a depth of about 8 km, mag. 2.9, P. Int. **V.** Felt by and frightened many in community at Mira Loma. Animals were frightened. Loud earth noises. Int. IV at Etiwanda. Also felt at Fontana.

Sept. 23: 02:45:03.9 (10:45), 02:48:12.1 (10:48), 02:56:25.4 (10:56), 07:07:48.1 (15:07; main shock). Epicenter (1) 36°48.6′ N., 121°33.7′ W., (2) 36°49.3′ N., 121°32.7′ W., (3) 36°48.0′ N., 121°33.1′ W., (4) 36°47.7′ N., 121°32.4′ W., central California, at depth of about 5, 5, 4, and 4 km, respectively, mag. 3.6, 3.6, 4.1, and 4.2, respectively, B. Epicenters are in an area about 6.4 km south of San Juan Bautista west of Saint Francis Retreat. Int. **V.** At Salinas, the press reported that four small earthquakes, three within 11 minutes, cracked pavements, walls, and a concrete garage floor, swayed tall buildings, and knocked objects from shelves. An observer at Salinas said a concrete garage floor was cracked. Sheriff's deputies in Salinas reported the shock (07:07) was a "real rocker," and that residents in central and north Salinas, Old Stage Road, and other nearby areas reported buildings swayed and objects toppled from shelves. Felt by all and awakened many at San Juan Bautista. Stereo and TV shifted. Loud, roaring earth noises. Two windows broke in home at 1210 San Juan–Hollister Road. At the Holthouse Ranch (about 4.3 km southeast of San Juan Bautista), pool water splashed as if someone "took a dive." Int. IV at Almaden Winery (about 14 km south of Hollister), Aromas, Castroville, Harris Ranch (about 11 km south of Hollister; first three shocks were light; fourth, sharp), Hollister, and Spreckels. Int. I–III at Carmel Highlands (press), Fort Ord, Gilroy, Moss Landing, Paicines, and Watsonville.

Sept. 28: 05:02:08.3 (13:02). Epicenter 34°25.9′ N., 118°23.0′ W., southern California, at a depth of about 8 km, mag. 1.7, P. Felt at Saugus.

Sept. 29: 01:46:10.3 (09:46). Epicenter 37°55.6′ N., 121°58.4′ W., central California, at a depth of about 2 km, mag. 3.3, B. Int. **IV** at Alamo, Concord, Martinez, and Walnut Creek; III at Lafayette.

Sept. 29: 06:13:41.2 (14:13). Epicenter 31°57.2′ N., 117°20.3′ W., California–Mexico border region, at a depth of about 8 km, mag. 4.3, P. Felt slightly in the San Diego area.

Oct. 2: 07:46:24.4 (15:46). Epicenter 34°05.7′ N., 118°15.9′ W., southern California, at a depth of about 8 km, mag. 2.4, P. Felt at Glendale and North Hollywood.

Oct. 2: 21:59:38.2 (Oct. 3, 05:59), 22:30:02.2 (Oct. 3, 06:30, main shock). Epicenter (1) 36°47.5′ N., 121°32.5′ W., (2) 36°47.6′ N., 121°32.6′ W., central California, both at a depth of about 7 km, mag. 2.9 and 4.8, respectively, B. Epicenters are located about 6.4 km south of San Juan Bautista in the area west of Saint Francis

Retreat. Several foreshocks were recorded, beginning at 21:59:38.2; about six aftershocks were recorded, the largest occurring on October 3 at 03:10:13.4. Int. **VI.** The main shock at 22:30 generally was felt over about 9,100 km² (3,500 mi²) (fig. 7). Maximum effects occurred in a very small area of San Juan Bautista and vicinity where small surface displacements were observed; at one site, old asphalt road cracks were widened and there were fresh cracks in patched areas. At the San Juan Bautista Mission, an old, previously damaged adobe wall was again damaged. Plaster cracked and fell. Heavy

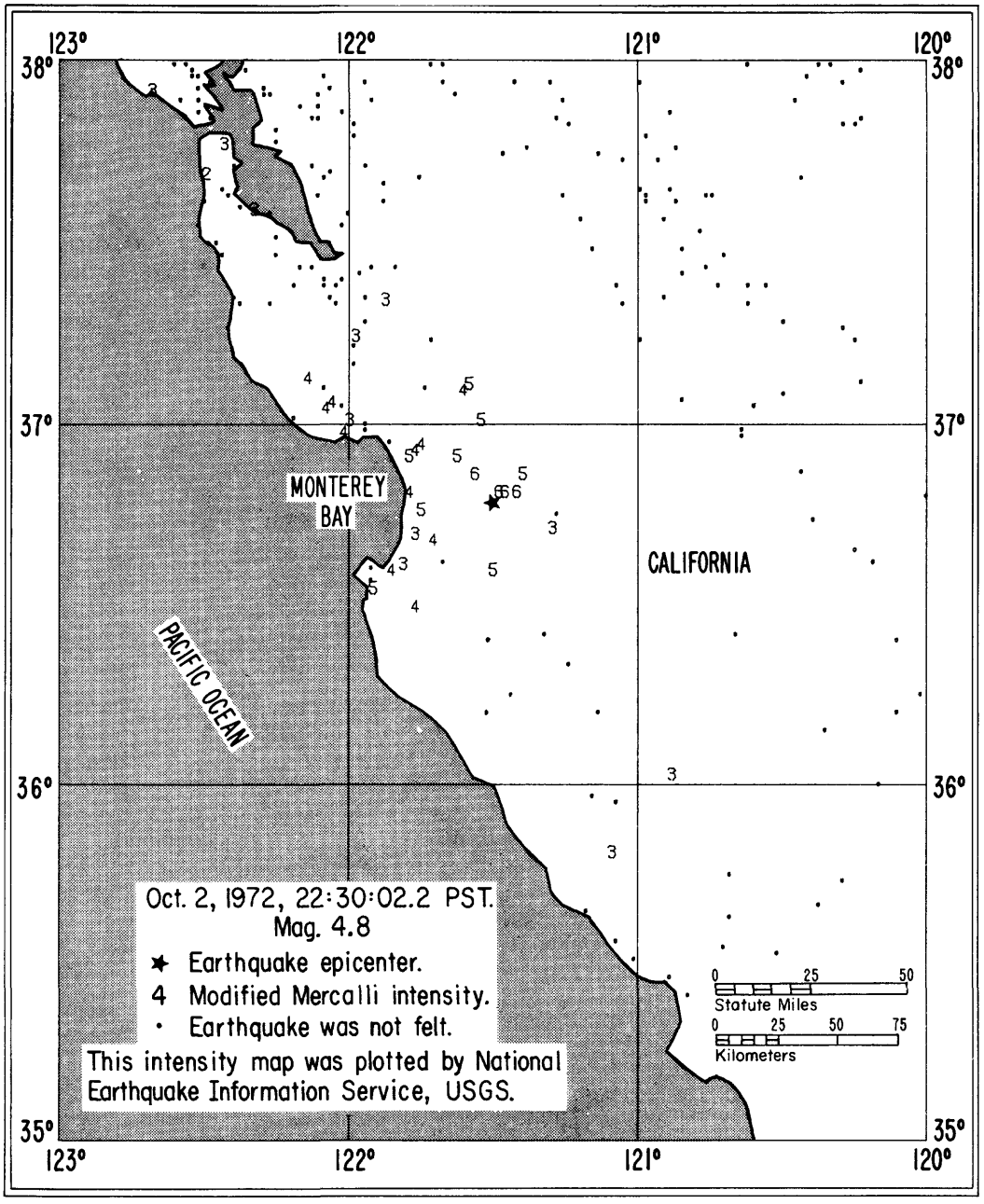

FIGURE 7.—Area affected by central California earthquake of October 2.

objects moved. Merchandise fell in stores at San Juan Bautista. Objects fell in homes. Water splashed from swimming pools and from toilets. Refrigerator and cabinet doors opened and contents fell out. No landslides or rockfalls were observed in the epicentral area.

INTENSITY VI:

San Juan Bautista and vicinity.—The following was excerpted from a report received from the California Division of Mines and Geology (CDMG). *"Fault Displacement*: The USGS observed small surface displacements at two sites on the San Andreas fault (active trace)—(1) A USGS creepmeter at Grant Boundary Road (1.1 airline miles SE. of San Juan Bautista) recorded a total displacement of 3–4 mm (including two displacement events—one at the time of the main earthquake (22:30:02.2) and another approximately ½ hour later); (2) on Saint Francis Retreat Road (at a site where offset fences, road cracks, and a slight topographic swale indicate the San Andreas active trace), old cracks (stepped left, en echelon) were observed to be widened, and asphalt patches were observed to be freshly cracked. Possible new fault cracks were also reported to have been observed (by USGS) at Saint Francis Retreat on the southernmost paved driveway north of a sag pond. No surface fault displacement was recorded on NOAA creepmeters at Niland Ranch site (½ airline mile NW. of San Juan Bautista), Harris Ranch site (8¼ airline miles SE. of San Juan Bautista), or Almaden Winery site (10¾ airline miles SE. of San Juan Bautista). No ground cracks were observed at an offset fence site 500 feet SE. of Saint Francis Retreat. The aftershock pattern (recorded by USGS) suggests that fault rupture began at Saint Francis Retreat and propagated northwestward. No landslides or rockfalls were observed. A reported case of ground cracks (perhaps landslide) several miles SW. of San Juan Bautista is being investigated by USGS.

"Neils Grocery (San Juan Bautista, west of San Andreas fault): Most counters are oriented E.-W. All aisles between these counters were covered with items thrown north and south off shelves. One counter (of wine) oriented N.-S. remained intact—no bottles off shelves. Maximum acceleration was evidently directed N.-S. Rumors of a damaged street light and a fallen tree could not be confirmed by Pacific Gas and Electric Company (PG&E), San Juan Bautista City Hall, or Hollister City Hall.

"Mission San Juan Bautista: The mission was built in 1797, and has been repeatedly damaged by a long series of earthquakes beginning in 1800. It is located less than 100 feet west of a local vertical fault scarp along the San Andreas fault active trace. Perched atop the upthrown side of the fault, the Mission has a commanding view of the fertile San Juan Valley. Additional damage occurred as a result of this earthquake—a part of the N.-NE. facing adobe wall (nearest to and subparallel with the fault scarp) collapsed and was thrown northward. This wall has been repeatedly damaged by past earthquakes and is supported by numerous buttresses of concrete and adobe construction. The October 2 damaged wall mass measured approximately 10 feet horizontally by 2 feet vertically along the wall, and involved the outside 1 foot of wall thickness (total wall thickness approximately 3 feet). This mass was thrown from the top of a wall remnant left from a previous earthquake collapse.

"San Juan Grammar School (San Juan Bautista): This is a new school located as close to the San Andreas fault as the Mission. A few books were thrown from shelves. No structural or other damage was reported.

"Baumgartner Ranch (2½ airline miles SE. of San Juan Bautista, east of San Andreas fault; wood frame house): Plaster cracked and plaster chips fell from two E.-W. oriented walls. Less severe plaster cracks occurred on N.-S. walls and ceilings. A heavy file cabinet was moved eastward

several inches. An E.-W. oriented, heavy sliding glass door was opened (moving eastward). Several large table lamps were thrown eastward or northeastward into chairs and onto floor. On dining room table, a centerpiece, and two candles (all in line) were moved eastward on table (1–2 feet), maintaining their relative positions. Heavy antique clock on mantle (together with other objects) moved eastward a few inches. This clock had been stopped, but was started by the shaking. A flash of light was observed outside the house. Existing cracks in floor tiles were enlarged. In bedroom, all cabinet drawers opened and desk objects all moved eastward. Maximum acceleration was evidently directed E.-W.

"Saint Francis Retreat (3.9 airline miles SE. of San Juan Bautista): Earthquake was felt strongly, but damage was minor—a mirror was thrown off one wall.

"Harmony Hills (5½ airline miles SE. of San Juan Bautista): Felt strongly. No objects were thrown off shelves. One man (standing) had to brace himself against a door to prevent being thrown down. Motion was felt first in E.-W. direction, changing to N.-S., then back to E.-W."

Press reports: At the Holthouse Ranch (about 2¾ airline miles SE. of San Juan Bautista), plaster cracked, cupboards emptied, and books and chinaware fell; water splashed "way out of swimming pool." Plaster was cracked at the San Juan State Historical Park. Aisles were littered with groceries at one food market and many jars were broken. Broken and fallen articles were reported at other San Juan business firms.

Other observers reported: At 1210 San Juan–Hollister Highway, water from toilets splashed out all over the floors. Articles in house were damaged. "This was during the 10:30 p.m. shock. The shocks at 10:00 p.m. and the shock on October 3 at 03:10 did not do so much damage. The one at 03:10 spilled all of the water out of the dog's dish in the kitchen." At 961 Olympia Road (San Juan Bautista), all objects on fireplace were thrown around and broken. Kitchen refrigerator door opened and food fell out. Water tower leaned. At 900 Olympia Road (reportedly located not too far from 1210 San Juan–Hollister Highway), pictures fell from walls. Refrigerator door in kitchen opened and several items were thrown out; cupboard doors opened and chinaware was thrown across the floor and broken; home-canned goods from cupboard on back porch fell to floor and broke. Electric power unit fell off freezer. Chests of drawers on the west side of the house were moved about 15 to 20 cm from the walls. The shock had a rumbling sound; jerking and cracking motion. "The house sounded as if it would snap apart. Nothing fell in the wash house behind the house. There was another light shock Tuesday night or early Wednesday morning."

INTENSITY V:

Aromas, Carmel, Castroville, Chualar, Cienega Road district (south of Hollister, at 7391 Cienega Rd., and at the Almaden Winery, 9970 Cienega Rd.), Corralitos, Gilroy, Hollister (garage floor cracked; damage slight), Jamesburg area (south of Carmel Valley; cement foundation and tile floor cracked), Mount Madonna State Park (about 13 km northwest of Gilroy), and Salinas.

INTENSITY IV:

Boulder Creek, Carmel Valley, Felton, Fort Ord, Freedom, Monterey, Moss Landing, Mount Hermon, San Martin, Santa Cruz, and Watsonville.

INTENSITY I–III:

Belmont, Ben Lomond, Bolinas, Bryson, Daly City, Marina, Monte Sereno, Paicines (about 10 km south of), San Ardo, San Francisco, San Jose, Seaside, and Woodside.

Oct. 3: 03:05, 03:10:13.4 (11:10). Epicenter 36°48.4′ N., 121°34.0′ W., central California, at a depth of 4 km, mag. 4.1, B. Aftershock of October 2. Int. **IV** at 1210 San Juan–Hollister Highway in San Juan Bautista. Also felt at 7391 Cienega Road (south of Hollister; shock also felt at 03:05),

and probably refers to an aftershock felt in the Jamesburg area (about 19 km south of Carmel Valley).

Oct. 4: Int. **II** at Salinas Airport.

Oct. 8: 03:47:17.5 (11:47). Epicenter 34°13.3′ N., 117°28.0′ W., southern California, at a depth of about 8 km, mag. 3.5, P. Int. **V.** Felt by and awakened many at Etiwanda; frightened few. Felt by all, awakened many, and frightened few at Lytle Creek where a sharp jolt was felt. Loud earth noises. Int. IV at Ontario and San Bernardino; I–III at Cucamonga, Mount Baldy, Riverside, and Upland.

Oct. 16: 04:34:14.2 (12:34). Epicenter 33°49.1′ N., 118°23.4′ W., southern California, at a depth of about 13 km, mag. 3.4, P. Int. **IV** at Gardena, Hawthorne, Hermosa Beach, Manhattan Beach, Palos Verdes Peninsula, Redondo Beach, Torrance, and Wilmington; I–III at Inglewood and West Los Angeles. Also felt at San Pedro.

Oct. 19: 05:26:45.9 (13:26). Epicenter 32°52.6′ N., 116°15.2′ W., California–Mexico border region, at a depth of about 8 km, mag. 3.5, P. Int. **IV** at Agua Caliente, Mount Laguna, and Pine Valley; II at Guatay.

Oct. 20: 09:53:24.5 (17:53). Epicenter 34°01.6′ N., 117°37.0′ W., southern California, at a depth of 3 km, mag. 3.0, **P.** Felt at Ontario.

Oct. 20: 16:03:39.0 (Oct. 21, 00:03). Epicenter 34°24.6′ N., 118°25.4′ W., southern California, at a depth of about 9 km, mag. 3.6, P. Felt in San Fernando Valley. Int. **III** at Sylmar (press).

Oct. 21: 04:53:07.6 (12:53). Epicenter 34°02.0′ N., 117°38.2′ W., southern California, at a depth of about 2 km, mag. 2.8, P. Felt at Ontario.

Oct. 31: 07:54:17.4 (15:54). Epicenter 37°13.5′ N., 121°43.3′ W., central California, at a depth of about 7 km, mag. about 3.4, B. Int. **IV** at Coyote and Morgan Hill; I–III at Corralitos, Gilroy, Metcalf Substation (at Anderson Reservoir north of Morgan Hill, PG&E), Holy City, and San Jose (southeast area).

Nov. 3: 23:16:44.0 (Nov. 4, 07:16). Epicenter 33°41.9′ N., 116°40.7′ W., southern California, at a depth of about 8 km, mag. 3.0, P. Slight jolt, lasting several seconds, was felt at Palm Springs (press).

Nov. 13: 18:10:12.7 (Nov. 14, 02:10). Epicenter 40°15′ N., 124°33′ W., near coast of northern California, at a depth of 21 km, mag. 4.6, B. Int. **V.** At Harris, the top of a brick chimney fell. Int. V effects (no damage) also were noted at Blocksburg, Ferndale, Leggett, Myers Flat, and Petrolia; IV at Bridgeville, Fortuna, Garberville, Honeydew, Laytonville, Miranda, Phillipsville, Piercy, Redcrest, Rio Dell, Weott, Whitethorn, and Zenia; I–III at Alderpoint, Eureka (Humboldt Hill), and Scotia.

Nov. 14: 03:07:50.7 (11:07). Epicenter 34°34.1′ N., 118°11.1′ W., southern California, at a depth of about 8 km, mag. 2.9, P. Felt at Palmdale.

Nov. 15: 06:49:05.7 (14:49). Epicenter 35°14.8′ N., 118°51.9′ W., central California, at a depth of about 8 km, mag. 3.3, **P.** Felt in Arvin–Lamont area (Kern County).

Nov. 16: 13:53:18.2 (21:53). Epicenter 33°44.3′ N., 117°31.4′ W., southern California, at a depth of about 8 km, mag. 3.1, P. Press reported a very light earthquake "rippled" through the area just south of Ontario. Felt at Ontario.

Nov. 16: 15:48:00.0 (23:48). Epicenter 40.2° N., 124.2° W., northern California, at a depth of 20 km, mag. 3.3, B. Int. **IV** at Ferndale (press); II at Fortuna.

Nov. 24: 22:57:38.2 (Nov. 25, 06:57), 23:02:06.5 (Nov. 25, 07:02), 23:07:39.6 (Nov. 25, 07:07). Epicenter (1) 34°01.0′ N., 117°35.8′ W., (2) 34°00.9′ N., 117°36.4′ W., (3) 34°01.0′ N., 117°36.3′ W., southern

California, all at a depth of about 8 km, mag. 3.4, 3.5, and 3.2, respectively, P. All of the shocks were felt at Ontario. Int. II at Etiwanda (23:02).

Nov. 26: 11:15, 11:17:54.6 (19:17), 11:22, 11:25. Epicenter 38°28.7′ N., 122° 41.4′ W., central California, at a depth of about 3 km, mag. 2.9, B. All of the shocks were felt at Santa Rosa, the strongest at 11:17. Int. **IV** ((11:17) near Fulton and at Santa Rosa; I–III at Cotati, Graton, and Sonoma.

Nov. 27: 04:18:00.3 (Nov. 28, 12:18). Epicenter 33°53.0′ N., 118°16.9′ W., southern California at a depth of 8 km, mag. 2.3, P. Felt at Gardena and Venice.

Dec. 2: 05:19:58.1 (13:19). Epicenter 39.6° N., 119.4° W., western Nevada, at a depth of about 5 km, mag. 4.0, B. Int. **IV** at Fernley; III at Silver City and Sparks.

Dec. 12: 21:04:20.0 (Dec. 13, 05:04), 21:12:55.8 (Dec. 13, 05:12). Epicenter (1) 34°01.4′ N., 117°36.4′ W., (2) 34°01.1′ N., 117°36.6′ W., southern California, both at a depth of about 8 km, mag. 3.1 and 3.3, respectively, P. Int. **IV** (21:12) at Mira Loma; III at Etiwanda. Both shocks were felt at Ontario.

Dec. 19: 14:32:22.0 (22:32). Epicenter 33°58.7′ N., 116°03.6′ W., southern California, at a depth of about 8 km, mag. 3.8, P. Felt in the Palm Springs area.

Dec. 20: 18:37:55.2 (Dec. 21, 02:37), 18:50:07.2 (Dec. 21, 02:50), 21:15:54.0 (Dec. 21, 05:15). Epicenter (1) 35°59.0′ N., 117°41.5′ W., (2) 35°57.8′ N., 117°46.1′ W., (3) 35°56.2′ N., 117°41.3′ W., central California, all at a depth of about 8 km, mag. 3.9, 3.3, and 3.6, respectively, P. It was reported that a swarm of approximately 100 earthquakes occurred in the desert area north of Ridgecrest, with at least six of moderate intensity. Int. **IV** (18:37 and 21:15) at Little Lake and Little Lake Lodge; II (18:37) about 3.2 km north of Inyokern. All three shocks were reported felt in the Ridgecrest area.

Dec. 21: 02:31:27.6 (10:31). Epicenter 35.9° N., 117.7° W., central California, at a depth of about 8 km, mag. 3.7, P. Felt in Ridgecrest area.

WASHINGTON AND OREGON

[All times are Pacific standard. If an epicenter is quoted, Greenwich mean time is given in parentheses.]

May 25: 05:36:53.7 (13:36). Epicenter 45.5° N., 122.4° W., Washington–Oregon border region, at a depth of 10 km, mag. 3.0, Oregon State University, Corvallis (press). Int. **V.** Press reported the shock was felt over much of Oregon's Multnomah County, but was not felt west of the Williamette River. Most calls to fire and police agencies came from an area between Portland International Airport on the north, east to Gresham, and south to Milwaukie, but the tremor also was felt in Portland's west hills area. Many were awakened. Police and fire departments, radio stations, and newspaper offices were inundated with telephone calls.

June 24: 17:42:21.3 (June 25, 01:42). Epicenter 48.0° N., 122.1° W., Washington, at a depth of 30 km, mag. 3.3. Felt in Everett-Snohomish area.

Nov. 7: 20:19 (LSM). Mag. 2.5–3.0; epicenter about 16 km from Victoria, B.C. Lightly felt at Port Townsend, Wash. (press).

ALASKA

[All times are Alaska standard (150° meridian). If an epicenter is quoted, Greenwich mean time is given in parentheses.]

Jan. 3: 07:06:22.3 (17:06). Epicenter 51.1° N., 178.9° E., Rat Islands, at a depth of 46 km, mag. 5.4 (M_S). Int. **II** on Adak Island.

Jan. 13: 14:21:29.2 (Jan. 14, 00:21). Epicenter 64.7° N., 147.6° W., central Alaska, at a depth of 12 km, mag. 4.1 (m_b). Felt in Fairbanks area.

Jan. 15: 13:30 (about). Int. **III** at Nome.

Jan. 23: 01:35:59.7 (11:35). Epicenter 52.0° N., 178.7° W., Andreanof Islands, at a depth of 102 km, mag. 4.9 (m_b). Int. **III** on Adak Island.

Jan. 29: 16:12:11.4 (Jan. 30, 02:12). Epicenter 51.8° N., 176.6° W., Andreanof Islands, at a depth of 70 km, mag. 4.4 (m_b). Int. **III** on Adak Island.

Jan. 31: 12:31:44.3 (22:31). Epicenter 62.1° N., 150.5° W., central Alaska, at a depth of 74 km, mag. 3.7 (m_b). Int. **II** at Talkeetna.

Jan. 31: 14:24:30.7 (Feb. 1, 00:24). Epicenter 51.8° N., 177.7° E., Rat Islands, at a depth of 57 km, mag. 5.2 (m_b). Int. **II** on Amchitka Island.

Feb. 13: 12:40:16.2 (22:40). Epicenter 59.9° N., 154.2° W., southern Alaska, at a depth of 153 km, mag. 4.9 (m_b). Int. **I–II** at Anchorage, Homer, Kenai, and Palmer.

Feb. 15: 01:21:49.7 (11:21). Epicenter 51.4° N., 177.4° W., Andreanof Islands, at a depth of 50 km, mag. 4.9 (m_b). Int. **IV** on Adak Island.

Feb. 21: 09:34:50.9 (19:34). Epicenter 55.9° N., 158.3° W., Alaska Peninsula, at a depth of 60 km, mag. 5.7 (m_b). Int. **V**. At Chignik, tile floor, window, and wall were cracked at a schoolhouse. Water was disturbed. Felt by and frightened all in community. Int. IV at False Pass, Unimak Island.

Feb. 22: 09:07:29.1 (19:07). Epicenter 51.4° N., 176.0° W., Andreanof Islands, at a depth of 43 km, mag. 4.2 (m_b). Int. **II** on Adak Island. The press reported the shock was felt slightly at Port Heiden on the Alaska Peninsula.

Feb. 22: 18:35. Int. **V** at Shemya Air Force Base, Shemya Island. Felt by all and frightened few.

Feb. 23: 15:43:04.5 (Feb. 24, 01:43). Epicenter 55.8° N., 158.3° W., Alaska Peninsula, at a depth of 66 km, mag. 5.3 (m_b). Int. **IV** at Chignik; III at False Pass, Unimak Island.

Feb. 24: 23:26:59.0 (Feb. 25, 09:26). Epicenter 61.2° N., 149.4° W., southern Alaska, at a depth of 45 km, mag. 3.5. Felt at Anchorage.

Mar. 2: 09:07:08.6 (19:07). Epicenter 51.4° N., 177.5° W., Andreanof Islands, at a depth of 56 km, mag. 4.2 (m_b). Int. **II** on Adak Island.

Mar. 13: 19:16:49.8 (Mar. 14, 05:16). Epicenter 60.0° N., 147.7° W., southern Alaska, at a depth of 34 km, mag. 4.3. Int. **III** on southwest end of Montague Island; int. **I** on north end of Island.

Mar. 18: 20:24:09.3 (Mar. 19, 06:24). Epicenter 62.4° N., 150.6° W., central Alaska, at a depth of 25 km, mag. 3.2. Int. **II** at Talkeetna (about 125 km north of Anchorage).

Mar. 20: 13:31:48.8 (23:31). Epicenter 51.3° N., 178.2° W., Andreanof Islands, at a depth of 46 km, mag. 5.4 (M_S). Int. **IV** on Adak Island. Also felt on Amchitka Island.

Mar. 20: 23:47:38.3 (Mar. 21, 09:47). Epicenter 50.0° N., 176.2° W., Andreanof Islands, at a depth of 33 km, mag. 4.4 (M_S). Felt on Adak Island.

Mar. 23: 01:00. Int. **IV** in Hamilton Acres area of Fairbanks.

Mar. 23: 17:38:27.1 (Mar. 24, 03:38). Epicenter 56.1° N., 157.2° W., Alaska Peninsula, at a depth of 69 km, mag. 6.0 (m_b). Int. **IV** at Port Heiden and II at King Salmon.

Apr. 1: 14:29:02.0. Mag. 4.4 (ADK). Int. **III** on Adak Island.

Apr. 4: 16:19:39.3. Mag. 4.0 (ADK). Int. **III** on Adak Island.

Apr. 5: 03:00. Int. **IV** at Shemya Air Force Base, Shemya Island.

Apr. 6: 01:10:04.8 (11:10). Epicenter 52.1° N., 175.0° E., Rat Islands, at a depth of 56 km, mag. 4.8 (m_b). Int. **V** at Shemya Air Force Base, Shemya Island, but no damage was sustained.

Apr. 6: 17:16:22.6 (Apr. 7, 03:16). Epicenter 60.1° N., 152.8° W., southern Alaska, at a depth of about 98 km, mag. 5.1. Int. **V.** Felt by all and frightened many at Homer. Small objects fell. Earth noises sounded like a "big bang."

Apr. 16: 08:35:39.3 (18:35). Epicenter 63.5° N., 147.7° W., central Alaska, at a depth of 11 km, mag. 4.6. Int. **III** in College–Fairbanks area.

Apr. 16: 15:02:01.5 (Apr. 17, 01:02). Epicenter 51.5° N., 177.4° W., Andreanof Islands, at a depth of 53 km, mag. 4.6 (m_b). Int. **III** on Adak Island.

Apr. 20: 05:14:49.4 (15:14). Epicenter 60.2° N., 152.1° W., southern Alaska, at a depth of 85 km, mag. 4.7 (m_b). Int. **V.** Trees and bushes shook at Homer. Many were awakened, but no damage was sustained.

Apr. 20: 15:28:09.5 (Apr. 21, 01:28). Epicenter 54.0° N., 166.9° W., Fox Islands, at a depth of 103 km, mag. 5.8 (m_b). The press reported the shock was "very strong" at Unalaska (Unalaska Island) and "strong" at Cape Sarichef (Unimak Island) and Nikolski (Umnak Island).

Apr. 23: 21:18:55.6. Mag. 4.4 (ADK). Int. **II** on Adak Island.

Apr. 25: 03:35:54.1 (13:35). Epicenter 62.0° N., 148.8° W., central Alaska, at a depth of 58 km, mag. 4.6 (m_b). Felt from Sutton to Anchorage (int. I–III).

Apr. 26: 21:40:06.4 (COL). Int. **III** at Fairbanks; II at Fort Wainwright.

Apr. 27: 09:30:22.6. Mag. 4.3 (ADK). Int. **II** on Adak Island.

May 2: 18:49:06.8 (May 3, 04:49). Epicenter 51.4° N., 179.2° W., Andreanof Islands, at a depth of 56 km, mag. 5.3 (m_b). Int. **II** on Adak Island.

May 6: 17:18 (COL). Int. **V** at Homer where small objects shifted and overturned.

May 6: 19:28:07.6 (May 7, 05:28). Epicenter 51.4° N., 176.8° W., Andreanof Islands, at a depth of 40 km. Int. **II** on Adak Island.

May 7: 17:44:08.8 (May 8, 03:44). Epicenter 64.7° N., 147.5° W., central Alaska, at a depth of 8 km. Felt in Fairbanks area.

May 11: 20:53:04.4 (May 12, 06:53). Epicenter 66.1° N., 157.2° W., Alaska, mag. 4.0 (m_b). Int. **V** at Hogatza (Hog River, 66° N., 156° W.), but no damage was sustained.

May 19: 20:43:43.1 (May 20, 06:43). Epicenter 57.8° N., 153.8° W., Kodiak Island region, at a depth of 59 km, mag. 5.2 (m_b). Int. **II** at Kodiak.

May 23: 07:32:36.5 (PMR). Int. **II** at Anchorage.

June 5: 16:19:41.6 (June 6, 02:19). Epicenter 51.6° N., 178.3° W., Andreanof Islands, at a depth of 51 km, mag. 5.6. Int. **III** on Adak Island.

June 8: 20:53:16.7 (ADK). Int. **III** on Adak Island.

June 12: 09:47:37.2 (19:47). Epicenter 53.3° N., 166.8° W., Fox Islands, at a depth of 44 km, mag. 5.8 (M_S). Felt at a cannery at Unalaska, Unalaska Island.

June 13: 14:52:35.7 (June 14, 00:52). Epicenter 60.5° N., 153.4° W., southern Alaska, at a depth of 152 km, mag. 5.2

(m_b). Felt in Anchorage–Palmer area and at Lake Iliamna on Kenai Peninsula.

June 18: 15:02:53.9 (June 19, 01:02), 15:09:17.7 (June 19, 01:09). Epicenter (1) 52.2° N., 175.0° E., (2) 52.0° N., 175.2° E., Rat Islands, at depths of 53 and 62 km, respectively, mag. 5.3 and 4.7 (m_b), respectively. Int. **V.** Felt by all and frightened many on Shemya Island. Radio and TV shifted. Also felt on Attu Island. Shock at 15:09 was felt on Shemya Island.

June 21: 19:57:34.2 (June 22, 05:57). Epicenter 61.4° N., 147.5° W., southern Alaska, at a depth of 48 km, mag. 4.5 (m_b). Int. **II** at Mile 36 (on Valdez Highway between Valdez and Glennallen).

July 17: 16:50. Int. **III** at Shemya Air Force Base, Shemya Island.

July 19: 15:35:52.7 (July 20, 01:35). Epicenter 61.1° N., 146.7° W., southern Alaska, mag. 3.5 (m_b). Int. **IV** at Valdez.

July 20: 07:17:15.0 (PMR). Int. **IV** at Valdez.

July 25: 08:06:22.0 (18:06). Epicenter 51.2° N., 176.8° W., Andreanof Islands, at a depth of 48 km, mag. 4.0 (m_b). Int. **II** on Adak Island.

July 27: 00:12:32.1 (10:12). Epicenter 51.1° N., 179.3° W., Andreanof Islands, at a depth of 46 km, mag. 4.8 (m_b). Int. **II** on Adak Island.

July 27: 22:49:03.1 (July 28, 08:49). Epicenter 52.6° N., 173.2° E., Near Islands, at a depth of 46 km, mag. 4.7 (M_S). Int. **V** on Attu Island where plaster cracked, dishes broke, and furniture moved. Felt strongly on Shemya Island.

July 30: 11:45:14.1 (21:45). Epicenter 56.82° N., 135.68° W., southeastern Alaska, at a depth of 25 km, mag. 7.6 (M_S). Int. **VII.** Felt over an area of about 130,000 km^2 (50,000 mi^2). Slightly felt at Quesnel, B.C. Seiches occurred in swimming pools as far south as Seattle, Wash. Felt onboard a ship at 55° 40′ N., 134° 10′ W. Also felt on a cruiser about 29 km southwest (true) of Sitka. "Shock lasted about 20 seconds; felt a heavy vibration that shook boat. Surface of water was agitated; appeared like ripples jumping up and down. Noted a lot of grass clumps that fell off Saint Lazaria Island." At Sitka, a few chimneys cracked and fell, some minor landslides occurred, and power was off briefly. Light damage also occurred at Hoonah, Juneau, Pelican, and Yakutat. At least 19 aftershocks were felt at Sitka as of August 29.

INTENSITY VII:

Sitka area.—Felt by all in community; frightened few. Three or four chimneys cracked and fell. Some minor landslides were noted in this area. Concrete walls cracked at Sitka Community Hospital. "Loud creaking. Thought building would collapse." Damage slight.

INTENSITY VI:

Auoss Lake (48 km south of Sitka).—Felt by all and frightened few. Food fell from shelves. Stove shifted. Cabin shook violently. Loud earth noises. Trees shook. Landslides in mountains. Damage slight.

Biorka Island (about 26 km southwest of Sitka).—Felt by and frightened all in community. Trees and bushes shook; vehicles rocked. Furniture and small objects overturned and broke.

Hoonah (about 120 km north of Sitka).—Felt by all in community; frightened few. Trees and bushes shook. Chimneys cracked. Small objects shifted. Damage slight.

Juneau.—Felt by all in community; many frightened. Trees and bushes shook; vehicles rocked. Furniture shifted, overturned, and broke. Plaster cracked, broke, and fell.

Pelican (about 115 km northwest of Sitka).—Felt by all and frightened few in community. Trees and bushes shook. Water was disturbed. Toilet tank broke. Articles fell from shelves. Hanging objects swung violently. Damage slight.

Yakutat.—Felt by all in community; frightened few. Trees swayed. "There was

damage to some baffles in the sewer plant pond about 300 yards away. Fiberglas partition in FAA sewer lagoon broke." Well water became muddy.

INTENSITY V:

Gustavus, Hoonah Mountain (466-m elevation, 6.4 km northwest of Hoonah), Ketchikan, Klawock, Petersburg, Skagway, Tenakee Springs, Whale Bay (south of Sitka), and Wrangell area.

INTENSITY IV:

Annette.

INTENSITY III:

Metlakatla.

July 30: 13:02:29.5 (PMR). Felt at Sitka.

Aug. 1: 01:20:38.3 (SIT). Int. **I** at Sitka.

Aug. 2: 17:51:14.1 (Aug. 3, 03:51). Epicenter 63.4° N., 147.6° W., central Alaska, at a depth of 16 km, mag. 3.7. Int. **II** in Palmer area.

Aug. 2: 18:40:54.9 (Aug. 3, 04:40). Epicenter 51.2° N., 178.1° W., Andreanof Islands, at a depth of 49 km, mag. 6.2 (M_S). Int. **VI.** At Adak, shelves and bins overturned; heavy furniture moved; dishes, etc., broke. "Some broken steam and water lines."

Aug. 2: 18:46:05.9. Mag. 4.9 (ADK). Int. **II** on Adak Island.

Aug. 2: 19:35:16.4 (Aug. 3, 05:35). Epicenter 51.2° N., 177.9° W., Andreanof Islands, at a depth of 49 km, mag. 4.8 (m_b). Int. **III** on Adak Island.

Aug. 2: 20:59:45.9 (Aug. 3, 06:59). Epicenter 51.2° N., 178.1° W., Andreanof Islands, at a depth of 45 km, mag. 5.4 (M_S). Int. **III** on Adak Island.

Aug. 2: 21:03:14.2 (Aug. 3, 07:03). Epicenter 51.2° N., 178.0° W., Andreanof Islands, at a depth of 48 km, mag. 5.4 (m_b). Int. **IV** on Adak Island.

Aug. 3: 15:28:31.1 (Aug. 4, 01:28). Epicenter 51.5° N., 178.5° W., Andreanof Islands, at a depth of 60 km, mag. 5.0 (m_b). Int. **II** on Adak Island.

Aug. 3: 23:48:11.0 (Aug. 4, 09:48). Epicenter 56.2° N., 135.5° W., southeastern Alaska, at a depth of 18 km, mag. 5.0 (M_S). Int. **II** at Sitka.

Aug. 4: 01:38:08.3 (11:38). Epicenter 56.2° N., 135.3° W., southeastern Alaska, at a depth of 20 km, mag. 5.8 (M_S). Int. **V** effects occurred at Gustavus, Petersburg, and Sitka, but no damage was sustained. Int. **IV** at Juneau.

Aug. 4: 06:52:39.1 (16:52). Epicenter 51.2° N., 178.0° W., Andreanof Islands, at a depth of 46 km, mag. 4.2 (m_b). Int. **II** on Adak Island.

Aug. 6: 05:23:15.6 (SIT). Int. **I** at Sitka.

Aug. 6: 22:33:53.0 (PMR). Int. **III** at Sitka.

Aug. 8: 12:42:45.0. Mag. 4.7 (ADK). Int. **I** on Adak Island.

Aug. 8: 13:57:27.7 (23:57). Epicenter 51.3° N., 177.9° W., Andreanof Islands, at a depth of 67 km, mag. 4.9 (m_b). Int. **III** on Adak Island.

Aug. 10: 11:40:10.6 (SIT). Int. **I** at Sitka.

Aug. 10: 21:26:41.0 (SIT). Int. **I** at Sitka.

Aug. 11: 23:42:05.2 (Aug. 12, 09:42). Epicenter 51.4° N., 179.3° W., Andreanof Islands, at a depth of 29 km, mag. 5.7 (M_S). Int. **III** on Adak Island.

Aug. 15: 00:56:12.8 (10:56). Epicenter 56.3° N., 135.5° W., southeastern Alaska, at a depth of 21 km, mag. 4.8 (M_S). Int. **V** at Gustavus where trees and bushes shook. Many were awakened, but no damage occurred. Int. III at Sitka; also felt at Juneau.

Aug. 15: 11:39:04.2 (21:39). Epicenter 65.1° N., 148.7° W., Alaska, at a depth of 20 km, mag 4.5 (M_S). Int. **IV** in College–Fairbanks area. "There were two tremors of about equal magnitude and about 3 or 4 seconds apart. Frequency was about 5 cycles per second."

Aug. 17: 14:41:56.5. Mag. 3.5 (PMR). Int. **II** at Talkeetna.

Aug. 22: 15:21:17.7 (Aug. 23, 01:21). Epicenter 51.4° N., 176.6° W., Andreanof Islands, at a depth of 43 km, mag. 3.8 (m_b). Int. **II** on Adak Island.

Aug. 22: 22:47:16.0 (Aug 23, 08:47). Epicenter 58.3° N., 153.6° W., Kodiak Island region, at a depth of 61 km, mag. 5.5 (m_b). Int. **IV** at Kodiak.

Aug. 25: 18:56:14.7 (SIT). Int. **II** at Sitka.

Aug. 27: 10:31:17.5 (SIT). Felt at Sitka.

Aug. 28: 05:21:01.8 (15:21). Epicenter 51.4° N., 179.2° W., Andreanof Islands, at a depth of 45 km, mag. 4.6 (M_S). Int. **IV** on Adak Island.

Aug. 28: 05:25:24.1 (PMR). Felt at Adak.

Aug. 28: 22:25:40.5 (SIT). Int. **I** at Sitka.

Aug. 29: 10:29:43.8 (SIT). Int. **I** at Sitka.

Sept. 1: 04:30:50.6 (14:30). Epicenter 51.4° N., 178.1° W., Andreanof Islands, at a depth of 63 km, mag. 5.2 (m_b). Int. **V.** Minor damage occurred on Adak Island. Plaster cracked, dishes broke, and bookshelves overturned.

Sept. 7: 07:19:24.0 (17:19). Epicenter 61.7° N., 150.6° W., southern Alaska, at a depth of 83 km. Int. **II** at Anchorage.

Sept. 10: 17:03:50.0 (Sept. 11, 03:03). Epicenter 59.6° N., 148.9° W., Kenai Peninsula, at a depth of 27 km, mag. 5.1 (m_b). Int. **II** at Anchorage.

Sept. 13: 11:09:32.0 (21:09). Epicenter 51.4° N., 175.4° W., Andreanof Islands, at a depth of 52 km, mag. 4.2 (m_b). Int. **II** on Adak Island.

Sept. 13: 21:02 (COL). Int. **III** at College; II at Fairbanks.

Sept. 20: 12:10:15.4 (22:10). Epicenter 51.8° N., 174.0° E., Near Islands, at a depth of 26 km, mag. 5.3 (M_S). Int. **II** on Shemya Island.

Sept. 23: 00:40:12.9 (10:40). Epicenter 51.2° N., 175.0° W., Andreanof Islands, at a depth of 41 km, mag. 4.8 (m_b). Int. **II** on Adak Island.

Sept. 23: 22:02:06.6 (COL). Felt in Fairbanks area.

Oct. 1: 00:08:49.7 (10:08). Epicenter 62.7° N., 149.1° W., Alaska, at a depth of 76 km, mag. 4.7 (m_b). Int. **II** at Palmer.

Oct. 1: 11:43:44.7 (21:43). Epicenter 51.7° N., 177.1° W., Andreanof Islands, at a depth of 58 km, mag. 5.2 (m_b). Int. **IV** on Adak Island.

Oct. 2: 10:05. Int. **IV** at Nome.

Oct. 3: 19:41:08.6 (Oct. 4, 05:41). Epicenter 62.9° N., 159.6° W., central Alaska, mag. 4.6 (m_b). Int. **V.** At Anvik (located on the Yukon River about 575 km northwest of Anchorage), small objects and furniture shifted; many in the community were frightened.

Oct. 11: 21:32:10.1 (Oct. 12, 07:32). Epicenter 64.6° N., 148.1° W., central Alaska, at a depth of 27 km. Int. **IV** at College.

Oct. 13: 00:54:33.9 (10:54). Epicenter 51.7° N., 175.9° W., Andreanof Islands, at a depth of 64 km, mag. 4.7 (m_b). Int. **IV** on Adak Island.

Oct. 13: 17:29:33.1 (Oct. 14, 03:29). Epicenter 51.7° N., 175.3° W., Andreanof Islands, at a depth of 62 km, mag. 5.1 (m_b). Int. **IV** on Adak Island.

Oct. 15: 09:34:42.6 (19:34). Epicenter 51.8° N., 175.3° W., Andreanof Islands, at a depth of 62 km, mag. 4.9 (m_b). Int. **III** on Adak Island.

Oct. 19: 21:55. Int. **V** at King Cove where the shock was felt by all in community; awakened and frightened few.

Oct. 21: 09:52:05.4 (19:52). Epicenter 63.2° N., 151.1° W., central Alaska, at a depth of 132 km, mag. 5.4 (m_b). Int. **IV** at Talkeetna. Also felt in Anchorage, Cantwell, and Palmer areas.

Oct. 22: 14:40. Int. **III** at Anvik (located on the Yukon River about 575 km northwest of Anchorage).

Oct. 25: 05:03:33.1 (15:03). Epicenter 61.3° N., 150.5° W., southern Alaska, at a depth of 30 km, mag. 3.2. Int. **III** at Anchorage.

Oct. 27: 08:18:14.7 (18:18). Epicenter 61.5° N., 150.4° W., southern Alaska, at a depth of 54 km, mag. 3.7 (m_b). Felt at Wasilla (about 50 km northeast of Anchorage).

Oct. 27: 10:45. Int. **II** at King Cove.

Oct. 30: 10:46:24.3 (20:46). Epicenter 52.0° N., 177.5° W., Andreanof Islands, at a depth of 98 km, mag. 4.1 (m_b). Int. **III** on Adak Island.

Oct. 30: 12:20:28.0. Mag. 4.5 (ADK). Int. **I** on Adak Island.

Nov. 2: 12:57:30.8 (22:57). Epicenter 64.6° N., 147.6° W., central Alaska, at a depth of 35 km, mag. 3.7. Felt in Fairbanks area.

Nov. 12: 23:25:51.2 (Nov. 13, 09:25). Epicenter 53.8° N., 169.0° W., Fox Islands, at a depth of 129 km, mag. 5.1 (m_b). Felt at Nikolski, Umnak Island, and Cold Bay, Alaska Peninsula.

Nov. 17: 06:41:34.7 (16:41). Epicenter 56.0° N., 135.5° W., southeastern Alaska, at a depth of 33 km, mag. 5.0 (m_b). Felt slightly at Sitka and Petersburg (about 150 km east of Sitka).

Nov. 21: 07:01:55.3 (17:01). Epicenter 52.4° N., 173.6° E., Near Islands, at a depth of 50 km, mag. 5.5 (m_b). Int. **V.** Trees and bushes shook on Shemya Island. Many were awakened, but no damage was sustained.

Nov. 28: 03:35:37.4 (13:35). Epicenter 65.7° N., 145.7° W., Alaska, at a depth of 36 km, mag. 5.0 (M_S). Int. **IV** at Central, Chena Hot Springs, Circle, Fairbanks, and Fort Yukon.

Nov. 30: 05:30:16.5 (15:30). Epicenter 52.0° N., 175.4° W., Andreanof Islands, at a depth of 64 km, mag. 4.4 (m_b). Int. **II** on Adak Island.

Dec. 7: 12:19:51.3 (SIT). Int. **I** at Sitka.

Dec. 15: 06:21:54.6 (16:21). Epicenter 60.7° N., 151.4° W., Kenai Peninsula, at a depth of 89 km, mag. 4.4 (m_b). Int. **II** at Clam Gulch, Kenai, and Soldotna.

Dec. 15: 10:09:01.6 (20:09). Epicenter 61.2° N., 149.3 ° W., southern Alaska, at a depth of 45 km. Int. **II** at Anchorage.

Dec. 18: 07:11:38.9. Mag. 4.7 (ADK). Int. **II** on Adak Island.

Dec. 21: 15:24:01.0 (ADK). Int. **III** on Adak Island.

Dec. 22: 16:17:40.9 (Dec. 23, 02:17). Epicenter 51.3° N., 179.1° E., Rat Islands, at a depth of 45 km, mag. 4.9 (M_S). Int. **IV** on Amchitka Island.

Dec. 26: 12:03:42.2 (22:03). Epicenter 51.7° N., 176.3° W., Andreanof Islands, at a depth of 57 km, mag. 5.5 (m_b). Int. **VI.** The press reported people ran from build-

ings on Adak Island and that heavy furniture was moved.

Dec. 31: 03:59:59.8. Mag. 4.5 (ADK). Int. **I** on Adak Island.

HAWAII [6]

[All times are Hawaiian standard. If an epicenter is quoted, Greenwich mean time is given in parentheses.]

Jan. 13: 13:59:32.2 (23:59). Epicenter 18°47.8′ N., 155°17.4′ W., at a depth of 8 km, mag. 4.3. Felt at Kapapala.

Feb. 17: 13:17:56.6 (23:17). Epicenter 19°22.1′ N., 155°24.7′ W., at a depth of 8 km, mag. 4.0. Felt at Kapapala, Volcano, Hilo, and Honokaa.

Feb. 21: 01:03:51.8 (11:03). Epicenter 18°47.8′ N., 155°17.3′ W., at a depth of 15 km, mag. 3.9. Felt at Kapapala.

Feb. 24: 22:49:36.9 (Feb. 25, 08:49). Epicenter 19°01.7′ N., 155°41.9′ W., at a depth of 34 km, mag. 3.9. Felt at Kainaliu, Captain Cook, and Kealakekua.

Feb. 29: 12:08:24.5 (22:08). Epicenter 19°21.7′ N., 156°20.4′ W., at a depth of 19 km, mag. 5.0. Felt at Kainaliu, Captain Cook, Kapapala, and on the Island of Oahu.

Mar. 3: 08:09:02.8 (18:09). Epicenter 18°48.2′ N., 155°22.2′ W., at a depth of 23 km, mag. 3.9. Felt at Captain Cook and Kapapala.

Mar. 10: 03:13:02.2 (13:13). Epicenter 19°16.9′ N., 155°50.9′ W., at a depth of 11 km, mag. 3.9. Felt at Milolii, Captain Cook, and Kainaliu.

Mar. 27: 06:01:01.4 (16:01). Epicenter 21°01.7′ N., 156°15.3′ W., at a depth of 38 km, mag. 4.1. Felt on the Island of Maui.

Mar. 30: 14:02:49.9 (Mar. 31, 00:02). Epicenter 18°55.1′ N., 155°30.5′ W., at a depth of 21 km, mag. 3.9. Felt at Kainaliu and Naalehu.

Mar. 31: 16:20:34.9 (Apr. 1, 02:20). Epicenter 19°20.8′ N., 155°05.6′ W., at a depth of 7 km, mag. 4.1. Felt at Volcano, Glenwood, Hilo, Papaikou, and Kalapana.

Apr. 19: 10:16:39.7 (20:16). Epicenter 18°57.7′ N., 155°38.8′ W., at a depth of 44 km, mag. 3.9. Felt at Captain Cook and Kapapala.

June 21: 11:38:25.5 (21:38). Epicenter 19°21.6′ N., 155°02.2′ W., at a depth of 7 km, mag. 3.6. Felt at Hilo and Pahoa.

July 14: 09:36:57.5 (19:36). Epicenter 19°00.4′ N., 155°19.0′ W., at a depth of 32 km, mag. 4.5. Felt at Pahala, Kapapala, Hilo, Papaikou, Honokaa, and Pahoa.

Sept. 5: 01:31:33.6 (11:31). Epicenter 19°20.0′ N., 155°12.3′ W., at a depth of 8 km, mag. 4.8. Felt at Kealakekua, Kainaliu, Napoopoo, Kapapala, Hilo, Pepeekeo, Laupahoehoe, and Waimea.

Sept. 5: 23:41:06.1 (Sept. 6, 09:41). Epicenter 19°20.7′ N., 155°06.9′ W., at a depth of 8 km, mag. 3.9. Felt at Kapapala, Volcano, Glenwood, Keaau, Pahoa, and Waimea.

Nov. 17: 09:29:33.9 (19:29). Epicenter 19°20.2′ N., 155°07.9′ W., at a depth of 3 km, mag. 3.7. Felt at Kurtistown and Hilo.

Nov. 19: 17:39:53.8 (Nov. 20, 03:39). Epicenter 19°15.1′ N., 155°02.2′ W., at a depth of 33 km, mag. 3.6. Felt at Hilo.

Dec. 23: 09:04:51.0 (19:04). Epicenter 19°34.0′ N., 155°59.1′ W., at a depth of 45 km, mag. 5.2. Int. **V** at Captain Cook (press). Felt at Kona, Kau, Volcano, Waimea, Puako, and on the Island of Maui.

Dec. 24: 10:43:05.1 (20:43). Epicenter 19°33.4′ N., 155°59.8′ W., at a depth of 47 km, mag. 4.8. Felt at Kona and on the Island of Oahu.

Dec. 25: 22:08:11.3 (Dec. 26, 08:08). Epicenter 19°34.1′ N., 156°00.7′ W., at a

[6] Prepared by Hawaiian Volcano Observatory, U.S. Department of the Interior, Geological Survey, Hawaii National Park, Hawaii.

depth of 47 km, mag. 3.5. Felt at Kona and on the Island of Oahu.

PANAMA CANAL ZONE

No earthquakes were reported felt in 1972.

PUERTO RICO

[All times are 60th meridian. If an epicenter is quoted, Greenwich mean time is given in parentheses.]

Feb. 2: 15:05:18.8 (19:05). Epicenter 18.5° N., 66.9° W., Puerto Rico region, at a depth of 92 km, mag. 4.7 (m_b). **Int. V.** Felt over the entire island, but no damage was sustained.

INTENSITY V:

Adjuntas.—Felt by all in community; frightened several. Windows, doors, dishes, etc., rattled. Moderate earth noises.

Carolina.—Felt by several and awakened few. Hanging objects swung moderately. Furniture shifted.

Morovis.—Felt by and frightened many in community; awakened all. Windows, doors, dishes, etc., rattled. Moderate earth noises. Hanging objects swung east-west. Small objects shifted.

Naranjito.—Felt in community; frightened few. Windows rattled. Faint earth noises. Trees and bushes shook; vehicles moved. Hanging objects swung moderately. Furniture shifted.

INTENSITY IV:

Aguadilla (Ramey Air Force Base), Cabo Rojo, Cayey, Coamo, Guayama, Santurce, and Utuado.

INTENSITY I–III:

Arecibo, Gurabo, Orocovis, San Germán, Vega Alta, Vega Baja, and Yauco.

May 22: 22:35:18.4 (May 23, 02:35). Epicenter 18.5° N., 67.0° W., Mona Passage, at a depth of 35 km, mag. 4.6 (m_b). **Int. V.** Felt over all of Puerto Rico, but no damage occurred.

INTENSITY V:

Adjuntas.—Felt by all; frightened few. Windows, doors, and dishes rattled. Moderate earth noises. House shook. Hanging objects swung north-south.

Arecibo.—Felt by, awakened, and frightened many. Windows, doors, dishes, etc., rattled. Moderate earth noises.

Cayey.—Felt by and awakened all; some alarmed. Small objects shifted.

Comerío.—Felt by several; awakened few. Some rattling of windows, doors, dishes, etc. Faint earth noises. Hanging objects swung moderately. Small objects shifted.

Guayama.—Felt by all in community. Windows, doors, dishes, etc., rattled. Desk moved.

Guayanilla (Central San Francisco).—Felt by all in community; awakened and frightened few. Windows and doors rattled. Walls creaked. Some ran into the street.

Mayagüez.—Felt by and frightened all in community; awakened few. Whole house vibrated. Loud earth noises. Vases rotated.

Morovis.—Felt by, awakened, and frightened many. Windows, doors, dishes, etc., rattled. Moderate earth noises. Hanging objects swung north-south. Small objects and furniture moved.

INTENSITY IV:

Aguadilla (Ramey Air Force Base), Juana Diáz, Lares, Orocovis, and Ponce.

INTENSITY I–III:

Caguas and Vega Alta.

Sept. 3: 03:13:59.3 (07:13). Epicenter 17.8° N., 65.7° W., Puerto Rico region, at a depth of 56 km, mag. 4.6 (m_b). **Int. V.** Felt from San Juan south to Coamo and from Utuado east to Vieques Island.

INTENSITY V:

Naranjito.—Felt by, awakened, and frightened many. Windows rattled. Moderate earth noises. Trees and bushes shook. Hanging objects swung moderately. Small objects and furniture shifted.

Utuado.—Felt by and awakened all in

community; frightened many. Windows, doors, dishes, etc., rattled. Loud earth noises. Trees and bushes shook. Hanging objects swung north-south. Damage slight.

Vieques Island.—Felt by many; awakened few. Moderate earth noises. Hanging objects swung moderately. Small objects and furniture shifted. Damage slight.

INTENSITY IV:
Cayey and Coamo.

INTENSITY III:
Caguas and Morovis.

VIRGIN ISLANDS

No earthquakes were reported felt in 1972.

TABLE 1.—*Instrumentally determined locations of earthquakes and related phenomena that occurred in the United States during 1972*

Date	Origin time[1] G.M.T.	Geographic coordinates		Region and comments[2]	Depth
		N. lat.	W. long.		
	h m s	°	°		*km*
Jan. 1.....	11:27:36.6	66.5	144.8	Alaska. Mag. 3.7 m_b	33
1.....	18:45:20.7	62.3	151.2	Central Alaska	96
1.....	19:20:31.0	60.3	153.3	Southern Alaska	139
1.....	20:02:54.7	58.7	153.5	Kodiak Island region. Mag. 4.1 m_b	60
2.....	09:06:16.5*	60.1	152.8	Southern Alaska	143
2.....	18:16:28.0	59.3	153.8	Southern Alaska. Mag. 4.5 m_b	96
3.....	17:26:24.8	51.2	178.8 E.	Rat Islands, Aleutian Islands. Mag. 4.1 m_b	46
3.....	17:31:29.4	51.1	178.9 E.	Rat Islands, Aleutian Islands. Mag. 5.1 m_b	46
3.....	20:01:22.5	51.1	179.0 E.	Rat Islands, Aleutian Islands. Mag. 4.6 m_b	43
3.....	20:06:03.5	51.2	179.0 E.	Rat Islands, Aleutian Islands. Mag. 5.1 m_b	50
5.....	00:58:54.9	51.2	178.9 E.	Rat Islands, Aleutian Islands. Mag. 4.3 MS; 5.1 m_b	49
5.....	01:18:59.8	51.3	178.9 E.	Rat Islands, Aleutian Islands. Mag. 4.4 m_b	46
5.....	01:20:49.4*	51.1	178.7 E.	Rat Islands, Aleutian Islands. Mag. 4.3 m_b	42
5.....	08:04:12.0	60.0	153.1	Southern Alaska	128
6.....	13:17:26.9	67.4	155.1	Alaska	33
6.....	17:26:21.4*	51.0	178.6 E.	Rat Islands, Aleutian Islands. Mag. 4.0 m_b	26
7.....	04:08:24.0P	33.2	116.8	Southern California. Mag. 3.5, P	8
7.....	20:22:25.3*	51.0	175.7	Andreanof Islands, Aleutian Islands. Mag. 4.2 m_b	37
9.....	06:06:19.4*	60.5	152.4	Southern Alaska	103
10.....	02:17:49.8*	62.0	151.0	Central Alaska. Mag. 3.0 M_L	18
11.....	00:39:19.0	61.7	150.1	Southern Alaska	38
11.....	06:15:12.0P	33.8	116.4	Southern California. Mag. 3.0, P	8
11.....	07:03:47.8	61.2	147.2	Southern Alaska	71
13.....	00:12:39.3*	63.0	150.7	Central Alaska	132
14.....	17:37:37.4	63.1	151.0	....do	129
15.....	00:27:38.0	63.1	148.2	....do	102
15.....	09:35:44.8*	63.2	150.0	Central Alaska. Mag. 4.0 m_b	91
16.....	18:38:28.5*	53.2	167.7	Fox Islands, Aleutian Islands. Mag. 4.4 m_b	61
18.....	00:17:43.0	56.5	153.5	Kodiak Island region. Mag. 5.1 m_b	23
20.....	07:48:46.2*	51.8	175.2	Andreanof Islands, Aleutian Islands. Mag. 4.0 m_b	33
20.....	09:24:23.2	60.7	153.2	Southern Alaska. Mag. 4.6 m_b	138
20.....	17:00:45.9	63.1	150.7	Central Alaska. Mag. 3.9 m_b	104
23.....	08:53:22.2	58.3	151.7	Kodiak Island region. Mag. 4.5 M_L; 4.6 m_b	34
24.....	13:30:53.9	36.7	115.5	California–Nevada border region. Mag. 3.4 M_L	10
24.....	17:25:13.1	55.3	159.5	Alaska Peninsula. Mag. 4.8 m_b	28
24.....	19:04:55.9*	59.6	151.4	Kenai Peninsula. Mag. 4.0 m_b	83
26.....	02:57:20.7*	37.5	118.3	California–Nevada border region	10
26.....	16:13:07.6*	59.7	152.6	Southern Alaska	119
26.....	17:47:57.7	63.5	151.2	Central Alaska. Mag. 3.3 M_L	33

See footnotes at end of table.

TABLE 1.—*Instrumentally determined locations of earthquakes and related phenomena that occurred in the United States during 1972*—Continued

Date	Origin time[1] G.M.T.	Geographic coordinates		Region and comments[2]	Depth
		N. lat.	W. long.		
	h m s	°	°		*km*
Jan. 28	12:50:54.4*	60.4	153.5	Southern Alaska. Mag. 3.1 M_L	33
28	13:19:24.3	61.6	147.6	do	19
28	17:00:21.9P	34.3	116.1	Southern California. Mag. 3.9, P	10
29	10:12:23.4P	33.9	116.3	do	10
29	10:57:05.6P	33.9	116.3	Southern California. Mag. 3.3, P	10
29	19:07:47.8*	35.8	121.3	Central California. Mag. 3.1, B	13
30	20:06:55.4*	61.4	151.8	Southern Alaska	118
30	21:41:17.2	63.3	150.9	Central Alaska. Mag. 3.2 M_L	33
31	05:23:43.0	60.9	147.3	Southern Alaska. Mag. 3.1 M_L	24
31	05:50:54.7	52.5	170.6	Fox Islands, Aleutian Islands. Mag. 4.7 m_b	52
Feb. 2	09:29:38.3*	50.3	178.6	Andreanof Islands, Aleutian Islands. Mag. 4.3 m_b	38
2	11:28:42.7*	66.3	157.4	Alaska. Mag. 4.3 m_b	33
3	04:16:04.6	63.1	149.3	Central Alaska	88
4	08:35:43.6	60.9	152.1	Southern Alaska	116
5	03:07:36.7*	60.3	153.6	Southern Alaska. Mag. 4.6 m_b	142
6	00:22:34.7	51.2	179.3	Andreanof Islands, Aleutian Islands. Mag. 4.5 m_b	43
6	00:30:44.7	51.2	179.3	Andreanof Islands, Aleutian Islands. Mag. 4.8 m_b	45
6	02:12:54.6	51.1	179.3	Andreanof Islands, Aleutian Islands. Mag. 4.2 m_b	45
6	17:41:52.5	51.7	174.3 E.	Near Islands, Aleutian Islands. Mag. 4.9 m_b	33
7	17:18:05.0*	61.3	147.3	Southern Alaska. Mag. 3.4 M_L	33
8	22:33:31.3	63.0	151.0	Central Alaska	160
8	23:30:01.2*	60.0	148.0	Kenai Peninsula, Alaska. Mag. 3.5 m_b	33
10	20:01:28.1*	59.7	153.4	Southern Alaska	143
11	02:16:08.2*	61.9	150.1	do	54
12	14:09:41.5*	52.1	170.2	Fox Islands, Aleutian Islands. Mag. 4.2 m_b	56
12	21:53:01.6*	64.6	147.0	Central Alaska	36
12	22:14:37.3*	59.9	148.6	Kenai Peninsula, Alaska. Mag. 3.8 m_b	50
13	02:18:27.9*	58.9	148.8	Gulf of Alaska. Mag. 3.5 M_L	33
13	05:37:58.6*	64.1	150.1	Central Alaska	98
13	17:55:41.5	52.8	161.5	South of Alaska. Mag. 5.0 m_b	33
13	23:17:32.4	51.7	176.3 E.	Rat Islands, Aleutian Islands. Mag. 4.1 m_b	39
15	02:58:05.3	52.4	173.1 E.	Near Islands, Aleutian Islands. Mag. 4.3 m_b	38
15	14:33:22.0*	65.5	147.9	Alaska. Mag. 3.7 M_L	8
16	16:57:13.0*	59.5	152.9	Southern Alaska	112
16	21:04:07.4	52.2	171.1	Fox Islands, Aleutian Islands. Mag. 4.8 m_b	48
17	02:02:53.0	52.2	171.0	do	44
17	19:02:03.6	37.1	116.1	Southern Nevada. Mag. 4.6 m_b	33
18	11:43:38.1*	44.3	105.1	Wyoming. Mag. 4.3 m_b	5
19	19:23:15.9*	60.0	152.4	Southern Alaska	102
21	13:40:19.7*	38.6	115.7	Nevada	10
22	05:27:12.7B	36.5	121.1	Central California. Mag. 3.5, B	4
22	05:41:58.3B	36.5	121.1	Central California. Mag. 3.6, B	5
23	11:35:57.0	51.6	172.2 E.	Near Islands, Aleutian Islands. Mag. 4.7 m_b	33
23	15:49:05.5*	40.2	117.5	Nevada	10
27	13:49:15.5	59.2	151.6	Kenai Peninsula, Alaska. Mag. 4.0 m_b	50
29	07:32:45.6	63.2	150.5	Central Alaska. Mag. 3.7 m_b	118
29	20:15:02.0*	60.4	150.9	Kenai Peninsula, Alaska	75
Mar. 1	11:39:58.7B	36.5	121.1	Central California. Mag. 3.8, B	6
1	11:52:23.3*	61.1	148.2	Southern Alaska. Mag. 3.0 M_L	16
1	12:44:39.1B	35.7	121.5	Central California. Mag. 3.8, B	3
1	13:54:57.8	51.8	177.0 E.	Rat Islands, Aleutian Islands. Mag. 3.9 m_b	79

See footnotes at end of table.

TABLE 1.—*Instrumentally determined locations of earthquakes and related phenomena that occurred in the United States during 1972*—Continued

Date	Origin time[1] G.M.T.	Geographic coordinates		Region and comments[2]	Depth
		N. lat.	W. long.		
	h m s	°	°		*km*
Mar. 1.....	16:12:23.8B	36.6	121.2	Central California. Mag. 3.5, B.....	7
1.....	20:38:28.3*	59.6	152.8	Southern Alaska. Mag. 4.6 m_b.....	101
4.....	23:35:19.6*	51.6	176.9	Andreanof Islands, Aleutian Islands. Mag. 4.3 m_b..	56
5.....	03:03:37.0	51.3	170.9	Fox Islands, Aleutian Islands. Mag. 5.2 m_b.....	33
5.....	12:55:45.3*	51.3	178.3	Andreanof Islands, Aleutian Islands. Mag. 4.3 m_b..	51
5.....	17:54:29.2*	53.2	163.7	Unimak Island region. Mag. 4.2 m_b.....	33
6.....	16:44:37.5*	60.2	153.4	Southern Alaska.....	131
6.....	19:17:31.3*	66.3	157.4	Alaska. Mag. 4.1 m_b.....	64
8.....	06:15:38.9	52.7	166.2	Fox Islands, Aleutian Islands. Mag. 4.8 m_b.....	47
8	15:22:58.8	54.5	162.6	Alaska Peninsula. Mag. 4.9 m_b.....	20
9.....	11:48:37.7	53.0	166.8	Fox Islands, Aleutian Islands. Mag. 4.6 m_b.....	42
9.....	15:29:31.8	52.7	169.4	Fox Islands, Aleutian Islands. Mag. 4.7 m_b.....	50
9.....	18:45:00.0E	32.8	110.5	Eastern Arizona. Mag. 4.5 m_b.....	0
11.....	19:51:02.8*	63.1	149.3	Central Alaska. Mag. 3.0 M_L.....	33
12.....	05:56:18.7*	58.9	136.9	Southeastern Alaska. Mag. 4.2 m_b.....	29
12.....	09:08:58.1	61.2	147.2	Southern Alaska. Mag. 2.8 M_L.....	29
12.....	13:01:18.4	64.1	148.4	Central Alaska. Mag. 4.2 m_b.....	124
12.....	15:00:24.5	61.6	147.7	Southern Alaska.....	43
13.....	01:17:30.5	61.0	146.1	.....do.....	47
14.....	05:43:29.4	63.1	149.4	Central Alaska.....	94
15.....	06:45:33.4	65.6	149.9	Alaska. Mag. 3.3 M_L.....	19
15.....	11:23:08.7	51.6	176.8 E.	Rat Islands, Aleutian Islands. Mag. 4.9 M_S; 5.4 m_b.	39
15.....	13:48:04.9*	51.2	178.9	Andreanof Islands, Aleutian Islands. Mag. 4.1 m_b..	37
15	20:30:16.7	48.7	115.8	Montana.....	5
17.....	12:28:41.5	53.0	165.6	Fox Islands, Aleutian Islands. Mag. 5.1 m_b.....	26
17.....	13:32:13.6	64.6	147.5	Central Alaska.....	5
18.....	04:49:52.8	51.0	179.8	Andreanof Islands, Aleutian Islands. Mag. 4.2 m_b..	43
21.....	00:55:33.5*	51.0	179.2	.....do.....	30
21.....	12:46:20.2*	51.2	179.2	Andreanof Islands, Aleutian Islands. Mag. 4.0 m_b..	36
21.....	15:48:29.1*	60.3	150.9	Kenai Peninsula, Alaska.....	84
21.....	18:07:29.0	51.0	179.1	Andreanof Islands, Aleutian Islands. Mag. 3.7 m_b..	30
22.....	23:18:04.9*	57.3	150.0	Gulf of Alaska. Mag. 3.6 M_L.....	33
23.....	04:24:01.8*	57.3	152.4	Kodiak Island region. Mag. 3.4 m_b.....	65
23.....	08:07:33.0*	59.6	153.0	Southern Alaska.....	143
23.....	15:47:39.2*	51.1	179.3	Andreanof Islands, Aleutian Islands. Mag. 3.9 m_b..	29
23.....	21:25:40.3*	42.7	126.2	Off coast of Oregon. Mag. 4.9 m_b.....	33
24	02:50:25.4*	42.7	126.3	Off coast of Oregon. Mag. 4.8 m_b.....	33
24.....	06:42:22.2*	59.5	150.1	Kenai Peninsula, Alaska. Mag. 3.0 M_L; 3.8 m_b.....	34
25.....	02:27:37.9P	32.8	116.1	California–Mexico border region. Mag. 3.7, P.....	10
25.....	02:45:49.3*	40.6	117.2	Nevada.....	14
25.....	13:41:36.3*	37.3	116.4	Southern Nevada.....	10
26.....	20:08:03.8	60.9	147.5	Southern Alaska. Mag. 3.3 m_b.....	47
27.....	07:50:20.5*	35.3	118.6	Central California. Mag. 3.3, P.....	7
27.....	09:18:47.0	56.0	161.9	Alaska Peninsula. Mag. 4.6 m_b.....	152
28.....	02:19:44.8	51.2	179.2	Andreanof Islands, Aleutian Islands. Mag. 4.5 m_b..	39
28.....	10:13:53.3	64.7	150.2	Central Alaska.....	48
28.....	13:11:17.0	63.8	148.9	.....do.....	119
28.....	19:38:35.5	59.8	153.4	Southern Alaska. Mag. 4.3 M_L.....	34
28.....	20:53:06.2	54.0	163.4	Unimak Island region. Mag. 4.8 m_b.....	25
29.....	15:38:51.2*	63.1	151.0	Central Alaska.....	141
29.....	21:00:43.4*	59.9	153.1	Southern Alaska. Mag. 5.1 m_b.....	126

See footnotes at end of table.

TABLE 1.—*Instrumentally determined locations of earthquakes and related phenomena that occurred in the United States during 1972*—Continued

Date	Origin time[1] G.M.T.	Geographic coordinates N. lat.	W. long.	Region and comments[2]	Depth
	h m s	°	°		*km*
Mar.30.....	14:25:15.0	62.7	149.8	Central Alaska. Mag. 3.5 M_L	25
30.....	16:08:48.3*	63.2	148.9	Central Alaska	92
30.....	21:00:01.2*	37.0	116.0	Southern Nevada. Mag. 4.6 m_b	10
Apr. 1.....	23:55:15.7P	33.9	116.4	Southern California. Mag. 3.3, P	10
2.....	06:44:57.4P	35.5	117.5	Central California	10
2.....	13:08:18.1	60.1	153.6	Southern Alaska. Mag. 4.9 m_b	123
4.....	05:03:02.0P	34.4	119.5	Southern California. Mag. 3.1, P	8
5.....	05:53:31.7P	33.7	115.7	Southern California. Mag. 3.0, P	10
5.....	09:24:57.1P	33.7	115.7	.....do	10
5.....	14:13:41.3P	33.7	115.7	Southern California. Mag. 3.2, P	10
5.....	19:52:52.7P	33.6	115.7	Southern California. Mag. 3.1, P	7
6.....	06:01:15.7P	33.6	115.7	Southern California. Mag. 3.0, P	7
6	22:40:42.4	54.8	162.8	Alaska Peninsula. Mag. 4.7 m_b	33
8.....	06:24:13.7	42.6	126.3	Off coast of Oregon. Mag. 5.6, B	11
8.....	11:28:57.3	62.9	151.3	Central Alaska	136
8.....	19:44:46.1*	66.2	148.3	Alaska	53
9.....	01:10:10.0	42.7	126.3	Off coast of Oregon. Mag. 4.7 m_b	33
9.....	16:54:19.5	64.0	151.1	Central Alaska. Mag. 3.9 m_b	68
9.....	18:05:57.0	64.0	151.1	Central Alaska. Mag. 3.8 m_b	46
11.....	02:35:54.9	62.5	151.0	Central Alaska	87
11.....	08:20:09.5	62.6	151.3	.....do	87
11.....	13:55:05.0*	58.3	151.5	Kodiak Island region	85
11.....	15:26:43.4*	55.2	156.6	South of Alaska. Mag. 4.0 m_b	16
11.....	18:21:35.5	62.0	150.4	Central Alaska. Mag. 4.2 M_L; 4.5 m_b	18
13.....	16:59:03.8	61.3	151.1	Southern Alaska. Mag. 3.0 M_L	33
14.....	20:00:58.3	34.1	116.4	Southern California. Mag. 4.2, P	10
17.....	01:27:11.5	51.3	179.3	Andreanof Islands, Aleutian Islands. Mag. 4.5 m_b	47
17.....	02:29:52.3	60.9	144.9	Southern Alaska. Mag. 3.8 m_b	41
17.....	05:04:50.5	51.3	179.0	Andreanof Islands, Aleutian Islands. Mag. 4.8 m_b	44
17.....	06:24:21.3P	34.2	116.7	Southern California. Mag. 3.0, P	10
17.....	14:38:56.9*	44.6	129.5	Off coast of Oregon. Mag. 4.8 MS; 5.0 m_b	33
17.....	23:29:33.2*	44.7	129.5	Off coast of Oregon. Mag. 4.6 m_b	33
18.....	14:14:06.6	52.7	175.5 E.	Rat Islands, Aleutian Islands. Mag. 4.5 m_b	136
19.....	03:33:36.2*	58.4	156.3	Alaska Peninsula. Mag. 3.8 m_b	136
19.....	12:46:41.2	60.2	147.3	Southern Alaska	83
19.....	16:32:00.0A	37.1	116.1	Southern Neveda. Nevada Test Site. Mag. 4.6 m_b	0
20.....	11:47:39.9	66.3	147.7	Alaska	17
20.....	12:07:32.3*	65.3	150.7	....do	65
20.....	17:27:13.5*	59.9	153.6	Southern Alaska. Mag. 4.5 m_b	138
22.....	07:19:44.5*	62.5	151.0	Central Alaska	51
25.....	02:26:31.3P	32.8	117.7	California–Mexico border region. Mag. 3.5, P	8
25.....	08:03:39.6	60.9	147.1	Southern Alaska	75
26.....	18:14:40.2	54.1	163.2	Unimak Island region. Mag. 4.4 m_b	22
27.....	10:44:59.9*	62.7	149.7	Central Alaska	49
28.....	17:13:14.6*	61.3	146.8	Southern Alaska	66
28.....	19:05:15.3	63.6	149.9	Central Alaska. Mag. 4.7 m_b	131
May 2....	19:15:01.8	37.2	116.2	Southern Nevada. Mag. 5.0 m_b	20
3.....	00:29:53.0	41.5	125.6	Off coast of northern California. Mag. 4.0, B	33
3.....	07:41:31.2*	51.0	179.3	Andreanof Islands, Aleutian Islands. Mag. 3.8 m_b	30
3.....	22:11:47.4*	51.0	179.3	Andreanof Islands, Aleutian Islands	31
4.....	06:32:21.4	60.1	152.8	Southern Alaska. Mag. 4.5 M_L	84

See footnotes at end of table.

TABLE 1.—*Instrumentally determined locations of earthquakes and related phenomena that occurred in the United States during 1972*—Continued

Date	Origin time[1] G.M.T.	Geographic coordinates		Region and comments[2]	Depth
		N. lat.	W. long.		
	h m s	°	°		*km*
May 4.....	09:58:38.8	62.2	151.0	Central Alaska. Mag. 3.1 M_L	33
6.....	04:59:49.4	64.3	149.8	Central Alaska	8
7.....	00:50:22.7	61.6	151.2	Southern Alaska. Mag. 3.0 M_L	33
7.....	09:15:11.5	61.1	152.2	Southern Alaska	97
8.....	05:38:05.7*	58.8	152.9	Kodiak Island region	50
8.....	14:41:07.4*	62.4	149.4	Central Alaska	97
8.....	21:49:15.2	63.1	150.8	.....do	136
12.....	08:39:21.8*	60.1	153.0	Southern Alaska	127
13.....	02:54:09.9*	37.4	118.6	California–Nevada border region. Mag. 3.8, B	5
14.....	01:10:04.8	65.5	150.0	Alaska. Mag. 4.5 M_L	9
14.....	03:58:06.5*	62.4	151.1	Central Alaska	93
14.....	09:39:55.0	61.9	150.3	Southern Alaska. Mag. 3.8 m_b	57
14.....	19:34:24.2	51.2	179.2	Andreanof Islands, Aleutian Islands. Mag. 5.0 M_S	46
14.....	21:00:49.4	51.2	179.3	Andreanof Islands, Aleutian Islands. Mag. 4.4 m_b	47
15.....	01:27:46.7*	51.2	179.8 E.	Rat Islands, Aleutian Islands. Mag. 4.0 m_b	29
15	13:37:34.9	51.1	179.2	Andreanof Islands, Aleutian Islands. Mag. 4.3 m_b	48
16.....	18:45:10.6	62.0	147.1	Central Alaska	55
17.....	14:10:00.2A	37.1	116.1	Southern Nevada. Nevada Test Site. Mag. 4.4 m_b	0
18.....	11:41:18.7	59.2	152.5	Southern Alaska	107
19.....	17:00:00.0A	37.1	116.0	Southern Nevada. Nevada Test Site. Mag. 4.9 m_b	0
19.....	22:36:48.6	59.6	152.9	Southern Alaska	100
20.....	21:26:07.2	53.5	160.0	South of Alaska. Mag. 5.2 m_b	33
23.....	18:18:24.6	59.9	148.0	Kenai Peninsula, Alaska. Mag. 3.5 m_b	16
24.....	12:05:36.5	61.5	149.5	Southern Alaska	31
26.....	05:35:46.4*	52.3	178.9	Andreanof Islands, Aleutian Islands. Mag. 3.6 m_b	220
27.....	01:16:56.6*	60.1	152.7	Southern Alaska	119
27.....	13:29:51.5	63.1	150.8	Central Alaska	139
30.....	00:55:34.1	60.4	152.2	Southern Alaska. Mag. 3.2 M_L	73
31.....	23:45:52.2	60.0	152.8	Southern Alaska	127
June 1.....	03:08:25.1	51.0	169.6	Fox Islands, Aleutian Islands. Mag. 5.0 m_b	33
2.....	21:46:47.0	51.8	174.6	Andreanof Islands, Aleutian Islands. Mag. 4.9 m_b	50
3.....	15:36:56.0*	51.3	174.6	Andreanof Islands, Aleutian Islands. Mag. 4.0 m_b	48
7.....	09:11:40.3*	51.1	178.7	Andreanof Islands, Aleutian Islands. Mag. 3.6 m_b	34
7.....	14:35:20.2	43.7	128.8	Off coast of Oregon. Mag. 4.6 m_b	33
8.....	06:13:20.5	51.1	169.5	Fox Islands, Aleutian Islands. Mag. 4.6 m_b	33
8.....	06:56:48.3	51.3	180.0	Andreanof Islands, Aleutian Islands. Mag. 4.2 m_b	44
9.....	02:52:07.2	51.7	176.8	Andreanof Islands, Aleutian Islands. Mag. 4.5 m_b	63
9.....	03:48:36.3*	65.5	150.4	Alaska	68
10.....	22:35:46.9	58.8	149.8	Gulf of Alaska. Mag. 4.0 M_L	33
10.....	22:50:35.9	59.9	152.6	Southern Alaska. Mag. 4.5 m_b	114
11.....	14:03:50.7*	60.2	152.6	Southern Alaska. Mag. 3.4 m_b	104
12.....	03:57:18.3P	33.7	116.7	Southern California. Mag. 3.3, P	10
13.....	08:47:02.6P	35.6	117.5	Central California. Mag. 3.7, P	10
13.....	10:25:31.5*	53.2	166.6	Fox Islands, Aleutian Islands. Mag. 4.4 m_b	33
14.....	13:38:23.0P	34.8	118.9	Southern California. Mag. 3.0, P	10
16.....	01:49:16.6	59.3	152.4	Southern Alaska	85
17.....	05:16:21.9*	54.4	161.4	Alaska Peninsula. Mag. 4.1 m_b	40
17.....	17:33:25.1	63.0	150.4	Central Alaska	135
18.....	12:09:06.2	62.4	153.1	Central Alaska. Mag. 4.9 M_S; 4.6 M_L	17
18.....	17:02:55.5	62.4	153.2	Central Alaska. Mag. 3.6 M_L	32
19.....	15:12:50.8	49.9	173.6	Aleutian Islands region. Mag. 4.7 M_S	33

See footnotes at end of table.

TABLE 1.—*Instrumentally determined locations of earthquakes and related phenomena that occurred in the United States during 1972*—Continued

Date	Origin time[1] G.M.T.	Geographic coordinates		Region and comments[2]	Depth
		N. lat.	W. long.		
	h m s	°	°		*km*
June 20	03:58:56.9	62.0	148.5	Central Alaska	44
20	04:15:53.9	59.6	153.6	Southern Alaska. Mag. 5.1 M_L	98
21	21:37:02.0*	59.5	152.6	Southern Alaska	92
22	04:39:41.7*	44.6	110.1	Yellowstone National Park, Wyo. Mag. 3.9 m_b	10
22	19:21:30.1P	33.5	116.4	Southern California. Mag. 3.2, P	10
22	22:02:00.7P	33.2	116.1	Southern California. Mag. 3.0, P	10
23	07:51:33.2	64.3	152.5	Central Alaska	77
23	08:01:06.6	60.4	147.8	Southern Alaska. Mag. 3.1 M_L	34
23	14:12:23.5	53.9	165.5	Fox Islands, Aleutian Islands. Mag. 4.4 MS ;5.0 m_b	23
24	17:52:37.8*	44.6	129.3	Off coast of Oregon. Mag. 4.4 m_b	33
26	06:13:21.8P	35.7	117.7	Central California. Mag. 3.2, P	10
26	07:51:25.1	63.1	151.0	Central Alaska. Mag. 3.1 m_b	134
26	09:21:14.9P	35.7	117.7	Central California. Mag. 3.2, P	10
26	20:06:51.7*	38.0	112.8	Utah	5
28	05:29:09.9P	35.8	117.6	Central California. Mag. 3.7, P	10
28	16:20:04.0*	37.1	116.1	Southern Nevada	33
29	06:41:09.3P	34.3	117.0	Southern California. Mag. 3.4, P	10
29	08:31:44.9*	19.2	65.0	Puerto Rico region. Mag. 4.2 m_b	41
30	09:25:45.7	59.6	151.7	Kenai Peninsula, Alaska. Mag. 3.4 m_b	91
30	14:36:36.7*	51.5	177.0	Andreanof Islands, Aleutian Islands. Mag. 4.3 m_b	51
July 1	07:02:36.0	59.8	151.9	Kenai Peninsula, Alaska. Mag. 3.4 m_b	99
1	14:19:18.2	62.9	150.8	Central Alaska	122
1	23:45:35.1*	37.1	113.6	Utah	5
2	14:34:19.7	37.3	113.8	.....do	5
2	15:55:34.4	51.4	178.2	Andreanof Islands, Aleutian Islands. Mag. 4.2 m_b	59
2	20:07:00.6	37.3	113.8	Utah	5
4	04:06:22.1*	58.4	155.8	Alaska Peninsula	177
4	08:20:03.9P	35.8	117.6	Central California. Mag. 3.7, P; 4.7, B	10
4	08:37:16.5P	35.8	117.7	Central California. Mag. 3.5, P	10
4	20:47:52.0*	59.9	153.6	Southern Alaska	146
5	15:40:28.1	51.4	179.0	Andreanof Islands, Aleutian Islands. Mag. 4.6 m_b	50
5	16:17:57.5*	61.6	151.7	Southern Alaska	95
7	01:08:24.3	60.1	153.3	.....do	162
7	06:58:45.9*	56.8	152.8	Kodiak Island region. Mag. 4.0 m_b	65
7	13:28:01.1*	57.5	155.0	Alaska Peninsula. Mag. 3.8 m_b	61
8	07:30:11.6*	36.8	115.3	California–Nevada border region	7
8	10:25:49.7*	24.2	108.8	Gulf of California. Mag. 4.3 m_b	33
9	16:11:29.5	52.2	179.1 E.	Rat Islands, Aleutian Islands. Mag. 3.7 m_b	183
9	23:42:53.6	60.0	152.7	Southern Alaska. Mag. 3.5 m_b	90
10	23:44:11.8	60.2	151.1	Kenai Peninsula, Alaska. Mag. 3.2 m_b	77
11	03:33:47.4	62.8	150.7	Central Alaska	117
11	20:28:17.8	62.1	149.9	.....do	70
12	20:20:15.5	59.6	146.0	Gulf of Alaska. Mag. 3.6 M_L	33
13	07:41:20.8	62.8	149.4	Central Alaska	95
13	14:12:17.3*	60.1	153.2	Southern Alaska	123
13	22:28:39.4*	52.3	172.8 E.	Near Islands, Aleutian Islands. Mag. 4.2 m_b	34
13	23:43:41.1*	51.6	173.9	Andreanof Islands, Aleutian Islands. Mag. 4.1 m_b	26
14	12:41:25.4*	60.4	153.0	Southern Alaska	116
15	01:43:40.1*	51.3	178.1	Andreanof Islands, Aleutian Islands. Mag. 4.1 m_b	46
15	10:35:34.6	60.5	148.1	Kenai Peninsula, Alaska. Mag. 3.0 m_b	41
16	08:24:15.5*	60.2	152.9	Southern Alaska	121

See footnotes at end of table.

TABLE 1.—*Instrumentally determined locations of earthquakes and related phenomena that occurred in the United States during 1972*—Continued

Date	Origin time[1] G.M.T.	Geographic coordinates		Region and comments[2]	Depth
		N. lat.	W. long.		
	h m s	°	°		*km*
July 16.....	16:36:34.5*	58.4	154.3	Alaska Peninsula. Mag. 5.2 m_b.....	33
17.....	06:20:03.2	51.3	176.9	Andreanof Islands, Aleutian Islands. Mag. 4.0 m_b..	59
18.....	09:35:13.6	59.7	154.6	Southern Alaska. Mag. 3.8 m_b.....	180
19.....	03:37:05.0P	33.5	116.6	Southern California.....	10
19.....	09:36:20.4*	61.7	150.4	Southern Alaska.....	51
19.....	23:03:41.3B	36.6	121.2	Central California. Mag. 3.1, B.....	6
20.....	04:04:10.2*	59.8	152.9	Southern Alaska.....	89
20.....	17:16:00.2A	37.2	116.2	Southern Nevada. Nevada Test Site. Mag. 5.0 m_b..	0
23.....	02:18:21.5	62.1	149.9	Central Alaska.....	34
23.....	02:34:24.4	62.5	149.4	Central Alaska. Mag. 3.0 m_b.....	72
23.....	15:44:05.4*	59.4	151.2	Kenai Peninsula, Alaska.....	56
24.....	01:30:01.1	60.0	152.8	Southern Alaska. Mag. 3.5 m_b.....	88
24.....	19:02:45.2	53.2	166.7	Fox Islands, Aleutian Islands. Mag. 4.6 m_b.....	46
25.....	02:30:12.2*	63.4	147.5	Central Alaska.....	6
25.....	13:30:03.1*	36.9	116.0	California–Nevada border region. Mag. 4.0 m_b.....	33
25.....	20:40:58.9*	50.9	176.7	Andreanof Islands, Aleutian Islands. Mag. 4.0 m_b..	24
26.....	18:00:38.4*	59.9	148.9	Kenai Peninsula, Alaska.....	72
27.....	01:12:04.0P	34.8	118.9	Southern California. Mag. 3.2, P.....	8
27.....	02:24:58.1	62.8	149.4	Central Alaska.....	6
27.....	03:53:19.5P	34.8	118.9	Southern California. Mag. 3.1, P.....	8
27.....	06:07:28.1*	58.2	155.2	Alaska Peninsula. Mag. 3.8 m_b.....	97
27.....	20:44:40.4*	63.7	149.4	Central Alaska.....	111
27.....	21:04:21.2*	60.1	147.6	Southern Alaska. Mag. 3.3 M_L.....	34
28.....	16:25:38.1	50.1	178.3 E.	Rat Islands, Aleutian Islands. Mag. 4.4 m_b.....	6
29.....	01:18:51.0P	33.2	116.8	Southern California. Mag. 3.0, P.....	10
29.....	04:45:00.8P	35.8	117.6	Central California.....	8
29.....	18:54:46.7	52.4	169.6	Fox Islands, Aleutian Islands. Mag. 4.6 m_b.....	40
29.....	23:54:08.3	37.1	116.2	Southern Nevada.....	5
30.....	04:49:27.5	51.8	176.5 E.	Rat Islands, Aleutian Islands. Mag. 4.0 M_S; 5.1 m_b.	46
30.....	06:40:06.4*	37.4	115.0	Southern Nevada.....	5
30.....	06:41:45.2*	37.4	115.0	.....do.....	5
30.....	09:04:37.4*	37.4	115.0	.....do.....	5
30.....	14:09:54.6P	35.8	117.6	Central California. Mag. 3.0, P.....	8
30.....	19:02:14.5P	35.8	117.6	Central California. Mag. 3.4, P.....	1
31.....	16:03:30.6*	60.2	153.1	Southern Alaska.....	121
31.....	21:51:49.3*	60.0	153.6	.....do.....	101
Aug. 1.....	09:20:01.0P	34.4	117.0	Southern California. Mag. 3.3, P.....	10
1.....	12:59:20.8	52.5	173.5	Andreanof Islands, Aleutian Islands. Mag. 4.1 m_b..	63
1.....	14:00:09.8	65.0	148.7	Alaska. Mag. 3.0 M_L.....	7
2.....	15:06:33.0*	63.1	151.1	Central Alaska.....	145
3.....	00:09:54.3	61.8	150.8	Southern Alaska. Mag. 3.4 m_b.....	62
3.....	05:06:50.5	50.9	178.3	Andreanof Islands, Aleutian Islands. Mag. 4.2 m_b..	33
3.....	05:13:12.0	51.2	178.0	Andreanof Islands, Aleutian Islands. Mag. 4.4 m_b..	40
5.....	08:27:06.2*	51.2	178.0	Andreanof Islands, Aleutian Islands. Mag. 4.3 m_b..	50
6.....	22:06:16.5	60.1	149.3	Kenai Peninsula, Alaska. Mag. 3.4 m_b.....	33
7.....	10:17:50.1P	34.2	119.4	Southern California. Mag. 3.3, P.....	10
8.....	05:10:13.3	64.5	150.6	Central Alaska. Mag. 3.0 M_L.....	34
8.....	09:05:59.9*	52.0	173.6	Andreanof Islands, Aleutian Islands. Mag. 4.0 m_b..	38
8.....	15:28:35.0*	60.0	152.6	Southern Alaska.....	125
12.....	02:00:37.6*	61.5	149.9	Southern Alaska. Mag. 3.6 m_b.....	46
12.....	11:18:08.9	64.6	153.5	Central Alaska.....	22

See footnotes at end of table.

TABLE 1.—*Instrumentally determined locations of earthquakes and related phenomena that occurred in the United States during 1972*—Continued

Date	Origin time[1] G.M.T.	Geographic coordinates		Region and comments[2]	Depth
		N. lat.	W. long.		
	h m s	°	°		*km*
Aug. 12	11:20:28.0*	51.1	179.3	Andreanof Islands, Aleutian Islands. Mag. 4.1 m_b	43
12	12:34:20.4	53.8	164.8	Unimak Island region. Mag. 4.6 MS; 5.0 m_b	33
13	02:30:09.9*	57.8	143.3	Gulf of Alaska	33
13	02:30:37.4*	59.5	144.5	Gulf of Alaska. Mag. 4.6 m_b	33
13	11:10:49.1	62.0	150.5	Central Alaska. Mag. 3.3 m_b	66
13	13:50:41.7	63.2	150.7	Central Alaska. Mag. 3.8 m_b	132
17	13:48:02.3	59.4	152.6	Southern Alaska. Mag. 3.7 m_b	64
17	14:27:38.2*	43.9	128.0	Off coast of Oregon. Mag. 4.6 m_b	33
18	14:11:18.4*	60.3	153.3	Southern Alaska. Mag. 3.4 m_b	115
18	17:04:59.9*	60.7	151.8	Kenai Peninsula, Alaska. Mag. 3.4 m_b	53
19	06:27:36.3*	59.1	153.4	Southern Alaska. Mag. 4.2 m_b	76
21	00:57:58.4*	62.5	151.3	Central Alaska. Mag. 3.5 m_b	90
22	04:05:36.7	51.3	178.4	Andreanof Islands, Aleutian Islands. Mag. 4.6 m_b	52
22	06:09:41.1	59.9	152.2	Southern Alaska. Mag. 4.4 m_b	71
23	05:57:02.7*	61.4	141.4	Southern Alaska. Mag. 3.5 m_b	54
23	09:53:52.9*	67.7	147.5	Alaska. Mag. 3.5 m_b	48
24	13:10:34.4	63.3	151.1	Central Alaska. Mag. 3.6 M_L	14
25	03:28:31.6*	37.2	116.1	Southern Nevada	5
25	07:06:49.7	61.7	150.8	Southern Alaska	74
25	09:39:09.6	60.8	147.5	Southern Alaska. Mag. 3.2 M_L	41
26	03:17:01.5	51.1	179.3	Andreanof Islands, Aleutian Islands. Mag. 3.8 m_b	32
26	11:38:09.8	52.5	170.6	Fox Islands, Aleutian Islands. Mag. 4.7 m_b	52
26	12:43:18.5*	59.9	153.2	Southern Alaska	103
26	18:05:01.4*	43.2	127.4	Off coast of Oregon. Mag. 4.4 MS; 4.9 m_b	33
27	04:54:38.2	65.2	150.8	Alaska. Mag. 2.9 M_L	29
27	10:10:51.7*	50.9	178.1	Andreanof Islands, Aleutian Islands. Mag. 3.9 m_b	30
28	01:53:08.0	63.4	150.6	Central Alaska. Mag. 3.0 M_L	7
28	15:44:01.5	51.0	179.2	Andreanof Islands, Aleutian Islands. Mag. 3.9 m_b	34
28	16:04:12.0	51.0	179.3	Andreanof Islands, Aleutian Islands. Mag. 3.8 m_b	34
28	16:07:20.8	51.0	179.3	Andreanof Islands, Aleutian Islands. Mag. 3.7 m_b	31
28	20:02:25.3*	51.0	179.2	Andreanof Islands, Aleutian Islands	35
31	15:33:55.5*	59.8	151.8	Kenai Peninsula, Alaska	89
31	21:25:20.1	60.5	152.2	Southern Alaska	102
Sept. 2	03:38:30.8*	61.0	147.1	.....do	83
3	01:10:58.4	62.9	150.1	Central Alaska	86
3	10:22:41.6	60.4	147.4	Southern Alaska	75
3	11:38:07.8	60.4	147.4	.....do	74
3	14:25:19.0	63.2	150.6	Central Alaska	127
3	14:57:34.6	59.7	149.1	Kenai Peninsula, Alaska. Mag. 3.3 M_L	33
5	01:22:08.1*	51.3	177.3	Andreanof Islands, Aleutian Islands. Mag. 3.8 m_b	33
5	01:25:46.6*	51.3	178.6 E.	Rat Islands, Aleutian Islands. Mag. 3.5 m_b	57
5	19:43:15.7	52.4	169.5	Fox Islands, Aleutian Islands. Mag. 4.4 m_b	37
6	01:55:09.2*	51.2	178.6	Andreanof Islands, Aleutian Islands. Mag. 3.7 m_b	30
6	02:29:23.4*	63.0	149.9	Central Alaska	94
6	07:40:19.2	51.4	179.3 E.	Rat Islands, Aleutian Islands. Mag. 4.2 m_b	64
6	11:55:33.8	61.7	150.1	Southern Alaska	71
7	09:05:38.9	55.2	160.6	Alaska Peninsula. Mag. 4.1 m_b	69
8	06:13:59.8	62.9	150.7	Central Alaska	98
8	15:24:04.1	61.1	152.1	Southern Alaska. Mag. 3.7 m_b	104
8	21:36:19.8*	59.7	152.2	Southern Alaska	101
9	00:26:09.5*	63.6	145.3	Central Alaska. Mag. 3.7 M_L	33

See footnotes at end of table.

TABLE 1.—*Instrumentally determined locations of earthquakes and related phenomena that occurred in the United States during 1972*—Continued

Date	Origin time[1] G.M.T.	Geographic coordinates		Region and comments[2]	Depth
		N. lat.	W. long.		
	h m s	°	°		*km*
Sept. 9.....	15:09:43.4*	61.6	148.5	Southern Alaska.....	114
10.....	02:46:59.1	56.5	153.6	Kodiak Island region. Mag. 4.9 m_b.....	33
10.....	02:53:53.2	56.5	153.5	Kodiak Island region. Mag. 4.2 m_b.....	33
10.....	02:59:24.3	56.5	153.5	Kodiak Island region. Mag. 4.0 m_b.....	33
11.....	06:43:59.5P	35.5	116.3	Southern California. Mag. 3.2, P.....	12
11.....	10:16:24.6P	33.5	116.4	Southern California. Mag. 3.0, P.....	4
11.....	19:58:32.1P	34.0	116.3	.....do.....	14
11.....	20:36:49.5	62.2	150.1	Central Alaska.....	65
12.....	01:32:56.7*	52.9	174.6	Andreanof Islands, Aleutian Islands. Mag. 4.2 m_b..	213
16.....	09:39:13.8*	60.7	150.4	Kenai Peninsula, Alaska. Mag. 3.2 M_L.....	23
17.....	02:28:14.6*	51.2	179.2	Andreanof Islands, Aleutian Islands. Mag. 4.0 m_b..	37
19.....	07:55:33.4*	60.1	153.3	Southern Alaska. Mag. 3.4 m_b.....	128
19.....	11:24:58.0	61.5	151.6	Southern Alaska. Mag. 3.5 m_b.....	79
19.....	19:36:30.5	62.0	148.4	Central Alaska.....	31
21.....	14:00:16.5*	59.7	147.6	Gulf of Alaska.....	54
21.....	15:30:00.2A	37.1	116.0	Southern Nevada. Nevada Test Site. Mag. 4.3 M_S; 5.7 m_b	0
22.....	07:27:06.1	55.5	157.4	Alaska Peninsula. Mag. 4.6 m_b.....	33
22.....	08:48:15.8*	38.0	118.6	California–Nevada border region.....	5
23.....	02:44:05.4	41.7	125.5	Off coast of northern California. Mag. 5.1 M_S; 4.5, B.	21
23.....	04:14:53.4	58.4	154.3	Alaska Peninsula. Mag. 3.3 M_L.....	33
23.....	06:14:47.2	36.8	115.8	California–Nevada border region.....	5
23.....	08:40:59.2	51.4	175.1	Andreanof Islands, Aleutian Islands. Mag. 4.5 m_b..	42
23.....	16:01:45.5*	58.9	147.5	Gulf of Alaska. Mag. 3.3 M_L.....	39
23.....	21:50:16.0*	57.7	153.7	Kodiak Island region. Mag. 3.5 M_L.....	48
24.....	04:41:48.3*	41.9	126.4	Off coast of northern California. Mag. 3.6, B.....	33
25.....	23:24:43.5*	59.3	146.2	Gulf of Alaska. Mag. 3.3 M_L.....	33
26.....	01:54:38.7*	53.9	167.4	Fox Islands, Aleutian Islands. Mag. 3.8 m_b.....	97
26.....	14:30:00.2A	37.1	116.1	Southern Nevada. Nevada Test Site. Mag. 4.4, B; 4.4 m_b.	0
29.....	09:00:36.3	60.2	141.0	Southeastern Alaska. Mag. 4.7 M_L.....	15
29.....	12:29:52.7	37.3	115.3	Southern Nevada.....	5
29.....	19:55:15.7*	66.0	156.1	Alaska.....	33
Oct. 1.....	13:52:31.1	59.8	153.3	Southern Alaska.....	146
2.....	04:10:51.9*	63.9	148.6	Central Alaska. Mag. 3.8 m_b.....	110
3.....	18:27:27.8*	52.3	169.5	Fox Islands, Aleutian Islands. Mag. 4.5 m_b.....	41
4.....	16:10:36.8*	62.1	149.7	Central Alaska.....	59
6.....	05:41:21.4	58.4	151.3	Kodiak Island region. Mag. 4.5 M_L.....	34
6.....	16:39:35.2*	40.9	124.7	Near coast of northern California. Mag. 4.2 m_b....	33
6.....	21:01:15.2	60.3	151.1	Kenai Peninsula, Alaska.....	80
7.....	21:36:56.3	61.4	151.3	Southern Alaska.....	110
8.....	06:01:59.9*	57.7	155.5	Alaska Peninsula.....	140
8.....	06:26:38.8	58.6	154.8	Alaska Peninsula. Mag. 4.7 m_b.....	46
9.....	03:43:49.2	60.0	152.8	Southern Alaska.....	110
9.....	05:52:50.7*	58.5	138.2	Southeastern Alaska. Mag. 4.0 m_b.....	33
9.....	11:48:46.0*	51.3	176.7	Andreanof Islands, Aleutian Islands. Mag. 3.8 m_b..	39
10.....	10:25:33.0*	51.0	179.3	Andreanof Islands, Aleutian Islands. Mag. 3.9 m_b..	19
11.....	02:53:44.6*	52.5	169.7	Fox Islands, Aleutian Islands. Mag. 4.4 m_b.....	50
12.....	02:33:16.2*	60.2	150.7	Kenai Peninsula, Alaska.....	67
12.....	03:43:09.1*	57.5	152.2	Kodiak Island region. Mag. 3.6 m_b.....	51

See footnotes at end of table.

TABLE 1.—*Instrumentally determined locations of earthquakes and related phenomena that occurred in the United States during 1972*—Continued

Date	Origin time[1] G.M.T.	Geographic coordinates		Region and comments[2]	Depth
		N. lat.	W. long.		
	h m s	°	°		*km*
Oct. 13.....	04:46:11.0	52.8	163.1	South of Alaska. Mag. 5.4 MS; 5.9 m_b.....	38
12.....	12:41:28.7	62.7	143.2	Central Alaska. Mag. 3.2 M_L.....	33
13.....	09:26:00.7*	52.7	172.0 E.	Near Islands, Aleutian Islands. Mag. 4.5 m_b.....	33
15.....	03:14:28.5	63.7	149.9	Central Alaska. Mag. 3.0 m_b.....	132
15.....	07:45:53.8	52.9	163.1	South of Alaska. Mag. 4.7 m_b.....	33
17.....	23:35:03.1*	37.7	113.5	Utah.....	10
20.....	06:10:08.9*	53.8	163.5	Unimak Island region. Mag. 4.0 m_b.....	38
20.....	13:49:09.7	63.3	149.6	Central Alaska.....	89
20.....	16:43:36.3	60.0	152.4	Southern Alaska.....	118
21.....	18:28:48.9	62.9	150.6	Central Alaska.....	218
22.....	11:49:23.7*	37.2	114.8	Southern Nevada.....	5
22.....	19:40:56.6*	62.7	159 9	Central Alaska. Mag. 4.3 M_L.....	33
23.....	00:09:02.5	51.1	179.3	Andreanof Islands, Aleutian Islands. Mag. 3.7 m_b..	35
23.....	19:35:30.5*	40.8	127.4	Off coast of northern California. Mag. 4.0, B; 4.6 m_b.	33
24.....	13:21:46.5	37.2	114.8	Southern Nevada.....	5
24.....	18:40:06.1	51.3	176.6	Andreanof Islands, Aleutian Islands. Mag. 4.6 m_b..	41
25.....	00:24:23.2	50.0	179.9	Andreanof Islands, Aleutian Islands. Mag. 4.5 m_b..	4
25.....	01:01:41.0	43.4	127.7	Off coast of Oregon. Mag. 5.2 MS; 5.3 m_b.....	33
25.....	01:21:59.1	57.5	156.1	Alaska Peninsula. Mag. 4.6 m_b.....	93
26.....	23:11:33.5	57.4	153.0	Kodiak Island region. Mag. 4.0 m_b.....	56
27.....	19:49:28.2P	35.1	116.4	Central California. Mag. 3.1, P.....	8
28.....	02:12:44.7*	39.1	119.0	Nevada.....	5
28.....	05:06:17.0*	51.9	173.4	Andreanof Islands, Aleutian Islands. Mag. 4.2 m_b..	26
28.....	19:01:24.9	37.2	114.9	Southern Nevada. Mag. 3.4 M_L.....	5
29.....	11:35:06.6	37.3	114.8	Southern Nevada. Mag. 3.2 M_L.....	5
29.....	13:12:09.4*	37.2	114.8	Southern Nevada.....	5
29.....	20:27:03.5	37.2	114.8	Southern Nevada. Mag. 3.1 M_L.....	5
30.....	02:07:19.5	37.2	114.8	Southern Nevada.....	5
30.....	07:08:20.1	37.2	114.8	.....do.....	5
30.....	08:13:08.6*	37.2	114.9	.....do.....	5
30.....	14:03:05.8	37.2	114.9	.....do.....	5
31.....	09:56:10.3P	33.3	116.9	Southern California. Mag. 3.2, P.....	8
Nov. 1.....	15:02:50.6	52.3	171.8	Fox Islands, Aleutian Islands. Mag. 4.5 m_b.....	49
3.....	15:47:16.6*	51.2	179.2	Andreanof Islands, Aleutian Islands. Mag. 3.9 m_b..	22
5.....	01:09:26.9	62.0	151.0	Central Alaska.....	75
6.....	23:47:18.4	47.9	114.3	Montana. Mag. 3.8 M_L.....	5
7.....	13:35:47.4	60.0	153.0	Southern Alaska.....	114
8.....	00:47:07.8*	50.3	178.9	Andreanof Islands, Aleutian Islands. Mag. 4.0 m_b..	38
10.....	16:49:56.4	63.0	151.0	Central Alaska.....	138
11.....	07:12:44.3	63.6	149.1	Central Alaska. Mag. 3.2 M_L.....	102
11.....	09:46:51.3	60.5	150.4	Kenai Peninsula, Alaska. Mag. 3.3 M_L.....	50
11.....	15:43:06.4*	58.0	156.7	Alaska Peninsula. Mag. 4.3 M_L.....	142
12.....	09:40:23.5	52.5	169.4	Fox Islands, Aleutian Islands. Mag. 4.2 m_b.....	45
14.....	11:12:28.2*	53.8	164.7	Unimak Island region. Mag. 4.5 m_b.....	47
14.....	11:28:25.9*	53.7	164.7	Unimak Island region. Mag. 4.6 m_b.....	50
14.....	17:00:04.3*	52.7	165.0	Aleutian Islands region. Mag. 4.3 m_b.....	40
15.....	15:40:56.0*	67.5	160.0	Alaska. Mag. 4.8 m_b.....	33
17.....	07:46:58.0	37.8	115.1	Southern Nevada.....	10
17.....	09:29:08.6	37.8	115.1	.....do.....	14
17.....	09:50:04.5	37.8	115.2	Southern Nevada. Mag. 3.8, B.....	10

See footnotes at end of table.

TABLE 1.—*Instrumentally determined locations of earthquakes and related phenomena that occurred in the United States during 1972*—Continued

Date	Origin time[1] G.M.T.	Geographic coordinates		Region and comments[2]	Depth
		N. lat.	W. long.		
	h m s	°	°		*km*
Nov. 17	17:19:59.8*	50.0	178.5	Andreanof Islands, Aleutian Islands. Mag. 4.2 m_b	20
17	23:18:42.5	37.8	115.1	Southern Nevada	11
18	02:10:31.4B	36.1	117.5	California–Nevada border region. Mag. 3.5, B	8
18	02:23:40.8	63.1	149.4	Central Alaska	126
18	15:08:39.1P	34.0	116.8	Southern California. Mag. 3.4, P	8
19	00:28:02.0*	58.1	150.9	Gulf of Alaska	33
19	15:50:06.9*	40.4	126.3	Off coast of northern California. Mag. 4.2, B; 4.7 m_b.	33
21	02:04:17.4	62.3	149.7	Central Alaska. Mag. 3.4 m_b	60
21	06:52:24.0	51.2	179.1	Andreanof Islands, Aleutian Islands. Mag. 4.1 m_b	41
21	15:16:13.2*	59.6	147.5	Gulf of Alaska	76
22	07:00:14.6*	51.3	178.6 E.	Rat Islands, Aleutian Islands. Mag. 4.3 m_b	54
22	13:25:21.6*	51.1	178.0	Andreanof Islands, Aleutian Islands. Mag. 4.5 m_b	25
22	19:56:27.1	59.7	152.3	Southern Alaska. Mag. 3.7 m_b	78
23	13:38:41.2*	51.6	177.4 E.	Rat Islands, Aleutian Islands. Mag. 3.1 m_b	58
25	00:05:35.5P	34.0	117.6	Southern California. Mag. 3.0, P	15
25	19:31:39.2P	36.6	118.0	Central California. Mag. 2.6, P; 3.7, B	8
26	06:57:12.1P	34.3	117.0	Southern California. Mag. 3.0, P	2
26	10:30:40.2*	52.8	168.4	Fox Islands, Aleutian Islands. Mag. 4.2 m_b	61
28	01:33:15.3*	59.7	153.4	Southern Alaska. Mag. 4.8 m_b	127
28	20:53:24.2*	37.5	113.0	Utah. Mag. 2.3 M_L	5
29	05:45:37.2	37.8	114.5	Southern Nevada. Mag. 2.9 M_L	5
29	05:53:19.5	37.8	114.5	Southern Nevada. Mag. 3.0 M_L; 3.7, B	5
30	17:30:33.3	61.7	150.0	Southern Alaska. Mag. 3.3 m_b	54
30	23:22:54.8*	37.4	113.6	Utah. Mag. 2.5 M_L	5
Dec. 1	10:29:11.6	56.3	154.9	Kodiak Island region. Mag. 4.1 m_b	26
3	06:28:20.9	53.3	166.7	Fox Islands, Aleutian Islands. Mag. 4.5 m_b	43
4	03:02:44.8P	33.2	116.0	Southern California. Mag. 3.1, P	8
4	08:43:21.2*	67.5	160.3	Alaska. Mag. 4.3 m_b	10
4	14:38:34.5	52.9	168.3	Fox Islands, Aleutian Islands. Mag. 4.7 m_b	49
7	19:18:52.9	53.1	171.0 E.	Near Islands, Aleutian Islands. Mag. 5.5 m_b	33
8	01:00:53.8	63.2	150.7	Central Alaska	142
8	16:07:37.4*	62.8	150.7	.....do	126
8	18:56:55.5	56.3	135.9	Southeastern Alaska. Mag. 4.2 m_b	20
9	02:44:45.7	38.7	115.6	Nevada. Mag. 4.6, B; 4.4 m_b	10
10	10:22:10.3P	34.0	117.6	Southern California. Mag. 3.1, P	8
13	16:02:08.3	51.6	175.3 E.	Rat Islands, Aleutian Islands. Mag. 4.6 M_S; 5.1 m_b.	33
14	09:05:11.3*	58.6	152.6	Kodiak Island region. Mag. 3.6 M_L	49
15	09:25:03.5*	40.4	125.7	Off coast of northern California. Mag. 4.4 m_b	33
15	17:56:00.9*	52.0	174.8 E.	Near Islands, Aleutian Islands. Mag. 4.1 m_b	33
16	04:49:03.2*	51.6	175.3 E.	Rat Islands, Aleutian Islands. Mag. 4.9 m_b	41
16	23:09:57.2	62.7	150.7	Central Alaska. Mag. 3.2 m_b	98
17	18:13:59.0	63.5	150.9	Central Alaska	57
18	02:53:43.7	60.8	153.3	Southern Alaska. Mag. 5.0 m_b	165
19	09:19:05.5*	61.2	151.2	Southern Alaska	68
19	10:33:49.0	52.0	169.7	Fox Islands, Aleutian Islands. Mag. 5.0 m_b	44
19	23:04:38.3*	52.2	169.6	Fox Islands, Aleutian Islands. Mag. 4.5 m_b	14
21	02:56:36.6P	35.9	117.8	Central California	8
21	20:15:00.2A	37.1	116.1	Southern Nevada. Nevada Test Site. Mag. 4.8, B; 5.0 m_b.	0

See footnotes at end of table.

TABLE 1.—*Instrumentally determined locations of earthquakes and related phenomena that occurred in the United States during 1972*—Continued

Date	Origin time[1] G.M.T.	Geographic coordinates		Region and comments[2]	Depth
		N. lat.	W. long.		
	h m s	°	°		*km*
Dec. 21.....	22:07:01.2*	61.6	149.9	Southern Alaska. Mag. 3.0 M_L.....	32
22.....	10:47:47.8	54.6	159.5	South of Alaska. Mag. 4.7 m_b.....	33
22.....	11:28:35.5P	34.1	116.8	Southern California. Mag. 3.3, P.....	18
22.....	11:56:27.4	51.1	179.1 E.	Rat Islands, Aleutian Islands. Mag. 4.6 m_b.....	44
22.....	16:13:32.1*	59.5	152.5	Southern Alaska.....	50
22.....	21:39:42.4*	51.0	178.9 E.	Rat Islands, Aleutian Islands. Mag. 4.0 m_b.....	34
23.....	02:40:08.7	50.9	178.9 E.	Rat Islands, Aleutian Islands. Mag. 4.1 m_b.....	38
23.....	20:43:05.1H	19.6	156.0	Hawaii. Mag. 4.5 M_L.....	45
25.....	22:23:32.4*	57.2	154.0	Kodiak Island region. Mag. 4.2 m_b.....	33
26.....	02:05:16.9	51.5	179.0 E.	Rat Islands, Aleutian Islands. Mag. 4.6 m_b.....	76
27.....	04:34:38.2	51.2	177.3	Andreanof Islands, Aleutian Islands. Mag. 4.3 m_b..	45
27.....	15:27:47.7	37.1	116.9	Southern Nevada.....	5
28.....	19:49:36.2P	33.5	116.5	Southern California. Mag. 3.1, P.....	8
28.....	20:07:25.0P	33.5	116.5	.....do.....	8
29.....	11:50:52.1	63.0	148.3	Central Alaska.....	104
29.....	16:38:37.4	61.7	151.3	Southern Alaska. Mag. 3.7 m_b.....	69
29.....	18:46:31.7*	61.5	151.2	Southern Alaska. Mag. 3.4 m_b.....	74
31.....	04:02:43.6*	61.8	151.7	Southern Alaska.....	93
31.....	10:07:19.1	58.3	151.7	Kodiak Island region. Mag. 4.8 M_L.....	21
31.....	13:46:20.2*	60.2	153.2	Southern Alaska. Mag. 3.7 m_b.....	143

[1] Symbols following the origin time are as follows:
*= The epicenter has been determined from incomplete, or less reliable, data and is not considered so accurate as the computed solution appears to indicate.
A = Underground explosion under the direction of the U.S. Atomic Energy Commission.
B = Parameters of hypocenter were furnished by the University of California, Berkeley.
E = Explosion or suspected explosion.
P = Parameters of hypocenter were furnished by the California Institute of Technology, Pasadena.
H = Parameters of hypocenter were furnished by the Hawaiian Volcano Observatory, U.S. Geological Survey, Hawaii National Park.

[2] Abbreviations following magnitudes are as follows:
B = University of California, Berkeley.
P = California Institute of Technology, Pasadena.

Magnitudes computed by ERL (Environmental Research Laboratories, NEIC) are as follows:
m_b = Computed from body wave on seismogram.
M_S = Computed from surface wave on seismogram.
M_L = Computed only for local earthquakes.

Miscellaneous Activities

HORIZONTAL CONTROL SURVEYS FOR CRUSTAL MOVEMENT STUDIES[1]

In 1972, surveys for the study of horizontal movements in the Earth's crust were made by NOAA's National Geodetic Survey (NGS) in the following areas of Alaska and California.

Alaska

Adak Island—During the summer of 1972, NGS was requested to evaluate short-range distance-measuring instruments for monitoring Earth strains. Repeated observations, including horizontal directions, vertical angles, and distance measurements, were made in the vicinity of the strainmeters on Adak during the period September 9 to October 18. Results of these tests showed that length changes on the order of 2 or 3 mm were detected when episodes were recorded on the strainmeters.

California

Aqueduct Surveys—The cooperative project with the California Department of Water Resources was continued during 1972. Resurveys were accomplished at six sites along the aqueduct route.

The results of the surveys at COLT and RIALTO indicated movements, both horizontal and vertical, in the opposite direction to the accumulated changes over the interval 1964–1970 for the horizontal, and 1964–1971 for the vertical.

During the interval 1970–1972, the horizontal movement was about 1 cm at COLT. Local movement continued at COLT F and the movement (toward the fault) since 1964 amounted to about 2 cm. The accumulated changes in elevations at COLT from 1964 to 1971 were on the same order of magnitude and opposite in sign to the changes from 1971 to 1972. Also, it is significant to note that the 1971 precise level surveys at COLT and RIALTO and the tie between them were observed just before the San Fernando earthquake of February 9, 1971.

The local movement at station RIALTO C continued during the interval 1970–1972 toward north-northeast. From 1968 to 1972 the accumulated horizontal movement amounted to 2.5 cm, and from 1964 to 1972 the vertical change was 4-cm subsidence.

From 1964 to 1970 no systematic horizontal movement was indicated at DEVIL. During the interval 1970–1972 the survey results indicated right-lateral movement of about 1.5 cm. The vertical change for the interval 1964–1971 indicated a relative subsidence on the southeast side of the fault of about 1 cm. This trend in vertical change may be due to the fact that the average elevation of the stations on the northeast side of the fault is about 200 m greater than the stations on the southwest side.

Resurveys at the HUGHES site did not indicate any significant movement.

The results of the two horizontal surveys (1970 and 1972) at the expanded RANCH-

[1] Prepared by B. K. Meade, NOAA, National Ocean Survey, National Geodetic Survey, Rockville, Md.

TEJON site indicated left-lateral movement of about 8 mm annually and a general area compression or contraction. The results of the vertical surveys showed a subsidence of about 3 mm at stations RANCH C, D, and E on the south side of the Garlock fault during the interval from July 1971 to January 1972. There was also a relatively large local disturbance at TUNNEL 3 PT 3, amounting to an uplift of 14 mm.

At the MEADE site, results of the horizontal surveys of 1969 and 1972 reflect the observed 3-second counterclockwise change in astronomic azimuth. Another survey will be needed to determine if this change is real. The vertical survey results show that stations MEADE A and B on the north side of a cultivated field have subsided 6 to 9 mm from 1969 to 1972.

TSUNAMIS[2]

Six tsunamis were reported to the National Oceanic and Atmospheric Administration during 1972. Two of these were recorded on National Ocean Survey tide gages.

The Japan Meteorological Agency reported that an earthquake near Taiwan on January 25 (22.5° N., 122.3° E.) caused a minor tsunami with an amplitude of 5 cm at Ishigakijima, Ryukyu Islands. The Pacific Tsunami Warning Center issued a tsunami *watch*.

An earthquake south of Honshu, Japan (33.3° N., 140.8° E.), on February 29 generated a tsunami with an amplitude of several centimeters which was observed at Tateyama (south of Kwanto), Cape Shionomisaki (south of Kinki), and at other places in Japan.

The southeastern Alaska shock of July 30 (56.82° N., 135.68° W.) caused a tsunami that was recorded at Juneau with an amplitude of 20 cm and at Sitka with an amplitude of 16 cm. The Alaska Regional Tsunami Warning System issued a *warning* for southeastern Alaska.

Following the New Britain earthquake of August 17 (6.0° S., 152.9° E.), a 0.6-m surge was reported at Pomio on southeast New Britain.

On December 2 an earthquake near Mindanao, Philippine Islands (6.5° N., 126.6° E.), caused a tsunami which was recorded on tide gages with the following amplitudes: Moen Island, Truk Islands, 9 cm; Guam, Mariana Islands, 6 cm; and White Beach, Okinawa, 5 cm.

Another earthquake south of Honshu on December 4 (33.3° N., 140.7° E.) caused a tsunami with a reported amplitude of 50 cm at Hachijojima and on the Pacific coast of Honshu. The Japan Meteorological Agency issued a tsunami *warning* for the Pacific coast of Honshu.

FLUCTUATIONS IN WELL-WATER LEVELS[3]

In 1943, the Coast and Geodetic Survey (now the National Ocean Survey) first published the section on well-water fluctuations in its annual *United States Earthquakes* series. Data for the years 1944–49 appeared in the 1949 issue. From 1950 to the present, the material has been published annually.

The section on well descriptions lists only the new wells reported to the Water Resources Division of the U. S. Geological Survey during the year. Table 2 lists fluctuations in well water caused principally by earthquakes. Table 3 lists the date, time, and location of specific events that may have been associated with the fluctuations noted in table 2. Also included are the states recording the fluctuations.

Complete information on earthquakes possibly associated with tabulations in table 2 may be obtained from the biweekly *Preliminary Determination of Epicenters* listings,

[2] Prepared by Mark G. Spaeth, NOAA, National Weather Service, Office of Oceanography, Silver Spring, Md.

[3] Prepared by K. B. Rennick, U.S. Department of the Interior, Geological Survey, Water Resources Division, Water Data Projects Office, Denver, Colo.

TABLE 2.—*Earthquake fluctuations in well-water levels, January 1 through December 31, 1972*

County and/or well number	Date	Time at recorder* (Greenwich mean time)	Depth to water before disturbance (*feet*)	Water-level fluctuations: From prequake level, Upward (*feet*)	Water-level fluctuations: From prequake level, Downward (*feet*)	Water-level fluctuations: Double amplitude (*feet*)	Earthquake location and/or remarks
ALASKA							
AK 1022	July 30	1800±(?)	39.28	0.46	0.47	0.93	Sitka, Alaska; clock time off.
AK 17	30	2130	55.86	.24	.27	.51	Sitka, Alaska.
AK 1430	30	2200	62.59	.09	.10	.19	Do.
AK 2049	30	2200	25.71	.91	.84	1.75	Sitka, Alaska. Water level fluctuated for estimated ½ hr.
GEORGIA							
Long 33M4	Jan. 25	0230	39.19	0.01	0.01	0.02	Taiwan.
Dougherty 13L3	25	0245	27.25	.04	.04	.08	Do.
McIntosh 35M13	25	0300	10.45	.01	.01	.02	Do.
Thomas 14E15	25	0300	198.60	.06	.06	.12	Do.
Charlton 27E2	25	0315	63.23	.03	.05	.08	Do.
Decatur 9F520	25	0400	45.20	.025	.025	.05	Do.
Dougherty 13L3	25	0420	27.25	.005	.005	.01	Do.
Long 33M4	Feb. 29	0950	39.15	.02	.02	.04	Honshu, Japan.
Do	Apr. 25	2030	38.63	.01	.01	.02	Mindanao, Philippine Is.
Thomas 14E15	25	2030	198.45	.03	.03	.06	Do.
McIntosh 35M13	July 30	.....	11.18	.20	.20	.40	Southeastern Alaska.
Charlton 27E2	30	2145	63.10	.66	.57	1.23	Do.
Dougherty 13L3	30	2200	28.80	1.01	1.05	2.06	Do.
Long 33M4	30	2200	39.46	.13	.15	.28	Do.
Thomas 14E15	30	2200 [a]	197.90	1.68	2.04	3.72	Do.
Decatur 9F520	30	2215	46.60	.78	.92	1.70	Do.
Dawson 13KK1	30	2220 [b]	27.88	.40	.13	.53	Do.
Do	Nov. 13	.....	30.02	.005	.005	.01	Oaxaca, Mexico.
McIntosh 35M13	13	.....	11.60	.03	.03	.06	Do.
Thomas 14E15	13	.....	198.14	.....	.....	.07	Do.
Dougherty 13L3	13	0510	34.96	.025	.03	.055	Do.
Long 33M4	13	0515	41.05	.03	.03	.06	Do.
Dougherty 13L3	Dec. 2	0120	35.70	.025	.03	.055	Mindanao, Philippine Is.
Long 33M4	2	0200	41.50	.015	.015	.03	Do.
McIntosh 35M13	4	1040	11.63	.03	.03	.06	Honshu, Japan.
Dawson 13KK1	4	1110	29.35	.01	.01	.02	Do.
Long 33M4	4	1130	41.43	.025	.025	.05	Do.
IDAHO							
Madison 7N-38E-23dba1.	Jan. 25	0330	40.67	0.05	0.03	0.08	Taiwan.
Do	Mar. 1	0955	41.57	.05	.04	.09	Northern California.
Do	Apr. 24	1030	42.16	.02	.02	.04	Taiwan.

*See footnotes at end of table.

TABLE 2.—*Earthquake fluctuations in well-water levels, January 1 through December 31, 1972*—Continued

County and/or well number	Date	Time at recorder (Greenwich mean time)	Depth to water before disturbance (*feet*)	Water-level fluctuations: From prequake level, Upward (*feet*)	Water-level fluctuations: From prequake level, Downward (*feet*)	Water-level fluctuations: Double amplitude (*feet*)	Earthquake location and/or remarks
IDAHO—Continued							
Madison 7N-38E-23dba1	Apr. 25	2000	42.14	0.02	0.02	0.04	Mindora, Philippine Is. Aftershocks lasted approximately 1 hr.
Do	July 5	1040	39.25	.02	.02	.04	Vancouver I. region.
Lincoln 5S-17E-26aca1.	23	1900	182.04	.01	.02	.03	Do.
Butte 4N-30E-7adb1	23	1915	311.76	.07	.04	.11	Do.
Madison 7N-38E-23dba1.	23	2000	38.68	.05	.06	.11	Do.
Jefferson 5N-32E-36add1.	30	2140	327.36	.18	.16	.34	Southeastern Alaska.
Lincoln 5S-17E-26aca1.	30	2145	181.64	.38	.43	.81	Aftershocks lasted approximately 1 hr.
Butte 4N-30E-7adb1	30	2200	311.95	.45	.59	1.04	Aftershocks lasted approximately 1½ hr.
Butte 3N-29E-14adb1	30	2200	450.13	.40	.29	.69	Aftershocks lasted approximately 1 hr.
Cassia 13S-21E-18bbc1.	30	2210	568.37	.13	.10	.23	
Jefferson 5N-34E-9bda1	30	2215	257.34	.23	.15	.38	
Butte 7N-31E-34bdc1	30	2215	266.41	.03	.02	.05	
Bingham 2N-31E-35dcc1.	30	2220	583.52	.18	.13	.31	
Minidoka 4S-24E-6bbc1.	30	2230	414.24	.02	.04	.06	
Blaine 1S-19E-3ccb2	30	2230	4.64	.21	.22	.43	
Butte 5N-31E-28ccc1	30	2230	261.17	.71	.76	1.47	Aftershocks lasted approximately 2 hr.
Madison 7N-38E-23dba1.	30	2250[c]	38.50	1.53	2.08	3.61	
Butte 5N-31E-28ccc1	Aug. 18	0100	261.58	.02	.03	.05	New Britain.
Madison 7N-38E-23dba1.	Oct. 20	0930	37.71	.13	.12	.25	Jalisco, Mexico.
Butte 5N-31E-28ccc1	20	0945	261.53	.05	.03	.08	Do.
Butte 4N-30E-7adb1	20	0945	313.25	.04	.08	.12	Do.
Madison 7N-38E-23dba1.	Nov. 13	0530	38.38	.11	.14	.25	Oaxaca, Mexico. Aftershocks lasted approximately ½ hr.
Butte 5N-31E-28ccc1	Dec. 2	0130	261.29	.08	.08	.16	Philippine Is. Aftershocks lasted approximately 1 hr.
INDIANA							
Ma 32	Jan. 25	.....	9.95	0.02	0.04	0.06	Taiwan region.

See footnotes at end of table.

TABLE 2.—*Earthquake fluctuations in well-water levels, January 1 through December 31, 1972*—Continued

County and/or well number	Date	Time at recorder (Greenwich mean time)	Depth to water before disturbance (*feet*)	Water-level fluctuations: From prequake level, Upward (*feet*)	From prequake level, Downward (*feet*)	Double amplitude (*feet*)	Earthquake location and/or remarks
INDIANA—Continued							
Ma 32	Jan. 25	.....	9.95	0.01	0.01	0.02	Taiwan region.
Do	Feb. 29	0840–0900	10.15	.02	.02	.04	Honshu, Japan.
Do	Mar. 20	0720–0730	10.06	.01	0	.01	Northern Peru.
Do	June 8	.....	11.33	.01	.02	.03	Central Chile.
Do	July 23	1910–1920	11.48	.02	.04	.06	Vancouver I.
My 7	30	.....	28.75	.12	.10	.22	Southeastern Alaska.
Al 6	30	.....	11.83	.07	.01	.08	Do.
Ba 9	30	.....	18.03	.03	.06	.09	Do.
Cs 3	30	.....	6.63	.77	.57	1.34	Do.
Hr 8	30	0440–0450	13.75	.06	.06	.12	Do.
Fu 7	30	0530–0540	9.53	.17	.13	.30	Do.
Ma 32	30	2210–2400	11.62	.82	1.02	1.84	Do.
Sh 2	30	2215–2300	19.81	.17	.12	.29	Do.
Pu 6	30	2320–2350	9.76	.51	.55	1.06	Do.
Ma 32	Oct. 20	0750–0810	10.40	.01	.01	.02	Jalisco, Mexico.
Do	Nov. 2	2000–2010	9.53	.03	.01	.04	Loyalty Is.
Do	13	0445–0515	9.70	.01	.01	.02	Oaxaca, Mexico.
Do	Dec. 2	.....	9.75	.01	.02	.03	Mindanao, Philippine Is.
Do	4	.....	9.73	.04	.03	.07	Honshu, Japan.
NEVADA							
S17/50-36dc1	Feb. 20	0610	2.70	0.03	0.04	0.07	Gulf of California.
Do	July 5	0900	3.510	.03	.055	.085	Vancouver I.
Do	23	1730	3.755	.240	.240	.480	Do.
Do	30	2230	3.685	.485	.295	.78	Southeastern Alaska. Float knocked out of well.
Do	Aug. 4	1145	3.685	.055	.075	.13	Southeastern Alaska.
Do	Oct. 20	0810	3.675	.18	.10	.28	Jalisco, Mexico.
Do	Nov. 10	1510	3.56	.05	.035	.085	Oaxaca, Mexico.
Do	13	0430	3.67	.44	.40	.84	Oaxaca, Mexico. Float knocked out of well.
S19/60-9bcc1	Dec. 4	1000	124.72	.06	.08	.14	Honshu, Japan.
S17/50-36dc1	4	1030	3.335	.09	.06	.15	Do.
WISCONSIN							
Ml-120	Jan. 4	0415	89.957	0.005	0.002	0.007	Taiwan.
Do	23	2220	89.506	.019	.001	.020	New Hebrides Is.
Lf-57	23	2245	109.50	0	.04	.04	Do.
Do	25	0315	109.55	.07	.12	.19	Taiwan.
Ml-120	Feb. 15	0045	88.783	.006	.014	.020	Santa Cruz Is.

See footnotes at end of table.

TABLE 2.—*Earthquake fluctuations in well-water levels, January 1 through December 31, 1972*—Continued

County and/or well number	Date	Time at recorder (Greenwich mean time)	Depth to water before disturbance (*feet*)	Water-level fluctuations: From prequake level, Upward (*feet*)	Water-level fluctuations: From prequake level, Downward (*feet*)	Double amplitude (*feet*)	Earthquake location and/or remarks
			WISCONSIN—Continued				
Lf-57	Feb. 15	0045	109.34	0.01	0.02	0.03	Santa Cruz Is.
Ml-120	29	0950	89.069	.020	.012	.032	Honshu, Japan.
Lf-57	29	1015	109.65	.07	.05	.12	Do.
Do	Apr. 24	1030	110.19	.02	.02	.04	Taiwan.
Ml-120	25	1935	88.775	.034	.018	.052	Mindora, Philippine Is.
Lf-57	25	1945	110.27	.04	.01	.05	Do.
Ml-120	May 4	0815	88.310	0	.008	.008	New Hebrides Is.
Lf-57	June 11	1630	110.04	.04	.01	.05	Celebes Sea.
Ml-120	11	1745	89.700	.022	.001	.023	Do.
Lf-57	July 5	1015	110.10	.02	.02	.04	Vancouver I.
Ml-120	5	1045	88.833	.002	.012	.014	Do.
Do	23	1930	88.268	.038	.040	.078	Do.
Lf-57	30	2000	109.79	1.67	1.78	3.45	2½-hr duration.
Sb-19	30	2130	3.81	.24	.10	.34	Southeastern Alaska.
Dg-4	30	2130	119.72	.02	.08	.10	Do.
Wk-31	30	2130	132.14	.06	.21	.27	Do.
Mt-5	30	2130	21.91	.98	.03	1.01	Do.
Ml-120	30	2145	87.982	.....	.....	Greater than 1.00 ft.	Recorder pen in reversal.
Wp-63	30	2145	20.81	.04	.07	.11	Southeastern Alaska.
Ml-45	30	2145	28.30	.09	.06	.15	Do.
Dr-24	30	2200	143.31	1.21	.94	2.15	Do.
Dr-254	30	2200	20.78	1.10	.88	1.98	Do.
Dr-255	30	2200	11.54	.77	.70	1.47	Do.
Fl-12	30	2215	68.26	.10	.04	.14	Do.
Ml-120	Aug. 3	0510	86.421	.003	.001	.004	Andreanof Is., Alaska.
Lf-57	4	1145	109.90	.04	.06	.10	Southeastern Alaska.
Ml-120	4	1150	86.901	.007	.043	.050	Do.
Lf-57	Oct. 20	0830	108.22	.04	.01	.05	Jalisco, Mexico.
Ml-120	20	0940	87.957	.023	.010	.033	Do.
Lf-57	Nov. 2	2030	106.97	0	.03	.03	Loyalty Is.
Ml-120	2	2145	87.220	.012	.015	.027	Do.
Do	13	0545	87.822	.007	.018	.025	Oaxaca, Mexico.
Lf-57	13	0545	107.09	.02	.01	.03	Do.
Do	Dec. 2	0100	106.40	.04	.04	.08	Mindanao, Philippine Is.
Ml-120	2	0100	87.454	.023	.056	.079	1½-hr duration.
Lf-57	4	1030	106.49	.07	.06	.13	Honshu, Japan.
Ml-120	4	1045	87.660	.051	.042	.093	Do.
Lf-57	27	2300	105.58	.01	.02	.03	Queen Elizabeth Is.
Ml-120	27	2335	87.258	.001	.011	.012	Do.

[a] Water level was displaced downward 0.50 ft.
[b] Water level was displaced downward 0.40 ft.
[c] Aftershocks lasted approximately 2 hr. Pen reversed on same trace. Unable to determine highest fluctuation point.

TABLE 3.—*Earthquakes in 1972 believed to have caused fluctuations in well-water levels*

Date	Origin time G.M.T.	Location and magnitude	States recording fluctuations
	h m s		
Jan. 4....	03:16:54.5	Taiwan region. Mag. 6.9.....	Wisconsin.
23....	21:17:52.1	New Hebrides Islands. Mag. 7.1.....	Do.
25....	02:06:23.3	Taiwan region. Mag. 7.5.....	Georgia, Idaho, Indiana, Wisconsin.
25....	03:41:23.7	Taiwan region. Mag. 7.0.....	Georgia.
Feb. 14....	23:29:51.7	Santa Cruz Islands. Mag. 7.4.....	Wisconsin.
20....	06:08:17.9	Gulf of California. Mag. 5.2.....	Nevada.
29....	09:22:59.8	South of Honshu, Japan. Mag. 7.2.....	Georgia, Indiana, Wisconsin.
Mar. 1....	09:28:56.7	Off coast of northern California. Mag. 5.9.....	Idaho.
20....	07:33:49.6	Northern Peru. Mag. 6.9.....	Indiana.
Apr. 24....	09:57:21.7	Taiwan. Mag. 6.9.....	Idaho.
25....	19:30:09.3	Mindoro, Philippine Islands. Mag. 7.2.....	Georgia, Idaho, Wisconsin.
May 4....	07:48:17.2	New Hebrides Islands. Mag. 6.8.....	Wisconsin.
June 8....	18:53:41.7	Near coast of central Chile. Mag. 6.6.....	Indiana.
11....	16:41:00.9	Celebes Sea. Mag. 7.5.....	Wisconsin.
July 5....	10:16:38.4	Vancouver Island region. Mag. 5.7.....	Idaho, Nevada, Wisconsin.
23....	19:13:09.0	Vancouver Island region. Mag. 6.4.....	Idaho, Indiana, Wisconsin.
30....	21:45:14.1	Southeastern Alaska. Mag. 7.6.....	Alaska, Georgia, Idaho, Indiana, Nevada, Wisconsin.
Aug. 3....	04:40:54.9	Andreanof Islands, Alaska. Mag. 6.2.....	Wisconsin.
4....	11:38:08.3	Southeastern Alaska. Mag. 5.8.....	Nevada, Wisconsin.
17....	23:44:05.9	New Britain region. Mag. 7.1.....	Idaho.
Oct. 20....	08:17:48.6	Off coast of Jalisco, Mexico. Mag. 6.5.....	Idaho, Indiana, Nevada, Wisconsin.
Nov. 2....	19:55:22.1	Loyalty Islands. Mag. 7.0.....	Indiana, Wisconsin.
10....	14:56:52.5	Near coast of Oaxaca, Mexico. Mag. 5.6.....	Nevada.
13....	04:43:45.2	Near coast of Oaxaca, Mexico. Mag. 6.5.....	Georgia, Idaho, Indiana, Nevada, Wisconsin.
Dec. 2....	00:19:47.2	Mindanao, Philippine Islands. Mag. 7.4.....	Georgia, Idaho, Indiana, Wisconsin.
4....	10:16:12.0	South of Honshu, Japan. Mag. 7.4.....	Georgia, Indiana, Nevada, Wisconsin.
27....	22:59:29.7	Queen Elizabeth Islands. Mag. 6.0.....	Wisconsin.

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WELL DESCRIPTIONS

Wisconsin

The following wells were first reported during the quarter July–September 1972.

Well No. Dr–24. Owner, Reynolds Preserving Co., 44°54′93″ N., 87°22′00″ W., Door County. Drilled observation artesian well in Niagara Dolomite of Silurian age. Depth, 385 feet; diameter, 6 inches; cased to 345 feet, open end.

Well No. Dr–254. Owner, U.S. Geological Survey, 44°50′50″ N., 87°21′39″ W., Door County. Drilled observation artesian well in Niagara Dolomite of Silurian age. Depth, 402 feet; diameter, 6 inches; cased to 100 feet, open end.

Well No. Dr–255. Owner, U.S. Geological Survey, 45°04′02″ N., 87°07′30″ W., Door County. Drilled observation artesian well in Niagara Dolomite of Silurian age. Depth, 519 feet; diameter, 6 inches; cased to 100 feet, open end.

Well No. Wp–63. Owner, Frito-Lay, Inc., 44°18′06″ N., 89°10′41″ W., Waupaca

County. Drilled unused water-table well in Pleistocene sand. Depth, 94 feet; diameter, 4 inches; cased to 94 feet, open end.

PRINCIPAL EARTHQUAKES

The table that follows lists and briefly describes the principal earthquakes of the world during 1972. The list is included in the *United States Earthquakes* series because of its general unavailability in this format in other reports. Table 4 includes earthquakes of magnitude greater than 6¾; shocks of smaller magnitude that were locally destructive and/or caused casualties; and tremors of unusual interest.

TABLE 4.—*Principal earthquakes of the world during 1972*

Date	Origin time G.M.T.	Region	Geographic coordinates		Remarks*
			Lat.	Long.	
	h m s		°	°	
Jan. 4....	03:16:54.5	Taiwan region.....	22.6 N.	122.1 E.	Felt on Ishigakijima, in Batan Is., and on northern Luzon, Philippines Is. Depth 33 km. Mag. 6.9 (M_s).
23....	21:17:52.1	New Hebrides Islands...	13.2 S.	166.4 E.	Felt at Luganville, Lonorore, and Lamap. Depth 33 km. Mag. 7.1 (M_s).
25....	02:06:23.3	Taiwan region.....	22.5 N.	122.3 E.	One killed, five houses destroyed, and some damage to roads on Taiwan. Felt on southern Ryukyu Is., on northern Luzon, Philippine Is., and at Hong Kong. Depth 33 km. Mag. 7.5 (M_s).
25....	03:41:23.7	....do.....	23.0 N.	122.2 E.	Felt on Taiwan, southern Ryukyu Is., and on northern Luzon, Philippine Is. Depth 33 km. Mag. 7.0 (M_s).
Feb. 4....	02:42:18.9	Central Italy.....	43.8 N.	13.3 E.	One dead, 2 injured, and moderate damage in Ancona area. Depth 25 km. Mag. 4.8 (m_b).
14....	23:29:51.7	Santa Cruz Islands.....	11.4 S.	166.3 E.	Felt on San Cristobal, Solomon Is. Depth 102 km. Mag. 7.4, P.
29....	09:22:59.8	South of Honshu, Japan..	33.3 N.	140.8 E.	Damage on Hachijojima and in the Tokyo area. Tsunami observed at Tateyama, Cape Shionomisaki, and other places. Felt widely on Honshu. Mag. 7.2, P.
Mar. 20....	07:33:49.6	Northern Peru.....	6.8 S.	76.8 W.	Seven killed, 50 injured, and major property damage in Juanjui area. Depth 64 km. Mag. 6.9, P.
22....	10:27:41.9	Kuril Islands.....	49.1 N.	153.6 E.	Depth 134 km. Mag. 6.8, P.

* See footnotes at end of table.

TABLE 4.—*Principal earthquakes of the world during 1972*—Continued

Date	Origin time G.M.T.	Region	Geographic coordinates		Remarks*
			Lat.	Long.	
	h m s		°	°	
Apr. 10....	02:06:53.2	Southern Iran.....	28.4 N.	52.8 E.	Five thousand and fifty-four killed and many injured. Qir completely destroyed. Damaged region extended over 1,000 km². Felt widely in southern Iran. Depth 33 km. Mag. 6.9 (M_s).
24....	09:57:21.7	Taiwan.....	23.6 N.	121.6 E.	Four killed, 11 injured, and moderate damage in Hualien area. Felt islandwide. Depth 33 km. Mag. 6.9 (M_s).
25....	19:30:09.3	Mindoro, Philippine Islands.	13.4 N.	120.3 E.	Damage in Manila area.Felt widely on Luzon. Depth 50 km. Mag. 7.2 (M_s).
May 4....	07:48:17.2	New Hebrides Islands...	15.9 S.	167.5 E.	Two injured and minor damage in Santo area. Depth 45 km. Mag. 6.8 (M_s).
22....	06:04:00.1	Luzon, Philippine Islands.	16.6 N.	122.3 E.	Minor damage at Manila. Depth 34 km. Mag. 6.9 (M_s).
22....	20:45:57.3	Tonga Islands.....	17.7 S.	175.2 W.	Felt at Apia, Western Samoa. Depth 227 km. Mag.7.0, P.
June 11....	16:41:00.9	Celebes Sea.....	3.9 N.	124.3 E.	Felt in southern Philippine Is. Depth 325 km. Mag. 7.5, P.
21....	15:06:53.3	Central Italy.....	43.8 N.	13.3 E.	Two killed, 3,500 homes uninhabitable, and $300 million property damage in Ancona area. Depth 4 km. Mag. 4.4 (m_b).
24....	15:29:22.2	Hindu Kush region.....	36.2 N.	69.7 E.	Eleven killed, 15 injured, and many homes destroyed or badly damaged in Ishkamish City area. Depth 47 km. Mag. 6.1 (M_s).
July 30....	21:45:14.1	Southeastern Alaska.....	56.82 N.	135.68 W.	Complex multiple event. Aftershocks indicate at least 75 km of rupture SE. of hypocenter along Fairweather fault. Minor damage at Sitka; felt at Juneau, Ketchikan, as far south as Seattle where seiches occurred in swimming pools, and onboard ship at 55°40′ N., 134°10′ W. Brief loss of power at Sitka. Depth 25 km. Mag. 7.6 (M_s).

* See footnotes at end of table.

TABLE 4.—*Principal earthquakes of the world during 1972*—Continued

Date	Origin time G.M.T.	Region	Geographic coordinates		Remarks*
			Lat.	Long.	
	h m s		°	°	
Aug. 17....	23:44:05.9	New Britain region.....	6.0 S.	152.9 E.	Felt at Rabaul and Palmamal, widely on New Britain, and as far as Port Moresby, New Guinea. Local tsunami reported at Pomio. Depth 10 km. Mag. 7.1 (M_S).
Sept. 3....	16:48:28.8	Northwestern Kashmir...	36.0 N.	73.4 E.	One hundred killed and 1,000 homes destroyed in Tangir–Gupis area. Felt in Kabul, Afghanistan, and Rawalpindi, Pakistan, area. Depth 36 km. Mag. 6.2 (M_s).
4....	18:11:12.0	Santa Cruz Islands.....	11.7 S.	166.2 E.	Depth 62 km. Mag. 7, P.
24....	20:09:35.6	Tanimbar Islands region.	6.3 S.	131.2 E.	Depth 33 km. Mag. 6.9 (M_s).
Nov. 2....	19:55:22.1	Loyalty Islands.....	20.0 S.	168.8 E.	Felt on Tanna and Anatom. Depth 32 km. Mag. 7.0 (M_s).
Dec. 2....	00:19:47.2	Mindanao, Philippine Islands.	6.5 N.	126.6 E.	Damage at Davao. Tsunami heights (crest to trough in cm) 18 at Yap, 9 at Guam, and 50 in Ryukyu Is. and on Pacific coast of Kyushu. Depth 33 km. Mag. 7.4 (M_s).
4....	10:16:12.0	South of Honshu, Japan.	33.3 N.	140.7 E.	Minor damage on Hachijojima. Felt in southern Honshu. Tsunami height 0.5 m at Hachijojima and southern Honshu. Depth 66 km. Mag. 7.4, P.
23....	06:29:42.5	Nicaragua.....	12.4 N.	86.1 W.	Estimated 4,000 to 6,000 deaths, thousands injured. Preliminary estimates indicate approximately $800 million property damage in Managua. Depth 5 km. Mag. 6.2 (M_s).

Source: *Preliminary Determination of Epicenters Monthly Listing*, published by NOAA–Environmental Research Laboratories, National Earthquake Information Center, Boulder, Colo., January–December 1972.

*Magnitudes computed by Environmental Research Laboratories are as follows: (MS)—computed from surface wave on seismogram; (m_b)—computed from body wave on seismogram. A magnitude value followed by P has been computed by California Institute of Technology, Pasadena.

Strong-Motion Seismograph Data[1]

INTRODUCTION

The Seismological Field Survey has conducted an engineering seismology program in the United States and Latin America since 1932. The Survey, with cooperation of state and municipal governments, private industry, and state and private educational institutions, has installed and maintained strong-motion seismographs and analyzed the seismograms. Results of these analyses have been published in Government bulletins and scientific journals, and the records, either originals or copies, have been made available to research scientists.

A list of strong-motion stations in the United States and Central and South America is available from the Seismological Field Survey (address in footnote 1). This list, which gives the geographic location of each station and instrumental constants, has been cataloged through 1972. The format is similar to that included in this paper.

The number of strong-motion accelerographs in the United States and Central and South America has risen from 75 in 1963 to 703 in December 1972. With the exception of six ½*g* instruments, all accelerographs are capable of recording acceleration pulses as large as 1*g* without going off scale. Figure 8 shows the locations of accelerographs in the network operated by the Seismological Field Survey. The rapid growth in the network is attributable largely to the development of modern low-cost accelerographs, to the cooperative programs instituted with the State of California Department of Water Resources, Army Corps of Engineers, and California Institute of Technology, and to numerous cities that have adopted building code provisions requiring three accelerographs in most structures taller than six stories.

Notes pertinent to this engineering seismology program may be found in preceding issues of the *United States Earthquakes* series, in *Publication 41–1, Earthquake History of the United States, Revised Edition (Through 1970),* and in *Publication 41–2, Earthquake Investigations in the Western United States, 1931–1964,* U.S. Department of Commerce, Coast and Geodetic Survey, Washington, D.C., 1965. The latter is much broader in scope, containing data on structural and ground vibrations and detailed descriptions of the many activities that constitute the seismological program as a whole.

INTERPRETATION OF RECORDS

Table 5 presents a complete listing of all earthquakes recorded in 1972 and the number of records obtained on strong-motion instruments. Table 6 gives all pertinent instrument data for each accelerograph or displacement meter that was activated by an

[1] Prepared by Glenn Converse, NOAA, Environmental Research Laboratories, Seismological Field Survey, San Francisco, Calif. Appreciation is extended to Virgilio Perez, Stephen Schwartz, Richard P. Maley, B. J. Morrill, and Charles F. Knudson of the Seismological Field Survey for their assistance in preparing this section.

Editors' note.—See Preface, p. iii, for organizational changes in 1973.

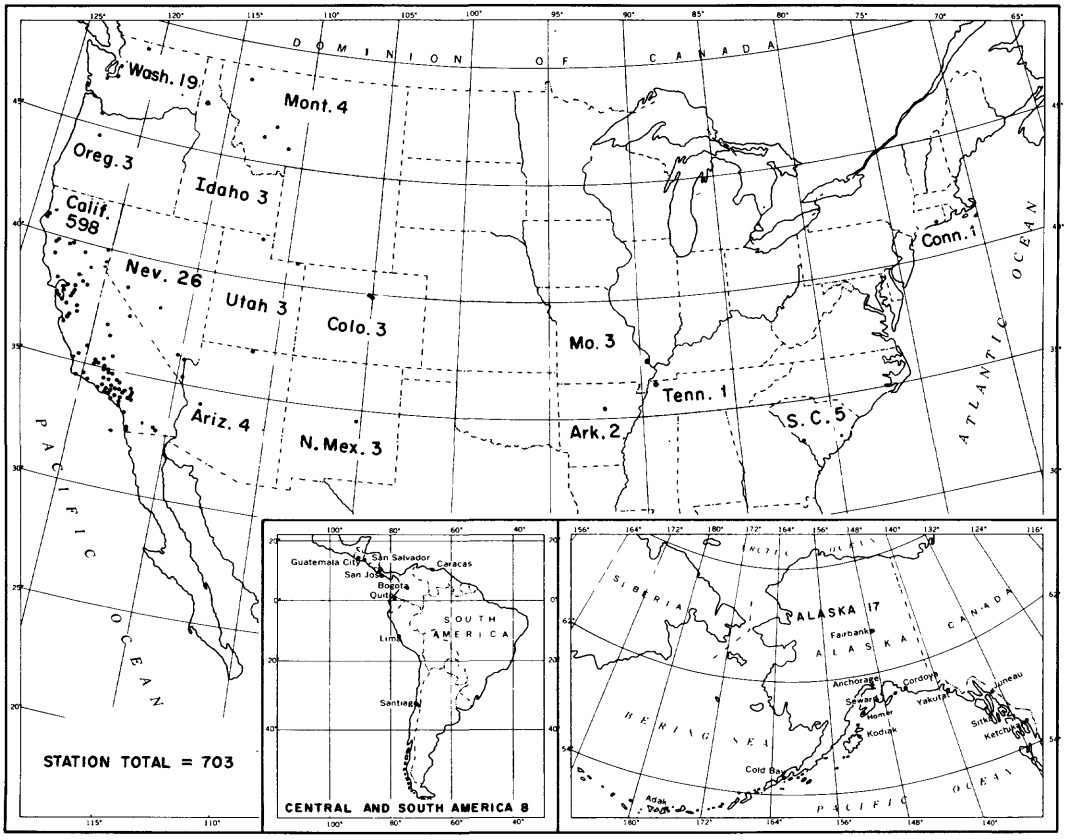

FIGURE 8.—NOAA strong-motion accelerograph network.

earthquake. Site station numbers with a designation of 9,000 or greater are temporary stations. For stations in the Southern Hemisphere, a minus sign precedes the latitude orientation. Also included in this table are the date of occurrence of an earthquake, its location and magnitude, and the maximum modified Mercalli intensity. For each station, the epicentral distance (in kilometers), the length of actual earthquake record (in seconds), the peak acceleration (in fractions of g) or displacement (in centimeters), the approximate period (in seconds) of this peak, and the duration (in seconds) and the number of cycles of acceleration which exceeded $0.2g$ are listed.

The accelerations and displacements are values derived from direct scaling of maximum amplitudes from the original records. Periods are approximated by measuring and doubling the time between zeros of that cycle with the maximum acceleration or displacement. Only accelerations greater than $0.01g$ and displacements greater than 0.1 cm were measured. For two events, accelerations greater than $0.2g$ were recorded. These were the September 4 earthquake in California and the December 23 earthquake in Nicaragua (Managua stations are not operated by NOAA). The number of seconds of acceleration exceeding $0.2g$ and the approximate number of cycles in this duration were measured and tabulated.

TABLE 5.—*Occurrence of earthquakes and number of strong-motion records for 1972*

Date	Location	Number
Feb.–May	Vicinity of San Fernando, Calif.	2
Feb. 24	Bear Valley, Calif.	1
27 (11:52)	....do.	1
27 (14:13)	....do.	2
Mar. 1	Off northern coast of California	1
Mar.–June	Vicinity of Bear Valley, Calif.	2
Apr. 6 or 20	Southern Alaska	1
July 5	Near San Fernando, Calif.	1
30	Southeastern Alaska	3
Aug. 3	Near the Andreanof Islands, Alaska	1
15	Fairbanks, Alaska	1
27	Beverly Hills, Calif.	90
Sept. 4	Paicines–Bear Valley, Calif.	5
23 (02:56)	South of San Juan Bautista, Calif.	2
23 (07:07)	....do.	2
Oct. 2	....do.	3
Dec. 23	Managua, Nicaragua	1

TABLE 6.—*Compilation of strong-motion accelerograph data for 1972*

Stn. no.	Station	Coordinates	Instruments	Component	Orientation	Sensitivity	Period *sec*	Crit. damp.	Stat. mag.	Epic. dist. *km*	Recd. leng. *sec*	Max. accl. Per. *sec*	Max. accl. Accl. *g*	Accl. gt. 0.2g Dur.	Accl. gt. 0.2g Cycle
					EARTHQUAKE BETWEEN 10 FEBRUARY AND 11 MAY. VICINITY OF SAN FERNANDO, CALIF.										
570	SAN FERNANDO	34.35N	SMA-1	L1040	N 77 E	2.09	.038	.61	58.3	0	PR	.2	.02		
	SAN FERNANDO OVERPASS	118.51W	HD-416	V1053	DOWN	1.70	.038	.59	47.5			.2	.01		
	BASE (FREE FIELD)			T1055	N 13 W	1.83	.040	.57	46.1			.3	.02		
571	SAN FERNANDO	34.35N	SMA-1	L1090	N 77 E	1.85	.039	.59	49.0	0	10	.2	.02		
	SAN FERNANDO OVERPASS	118.51W	HD-417	V1041	DOWN	1.83	.039	.59	48.5			.2	.02		
	(TOP OF OVERPASS)			T1066	N 13 W	1.95	.040	.61	49.1			.3	.02		
					EARTHQUAKE OF 24 FEBRUARY (07.56.51 PST). BEAR VALLEY, CALIF. 36.59 N, 121.20 W, DEPTH = 6 KM., MAG = 5.1, (MM) INTENSITY = VI.										
1028	HOLLISTER	36.85N	S-M	V 238	UP	13.8	.067	.58	123	34	76	.3	.01		
	CITY HALL	121.40W	FS-24	L 239	S 01 W	12.9	.065	.62	124			.5	.02		
	(HALF-BASEMENT)		WITH	T 240	N 89 W	12.7	.065	.56	122			.6	.03		
			CDMS	L 6	S 01 W		2.10	.59	1.0			1.1	.2*		
				T 5	S 89 E		2.22	.61	1.0			1.1	.3*		
					AFTERSHOCK OF 27 FEBRUARY (11.52.45 PST). BEAR VALLEY, CALIF. 36.64 N, 121.25 W, DEPTH = 6 KM., MAG = 3.4 .										
1202	STONE CANYON	36.64N	SMA-1	L	S 03 E	1.86	.039	.57	49.3	1	8	.2	.03		
	GEOPHYSICAL	121.24W	FS-298	V	DOWN	1.63	.037	.53	48.0			.1	.02		
	OBSERVATORY			T	N 87 E	1.81	.038	.55	48.5			.2	.03		

See footnotes at end of table.

TABLE 6.—*Compilation of strong-motion accelerograph data for 1972*—Continued

Stn. no.	Station	Coordinates	Instruments	Component	Orientation	Sensitivity	Period *sec*	Crit. damp.	Stat. mag.	Epic. dist. *km*	Recd. leng. *sec*	Max. accl. Per. *sec*	Max. accl. Accl. *g*	Accl. gt. 0.2g Dur.	Accl. gt. 0.2g Cycle
	AFTERSHOCK OF 27 FEBRUARY (14.13.09 PST). BEAR VALLEY, CALIF. 36.55 N, 121.09 W, DEPTH = 10 KM., MAG = 4.7, (MM)INTENSITY = V.														
1028	HOLLISTER	36.85N	S-M	V 238	UP	13.8	.067	.58	123	33	81		---		
	CITY HALL	121.40W	FS-24	L 239	S 01 W	12.9	.065	.62	124				---		
	(HALF-BASEMENT)		WITH	T 240	N 89 W	12.7	.065	.56	122				---		
			CDMS	L 6	S 01 W		2.10	.59	1.0			1.1	.1*		
				T 5	S 89 E		2.22	.61	1.0				--*		
1202	STONE CANYON	36.04N	SMA-1	L	S 03 E	1.86	.039	.57	49.3	17	27	.3	.03		
	GEOPHYSICAL	121.24W	FS-298	V	DOWN	1.63	.037	.53	48.0			.1	.02		
	OBSERVATORY			T	N 87 E	1.81	.038	.55	48.5			.5	.04		
	EARTHQUAKE OF 1 MARCH (01.28.42 PST). OFF NORTHERN COAST OF CALIFORNIA. 40.67 N, 125.25 W, DEPTH = 10 KM., MAG = 5.2, (MM)INTENSITY = V.														
1023	FERNDALE	40.58N	S-M	V 247	UP	13.8	.068	.57	125	84	115	.3	---		
	CITY HALL	124.26W	FS-23	L 248	S 44 W	13.3	.067	.57	125			.3	.01		
	(GRD. LEVEL PIER)			T 249	N 46 W	12.3	.065	.59	123			.2	.01		
			DM	RIGHT	S 46 E		9.3	.59	1						
			13	LEFT	S 44 W		9.8	.62	1						

TABLE 6.—*Compilation of strong-motion accelerograph data for 1972*—Continued

Stn. no.	Station	Coordinates	Instruments	Component	Orientation	Sensitivity	Period *sec*	Crit. damp.	Stat. mag.	Epic. dist. *km*	Recd. leng. *sec*	Max. accl. Per. *sec*	Max. accl. Accl. *g*	Accl. gt. 0.2g Dur.	Accl. gt. 0.2g Cycle
				TWO EARTHQUAKES BETWEEN 4 MARCH AND 16 JUNE. VICINITY OF BEAR VALLEY, CALIF.											
1211	HOLLISTER	36.59N	RFT-250	L 313	N 61 E	3.80	.065	.59	18.1	0	23	.1	.15		
	MELENDY RANCH BARN	121.19W	FS-245	V 336	DOWN	3.90	.065	.57	18.6			.1	.04		
	(FREEFIELD)			T 337	N 29 W	3.78	.063	.57	19.2			.1	.07		
1211	HOLLISTER	36.59N	RFT-250	L 313	N 61 E	3.80	.065	.59	18.1	0	8	.2	.07		
	MELENDY RANCH BARN	121.19W	FS-245	V 336	DOWN	3.90	.065	.57	18.6			.1	.01		
	(FREEFIELD)			T 337	N 29 W	3.78	.063	.57	19.2			.1	.03		
				EARTHQUAKE OF EITHER 6 APRIL (17.16.23 AST) OR 20 APRIL (05.14.49 AST). SOUTHERN ALASKA. 60.1(60.2) N, 152.8(152.1) W, DEPTH = 98 (85), MAG = 5.1 (4.7), MM = V.											
2712	HOMER, ALASKA	59.64N	AR-240	L 255	NORTH	7.5	.052	.59	110	78	5	.2	.03		
	FAA STORAGE BLDG.	151.50W	FS-146	V 217	DOWN	7.5	.063	.59	75			.2	.01		
	(GROUND LEVEL)			T 227	WEST	7.5	.061	.59	77			.2	.02		
				EARTHQUAKE OF 5 JULY (11.57.40 PST). NEAR SAN FERNANDO, CALIF. 34.41 N, 118.38 W, DEPTH = 9.KM., MAG = 3.4 .											
279	SAN FERNANDO	34.34N	AR-240	L 355	N 76 W	7.61	.052	.62	113	8	7	.1	.03		
	PACOIMA DAM	118.40W	FC-179	V 311	DOWN	7.55	.052	.63	115			.1	.01		
	(ABUTMENT)			T 352	S 14 W	7.69	.050	.63	121			.1	.02		

TABLE 6.—*Compilation of strong-motion accelerograph data for 1972*—Continued

Stn. no.	Station	Coordinates	Instruments	Component	Orientation	Sensitivity	Period *sec*	Crit. damp.	Stat. mag.	Epic. dist. *km*	Recd. leng. *sec*	Max. accl. Per. *sec*	Max. accl. Accl. *g*	Accl. gt. 0.2g Dur.	Accl. gt. 0.2g Cycle
		EARTHQUAKE OF 30 JULY (11.45.14 AST). SOUTHEASTERN ALASKA. 56.8 N, 135.7 W, DEPTH = 25 KM., MAG = 6.5, (MM)INTENSITY = VII.													
2708	JUNEAU, ALASKA	58.38N	AR-240	L 281	NORTH	7.8	.055	.59	104	185	24	.3	.01		
	FISHERIES LAB(BSMNT.)	134.64W	FS-147	V 278	DOWN	7.7	.051	.59	118			.2	---		
	AUKE BAY			T 279	WEST	7.8	.051	.59	120			.2	.01		
2714	SITKA, ALASKA	57.06N	AR-240	L 205	NORTH	7.0	.052	.59	103	35	54	.2	.09		
	MAGNETIC OBSERVATORY	135.32W	FS-148	V 213	DOWN	9.4	.057	.61	117			.2	.05		
	(SEISMOMETER VAULT)			T 148	WEST	7.0	.049	.62	119			.2	.11		
2715	YAKUTAT, ALASKA	59.51N	AR-240	L 246	S 37 E	7.2	.060	.59	80	381	110		---		
	FAA, YAKUTAT AIRPORT	139.67W	FS-140	V 215	DOWN	7.2	.058	.61	86				---		
	(WOOD PUMP HOUSE)			T 203	N 53 E	7.2	.063	.57	73			1.7	.01		
		EARTHQUAKE OF 3 AUGUST (15.28.31 AST). NEAR THE ANDREANOF ISLANDS, ALASKA. 51.5 N, 178.5 W, DEPTH = 60 KM., MAG = 5.0, (MM)INTENSITY = II.													
2701	ADAK, ALASKA	51.88N	AR-240	L 235	NORTH	8.2	.055	.59	107	139	6		---		
	U.S. NAVAL BASE	176.58W	FS-141	V 409	DOWN	6.5	.051	.59	100				---		
	(SEISMIC VAULT)			T 232	WEST	7.5	.055	.59	100			.4	.02		

TABLE 6.—*Compilation of strong-motion accelerograph data for 1972*—Continued

Stn. no.	Station	Coordinates	Instruments	Component	Orientation	Sensitivity	Period *sec*	Crit. damp.	Stat. mag.	Epic. dist. *km*	Recd. leng. *sec*	Max. accl. Per. *sec*	Max. accl. Accl. *g*	Accl. gt. 0.2g Dur.	Accl. gt. 0.2g Cycle
				EARTHQUAKE OF 15 AUGUST (11.39.04 AST). FAIRBANKS, ALASKA. 65.1 N, 148.7 W, DEPTH = 20 KM., MAG = 4.3, (MM) INTENSITY = IV.											
2707	FAIRBANKS, ALASKA	64.86N	AR-240	L 138	N 19 E	7.2	.051	.57	111	49	7	.1	.03		
	COLLEGE MAG. OBSERV.	147.83W	FS-111	V 188	DOWN	7.2	.051	.64	115			.2	.02		
	(SEISMIC VAULT)			T 134	N 71 W	7.2	.053	.73	104			.1	.04		
				EARTHQUAKE OF 27 AUGUST (00.49.27 PST). BEVERLY HILLS, CALIF. 34.06 N, 118.39 W, DEPTH = 8 KM., MAG = 3.2, (MM) INTENSITY = V.											
184	LOS ANGELES	34.06N	MO-2	B	N 44 E	1.58	.030	.59	69	3	45		.01		
	1900 AVE. OF STARS	118.42W	LA-121	A	S 46 E	1.58	.030	.59	69				.01		
	(BASEMENT)			V	UP	2.31	.030	.59	101				.01		
185	LOS ANGELES	34.06N	MO-2	B	N 44 E	1.52	.030	.59	67	3	45		.01		
	1900 AVE. OF STARS	118.42W	LA-144	A	S 46 E	1.32	.030	.59	58				.01		
	(16TH FLOOR)			V	UP	2.31	.030	.59	101				.02		
186	LOS ANGELES	34.06N	MO-2	B	N 44 E	1.54	.030	.59	68	3	45		.01		
	1900 AVE. OF STARS	118.42W	LA-197	A	S 46 E	1.54	.030	.59	68				.01		
	(ROOF, 29TH LEVEL)			V	UP	2.36	.030	.59	104				.04		
187	LOS ANGELES	34.06N	AR-240	L 182	N 46 W	7.6	.051	.59	116	3	7		.02		
	1901 AVE. OF STARS	118.42W	LA-278	V 194	DOWN	7.6	.051	.59	118				.01		
	(SUB-BASEMENT)			T 185	S 44 W	7.6	.051	.59	119				.02		
188	LOS ANGELES	34.06N	AR-240	L 183	N 46 W	7.6	.050	.57	122	3	7		.01		
	1901 AVE. OF STARS	118.42W	LA-283	V 184	DOWN	7.6	.051	.57	116				.02		
	(9TH FLOOR)			T 191	S 44 W	7.6	.049	.57	131				.03		

TABLE 6.—*Compilation of strong-motion accelerograph data for 1972*—Continued

Stn. no.	Station	Coordinates	Instruments	Component	Orientation	Sensitivity	Period *sec*	Crit. damp.	Stat. mag.	Epic. dist. *km*	Recd. leng. *sec*	Max. accl. Per. *sec*	Max. accl. Accl. *g*	Accl. gt. 0.2g Dur.	Accl. gt. 0.2g Cycle
	EARTHQUAKE OF 27 AUGUST (00.49.27 PST). BEVERLY HILLS, CALIF. 34.06 N, 118.39 W, DEPTH = 8 KM., MAG = 3.2, (MM)INTENSITY = V.														
189	LOS ANGELES	34.06N	AR-240	L 187	N 46 W	7.6	.050	.57	124	3	7		.02		
	1901 AVE. OF STARS	118.42W	LA-275	V 190	DOWN	7.6	.048	.57	136				.03		
	(21ST FLOOR)			T 181	S 44 W	7.6	.050	.57	123				.01		
413	LOS ANGELES	34.06N	MO-2	B	N 31 W	1.54	.034	.59	54	1	45		.06		
	1177 BEVERLY DR	118.40W	LA-170	A	N 59 E	1.57	.034	.59	55				.03		
	(BASEMENT)			V	UP	2.38	.034	.59	83				.04		
414	LOS ANGELES	34.06N	MO-2	B	N 31 W	1.50	.035	.59	49	1	45		.08		
	1177 BEVERLY DR	118.40W	LA-176	A	N 59 E	1.51	.035	.59	50				.17		
	(3RD FLOOR)			V	UP	2.28	.035	.59	75				.07		
415	LOS ANGELES	34.06N	MO-2	B	N 31 W	1.51	.035	.59	50	1	NR				
	1177 BEVERLY DR	118.40W	LA-131	A	N 59 E	1.52	.034	.59	53						
	(7TH FLOOR)			V	UP	2.32	.034	.59	81						
488	BEVERLY HILLS	34.07N	SMA-1	L 466	N 50 E	1.67	.037	.53	49.0	2	7		.01		
	430 CAMDEN DR.	118.40W	BH-241	V 478	DOWN	1.81	.038	.59	50.5				---		
	(GROUND FLOOR)			T 477	N 40 W	1.67	.039	.55	44.3				.02		
485	BEVERLY HILLS	34.07N	SMA-1	L 455	N 50 E	1.76	.038	.59	49.0	2	7		.02		
	430 CAMDEN DR.	118.40W	BH-243	V 482	DOWN	1.69	.038	.59	47.2				.01		
	(4TH FLOOR)			T 483	N 40 W	1.85	.039	.59	49.0				.01		
490	BEVERLY HILLS	34.07N	SMA-1	L 481	N 50 E	1.64	.039	.57	45.8	2	7		.03		
	430 CAMDEN DR.	118.40W	BH-242	V 450	DOWN	1.71	.040	.59	43.1				.03		
	(6TH FLOOR)			T 466	N 40 W	1.74	.039	.58	48.6				.01		

TABLE 6.—*Compilation of strong-motion accelerograph data for 1972*—Continued

Stn. no.	Station	Coordinates	Instruments	Component	Orientation	Sensitivity	Period *sec*	Crit. damp.	Stat. mag.	Epic. dist. *km*	Recd. leng. *sec*	Max. accl. Per. *sec*	Max. accl. Accl. *g*	Accl. gt. 0.2g Dur.	Accl. gt. 0.2g Cycle
	EARTHQUAKE OF 27 AUGUST (00.49.27 PST). BEVERLY HILLS, CALIF. 34.06 N, 118.39 W, DEPTH = 8 KM., MAG = 3.2, (MM) INTENSITY = V.														
425	LOS ANGELES	34.06N	SMA-1	L 324	S 36 E	1.98	.041	.57	47.5	2	15		.06		
	1800 CENTURY PARK EAST	118.41W	LA-141	V 231	DOWN	1.80	.042	.50	45.0				.04		
	(BASEMENT)			T 233	N 54 E	1.80	.039	.50	41.5				.02		
426	LOS ANGELES	34.06N	SMA-1	L 227	S 36 E	1.85	.040	.55	46.5	2	15		.05		
	1800 CENTURY PARK EAST	118.41W	LA-140	V 229	DOWN	1.78	.041	.53	43.0				.05		
	(5TH FLOOR)			T 226	N 54 E	1.95	.040	.53	49.0				.04		
427	LOS ANGELES	34.06N	SMA-1	L 219	S 36 E	1.73	.040	.50	43.5	2	15		.09		
	1800 CENTURY PARK EAST	118.41W	LA-135	V 218	DOWN	1.82	.041	.55	44.0				.09		
	(PENTHOUSE,16TH FLR.)			T 208	N 54 E	1.69	.039	.46	44.5				.04		
440	LOS ANGELES	34.06N	SMA-1	L 185	N 54 E	1.92	.040	.55	48.5	2	20		.06		
	1880 CENTURY PARK EAST	118.41W	LA-121	V 118	DOWN	1.64	.037	.57	48.5				.04		
	(BASEMENT)			T 121	N 36 W	1.82	.041	.59	44				.08		
441	LOS ANGELES	34.06N	SMA-1	L 166	N 54 E	1.85	.042	.59	43	2	20		.02		
	1880 CENTURY PARK EAST	118.41W	LA-115	V 160	DOWN	1.74	.040	.55	44				.01		
	(7TH FLOOR)			T 181	N 36 W	1.87	.043	.59	42.5				.05		
442	LOS ANGELES	34.06N	SMA-1	L 131	N 54 E	1.85	.035	.59	60.9	2	NR				
	1880 CENTURY PARK EAST	118.41W	LA-111	V 147	DOWN	1.68	.034	.53	58.6						
	(PENTHOUSE, 17TH FLR.)			T 124	N 36 W	1.53	.033	.53	56.6						
419	LOS ANGELES	34.06N	RFT-250	L 476	S 36 E	1.85	.049	.61	31	2	9		.05		
	1888 CENTURY PARK EAST	118.41W	LA-273	V 505	DOWN	1.90	.051	.63	29				.01		
	(BASEMENT)			T 517	N 54 E	1.87	.049	.61	31				.05		

TABLE 6.—*Compilation of strong-motion accelerograph data for 1972*—Continued

Stn. no.	Station	Coordinates	Instruments	Component	Orientation	Sensitivity	Period *sec*	Crit. damp.	Stat. mag.	Epic. dist. *km*	Recd. leng. *sec*	Max. accl. Per. *sec*	Max. accl. Accl. *g*	Accl. gt. 0.2g Dur.	Accl. gt. 0.2g Cycle
	EARTHQUAKE OF 27 AUGUST (00.49.27 PST). BEVERLY HILLS, CALIF. 34.06 N, 118.39 W, DEPTH = 8 KM., MAG = 3.2, (MM)INTENSITY = V.														
420	LOS ANGELES	34.06N	RFT-250	L 441	S 36 E	1.87	.051	.55	29	2	9		.01		
	1888 CENTURY PARK EAST	118.41W	LA-269	V 499	DOWN	1.90	.049	.57	32				.06		
	(14TH FLOOR)			T 489	N 54 E	1.86	.050	.57	30				---		
421	LOS ANGELES	34.06N	RFT-250	L 469	S 36 E	1.87	.050	.57	30	2	NR				
	1888 CENTURY PARK EAST	118.41W	LA-268	V 440	DOWN	1.90	.047	.59	35						
	(21ST FLOOR)			T 465	N 54 E	1.89	.047	.59	35						
422	LOS ANGELES	34.06N	RFT-250	L 511	S 36 E	1.90	.051	.59	29	2	10		.05		
	1888 CENTURY PARK EAST	118.41W	LA-280	V 506	DOWN	1.90	.047	.59	35				.03		
	(PARKING RAMP,BSMNT.)			T 444	N 54 E	1.83	.051	.59	28				.06		
423	LOS ANGELES	34.06N	RFT-250	L 518	S 36 E	1.87	.048	.61	33	2	10		.05		
	1888 CENTURY PARK EAST	118.41W	LA-265	V 452	DOWN	1.90	.049	.57	32				.05		
	(PARKING RAMP,5TH FLR)			T 460	N 54 E	1.86	.048	.61	33				.08		
424	LOS ANGELES	34.06N	RFT-250	L 496	S 36 E	1.84	.048	.53	32	2	10		.16		
	1888 CENTURY PARK EAST	118.41W	LA-275	V 457	DOWN	1.90	.049	.59	32				.06		
	(PARKING RAMP,ROOF,9)			T 462	N 54 E	1.89	.048	.59	33				.07		
193	LOS ANGELES	34.06N	MO-2	B	N 40 W	1.63	.030	.59	72	2	45		.02		
	2080 CENTURY PARK EAST	118.41W	LA-115	A	N 50 E	1.66	.030	.59	73				.03		
	(BASEMENT)			V	UP	2.33	.030	.59	102				.01		
194	LOS ANGELES	34.06N	MO-2	B	N 40 W	1.56	.030	.59	68	2	45		.04		
	2080 CENTURY PARK EAST	118.41W	LA-184	A	N 50 E	1.60	.030	.59	70				.02		
	(10TH FLOOR)			V	UP	2.37	.030	.59	104				.01		

TABLE 6.—*Compilation of strong-motion accelerograph data for 1972*—Continued

Stn. no.	Station	Coordinates	Instruments	Component	Orientation	Sensitivity	Period *sec*	Crit. damp.	Stat. mag.	Epic. dist. *km*	Recd. leng. *sec*	Max. accl. Per. *sec*	Max. accl. Accl. *g*	Accl. gt. 0.2g Dur.	Accl. gt. 0.2g Cycle
	EARTHQUAKE OF 27 AUGUST (00.49.27 PST). BEVERLY HILLS, CALIF. 34.06 N, 118.39 W, DEPTH = 8 KM., MAG = 3.2, (MM)INTENSITY = V.														
195	LOS ANGELES	34.06N	MO-2	B	N 40 W	1.55	.030	.59	68	2	45		.04		
	2080 CENTURY PARK EAST	118.41W	LA-199	A	N 50 E	1.54	.030	.59	68				.07		
	(ROOF)			V	UP	2.43	.030	.59	107				.04		
542	LOS ANGELES	34.06N	RFT-250	L 247	S 55 W	1.89	.045	.58	37.6	3	8		.01		
	1801 CENTURY PARK WEST	118.42W	LA-197	V 300	DOWN	2.03	.045	.57	40.4				.01		
	(BASEMENT)			T 286	S 35 E	1.95	.044	.57	40.6				---		
543	LOS ANGELES	34.06N	RFT-250	L 598	S 55 W	1.90	.047	.60	34.1	3	8		.01		
	1801 CENTURY PARK WEST	118.42W	LA-290	V 575	DOWN	1.95	.046	.58	37.9				.01		
	(6TH FLOOR)			T 607	S 35 E	1.84	.046	.59	36.4				.01		
544	LOS ANGELES	34.06N	RFT-250	L 588	S 55 W	1.87	.052	.57	27.9	3	8		---		
	1801 CENTURY PARK WEST	118.42W	LA-292	V 568	DOWN	1.99	.048	.59	34.8				.01		
	(ROOF,11TH LEVEL)			T 573	S 35 E	1.91	.049	.60	32.1				.01		
169	LOS ANGELES	34.05N	RFT-250	L 177	N 60 W	2.04	.047	.57	37.2	11	8		---		
	750 GARLAND	118.27W	LA-153	V 205	DOWN	1.95	.048	.57	34.1				---		
	(GROUND FLOOR)			T 216	S 30 W	1.93	.048	.57	33.8				---		
170	LOS ANGELES	34.05N	RFT-250	L 161	N 60 W	1.91	.046	.68	36.4	11	8		---		
	750 GARLAND	118.27W	LA-152	V 172	DOWN	1.99	.047	.57	36.3				---		
	(2ND FLOOR)			T 171	S 30 W	1.88	.047	.68	34.3				---		
171	LOS ANGELES	34.05N	RFT-250	L 160	N 60 W	1.97	.048	.63	34.5	11	8		.01		
	750 GARLAND	118.27W	LA-151	V 170	DOWN	1.97	.046	.59	37.5				---		
	(6TH FLOOR)			T 169	S 30 W	1.96	.047	.59	35.8				---		

TABLE 6.—*Compilation of strong-motion accelerograph data for 1972*—Continued

Stn. no.	Station	Coordinates	Instruments	Component	Orientation	Sensitivity	Period *sec*	Crit. damp.	Stat. mag.	Epic. dist. *km*	Recd. leng. *sec*	Max. accl. Per. *sec*	Max. accl. Accl. *g*	Accl. gt. 0.2g Dur.	Accl. gt. 0.2g Cycle
	EARTHQUAKE OF 27 AUGUST (00.49.27 PST). BEVERLY HILLS, CALIF. 34.06 N, 118.39 W, DEPTH = 8 KM., MAG = 3.2, (MM)INTENSITY = V.														
539	LOS ANGELES	33.98N	RFT-250	L 488	S 45 W	1.87	.047	.58	34.1	8	44		---		
	5990 GREEN VALLEY CIR.	118.38W	LA-259	V 520	DOWN	1.91	.047	.58	34.9				---		
	(1ST FLOOR)			T 477	S 45 E	1.88	.050	.59	31.7				---		
540	LOS ANGELES	33.98N	RFT-250	L 534	S 45 W	1.90	.047	.60	36.7	8	44		---		
	5990 GREEN VALLEY CIR.	118.38W	LA-286	V 593	DOWN	1.99	.047	.59	37.9				.01		
	(4TH FLOOR)			T 539	S 45 E	1.93	.048	.60	32.4				.01		
541	LOS ANGELES	33.98N	RFT-250	L 611	S 45 W	1.95	.049	.58	34.1	8	44		.01		
	5990 GREEN VALLEY CIR.	118.38W	LA-287	V 548	DOWN	2.01	.049	.58	33.7				.01		
	(8TH FLOOR)			T 536	S 45 E	1.95	.048	.57	35.7				.02		
407	LOS ANGELES	34.06N	MO-2	B	N 76 W	1.51	.035	.59	50	5	NR				
	930 HILGARD	118.44W	LA-166	A	N 14 E	1.53	.035	.59	50						
	(BASEMENT)			V	UP	2.34	.034	.59	77						
408	LOS ANGELES	34.06N	MO-2	B	N 76 W	1.50	.034	.59	52	5	45		.02		
	930 HILGARD	118.44W	LA-200	A	N 14 E	1.55	.034	.59	54				.01		
	(8TH FLOOR)			V	UP	2.38	.034	.59	83				.02		
409	LOS ANGELES	34.06N	MO-2	B	N 76 W	1.54	.035	.59	51	5	45		.01		
	930 HILGARD	118.44W	LA-158	A	N 14 E	1.57	.037	.59	55				---		
	(15TH FLOOR)			V	UP	2.28	.037	.59	80				.01		
533	LOS ANGELES	34.10N	SMA-1	L 699	NORTH	1.79	.039	.59	47.4	6	16		.01		
	7060 HOLLYWOOD BLVD.	118.34W	LA-335	V 674	DOWN	1.84	.039	.59	48.8				---		
	(BASEMENT)			T 702	WEST	1.91	.039	.57	52.2				.06		

TABLE 6.—*Compilation of strong-motion accelerograph data for 1972*—Continued

Stn. no.	Station	Coordinates	Instruments	Component	Orientation	Sensitivity	Period *sec*	Crit. damp.	Stat. mag.	Epic. dist. *km*	Recd. leng. *sec*	Max. accl. Per. *sec*	Max. accl. Accl. *g*	Accl. gt. 0.2g Dur.	Accl. gt. 0.2g Cycle
	EARTHQUAKE OF 27 AUGUST (00.49.27 PST). BEVERLY HILLS, CALIF. 34.06 N, 118.39 W, DEPTH = 8 KM., MAG = 3.2, (MM)INTENSITY = V.														
534	LOS ANGELES	34.10N	SMA-1	L 728	NORTH	1.85	.039	.63	49.0	6	16		.01		
	7060 HOLLYWOOD BLVD.	118.34W	LA-334	V 744	DOWN	1.73	.039	.57	45.8				.02		
	(6TH FLOOR)			T 693	WEST	1.90	.039	.57	50.3				.06		
535	LOS ANGELES	34.10N	SMA-1	L 687	NORTH	1.94	.039	.57	51.4	6	16		.02		
	7060 HOLLYWOOD BLVD.	118.34W	LA-332	V 689	DOWN	1.92	.040	.61	48.4				.04		
	(ROOF, 13TH LEVEL)			T 673	WEST	1.81	.040	.59	45.6				.04		
446	LOS ANGELES	34.10N	MO-2	A	SOUTH	1.47	.034	.59	51.3	6	45		.01		
	1760 N. ORCHID	118.34W	LA-152	B	EAST	1.52	.034	.59	53.0				.01		
	(GROUND FLOOR)			V	UP	2.34	.034	.59	81.6				---		
447	LOS ANGELES	34.10N	MO-2	B	EAST	1.52	.034	.59	53.0	6	45		---		
	1760 N. ORCHID	118.34W	LA-135	A	SOUTH	1.47	.034	.59	51.3				---		
	(12TH FLOOR)			V	UP	2.34	.034	.59	81.6				.01		
448	LOS ANGELES	34.10N	MO-2	B	EAST	1.57	.035	.59	51.7	6	45		.01		
	1760 N. ORCHID	118.34W	LA-132	A	SOUTH	1.54	.035	.59	50.7				---		
	(23RD FLOOR)			V	UP	2.42	.035	.59	79.6				.02		
142	LOS ANGELES	34.06N	AR-240	L 530	S 02 W	7.6	.055	.61	102	1	PR				
	120 N. ROBERTSON	118.38W	LA-239	V 534	DOWN	7.6	.054	.59	104						
	(2ND BASEMENT)			T 533	S 88 E	7.6	.054	.59	105						
143	LOS ANGELES	34.06N	AR-240	L 539	S 02 W	7.6	.053	.59	109	1	11		.13		
	120 N. ROBERTSON	118.38W	LA-237	V 535	DOWN	7.6	.054	.57	106				.03		
	(4TH FLOOR)			T 538	S 88 E	7.6	.057	.57	98				.12		

TABLE 6.—*Compilation of strong-motion accelerograph data for 1972*—Continued

Stn. no.	Station	Coordinates	Instruments	Component	Orientation	Sensitivity	Period *sec*	Crit. damp.	Stat. mag.	Epic. dist. *km*	Recd. leng. *sec*	Max. accl. Per. *sec*	Max. accl. Accl. *g*	Accl. gt. 0.2g Dur.	Accl. gt. 0.2g Cycle
	EARTHQUAKE OF 27 AUGUST (00.49.27 PST). BEVERLY HILLS, CALIF. 34.06 N, 118.39 W, DEPTH = 8 KM., MAG = 3.2, (MM)INTENSITY = V.														
144	LOS ANGELES	34.06N	AR-240	L 532	S 02 W	7.6	.056	.61	98.5	1	11		.13		
	120 N. ROBERTSON	118.38W	LA-238	V 536	DOWN	7.6	.056	.61	98.5				.06		
	(9TH FLOOR)			T 528	S 88 E	7.6	.054	.59	105				.10		
455	BEVERLY HILLS	34.08N	SMA-1	L 308	N 50 E	1.83	.041	.57	44	4	11		.02		
	450 N. ROXBURY	118.41W	BH-151	V 284	DOWN	1.86	.039	.57	49.5				---		
	(1ST FLOOR)			T 288	N 40 W	1.80	.039	.57	45.5				.02		
456	BEVERLY HILLS	34.08N	SMA-1	L 313	N 50 E	1.81	.039	.57	48	4	11		.02		
	450 N. ROXBURY	118.41W	BH-153	V 327	DOWN	1.86	.041	.53	45				.01		
	(5TH FLOOR)			T 318	N 40 W	1.69	.039	.53	45.5				.02		
457	BEVERLY HILLS	34.08N	SMA-1	L 311	N 50 E	1.66	.038	.53	49	4	11		.02		
	450 N. ROXBURY	118.41W	BH-152	V 321	DOWN	1.84	.039	.53	49				.02		
	(10TH FLOOR)			T 241	N 40 W	1.81	.040	.53	45.5				.02		
613	LOS ANGELES	34.06N	RFT-250	L 532	N 40 W	1.96	.049	.55	32.9	3	12		---		
	10100 SANTA MONICA	118.42W	LA-282	V 537	DOWN	1.99	.047	.59	36.3				.01		
	(BASEMENT)			T 525	S 50 W	1.95	.046	.59	37.1				---		
614	LOS ANGELES	34.06N	RFT-250	L 526	N 40 W	1.97	.049	.55	33.1	3	12		.04		
	10100 SANTA MONICA	118.42W	LA-285	V 546	DOWN	1.90	.046	.55	36.2				.03		
	(14TH FLOOR)			T 530	S 50 W	1.99	.048	.55	34.8				---		
615	LOS ANGELES	34.06N	RFT-250	L 535	N 40 W	1.93	.046	.59	36.8	3	12		.03		
	10100 SANTA MONICA	118.42W	LA-281	V 540	DOWN	2.01	.047	.55	36.7				.03		
	(ROOF,27TH FLOOR)			T 553	S 50 W	2.00	.048	.57	36.5				---		

TABLE 6.—*Compilation of strong-motion accelerograph data for 1972*—Continued

Stn. no.	Station	Coordinates	Instruments	Component	Orientation	Sensitivity	Period *sec*	Crit. damp.	Stat. mag.	Epic. dist. *km*	Recd. leng. *sec*	Max. accl. Per. *sec*	Max. accl. Accl. *g*	Accl. gt. 0.2g Dur.	Accl. gt. 0.2g Cycle
	EARTHQUAKE OF 27 AUGUST (00.49.27 PST). BEVERLY HILLS, CALIF. 34.06 N, 118.39 W, DEPTH = 8 KM., MAG = 3.2, (MM)INTENSITY = V.														
235	LOS ANGELES	34.10N	MO-2	B	EAST	1.49	.030	.59	65	7	45		.01		
	6464 SUNSET BLVD.	118.33W	LA-123	A	SOUTH	1.52	.030	.59	67				.01		
	(BASEMENT)			V	UP	2.40	.030	.59	105				---		
236	LOS ANGELES	34.10N	MO-2	B	EAST	1.55	.030	.59	68	7	45		.01		
	6464 SUNSET BLVD.	118.33W	LA-108	A	SOUTH	1.55	.030	.59	68				.02		
	(6TH FLOOR)			V	UP	2.33	.030	.59	102				.02		
237	LOS ANGELES	34.10N	MO-2	B	EAST	1.57	.030	.59	69	7	45		.01		
	6464 SUNSET BLVD.	118.33W	LA-116	A	SOUTH	1.52	.030	.59	67				.02		
	(12TH FLOOR)			V	UP	2.44	.030	.59	107				.02		
223	LOS ANGELES	34.06N	AR-240	L 176	N 18 E	7.6	.048	.59	135	5	10		.06		
	4680 WILSHIRE	118.33W	LA-268	V 138	DOWN	7.6	.047	.59	137				.03		
	(BASEMENT)			T 145	N 72 W	7.6	.047	.59	137				.05		
224	LOS ANGELES	34.06N	AR-240	L 173	N 18 E	7.6	.049	.59	126	5	10		.10		
	4680 WILSHIRE	118.33W	LA-284	V 168	DOWN	7.6	.050	.59	124				.03		
	(3RD FLOOR)			T 170	N 72 W	7.6	.047	.59	136				.10		
225	LOS ANGELES	34.06N	AR-240	L 177	N 18 E	7.6	.046	.59	147	5	10		.06		
	4680 WILSHIRE	118.33W	LA-279	V 178	DOWN	7.6	.045	.59	150				.03		
	(6TH FLOOR)			T 180	N 72 W	7.6	.048	.59	135				.06		
428	LOS ANGELES	34.06N	MO-2	B	S 07 W	1.52	.034	.59	53	2	45		.05		
	5900 WILSHIRE	118.36W	LA-112	A	N 83 W	1.50	.035	.59	49				.03		
	(BASEMENT)			V	UP	2.39	.036	.59	74				.02		

TABLE 6.—*Compilation of strong-motion accelerograph data for 1972*—Continued

Stn. no.	Station	Coordinates	Instruments	Component	Orientation	Sensitivity	Period *sec*	Crit. damp.	Stat. mag.	Epic. dist. *km*	Recd. leng. *sec*	Max. accl. Per. *sec*	Max. accl. Accl. *g*	Accl. gt. 0.2g Dur.	Accl. gt. 0.2g Cycle
	EARTHQUAKE OF 27 AUGUST (00.49.27 PST). BEVERLY HILLS, CALIF. 34.06 N, 118.39 W, DEPTH = 8 KM., MAG = 3.2, (MM)INTENSITY = V.														
429	LOS ANGELES	34.06N	MO-2	B	S 07 W	1.55	.034	.59	54	2	45		.05		
	5900 WILSHIRE	118.36W	LA-161	A	N 83 W	1.49	.034	.59	52				.03		
	(16TH FLOOR)			V	UP	2.37	.034	.59	83				.04		
430	LOS ANGELES	34.06N	MO-2	B	S 07 W	1.50	.034	.59	52	2	45		.02		
	5900 WILSHIRE	118.36W	LA-178	A	N 83 W	1.47	.034	.59	51				.05		
	(PENTHOUSE,32ND FLOOR)			V	UP	2.30	.035	.59	76				.02		
443	LOS ANGELES	34.06N	MO-2	B	N 82 W	1.57	.034	.59	55	2	45		.05		
	6200 WILSHIRE	118.36W	LA-173	A	N 08 E	1.49	.035	.59	49				.01		
	(GROUND FLOOR)			V	UP	2.33	.035	.59	77				.03		
444	LOS ANGELES	34.06N	MO-2	B	N 82 W	1.49	.034	.59	52	2	45		.15		
	6200 WILSHIRE	118.36W	LA-185	A	N 08 E	1.50	.035	.59	49				.06		
	(10TH FLOOR)			V	UP	2.34	.035	.59	77				.03		
445	LOS ANGELES	34.06N	MO-2	B	N 82 W	1.57	.034	.59	55	2	45		.09		
	6200 WILSHIRE	118.36W	LA-127	A	N 08 W	1.50	.035	.59	49				.08		
	(17TH FLOOR)			V	UP	2.32	.035	.59	81				.04		
567	LOS ANGELES	34.06N	SMA-1	L1012	S 82 E	2.03	.040	.61	51.1	1	17		.08		
	6300 WILSHIRE	118.37W	LA-344	V1030	DOWN	1.84	.038	.59	51.4				.04		
	(BASEMENT)			T1018	N 08 E	1.89	.039	.59	50.1				.10		
568	LOS ANGELES	34.06N	SMA-1	L 862	S 82 E	1.85	.038	.59	51.6	1	17		.08		
	6300 WILSHIRE	118.37W	LA-343	V 990	DOWN	1.85	.038	.57	51.6				.04		
	(11TH FLOOR)			T 861	N 08 E	1.81	.037	.55	53.3				.05		

TABLE 6.—*Compilation of strong-motion accelerograph data for 1972*—Continued

Stn. no.	Station	Coordinates	Instruments	Component	Orientation	Sensitivity	Period *sec*	Crit. damp.	Stat. mag.	Epic. dist. *km*	Recd. leng. *sec*	Max. accl. Per. *sec*	Max. accl. Accl. *g*	Accl. gt. 0.2g Dur.	Accl. gt. 0.2g Cycle
	EARTHQUAKE OF 27 AUGUST (00.49.27 PST). BEVERLY HILLS, CALIF. 34.06 N, 118.39 W, DEPTH = 8 KM., MAG = 3.2, (MM)INTENSITY = V.														
569	LOS ANGELES	34.06N	SMA-1	L 951	S 82 E	2.05	.039	.61	54.3	1	NR				
	6300 WILSHIRE	118.37W	LA-345	V 947	DOWN	1.91	.039	.61	50.6						
	(21ST FLOOR)			T 800	N 08 E	1.87	.038	.55	52.2						
627	LOS ANGELES	34.06N	SMA-1	L 853	S 82 E	1.93	.038	.61	53.7	1	12		.15		
	6420 WILSHIRE BLVD	118.37W	LA-337	V 875	DOWN	1.92	.037	.59	56.5				.02		
	(BASEMENT)			T 852	N 08 E	1.89	.038	.59	52.9				.06		
628	LOS ANGELES	34.06N	SMA-1	L 801	S 82 E	1.79	.038	.57	50.0	1	12		.06		
	6420 WILSHIRE BLVD	118.37W	LA-338	V 858	DOWN	1.77	.037	.55	52.2				.05		
	(11TH FLOOR)			T 778	N 08 E	1.84	.037	.53	54.5				.05		
629	LOS ANGELES	34.06N	SMA-1	L 940	S 82 E	1.83	.038	.55	52.5	1	12		.03		
	6420 WILSHIRE BLVD	118.37W	LA-339	V 942	DOWN	1.86	.036	.55	56.2				.05		
	(PENTHOUSE,20TH FLR.)			T 973	N 08 E	1.78	.038	.53	51.0				.04		
506	BEVERLY HILLS	34.06N	SMA-1	L 232	EAST	1.77	.038	.55	49.5	1	23		.15		
	8383 WILSHIRE	118.38W	BH-170	V 325	DOWN	1.80	.039	.57	48.1				.04		
	(BASEMENT)			T 289	NORTH	1.58	.038	.55	44.1				.12		
507	BEVERLY HILLS	34.06N	SMA-1	L 296	EAST	1.66	.039	.57	48.0	1	23		.07		
	8383 WILSHIRE	118.38W	BH-175	V 285	DOWN	1.61	.039	.57	42.7				.02		
	(5TH FLOOR)			T 328	NORTH	1.44	.038	.57	40.2				.06		
508	BEVERLY HILLS	34.06N	SMA-1	L 184	EAST	1.76	.036	.53	54.7	1	23		.06		
	8383 WILSHIRE	118.38W	BH-120	V 173	DOWN	1.34	.034	.53	46.7				.08		
	(ROOF,11TH LEVEL)			T 164	NORTH	1.74	.038	.50	48.6				.07		

TABLE 6.—*Compilation of strong-motion accelerograph data for 1972*—Continued

Stn. no.	Station	Coordinates	Instruments	Component	Orientation	Sensitivity	Period *sec*	Crit. damp.	Stat. mag.	Epic. dist. *km*	Recd. leng. *sec*	Max. accl. Per. *sec*	Max. accl. Accl. *g*	Accl. gt. 0.2g Dur.	Accl. gt. 0.2g Cycle
	EARTHQUAKE OF 27 AUGUST (00.49.27 PST). BEVERLY HILLS, CALIF. 34.06 N, 118.39 W, DEPTH = 8 KM., MAG = 3.2, (MM)INTENSITY = V.														
581	BEVERLY HILLS	34.07N	SMA-1	L 540	S 75 E	1.83	.038	.61	51.1	2	15		.09		
	8601 WILSHIRE BLVD	118.38W	BH-208	V 504	DOWN	1.78	.039	.61	47.2				.02		
	(GRDUND FLOOR)			T 505	N 15 E	1.75	.038	.55	48.8				.07		
582	BEVERLY HILLS	34.07N	SMA-1	L 550	S 75 E	1.70	.037	.57	50.1	2	15		.06		
	8601 WILSHIRE BLVD	118.38W	BH-209	V 532	DOWN	1.69	.038	.57	47.2				.02		
	(7TH FLOOR)			T 544	N 15 E	1.73	.037	.57	50.9				.07		
583	BEVERLY HILLS	34.07N	SMA-1	L 498	S 75 E	1.78	.037	.59	52.4	2	15		.05		
	8601 WILSHIRE BLVD	118.38W	BH-210	V 501	DOWN	1.75	.038	.55	48.8				.02		
	(ROOF,12TH FLOOR)			T 502	N 15 E	1.78	.038	.59	49.7				.05		
416	BEVERLY HILLS	34.07N	MO-2	A	SOUTH	1.54	.035	.59	51	2	45		.09		
	9100 WILSHIRE	118.39W	BH-148	B	EAST	1.49	.035	.59	49				.12		
	(BASEMENT)			V	UP	2.44	.036	.59	76				.02		
417	BEVERLY HILLS	34.07N	MO-2	B	EAST	1.51	.036	.59	47	2	45		.04		
	9100 WILSHIRE	118.39W	BH-133	A	SOUTH	1.42	.035	.59	47				.05		
	(5TH FLOOR)			V	UP	2.30	.036	.59	71				.03		
418	BEVERLY HILLS	34.07N	MO-2	B	EAST	1.58	.034	.59	55	2	45		.04		
	9100 WILSHIRE	118.39W	BH-107	A	SOUTH	1.56	.034	.59	54				.05		
	(ROOF,11TH LEVEL)			V	UP	2.39	.035	.59	79				.04		
527	BEVERLY HILLS	34.07N	SMA-1	L 950	S 52 W	1.91	.039	.61	50.6	2	13		.01		
	9401 WILSHIRE	118.40W	BH-361	V 986	DOWN	1.82	.039	.59	48.2				---		
	(BASEMENT)			T 866	S 38 E	1.77	.038	.59	49.4				.02		

TABLE 6.—*Compilation of strong-motion accelerograph data for 1972*—Continued

Stn. no.	Station	Coordinates	Instruments	Component	Orientation	Sensitivity	Period *sec*	Crit. damp.	Stat. mag.	Epic. dist. *km*	Recd. leng. *sec*	Max. accl. Per. *sec*	Max. accl. Accl. *g*	Accl. gt. 0.2g Dur.	Accl. gt. 0.2g Cycle
				EARTHQUAKE OF 27 AUGUST (00.49.27 PST). BEVERLY HILLS, CALIF. 34.06 N, 118.39 W, DEPTH = 8 KM., MAG = 3.2, (MM)INTENSITY = V.											
52B	BEVERLY HILLS	34.07N	SMA-1	L 937	S 52 W	1.98	.039	.59	52.5	2	13		.02		
	9401 WILSHIRE	118.40W	BH-362	V 859	DOWN	1.80	.039	.55	47.7				.01		
	(6TH FLOOR)			T 981	S 38 E	2.00	.040	.61	50.4				.03		
529	BEVERLY HILLS	34.07N	SMA-1	L 953	S 52 W	2.03	.039	.61	53.8	2	13		.02		
	9401 WILSHIRE	118.40W	BH-363	V 967	DOWN	1.92	.041	.57	46.0				.02		
	(ROOF,13TH LEVEL)			T 993	S 38 E	1.83	.038	.59	51.1				.03		
434	BEVERLY HILLS	34.07N	SMA-1	L 217	EAST	1.91	.039	.57	50.5	2	11		.03		
	9450 WILSHIRE	118.40W	BH-138	V 213	DOWN	1.92	.040	.59	48.5				.01		
	(BASEMENT, P-3)			T 206	NORTH	1.94	.038	.55	54				.02		
435	BEVERLY HILLS	34.07N	SMA-1	L 195	EAST	1.76	.038	.59	49.5	2	11		.03		
	9450 WILSHIRE	118.40W	BH-137	V 196	DOWN	1.82	.039	.57	48.5				.02		
	(4TH FLOOR)			T 204	NORTH	1.68	.039	.53	47				.01		
436	BEVERLY HILLS	34.07N	SMA-1	L 200	EAST	1.86	.040	.53	47	2	11		.02		
	9450 WILSHIRE	118.40W	BH-139	V 215	DOWN	1.76	.038	.55	49.5				.05		
	(ROOF,13TH LEVEL)			T 216	NORTH	1.86	.040	.55	47				.01		
521	BEVERLY HILLS	34.07N	SMA-1	L 626	SOUTH	1.78	.038	.59	49.7	2	11		.02		
	9500 WILSHIRE	118.40W	BH-270	V 570	DOWN	1.73	.038	.55	48.3				.01		
	(BASEMENT)			T 573	EAST	1.79	.038	.55	50.0				.03		
522	BEVERLY HILLS	34.07N	SMA-1	L 627	SOUTH	1.70	.037	.57	50.1	2	11		.05		
	9500 WILSHIRE	118.40W	BH-274	V 623	DOWN	1.86	.039	.53	49.3				.01		
	(3RD FLOOR)			T 633	EAST	1.82	.039	.53	48.2				.03		

TABLE 6.—*Compilation of strong-motion accelerograph data for 1972*—Continued

Stn. no.	Station	Coordinates	Instruments	Component	Orientation	Sensitivity	Period *sec*	Crit. damp.	Stat. mag.	Epic. dist. *km*	Recd. leng. *sec*	Max. accl. Per. *sec*	Max. accl. Accl. *g*	Accl. gt. 0.2g Dur.	Accl. gt. 0.2g Cycle
	EARTHQUAKE OF 27 AUGUST (00.49.27 PST). BEVERLY HILLS, CALIF. 34.06 N, 118.39 W, DEPTH = 8 KM., MAG = 3.2, (MM)INTENSITY = V.														
523	BEVERLY HILLS	34.07N	SMA-1	L 513	SOUTH	1.71	.037	.55	50.3	2	11		.06		
	9500 WILSHIRE	118.40W	BH-272	V 619	DOWN	1.76	.037	.57	51.8				.02		
	(12TH FLOOR)			T 635	EAST	1.82	.038	.57	50.8				.03		
651	BEVERLY HILLS	34.07N	SMA-1	L 577	N 39 W	1.68	.038	.57	47.0	2	9		.02		
	9665 WILSHIRE BLVD	118.40W	BH-408	V 790	DOWN	1.76	.038	.55	47.9				---		
	(BASEMENT)			T 757	S 51 W	1.72	.038	.53	48.1				.02		
652	BEVERLY HILLS	34.07N	SMA-1	L1132	N 39 W	1.93	.040	.61	49.8	2	9		.02		
	9665 WILSHIRE BLVD	118.40W	BH-409	V 826	DOWN	1.86	.039	.57	49.2				.01		
	(4TH FLOOR)			T 933	S 51 W	1.75	.038	.59	50.3				.03		
653	BEVERLY HILLS	34.07N	SMA-1	L1084	N 39 W	1.77	.037	.55	52.2	2	9		.01		
	9665 WILSHIRE BLVD	118.40W	BH-410	V1125	DOWN	1.80	.038	.55	49.0				.02		
	(PENTHOUSE)			T1100	S 51 W	1.92	.040	.61	48.0				.02		
616	LOS ANGELES	34.06N	SMA-1	L1429	N 18 W	1.89	.039	.53	50.1	5			---		
	10850 WILSHIRE BLVD	118.44W	LA-468	V1438	DOWN	1.77	.039	.53	46.9				---		
	(BASEMENT)			T1437	S 72 W	1.93	.039	.53	51.1				---		
617	LOS ANGELES	34.06N	SMA-1	L1420	N 18 W	1.95	.038	.55	54.4	5			.01		
	10850 WILSHIRE BLVD	118.44W	LA-469	V1432	DOWN	1.76	.039	.53	46.6				---		
	(6TH FLOOR)			T1421	S 72 W	1.88	.038	.57	52.5				---		
618	LOS ANGELES	34.06N	SMA-1	L1441	N 18 W	1.77	.039	.53	50.1	5			.01		
	10850 WILSHIRE BLVD	118.44W	LA-470	V1436	DOWN	1.89	.039	.59	46.9				.02		
	(13TH FLOOR)			T1456	S 72 W	1.86	.039	.59	49.3				---		

TABLE 6.—*Compilation of strong-motion accelerograph data for 1972*—Continued

Stn. no.	Station	Coordinates	Instruments	Component	Orientation	Sensitivity	Period *sec*	Crit. damp.	Stat. mag.	Epic. dist. *km*	Recd. leng. *sec*	Max. accl. Per. *sec*	Max. accl. Accl. *g*	Accl. gt. 0.2g Dur.	Accl. gt. 0.2g Cycle
	EARTHQUAKE OF 4 SEPTEMBER (10.04.41 PST). PAICINES - BEAR VALLEY, CALIF. 36.64 N, 121.29 W, DEPTH = 2 KM., MAG = 4.7, (MM)INTENSITY = VI.														
1209	HOLLISTER	36.75N	SMA-1	L 719	N 45 W	1.90	.039	.53	47.9	33	44	.2	.01		
	ALMADEN WINERY	121.38W	FS-287	V 685	DOWN	1.75	.039	.53	46.4			.2	.02		
	CARPENTER SHOP(FF)			T 682	S 45 W	1.80	.039	.55	47.7			.3	.02		
1210	HOLLISTER	36.57N	SMA-1	L 788	S 81 E	1.88	.035	.55	61.9	16	35	.2	.11		
	BEAR VALLEY FIRE STA.	121.18W	FS-312	V 761	DOWN	1.78	.034	.57	62.1			.3	.09		
	(FREEFIELD)			T 710	N 09 E	1.80	.034	.59	62.4			.3	.18		
1028	HOLLISTER	36.85N	S-M	V 238	UP	13.8	.067	.58	123	44	59		---		
	CITY HALL	121.40W	FS-24	L 239	S 01 W	12.9	.065	.62	124				---		
	(HALF-BASEMENT)		WITH	T 240	N 89 W	12.7	.065	.56	122				---		
			CDMS	L 6	S 01 W		2.10	.59	1.0			1.2	.1*		
				T 5	S 89 E		2.22	.61	1.0				--*		
1211	HOLLISTER	36.59N	RFT-250	L 313	N 61 E	3.80	.065	.59	18.1	17	26	.2	.48	.6	3.5
	MELENDY RANCH BARN	121.19W	FS-245	V 336	DOWN	3.90	.065	.57	18.6			.1	.21	.1	.5
	(FREEFIELD)			T 337	N 29 W	3.78	.063	.57	19.2			.2	.69	1.1	7.5
1202	STONE CANYON	36.64N	SMA-1	L	S 03 E	1.86	.039	.57	49.3	20	36	.2	.17		
	GEOPHYSICAL	121.24W	FS-298	V	DOWN	1.63	.037	.53	48.0			.1	.10		
	OBSERVATORY			T	N 87 E	1.81	.038	.55	48.5			.2	.18		

TABLE 6.—*Compilation of strong-motion accelerograph data for 1972*—Continued

Stn. no.	Station	Coordinates	Instruments	Component	Orientation	Sensitivity	Period *sec*	Crit. damp.	Stat. mag.	Epic. dist. *km*	Recd. leng. *sec*	Max. accl. Per. *sec*	Max. accl. Accl. *g*	Accl. gt. 0.2g Dur.	Accl. gt. 0.2g Cycle
	EARTHQUAKE OF 23 SEPTEMBER (02.56.25 PST). SOUTH OF SAN JUAN BAUTISTA, CALIF. 36.80 N, 121.55 W, DEPTH = 4 KM., MAG = 4.1, (MM)INTENSITY = V.														
1209	HOLLISTER	36.75N	SMA-1	L 719	N 45 W	1.90	.039	.53	47.9	16	11	.3	.03		
	ALMADEN WINERY	121.38W	FS-287	V 685	DOWN	1.75	.039	.53	46.4			.1	.01		
	CARPENTER SHOP(FF)			T 682	S 45 W	1.80	.039	.55	47.7			.2	.02		
1028	HOLLISTER	36.85N	S-M	V 238	UP	13.8	.067	.58	123	14	85	.2	---		
	CITY HALL	121.40W	FS-24	L 239	S 01 W	12.9	.065	.62	124			.3	.01		
	(HALF-BASEMENT)		WITH	T 240	N 89 W	12.7	.065	.56	122			.3	.02		
			CDMS	L 6	S 01 W		2.10	.59	1.0				--*		
				T 5	S 89 E		2.22	.61	1.0			.5	--*		
	EARTHQUAKE OF 23 SEPTEMBER (07.07.48 PST). SOUTH OF SAN JUAN BAUTISTA, CALIF. 36.80 N, 121.54 W, DEPTH = 4 KM., MAG = 4.2, (MM)INTENSITY = V.														
1209	HOLLISTER	36.75N	SMA-1	L 719	N 45 W	1.90	.039	.53	47.9	15	15	.2	.03		
	ALMADEN WINERY	121.38W	FS-287	V 685	DOWN	1.75	.039	.53	46.4			.1	.01		
	CARPENTER SHOP(FF)			T 682	S 45 W	1.80	.039	.55	47.7			.2	.02		
1028	HOLLISTER	36.85N	S-M	V 238	UP	13.8	.067	.58	123	14	81	.2	.01		
	CITY HALL	121.40W	FS-24	L 239	S 01 W	12.9	.065	.62	124			.2	.02		
	(HALF-BASEMENT)		WITH	T 240	N 89 W	12.7	.065	.56	122			.2	.03		
			CDMS	L 6	S 01 W		2.10	.59	1.0				--*		
				T 5	S 89 E		2.22	.61	1.0				--*		

TABLE 6.—*Compilation of strong-motion accelerograph data for 1972*—Continued

Stn. no.	Station	Coordinates	Instruments	Component	Orientation	Sensitivity	Period *sec*	Crit. damp.	Stat. mag.	Epic. dist. *km*	Recd. leng. *sec*	Max. accl. Per. *sec*	Max. accl. Accl. *g*	Accl. gt. 0.2g Dur.	Accl. gt. 0.2g Cycle
	EARTHQUAKE OF 2 OCTOBER (22.30.02 PST). SOUTH OF SAN JUAN BAUTISTA, CALIF. 36.80 N, 121.54 W, DEPTH = 7 KM., MAG = 4.8, (MM)INTENSITY = VI.														
1209	HOLLISTER	36.75N	SMA-1	L 719	N 45 W	1.90	.039	.53	47.9	15	35	.4	.03		
	ALMADEN WINERY	121.38W	FS-287	V 685	DOWN	1.75	.039	.53	46.4			.6	.02		
	CARPENTER SHOP(FF)			T 682	S 45 W	1.80	.039	.55	47.7			.3	.02		
1028	HOLLISTER	36.85N	S-M	V 238	UP	13.8	.067	.58	123	14	76	.2	.02		
	CITY HALL	121.40W	FS-24	L 239	S 01 W	12.9	.065	.62	124			.5	.03		
	(HALF-BASEMENT)		WITH	T 240	N 89 W	12.7	.065	.56	122			.2	.03		
			CDMS	L 6	S 01 W		2.10	.59	1.0			1.0	.3*		
				T 5	S 89 E		2.22	.61	1.0			.8	.3*		
1032	HOLLISTER	36.80N	SMA-1	L 788	NORTH	1.88	.035	.55	61.9	12	17		---		
	SAGO VAULT	121.41W	FS-312	V 761	DOWN	1.73	.034	.57	62.1				---		
	HARRIS RANCH			T 710	EAST	1.80	.034	.59	62.4				---		
	EARTHQUAKE OF 23 DECEMBER (06.29.42 GCT). MANAGUA, NICARAGUA. 12.4 N, 86.1 W, DEPTH = 5 KM., MAG = 5.6, (MM)INTENSITY = IX.														
	MANAGUA, NICARAGUA	12.15N	AR-240	L	N 84 W	7.55	.055	.59		33	NR				
	CENTRAL BANK OF	86.27W	-201	V	UP	7.35	.054	.58							
	NICARAGUA			T	S 06 W	7.35	.050	.57							
	MANAGUA, NICARAGUA	12.14N	AR-240	L	SOUTH	14.75	.060	.56		37	85	.5	.39	5.8	29.0
	ESSO REFINERY	86.32W	-290	V	DOWN	13.62	.058	.54				.2	.33	4.5	33.0
	(GROUND FLOOR)			T	EAST	13.28	.063	.54				.7	.33	5.2	18.5
	MANAGUA, NICARAGUA	12.11N	AR-240	L	S 35 E	7.39	.050	.59		36	NR				
	NATIONAL UNIVERSITY	86.24W	-204	V	UP	7.10	.058	.58							
	OF NICARAGUA			T	N 55 E	7.42	.052	.58							

[1] Instrument type code:

(S-M)	Strong-motion seismograph (FS Standard). (CDM's refer to the two Carder Displacement Meters which are a part of the instruments.)
(AR)	Teledyne Model AR-240.
(DM)	FS 10-second displacement meter.
(RFT)	Teledyne Model RFT-250.
(MO)	New Zealand Model MO-2.
(SMA)	Kinemetrics Model SMA-1.
(SR)	Simultaneous radio starting and timing.
(DH)	Down-hole instruments.
(RM)	Teledyne Model RMT-280.
(PR)	Peak recording accelerometer.

[2] Owner code:

(LA)	Los Angeles Building Code.
(FS)	Seismological Field Survey.
(CW)	Calif. Dept. of Water Resources Cooperative Project.
(CT)	California Institute of Technology.
(AT)	Atomic Energy Commission.
(BR)	Bureau of Reclamation.
(CA)	Calif. State Office of Architecture and Construction.
(FC)	Los Angeles Flood Control District.
(RC)	Redwood City.
(UC)	University of California.
(PT)	Pacific Telephone and Telegraph Co.
(DW)	Los Angeles Dept. of Water and Power.
(CE)	Southern California Edison Co.
(AE)	Corps of Engineers, U.S. Army.
(BA)	Bank of America.
(BT)	Bay Area Rapid Transit District.
(CC)	Contra Costa Junior College District.
(BP)	Bethlehem Pacific Steel Co.
(SW)	Seattle Dept. of Water and Power.
(SD)	San Diego Gas and Electric Co.
(SR)	Santa Rosa.
(PA)	Palo Alto.
(WL)	Woodword-Lundgren & Associates (Oakland, Calif.)
(SU)	Sacramento Municipal Utility District.
(CY)	Conn. Yankee Atomic Power Co.
(NL)	U.S. Navy Research and Evaluation Lab.
(GL)	Glendale.
(SL)	San Luis Obispo County Flood Control District.
(LR)	Livermore Radiation Lab.
(BH)	Beverly Hills Ordinance.
(BE)	Berkeley Ordinance.
(GS)	Geological Survey, FS Cooperative Project.
(RA)	San Francisco Redevelopment Agency.

[2] Owner code (continued):

(HD) California State Division of Highways.
(SN) Savannah River Nuclear Project.
(GW) Great Western.
(BK) Bakersfield Ordinance.
(HA) Hayward Ordinance.
(UW) United Water Conservation District.
(FF) Fireman's Fund.
(EK) Eastman Kodak.

[3] Definitions:

Component = Refers to seismometers housed within instruments.
Components are indicated by number and position.
Letters V, L, and T indicate vertical, longitudinal, and transverse with respect to axis perpendicular to recording paper.
Orientation = Direction of displacement of seismometer pendulum for trace up on the record.
Sensitivity = Centimeters of trace deflection from position of rest for acceleration of gravity.
Period = Free period of seismometer in seconds.
Crit. damp. = Fraction of critical damping.
Stat. mag. = Static (optical) magnification.
Epic. dist. = Epicentral distance to station in kilometers.
Recd. leng. = Length of main shock record in seconds.
Per. = Period of maximum acceleration in seconds.
Max. acel. = Maximum absolute acceleration in gravity units (lg = 980 cm/sec^2).
Accl. gt. 0.2g = Acceleration greater than 0.2 gravity unit.
Dur./Cycle = Duration, in seconds, and number of cycles.

[4] Strong-motion seismograph pendulum directions:
The following conventions are observed throughout:
1. Trace up implies that the trace on the record is away from the observer when viewed with record progressing from left to right and with the emulsion side up.
2. Pendulum direction is the direction of motion of the pendulum with respect to the observer when the observer faces in the direction from recorder to seismometers.

Directions of Pendulum for Trace Up

Seismographs		*Component*	*Direction*
FS Standard	(Accel.)	Vertical	Up
		Longitudinal	Toward
		Transverse	Left
	(CDM's)	Longitudinal	Toward
		Transverse	Right
UED AR-240	(Accel.)	Longitudinal	Away
		Vertical	Down
		Transverse	Left
RFT-250	(Accel.)	Longitudinal	Away
		Vertical	Down
		Transverse	Left

Directions for Pendulum for Trace Up—Continued

Seismographs		*Component*	*Direction*
MO-2	(Accel.)	Vertical	Up
		Longitudinal (B)	45 Left
		Transverse (A)	45 Right
SMA-1	(Accel.)	Longitudinal	Toward
		Vertical	Down
		Transverse	Right

[5] Record notation:

PST=Pacific standard time (=GMT −8 hours).
AST=Alaska standard time (=GMT −10 hours).
DEPTH=Focal depth (in km).
MAG=Magnitude (from body waves).
MM=Modified Mercalli Intensity Scale (=I-XII).
NI=Not installed.
NT=Not triggered.
NR=No record.
PR=Partial record.
NTM=No time mark.
- - -=Acceleration is less than 0.01g.
*=Maximum displacement (in cm).
- -*=Maximum displacement is less than 0.1 cm.

Additions and Corrections to Previous Issues

United States Earthquakes, 1953. On page 10, delete September 9 earthquake at 02:30.

United States Earthquakes, 1965. Page 13, column 2, January 12 earthquake, change eastern Idaho to southwestern Montana.

United States Earthquakes, 1966. Magnitude values and/or origin time for the following earthquakes have been revised: August 16, 11:02:36.1*, from 6.1 to 5.6; September 19, 03:06:42.4*, from 4.4 to 4.0; October 11, 10:52:31.3*, from 4.6 to 4.3; and November 14, 13:02:45.8* to 13:02:35.9* and 4.1 to 4.3.

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