DEPARTMENT OF THE INTERIOR

U.S. GEOLOGICAL SURVEY

United States Earthquakes, 1962

By

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and

William K. Cloud

Open-File report 84-962

Prepared in cooperation with National Oceanic and Atmospheric Administration.

This report has not been reviewed for conformity with U.S. Geological Survey editorial standards.

1984

U.S. DEPARTMENT OF COMMERCE
LUTHER H. HODGES, SECRETARY
COAST AND GEODETIC SURVEY
H. ARNOLD KARO, DIRECTOR

UNITED STATES EARTHQUAKES
1962

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U.S. GOVERNMENT PRINTING OFFICE
WASHINGTON : 1964

For sale by the Superintendent of Documents, U.S. Government Printing Office
Washington, D.C., 20402 - Price 60 cents

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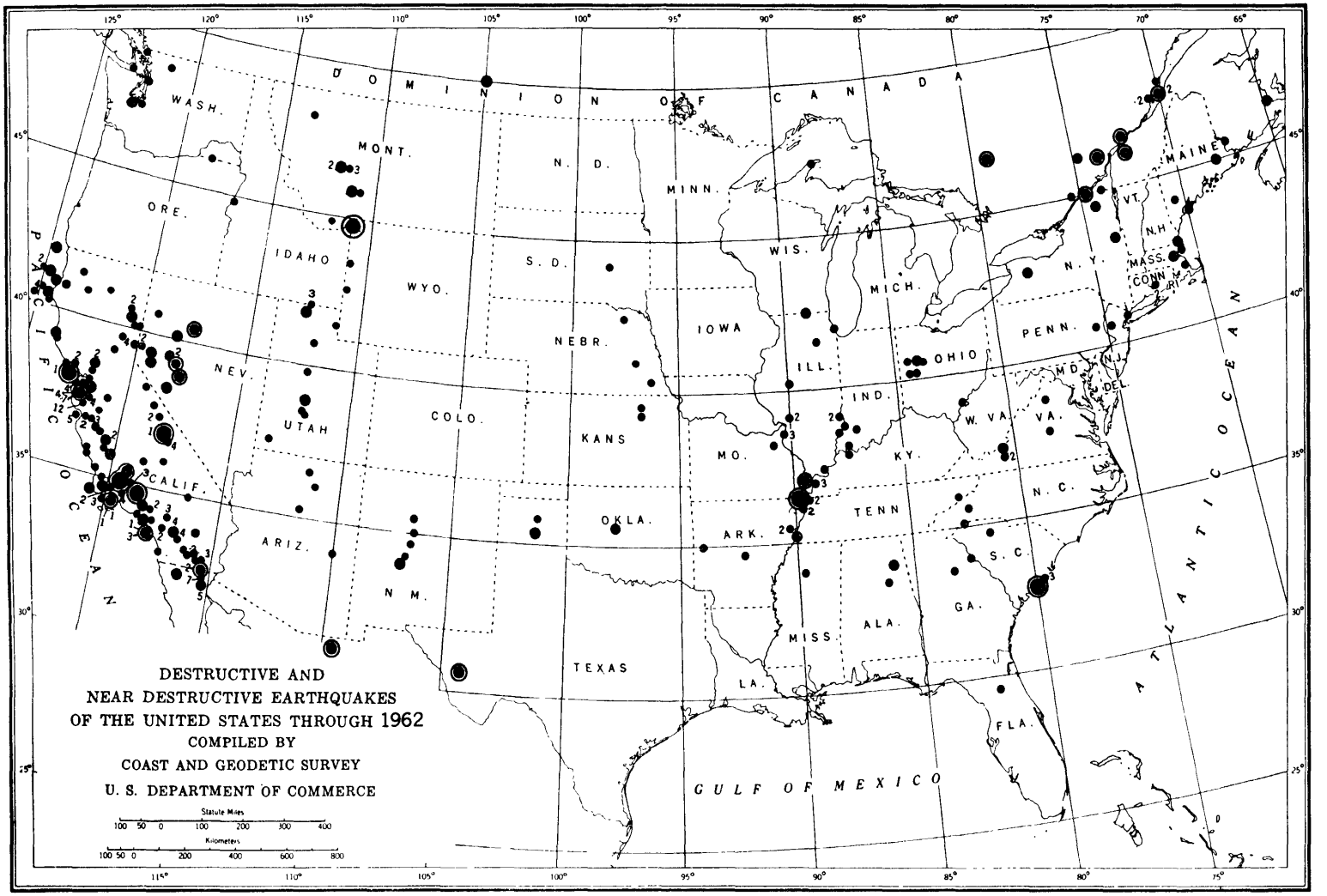

FIGURE 1.—*Destructive and near destructive earthquakes in the United States through 1962.*

UNITED STATES EARTHQUAKES, 1962

INTRODUCTION

This publication is a summary of earthquake activity in the United States and regions under its jurisdiction for the calendar year 1962. The sources of noninstrumental information used in the compilation include the United States Weather Bureau, whose observers prepare periodic reports on local seismic activity; telegraphic information collected by Science Service, Washington, D.C.; Bulletins of the Seismological Society of America; special reports of the Jesuit Seismological Association and the Northeastern Seismological Association; the *Hawaiian Volcano Observatory Summary;* newspaper clippings; and reports from interested individuals. Instrumental data used in locating earthquakes are obtained from the network of Coast and Geodetic Survey stations listed on page 60 and from other cooperating seismological stations in the United States and throughout the world.

The Coast and Geodetic Survey endeavors to coordinate efforts in collecting all types of earthquake information with the special object of correlating instrumental earthquake locations with noninstrumental reports received from the epicentral areas. This is done by local organizations making intensive regional investigations in California and elsewhere, and, when necessary, by the Coast and Geodetic Survey. This information serves to map the seismic areas of the country adequately and promote public safety through a better understanding of earthquake phenomena. Since the success of the general information service depends largely on the cooperation of local officials and citizens, all are urged to fill out and return earthquake questionnaires.

Earthquake information services.—The Coast and Geodetic Survey maintains a Seismological Field Survey in San Francisco to collect earthquake information and make field investigations of strong shocks in the Pacific coast and western mountain States. Details concerning damage, destruction, and other effects are enumerated in the quarterly *Abstracts of Earthquake Reports for the Pacific Coast and the Western Mountain Region.* This report is available on request from the Director of the Coast and Geodetic Survey, Washington, D.C., 20230. Active cooperation in this work is received from the University of California Seismographic Station, Berkeley (Dr. Perry Byerly, in charge); and the Seismological Laboratory, Pasadena (Dr. Frank Press, Director); as well as State Collaborators in Seismology. The following Collaborators served as agents of the Coast and Geodetic Survey in their respective States in 1962.

Arizona.—Dr. Eldred D. Wilson, University of Arizona, Tucson.

Colorado.—Prof. W. Warren Longley, University of Colorado, Boulder.

Idaho.—Dr. Earl F. Cook, Idaho Bureau of Mines and Geology, Moscow.

Montana.—Prof. Stephen W. Nile, Montana School of Mines, Butte.

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

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

Oregon.—Dr. Ira S. Allison, Oregon State College, Corvallis.

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

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

Wyoming.—Prof. Horace D. Thomas, University of Wyoming, Laramie.

Among the commercial agencies on the West Coast rendering valuable services are telephone, power, oil, railroad, and especially insurance companies. Certain concerns interested in the manufacture of earthquake-resistant building materials are also active, together with various organizations of structural engineers and architects.

In other parts of the country the Jesuit Seismological Association with central office at St. Louis University collects information in the central Mississippi Valley area (Rev. Dr. Victor J. Blum, S. J., Dean of the Institute of Technology). The Northeastern Seismological Association with headquarters at Weston College, Weston, Mass. (Rev. Daniel J. Linehan, S.J., in charge), undertakes similar work in the northeastern States. Additional information is furnished regularly by Mr. Berlen C. Moneymaker, Chief Geologist, Tennessee Valley Authority, Knoxville, Tenn., for earthquakes in the State of Tennessee, and Dr. Gerald R. MacCarthy, Department of Geology, University of North Carolina, Chapel Hill, N.C., for earthquakes in the State of North Carolina.

Modified Mercalli Intensity Scale of 1931.—All intensities used by the Coast and Geodetic Survey refer to the Modified Mercalli Intensity Scale of 1931.[1] The abridged version of this scale is given here with equivalent intensities according to the Rossi-Forel scale.

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[1] Modified Mercalli Intensity Scale of 1931. Harry O. Wood and Frank Neumann, *Bulletin of the Seismological Society of America, vol. 12, no. 4, December 1931.*

MODIFIED MERCALLI INTENSITY SCALE OF 1931

(ABRIDGED)

I. Not felt except by a very few under specially favorable circumstances. (I Rossi-Forel scale.)

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

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

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 Rossi-Forel scale.)

V. Felt by nearly everyone, many awakened. Some dishes, windows, etc., broken; a few instances of cracked plaster; unstable objects overturned. Disturbances of trees, poles, and other tall objects sometimes noticed. Pendulum clocks may stop. (V to VI Rossi-Forel scale.)

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 Rossi-Forel scale.)

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 Rossi-Forel scale.)

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− Rossi-Forel scale.)

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+ Rossi-Forel scale.)

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

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.

Epicenter maps.—Figure 1 is designed to show the existence of destructive and near destructive earthquakes in the United States through 1962. The smallest dots indicate the shock was strong enough to overthrow chimneys or affect an area of more than 25,000 square miles (intensity VII to VIII); the largest solid dots may be associated with damage ranging from several thousand dollars to one hundred thousand dollars, or to shocks usually perceptible over more than 150,000 square miles (intensity VIII to IX); the smaller encircled dots represent damage ranging from approximately one hundred thousand to one million dollars, or an affected area greater than 500,000 square miles (intensity IX to X); the larger encircled dots represent damage of a million dollars or more, or an affected area usually greater than 1,000,000 square miles (intensity X to XII).

Figure 2 shows earthquake distribution in the United States during 1962. In a few cases where instrumental control is not satisfactory or where results of investigations are inadequate, the plotted epicenters should be considered as showing the existence of the earthquake rather than the precise location.

In figure 2, those earthquakes occurring in the California area are plotted when felt reports are received from several places. Earthquakes reported as feeble are not plotted on the epicenter map of the United States, nor are minor aftershocks plotted for heavy earthquakes in California or any other region. The number after a dot indicates the number of shocks which have occurred at or near the location shown. Bulletins of the University of California Seismographic Station, Berkeley and the Seismological Laboratory, Pasadena, should be consulted for further details regarding epicenters and often for data on additional shocks.

The selection of isoseismal or "felt area" maps (figs.3–10) is governed largely by the size of the area affected, the minimum radius generally being of the order of 50 miles. In the case of sharp localized shocks this means that some earthquakes of intensity VI (mostly in California) will not be shown on such maps whereas others of intensity IV and V (largely in the eastern and central areas) will be shown.

Teleseismic results.—On page 60 is a list of Survey and cooperating teleseismic stations for which the Survey publishes results. During the year the locations of 2272 epicenters were announced promptly on *Preliminary Determination of Epicenter* cards. Those desiring to receive these cards should request addition of their name to the PDE mailing list. All seismogram interpretations are published in the monthly *Seismological Bulletin*, MSI series, available on mailing list CGS–7 from the Director, Coast and Geodetic Survey, Washington, D.C., 20230. During the year 1962, MSI–253 through 264 for the monthly bulletins of 1962 were published.

Magnitude and Intensity (Damage) Ratings.—Magnitude Rating, stated according to The Gutenberg-Richter scale, is a measure of the energy-release at the focus of the earthquake, having therefore a fundamental relation to the shock. It is estimated by the analysis of seismograph records, as explained in the *Bulletin of Seismological Society of America*, Vol. 32, No. 3, 1942. Intensity (Damage) Rating, usually expressed on the *Modified Mercalli Scale of 1931*, is a local measure of the effects on people and objects at any affected locality, being, therefore a result of many factors, including energy-release of the earthquake, distance, geological and topographic conditions, and structural properties of buildings. It varies from place to place. The two ratings are not simply comparable.

Strong-motion seismograph results.—The maintenance of a network of strong-motion seismographs and analysis of the records of destructive earthquake motions thus obtained are functions of the Bureau in connection with a broad cooperative program of research being carried out on the Pacific Coast with a number of local organizations and institutions interested in the engineering aspects of the earthquake problem. The details of this program are described in S.P. 201, *Earthquake Investigations in California, 1934–35.* (Out of print.)

The preliminary analyses of strong-motion records are published in the *Quarterly Engineering Seismology Bulletin* which is available upon request from the Director, Coast and Geodetic Survey, Washington, D.C., 20230. The revised analyses are given in table 7.

Earthquake history.—A history of the more important shocks of the country appears in Publication 41–1, *Earthquake History of the United States.* Part I covers continental United States and Alaska, exclusive of California and western Nevada; Part II covers the stronger earthquakes of California and western Nevada. The first part was revised in 1958 and the latter in 1961.

A history of minor activity is covered largely in a series of references listed in Publication 41–1, in recent reports of the Coast and Geodetic Survey, and in the *Bulletin of the Seismological Society of America*, Volume 29, No. 1, January 1939. The last two references give detailed information for all California earthquakes. The last one contains all information appearing in early catalogs published by the Smithsonian Institution.

A summary of the earthquake program as carried out in the United States is briefly outlined in S.P. 282, *Earthquake Investigation in the United States*, revised 1962. The major organizations and stations are listed together with a list of the independent and/or privately operated stations. This publication is available from the Superintendent of Documents, Government Printing Office, Washington, D.C., 20402, for 25 cents.

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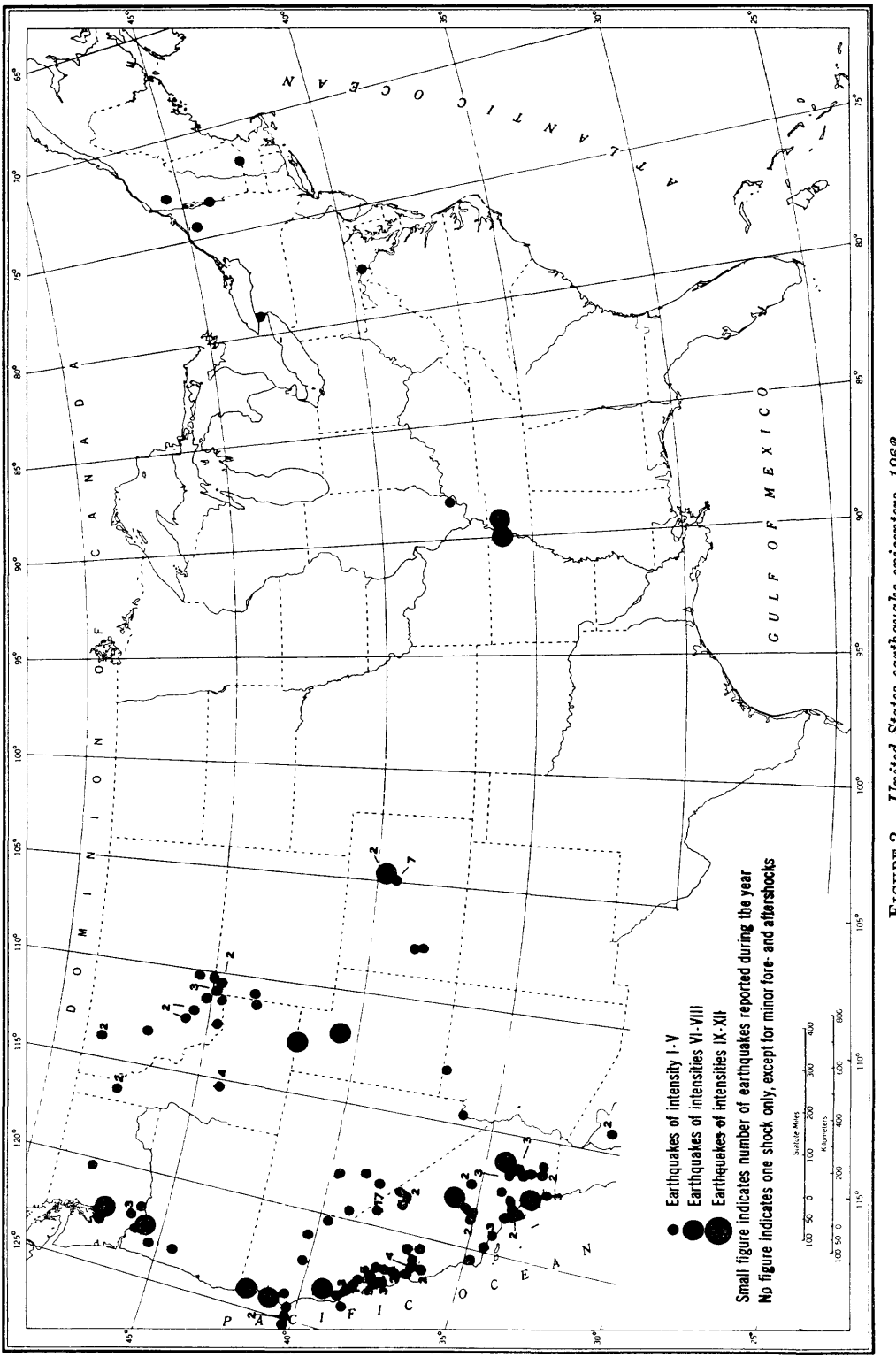

FIGURE 2.—*United States earthquake epicenters, 1962.*

NONINSTRUMENTAL RESULTS

NOTE.—The following symbols are used to indicate authority for times or reported epicenters: P, reported by the Seismological Laboratory, California Institute of Technology, Pasadena; B, reported by the Seismographic Station, University of California, Berkeley; NESA, reported by the Northeastern Seismological Association, Weston, Mass.; JSA, reported by the Jesuit Seismological Association, Saint Louis, Mo.; S, reported by the Seismograph Station, University of Washington, Seattle, Wash.; and W, reported by the Washington office of the Coast and Geodetic Survey.

An asterisk (*) indicates instrumental origin time of the earthquake when coordinates of the epicenter are given. Otherwise, instrumental times shown with asterisks are those of first motion.

When more than one degree of intensity is reported from a town, the town is listed under the highest intensity reported. More details will be found in the quarterly Abstracts of Earthquake Reports for the Pacific Coast and Western Mountain Region, MSA series, issued on mailing list CGS-3 by the Coast and Geodetic Survey, Washington, D.C., 20230.

EARTHQUAKE ACTIVITY IN THE VARIOUS STATES

NOTE.—The intensities of the earthquakes for which no ratings are given range from I to IV.

Alaska: February 26; 28; March 14, IV; 25, IV; 28; April 6; 13; May 9, V; 21; 22; 29; June 13; 17; 19; 21; 22; 29, IV; July 6; 9; 15; 16, V; August 15; 16; 17 (2), IV; 18, V; 30; 31 (3); September 13; 15; 23; 25; October 19; 20, VI; November 8; 12; December 12 (2); 13, V.

Arizona: January 17, IV.

Arkansas: February 2, V; July 23, III.

California: (Intensity V and above) January 1, V; 8, V; 15, V; 31, V; February 6, V; March 4, V; 5, V; 7, V; 17, V; 23, V; April 1, V; 13, V; 15, V; 27, VI; May 5, V (2); June 6, VII; 7, V; 10, V; July 14, V; 20, V; August 23, VI; September 1, V; 4, VI; 11, V; 15, VI; 16, V; 17, V; 26, V; October 5, V; 28, VI; November 6, V; 30, V.

Colorado: January 13, IV; February 5, V; June 18, V; 24, IV; August 6, V, IV; 6 (2); 7, IV; 15 (2); 30, IV; December 4, VI; 4; 5, VI; 5 (2).

Hawaiian Islands: January 3 (2); 7, IV; 21; 26; February 7 (3); March 9 (2); 22; 23 (2); 24; 28; 30; April 11; 24; May 10; 11; 16; 23 (2); 26; 29; 31; June 4; 7; 8; 11 (2); 13; 14; 27, VI; 28; July 3 (2); 14 (2); 15; 23; 24; 27 (2); 28; 30; 31 (2); August 2; 16 (2); 17; 18; 22; September 2; 8 (2); 10; 11 (2); 19; 25; 27; October 19; 24; 31; November 2; 6 (3); 8 (3); 20; 22; 26; December 3; 7; 9; 10; 12; 13 (2); 28; 30; 31.

Idaho: February 4, III; August 23; 30, VII; October 18, III (4); 19, III; December 18; 25, III; 28, IV.

Illinois: February 2, IV; June 26, V.

Kentucky: February 2, V; June 26, V.

Maine: April 10, IV.

Maryland: September 4, IV.

Massachusetts: April 10, III; December 29, IV.

Missouri: February 2, VI; June 26, IV; July 23, IV.

Montana: January 4, IV; 18, IV; February 1, IV; 8, IV; 25, V; March 19; 24, IV; April 3, IV; 5, IV; 6, IV; 11, IV; 15; 20, IV; May 30, IV; July 14, III; September 24, IV; December 18, V; 18 (2); 19, IV (2); 28, V.

Nevada: April 5; 13, IV; 18; 25, V; 25; August 30, IV; October 17, IV; July 20, V; October 1, V.

New Hampshire: April 10, V; June 20, IV; December 29, V.

New York: March 27, V; April 10, V; June 20, IV; October 2, IV.

Oregon: August 23, VI; September 4, V, IV; October 17, II; November 5, VI; 5.

Tennessee: February 2, V; July 23, VI.

Utah: February 15, V; August 30, VII; 30; 31, IV; September 4, V; 5, VI; 7, V; 9.

Vermont: April 10, V; June 20, V.

Washington: January 14, V; July 16, IV; August 11, IV; September 12, III; November 3, IV; 5, VI; 5; 6; 9, IV; 9; December 31, VI; 31.

Wyoming: July 15, IV; August 26, V (2); 30, VI; October 6, IV; 9, IV; 15, IV; 18, IV.

EARTHQUAKE ACTIVITY OUTSIDE THE UNITED STATES

Panama Canal Zone: March 12, V; 12, IV; June 4, IV; July 26, V; 30, V; August 29, II; September 17, IV; October 25, II.

Puerto Rico: April 20; July 23.

NORTHEASTERN REGION

(75TH MERIDIAN OR EASTERN STANDARD TIME)

March 27: 01:37. Niagara Falls, N. Y. V. Felt by, awakened, and frightened many. Hundreds of persons telephoned the police and fire departments inquiring about the tremor. Beds, chairs displaced; houses shook; dishes rattled. Intensity (damage) IV at Sandy Beach (Grand Island) where houses shook. Felt at Cambria, Lewiston, North Tonawanda, Pekin, and Tonawanda. Also felt at Saint Catharines and Stamford, Ontario, Canada.

April 10: 09:30:48.1*. Epicenter 44.1° north, 73.4° west, depth about 33 km, western Vermont. Felt over an area of 20,000 square miles of Vermont, Maine, Massachusetts, New Hampshire, and New York. Maximum intensity (damage) V. Questionnaire canvass conducted by Weston Observatory.

INTENSITY (DAMAGE) V IN VERMONT:

Barre.—Felt by all; frightened many. Slight damage. Several pieces of tile fell from ceiling of bank and two cracks appeared in walls. Small objects overturned. Dishes rattled. Trees, bushes shaken slightly. Moderate earth noises. Motion rapid, duration 30 seconds.

Berlin.—Felt by nearly all; frightened some. Dishes fell to floor. Buildings creaked; loose objects rattled. Rumbling earth sounds heard by many during earthquake. Abrupt onset; trembling motion.

Bethel.—Felt by all; frightened many. Floors shook; dishes displaced on shelves; windows rattled; walls and frame creaked. Trees, bushes shaken slightly. Loud earth noises.

Brandon.—Felt by all; frightened many. Walls, floors, and frame creaked. Windows, doors, and dishes rattled.

Bristol.—Felt by nearly all. Merchandise tumbled from shelves in stores. Many people thought their furnaces had blown up. Buildings creaked; loose objects rattled.

Burlington.—Felt by and frightened many. Window reported broken. Numerous calls were received by the U.S. Weather Bureau. Buildings shook; doors and dishes rattled; walls creaked. Motion slow.

Chelsea.—Felt by many. Chairs, tables, and stoves displaced. Rattling of loose objects heard by many. Abrupt onset; trembling motion.

Chester.—Felt by several. Small objects shifted. Windows, doors, and dishes rattled; walls creaked. Felt like a heavy truck going by on highway.

Enosburg Falls.—Felt by many. Small objects shifted. Windows, doors, and dishes rattled; walls and frame creaked.

Fair Haven.—Felt by many; awakened few. Trees, bushes shaken slightly. Windows, doors, and dishes rattled; frame creaked. Moderate earth noises heard by many. Motion slow, duration 30 seconds.

Gaysville.—Felt by and frightened all. Windows, doors, and dishes rattled. Trees shaken slightly. Motion rapid.

Ludlow.—Felt by several. "Oil stove popped and lifted griddle up off stove." Buildings creaked; windows and dishes rattled. Thunderous earth sounds heard by several. Abrupt onset; rattling motion.

Middlebury.—Felt by all; frightened few. Small objects displaced. Trees, bushes shaken moderately. Windows, doors, and dishes rattled.

Middlesex.—Felt by many; frightened few. Telephone and electric wires swayed. Creaking of buildings heard by many. Suspended articles swayed from west to east. Rumbling sounds heard. Abrupt onset; trembling motion.

Montpelier.—Felt by all; frightened many. Slight damage. A beam supporting the State House was dislodged and the brace dropped about 5 inches. Two beams under dome were weakened and 20 window panes cracked. A few cases of cracked plaster reported. Trees, bushes shaken slightly. The tremor was so strong the State Police headquarters were evacuated. Buildings shook; windows and dishes rattled. Moderately loud, rumbling earth noises heard by many during earthquake. Gradual onset; rapid motion.

Morrisville.—Felt by all; frightened few. Overhead wires moved slightly. Buildings creaked; windows, doors, and dishes rattled. Earth sounds like passing train or snow plow heard by many. Abrupt onset; trembling motion.

Newport.—Felt by many; frightened few. Small objects overturned; pictures fell from walls. Windows, dishes, and doors rattled. Moderate earth noises heard by many before earthquake.

Northfield.—Felt by all. Windows rattled. Motion rapid. Loud earth noises heard by many before earthquake.

Randolph.—Felt by all; frightened few. Windows and dishes rattled; walls creaked. Hanging objects swung. Moderate earth noises heard by many before earthquake. Motion rapid.

Rutland.—Felt by and frightened many. Employees rushed from one office building. Buildings creaked; floors and walls shook; loose objects and dishes rattled. Rumbling earth sounds heard immediately before earthquake. Rapid onset.

Vergennes.—Felt by all; frightened few. Windows rattled.

Waitsfield.—Felt by and frightened many. Many felt that their boilers were exploding. Objects on shelves on south wall fell. Buildings creaked; dishes rattled. "Employees working on steel lift tower at ski area reported considerable movement, almost a dancing of the tower." Gradual onset; rocking-swaying motion north-south.

Waterbury.—Felt by all; frightened few. Small objects shifted. Trees, bushes shaken slightly. Windows, doors, and dishes rattled. Earth noises heard by many before earthquake.

White River Junction.—Felt by several. Small objects shifted in some homes. Trees, bushes shaken slightly. Windows rattled; walls creaked.

Windsor.—Felt by many; frightened few. Dishes fell from shelves. Some persons thought their furnaces had blown up. Windows, doors, and dishes rattled; walls and frame creaked.

INTENSITY (DAMAGE) V IN NEW HAMPSHIRE:

Claremont.—Felt by many; frightened few. Trees, bushes shaken moderately. Windows

rattled. Loud earth noises heard by many before earthquake. Motion rapid, duration 3–4 minutes.

Hanover.—Felt by many. Trees, bushes shaken strongly. Moved pen on microbarograph at Shattuck Observatory, Dartmouth College. Houses shook; windows and dishes rattled. Trembling motion.

Lancaster.—Felt by nearly all. Abrupt onset; rumbling motion.

Littleton.—Felt by all. Windows, doors, and dishes rattled. Moderately loud earth noises heard before earthquake. Motion rapid, duration 2–3 minutes.

Whitefield.—Felt by several. Visible swaying of trees and bushes. Building creaked; loose objects rattled. Rumbling earth sounds heard by several before shock. Gradual onset.

INTENSITY (DAMAGE) V IN NEW YORK:

Comstock.—Felt by all. Motion slow, duration 1–2 minutes.

Elizabethtown.—Felt by all; frightened few. Hanging objects swung. Windows, doors, and dishes rattled. Moderate earth noises heard by many many before earthquake.

Glens Falls.—Felt by several; frightened few. Furnishings shifted. Windows and dishes rattled.

Hudson Falls.—Felt by all. Windows rattled. "Similar to a large truck passing by."

Saratoga Springs.—Felt by many; frightened few. Small objects shifted. Dishes rattled; frame and floor creaked. Motion rapid, duration about 5 or 6 seconds. Faint earth noises heard by many before earthquake.

Schroon Lake.—Felt by and frightened many. Buildings creaked; loose objects rattled. Rapid onset; trembling motion.

Willsboro.—Felt by all; frightened many. Trees, bushes shaken slightly. Windows, dishes and doors rattled; frame creaked. Motion rapid, duration 5 seconds.

INTENSITY (DAMAGE) IV IN MAINE: Bridgton.

INTENSITY (DAMAGE) IV IN NEW HAMPSHIRE: Bethlehem, Bristol, Haverhill, Landaff, Lebanon, Meriden, Walpole, and Woodsville.

INTENSITY (DAMAGE) IV IN NEW YORK: Cadyville, Cambridge, Chazy, Granville, Greenwich, Hague, Keene, Plattsburgh, Port Henry, Rensselaer, Ticonderoga, Tupper Lake, Westport, and Whitehall.

INTENSITY (DAMAGE) IV IN VERMONT: Bloomfield, Brattleboro, Canaan, Cavendish, Charlestown, Corinth, Danville, Fairfax, Gilman, Grafton, Hartland, Hardwick, Manchester Center, McIndoe Falls, Newfane, Norwich, Pittsford, Poultney, Proctor, Saint Albans, Saint Johnsbury, Shelburne, South Londonderry, Springfield, Stowe, Taftsville, Townshend, Wallingford, Westfield, and Woodstock.

INTENSITY (DAMAGE) I TO III IN MAINE: Lewiston and Minot.

INTENSITY (DAMAGE) I TO III IN MASSACHUSETTS: Shelburne Falls.

INTENSITY (DAMAGE) I TO III IN NEW HAMPSHIRE: Portsmouth.

INTENSITY (DAMAGE) I TO III IN NEW YORK: Albany, Au Sable Forks, Hadley, and Lyndonville.

INTENSITY (DAMAGE) I TO III IN VERMONT: Bennington, Chittenden, Lyndonville, and Peru.

June 20: 21:06:47.7*. Epicenter 45°22′ north, 72°42′ west, magnitude 3.9, depth about 25 km, southern Quebec, Canada (Dominion Observatory, Ottawa). Maximum intensity (damage) V in the United States.

INTENSITY (DAMAGE) V IN VERMONT:

Beebe Plain.—Felt by and alarmed many. Radio station switchboard swamped with calls. Buildings vibrated; floors trembled. Abrupt onset; trembling motion.

Coventry.—Felt by many; several frightened. Pictures knocked askew. Buildings creaked and swayed; windows and loose objects rattled. Abrupt onset.

Derby.—Felt by all. Windows, doors, and dishes rattled; buildings creaked. Abrupt onset; trembling motion.

Derby Line.—Felt by nearly all. Buildings shook; dishes rattled. Light fixtures swayed. Rapid onset; trembling motion.

North Montpelier.—Felt. Cracked and moved chimney. Buildings creaked; loose objects rattled. Rumbling sounds heard. Trembling motion.

Plainfield.—Felt by many; a few ran outdoors. Buildings creaked; loosed objects rattled. Earth sounds "like a jet breaking the sound barrier." Abrupt onset; bumping, then trembling motion.

INTENSITY (DAMAGE) IV IN NEW HAMPSHIRE: Monroe.

INTENSITY (DAMAGE) IV IN NEW YORK: Elizabethtown.

INTENSITY (DAMAGE) IV IN VERMONT: Albany, Barre, Barton, Burlington, Craftsbury, Craftsbury Common, Greensboro, Irasburg, Lowell, Moretown, Morgan, Morgan Center, Newport, Newport Center, Newport City, North Troy, Orleans, Roxbury, Waterbury, West Charleston, and West Glover.

INTENSITY (DAMAGE) I TO III IN VERMONT: Adamant, Cabot, Greensboro Bend, Troy, Waitsfield, Waterbury Center, West Burke, Westfield, and Worcester.

October 2: 18:45:52*. Northern New York. Maximum intensity (damage) IV at

Malone, North Bangor, Saint Regis Falls, Saranac Lake and Tupper Lake, where buildings shook, windows and dishes rattled, and rumbling sounds were heard by many. Also felt at Colton, Gabriels, Lake Placid, Norfolk, Norwood, Potsdam, and Vermontville. Recorded by the Montreal seismograph station.

December 29: 01:19. Milford, N.H. V. Felt by and awakened many in community; frightened one. Windows rattled; walls creaked. Felt at Newburyport (walls, windows, and dishes rattled) and Amesbury, Mass. Recorded by the seismograph at Weston, Mass.

EASTERN REGION

(75TH MERIDIAN OR EASTERN STANDARD TIME)

September 4: 18:40. Boonsboro, Md. IV. Felt by many. Buildings creaked; floor trembled; walls shook; windows, dishes, and doors rattled. Felt at Frederick, Keedysville (thought to be a sonic boom), and at Kearneysville, W. Va. May not be of seismic origin.

CENTRAL REGION

(90TH MERIDIAN OR CENTRAL STANDARD TIME)

February 2: 00:43:34*. Epicenter 36°29.5′ north, 89°35.5′ west, New Madrid, Missouri area, JSA. Felt by, awakened, and alarmed many over a 35,000 square mile area of Arkansas, Illinois, Kentucky, Missouri, and Tennessee. (See map, p. 11.) Maximum intensity (damage) VI was reported at Catron and Marston, Missouri.—(*BSSA, April 1963.*) Questionnaire canvass conducted by Saint Louis University.

INTENSITY (DAMAGE) VI IN MISSOURI:

Catron.—Felt by and awakened nearly all. Slight damage. Walls and plaster cracked. Two water pipes reported broken. Buildings creaked; loose objects rattled. Light fixtures and window sash weights swayed.

Marston.—Felt by, awakened, and alarmed many. Slight damage. One chimney destroyed; two partially damaged; some windows cracked. Objects fell to the west. Buildings rattled and shook.

INTENSITY (DAMAGE) V IN ARKANSAS:

Jonesboro.—Felt by nearly all. Windows rattled. Continuous roar with occasional vibrations—some fairly heavy.

Maynard.—Felt by nearly all. Windows and dishes rattled; rumbling sounds heard.

Osceola.—Felt. Broke window in dining room at the Harris Restaurant.

Tulot.—Felt by and awakened nearly all. Creaking of buildings and rattling of loose objects heard by few. Abrupt onset; trembling motion.

INTENSITY (DAMAGE) V IN KENTUCKY:

Boaz.—Felt by and awakened many. Buildings creaked; loose objects and windows rattled. Loud rattling earth sounds heard. Rapid onset; rumbling and shaking motion.

INTENSITY (DAMAGE) V IN MISSOURI:

Cape Girardeau.—Felt by, awakened and frightened many. Buildings rocked; loose objects and venetian blinds rattled. Moderate rumbling earth sounds heard at beginning of earthquake. Rapid onset.

Chafee.—Felt by and awakened many. Buildings creaked; loose objects rattled. Lamp swayed in north-south direction. Faint rattling earth sounds heard during earthquake. Gradual onset; north-south motion; duration 10–15 seconds.

Charleston.—Felt by and awakened many. Buildings creaked; loose objects rattled. Rumbling, thunderous sounds heard. Abrupt onset; trembling motion.

Dutchtown.—Felt by and awakened nearly all. Buildings creaked, loose objects, windows, and dishes rattled. Loud bumping and rattling earth sounds heard at beginning of earthquake. Abrupt onset; trembling motion.

Falcon.—Felt. "Things fell from shelves."

Fredericktown.—Felt by and awakened many. Houses shook; bed moved. Deep rumbling sounds heard during earthquake.

Fruitland.—Felt by and awakened nearly all. Slight damage. Report of crack in underground cistern. Loose objects rattled; bed rocked. Roaring sounds heard by nearly all. Abrupt onset; undulating motion, east-west; duration, 10–60 seconds.

Gideon.—Felt by and awakened many. Buildings creaked; loose objects rattled. Faint roaring earth sounds heard by many at beginning of earthquake. Abrupt onset; trembling motion.

Hollywood.—Felt by all. Buildings shook; dishes and windows rattled.

Malden.—Felt by and awakened many. Slight damage. Reports of cracked windows. Buildings shook; loose objects and windows rattled. Abrupt onset; trembling motion, southwest-northeast.

Morley.—Felt by and awakened many. Abrupt onset; bumping motion.

New Madrid.—Felt by and awakened many. Buildings creaked; loose objects rattled. Thunderous earth sounds heard by many at beginning of earthquake. Abrupt onset; trembling motion.

Portageville.—Felt by and awakened many. Buildings creaked; loose objects rattled. Roaring earth sounds heard by many at beginning of earthquake. Rapid onset; trembling motion.

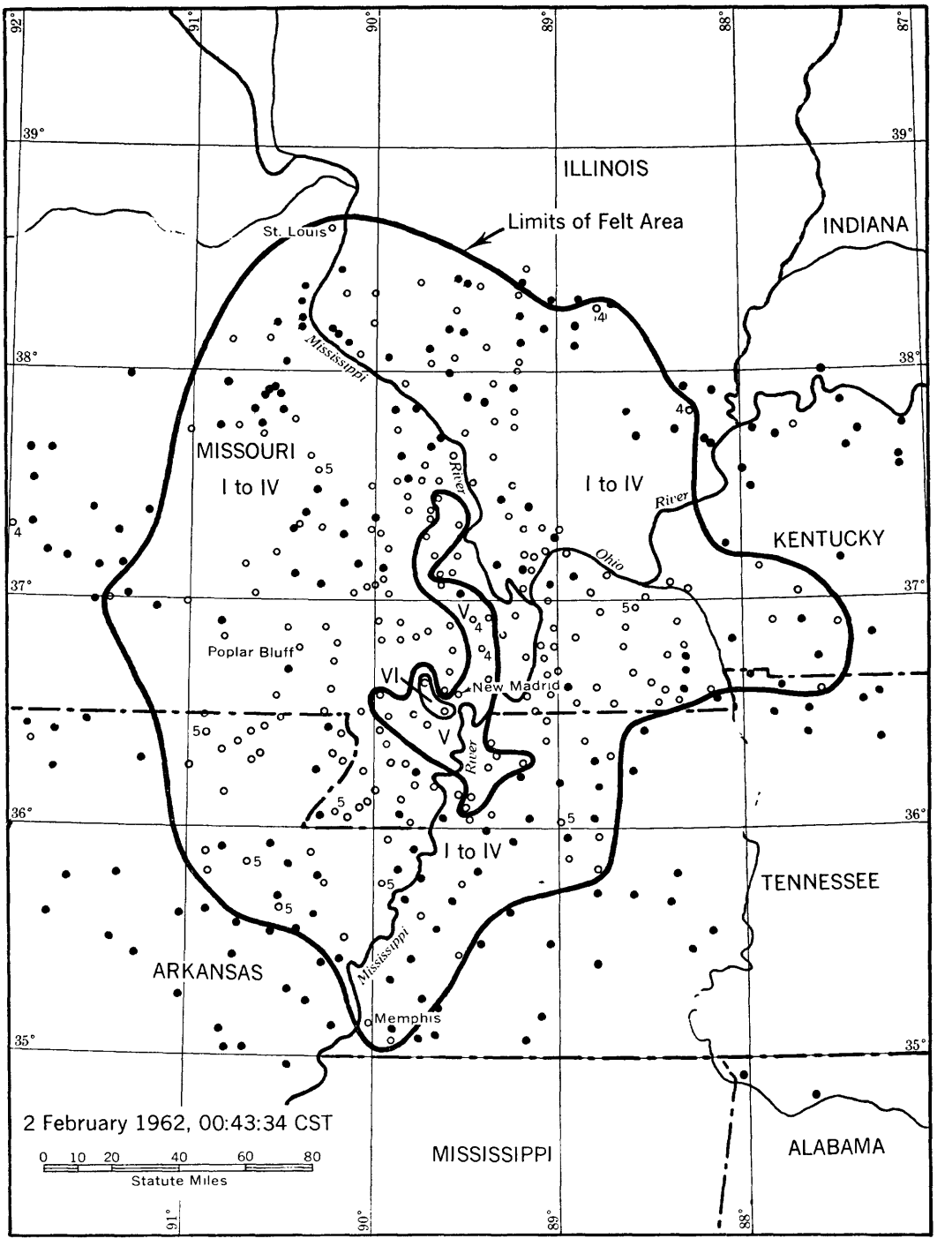

FIGURE 3.—*Area affected by earthquake of February 2.*

Saint Louis.—Felt by and awakened many. Police switchboards flooded with calls from alarmed citizens.

Tallapoosa.—Felt by and awakened nearly all. General alarm. Buildings creaked; loose objects rattled. Moderately loud roaring sounds heard by nearly all. Gradual onset; trembling motion.

Wolf Island.—Felt by and awakened many. Buildings creaked; loose objects and windows rattled; bed shook. Rapid onset.

INTENSITY (DAMAGE) V IN TENNESSEE:

Bogota.—Felt by and alarmed many. Buildings creaked; loose objects rattled. Subterranean sounds heard before earthquake. Gradual onset; trembling motion.

Elbridge.—Felt by and awakened many; few alarmed. Buildings creaked; loose objects rattled. Thunderous sounds heard by nearly all. Rapid onset; trembling motion from west; duration, 1 minute.

Hornbeak.—Felt by many. General Alarm. Buildings creaked; loose objects rattled. Bird knocked off perch. Rapid onset.

Lenox.—Felt by nearly all. Doors and windows rattled. Rumbling sounds heard during earthquake.

Obion.—Felt by and awakened many; few alarmed. Buildings creaked; loose objects rattled. Disturbed objects observed by many. Trembling motion.

Reelfoot Lake (vicinity of).—"It was reported to have broken water pipes in some places."

Troy.—Felt by and awakened many. Slight damage. Buildings creaked; loose objects rattled. Disturbed objects observed by several. Gradual onset; trembling motion.

Union City.—Felt by and awakened many; few alarmed. Slight damage. Wall cracked. Buildings creaked; loose objects, windows, and doors rattled. Dishes on north-south wall rattled. Gradual onset; trembling motion.

INTENSITY (DAMAGE) IV IN ARKANSAS: Datto, Greenway, Joiner, Knobel, Monette, O'Kean, Peach Orchard, Piggott, Pocahontas, Reyno, and West Ridge.

INTENSITY (DAMAGE) IV IN ILLINOIS: Anna, Belle Rive, Carbondale, De Soto, Murphysboro, Nashville, Oakdale, Perks, Pomona, Ridgeway, Steeleville, Vergennes, and Waterloo.

INTENSITY (DAMAGE) IV IN KENTUCKY: Arlington, Bandana, Bardwell, Benton, Cerulean, Columbus, Fancy Farm, Gilbertsville, Hickory, Hopkinsville, Lovelaceville, Lynn Grove, Mayfield, Melber, Milburn, Oak Grove, Oakton, Princeton, Sedalia, Water Valley, and West Paducah.

INTENSITY (DAMAGE) IV IN MISSOURI: Altenburg, Bell City, Bertrand, Bragg City, Brazeau, Broseley, Brownwood, Caruthersville, Clarkton, Coldwater, Commerce, Deering, East Prairie, Essex, Fisk, Glen Allen, Gobler, Gordonville, Grandin, Hendrickson, Herculaneum, Houston, Iron Mountain, Jackson, Kennett, Kewanee, Libourn, Lutesville, Matthews, Mill Spring, Morehouse, Neelyville, Oak Ridge, Old Appleton, Oran, Parma, Peach Orchard, Pocahontas, Poplar Bluff, Qulin, Scott City, Sikeston, Teresita, and Van Buren.

INTENSITY (DAMAGE) IV IN TENNESSEE: Big Rock, Dresden, Dukedom, Dyersburg, Finley, Martin, Mason, Milan, Miston, Munford, Nashville, Ripley, Trenton, and Woodland Mills.

INTENSITY (DAMAGE) I TO III IN ARKANSAS: Biggers, Blytheville, Cash, Corning, Egypt, Moark, Nimmons, Salem, and Warm Springs.

INTENSITY (DAMAGE) I TO III IN ILLINOIS: Ashley, Baldwin, Cairo, Chester, Cutler, Dowell, Du Quoin, Gorham, Hazleton, Hecker, Karnak, Mill Creek, Mound City, Olmsted, Pinckneyville, Prairie du Rocher, Pulaski, Red Bud, Ullin, Villa Ridge, and Wolf Lake.

INTENSITY (DAMAGE) I TO III IN KENTUCKY: Cadiz, Calvert City, Cayce (near Fulton), Clinton, Delaware, Farmington, Fulton, Hardin, Hazel, Hickman, Kirksey, Lowes, New Concord, and Paducah.

INTENSITY (DAMAGE) I TO III IN MISSOURI: Advance, Anniston, Benton, Bloomfield, Burfordville, Caledonia, Campbell, Cascade, Cooter, De Soto, Dexter, Fagus, Farmington, Gibson, Grayridge, Hornersville, Idalia, Kelso, Leopold, Leora, Millersville, Mine La Motte, Pascola, Patterson, Patton, Perryville, Piedmont, Puxico, Richwoods, Rives, Rombauer, Sedgewickville, Steele, Wittenberg, and Wyatt.

INTENSITY (DAMAGE) I TO III IN TENNESSEE: Burlison, Capleville, Humboldt, Medina, Memphis, Rives, and Samburg.

June 26: 19:28:55.7. Epicenter 37.7° north, 88.5° west, southern Illinois, W. Felt in Illinois, Kentucky, and Missouri. Maximum intensity (damage) V. In Williamson and Franklin counties, Illinois, flower pots toppled, pictures fell from walls, and clocks stopped. Slight damage to walls at Johnston City and window damage at West Frankfort was also reported. Questionnaire canvass conducted by Saint Louis University.

INTENSITY (DAMAGE) V IN ILLINOIS:

Jacob.—Felt by all. Houses shook; "something" rattled on oil burner stove.

Johnston City.—Felt. Slight damage to walls reported.

Marion.—Felt. Buildings creaked; loose objects rattled. Moderately loud earth sounds heard. Gradual onset; trembling motion.

West Frankfort.—Felt. Window damage reported.

INTENSITY (DAMAGE) V IN KENTUCKY:

Paducah.—Felt by many. Police, newspaper, and television switchboards flooded with calls from alarmed residents. Buildings shook; windows and doors rattled.

INTENSITY (DAMAGE) IV IN ILLINOIS: Anna, Ava, Benton, Buncombe, Cache, Carbondale, Carterville, Cobden, Dowell, Goreville, Harrisburg, Herrin, Makanda, Millcreek, Murphysboro, New Burnside, Perks, Pomona, Ullin, Unity, Vienna, and Wolf Lake.

INTENSITY (DAMAGE) IV IN KENTUCKY: Bardwell and Marion.

INTENSITY (DAMAGE) IV IN MISSOURI: Altenburg, Bertrand, Brazeau, Chaffee, Daisy, Fruitland, Illmo, Oak Ridge, and Saint Marys.

INTENSITY (DAMAGE) I TO III IN ILLINOIS: Alto Pass, Belknap, Boles, Cairo, Cambria, Campbell Hill, Colp, Creal Springs, De Soto, Energy, Freeman Spur, Gale, Grand Chain, Grantsburg, Hurst, Karnak, Mound City, Nashville, Pittsburg, Reevesville, Simpson, Tunnel Hill, and Vergennes.

INTENSITY (DAMAGE) I TO III IN KENTUCKY: Kevil, Milburn, Mayfield, and Wickliffe.

INTENSITY (DAMAGE) I TO III IN MISSOURI: Allenville, Bloomfield, Cape Girardeau, Clearwater, Commerce, Frohna, Ironton, Jackson, Menfro, New Wells, Old Appleton, Oran, Perryville, Pocahontas, and Saint Louis.

July 23: 00:05:18.4*. Epicenter 36.1° north, 89.8° west, southern Missouri, W. Felt in Arkansas, Missouri, and Tennessee. Maximum intensity (damage) VI at Dyersburg, Tenn., where walls and plaster on walls cracked.

INTENSITY (DAMAGE) VI IN TENNESSEE:

Dyersburg.—Felt by nearly all; awakened and alarmed many. Slight damage. Walls and plaster on walls cracked. Police and radio station switchboards swamped with calls. Buildings shook; windows, doors, dishes, and kitchen utensils rattled; bed jumped. Moderately loud thunderous earth sounds heard by several before earthquake.

INTENSITY (DAMAGE) V IN TENNESSEE:

Bogota.—Felt by, awakened, and alarmed nearly all. Buildings creaked; loose objects, doors, windows, and dishes rattled. Gradual onset; trembling motion.

Boothspoint.—Felt by and awakened many. Doors swung open. Buildings, doors and windows rattled.

Elbridge.—Felt by and awakened many. Buildings creaked; windows, doors, dishes and loose objects rattled. Rattling, thunderous earth sounds heard by several at beginning of earthquake. Rapid onset; trembling motion.

Finley.—Felt by all; awakened and alarmed many. Furniture shifted; small objects overturned. Buildings creaked; loose objects rattled. Bumping earth sounds heard by several during earthquake. Abrupt onset; trembling motion, north to south.

Lenox.—Felt by and awakened many. Small objects overturned. Buildings creaked; loose objects, windows, doors, and dishes rattled. "Felt like a heavy object hitting the building." Thunderous earth sounds heard. Rapid onset; bumping motion.

Miston.—Felt by, awakened, and alarmed many. Slight damage to wall (pulled the wall away from floor in kitchen). Buildings creaked; loose objects rattled. "Felt like a heavy object hitting the building." Bumping, roaring earth sounds heard. Abrupt onset; rolling motion, south to west.

Newbern.—Felt by and awakened many; few alarmed. Buildings creaked; loose objects, windows, doors and dishes rattled; doors swung shut. "Felt like a heavy object hitting the house." Abrupt onset; trembling motion.

INTENSITY (DAMAGE) IV IN MISSOURI: Caruthersville and Hayti.

INTENSITY (DAMAGE) IV IN TENNESSEE: Crockett Mills, Halls, Ridgely, Tiptonville, Trimble, and Woodland Mills.

INTENSITY (DAMAGE) I TO III IN ARKANSAS: Osceola.

INTENSITY (DAMAGE) I TO III IN TENNESSEE: Humboldt.

WESTERN MOUNTAIN REGION

(105TH MERIDIAN OR MOUNTAIN STANDARD TIME)

January 4: 22:17:47*. Cameron, Mont. (Talc Mine in Johnny Gulch). IV. House shook and windows rattled. Described as hard shake, with north-south direction.

January 13: 07:00. Southwestern Colorado. IV. At Montrose, felt by many; few alarmed. Disturbed objects observed by several. Faint bumping earth noises heard by few. Also felt at Ouray, 32 miles southeast of Montrose, where the shock was described as mild; motion rocking; rapid onset.

January 17: 09:09. Fredonia, Ariz. IV. Two very light tremors felt by several in community. Windows rattled. Motion slow, duration 1 second.

January 18: 07:32:13*. West Yellowstone, Mont. IV. Rapid, 2-second shock, accompanied by moderate roaring earth noises, felt by two in home. Windows rattled; walls creaked.

February 1: 10:00. Ovando, Mont. (1 mile southwest of). IV. One-second shock, with abrupt onset, felt by observer. House creaked; loose objects rattled; disturbed objects observed. Moderately loud earth noises heard.

February 4: 04:30. Linfor, Idaho (about 8 miles north of Enaville in Shoshone County). III. Felt by observer lying down. Bed shook. Duration 25 seconds.

February 5: 07:45:51.1*. Epicenter 38.2° north, 107.6° west, southwestern Colorado, W. V. Felt by all and frightened few at Cimarron. Damage slight. Small objects shifted and overturned. Duration 1 second. Dishes rattled at Montrose; faint earth noises from south heard; motion slow, duration a few seconds. Felt slightly at Ridgeway; "sounded like gunshot."

February 8: 16:13:17*. Papoose Creek at Madison River (Helland Ranch), Mont. IV. Rapid, 2–3 second shock felt by several in log house. Walls creaked.

February 15: 00:12:42.9*. Epicenter 36.9° north, 112.4° west, Arizona-Utah border, W. Magnitude 4.5, P. Utah. V. At Kanab, felt by, awakened all, and frightened few in community. Doors and dishes rattled; hanging objects swung. Rapid, 10-second shock in northeast direction. Awakened many and frightened few in community at Orderville. Windows rattled; house seemed to tip to the north then settle back. Rapid motion; long duration; loud earth noises heard. Intensity IV at Rockville, where the shock was felt by several and awakened few in in community. Slow, blastlike motion; very brief. Windows and doors rattled.

February 25: 10:17:38.9*. Epicenter 45.2° north, 111.2° west, western Montana, W. V. At Papoose Creek (Helland Ranch), felt by all and frightened many. Windows, doors, and dishes rattled. Motion slow; long duration; direction west-east. At 320 Ranch (upper Gallatin River area), felt by man sitting; dishes rattled; direction west. House shaken slightly at the Black Butte Ranch (upper Gallatin River area).

March 19: 16:53:35*. Cameron, Mont. (Talc Mine in Johnny Gulch). Sharp shock; motion seemed from the southwest.

March 24: 22:05. Virginia City, Mont. IV. Sudden, sharp, rapid, 1-second shock, felt by osberver lying down. Northeast corner of house creaked loudly. Resembled gust of wind.

April 3: 15:53:56.6*. Papoose Creek at Madison River (Helland Ranch), Mont. IV. Felt by observer lying down. Walls creaked. Rapid, ½-second shock; roaring sounds heard.

April 5: 05:09:17.8*. Papoose Creek at Madison River (Helland Ranch), Mont. IV. Felt by observer lying down. Walls creaked. Rapid, 1–second shock.

April 6: 23:07:29.3*. Papoose Creek at Madison River (Helland Ranch), Mont. IV. Rapid, 1-second shock, accompanied by roaring sounds, felt by observer sitting. Windows, doors, and dishes rattled slightly; walls creaked.

April 11: 12:28:24*. Papoose Creek at Madison River (Helland Ranch), Mont. IV. Moderate 1 second shock, with roaring sounds before and during shock, felt by observer sitting. Walls creaked. Direction east-west.

April 15: 02:00 (about). Virginia City, Mont. Some persons thought that a shock occurred about 2 a.m. The collapse of a wall of an old stone warehouse was attributed to the shock. Roaring sounds heard.

April 20: 20:41:42*. Lima, Mont. IV. Felt by many. Dishes rattled; bed shook. Motion rocking; rapid onset, duration about 5–10 seconds. Earth noises, like wind blowing through trees, heard.

May 30: 18:22:13*. Kirby Ranch, Mont. (where west fork of the Madison joins the Madison River). IV. Felt by several. Dishes rattled; frame creaked. Motion slow, duration about 1 second.

June 18: 21:55. Dupont, Colo. (about 2 miles north of Derby). V. Frightened all in neighborhood; some went outside. Metal grass edger installed evenly the day before, appeared to have moved outwardly about 4 inches. Vase on north window tilted to west. Entire house creaked. Some persons in lower level of houses thought walls would collapse.

June 24: (p.m.). Denver, Colo. IV. Felt by two in home; windows rattled; bed shook.

July 14: 06:00. Black Butte Ranch, Mont. (upper Gallatin Valley). III. Felt by two at ranch. Roaring earth noises heard.

July 15: 04:59:21.9*. Epicenter 45.0° north 110.2° west, Wyoming-Montana border, W. Yellowstone National Park, Wyo. (Canyon, Lower Fall Campgrounds). IV. Rapid, 5-second shock, with north-south direction, awakened one in trailer; trailer shook.

August 6: 17:50 (about). Colorado. Felt over a small area northeast of Denver, principally in the Derby-Dupont area. Slight plaster cracking reported from one resident at Dupont. Maximum intensity (damage) V. Felt by all and frightened few at Derby. Floor seemed to rise up and down; walls creaked. Moderate earth noises heard at time of shock; seemed from all directions to one observer, from northeast to another. Explosivelike shock. At Dupont, felt by all and frightened many in community; some went outdoors. Slight plaster cracking reported. Dishes on table shifted; large house plants shook back and forth. Two very loud and heavy explosivelike jolts, about 3 seconds apart, seemed definitely underfoot. Felt by many (some outdoors) and frightened few at Henderson, where furnishings shifted; windows rattled; house

creaked. Motion rapid, brief. Intensity (damage) IV at Adams City and two places in the northeast Denver area. Also felt at Brighton, Eastlake, and Thornton.

August 6: 18:23, 18:40. Dupont, Colo. IV. Very small jolt at 18:23; two jolts at 18:40, slightly stronger than the first. Felt in home and outdoors by man sitting in lawn chair. Lawn chair moved and caused sensation of nausea.

August 6: 21:00. Derby, Colo. One observer reported this shock as stronger than the one at 17:50.

August 7: (no time given). Dupont, Colo. IV. Slight shock felt by one. Objects in garage rattled.

August 15: 17:00 (about) and 23:55. Dupont, Colo. Jerk, then thudlike sound on ground floor.

August 23: 22:00 or 22:30. Driggs, Idaho. Slight shock felt by some at Driggs. "From what I heard, the people at Tetonia, 8 miles north of Driggs, felt the shock more distinctly."

August 26: 05:15. Yellowstone National Park, Wyo. (Canyon). V. Rapid, 2–3 second shock felt by two lying down. Pendulum clock stopped.

August 26: 06:22:00*. Yellowstone National Park, Wyo. (Canyon). V. Felt by, awakened, and frightened many in community. Windows rattled. Hanging objects swung. Trees, bushes shaken moderately. Motion rapid, duration 2–3 seconds.

August 30: 06:35:28.7* (main shock). Epicenter 41.8° north, 111.8° west, northern Utah, W. Magnitude 5.7. This was the most damaging and widely felt earthquake originating in Utah since the Hansel Valley earthquake of 1934, and the only earthquake in recorded history originating on the East Cache Valley fault which caused damage to structures. The shock was felt over an area of approximately 65,000 square miles. (See maps, pp. 16 and 17.) Maximum intensity (damage) VII. Damage was estimated at upwards of $1 million. There were no deaths. Cache County was designated a disaster region by the Small Business Administration. The Red Cross immediately dispatched aid to the area, especially needed in Richmond, where damaged dwellings rendered many homeless. Field investigations conducted by the Seismological Field Survey, Utah State University, Stanford Research Institute, Pacific Fire Rating Bureau, and other organizations revealed principal building damage occurred in areas on the east side of Cache Valley from Logan to Lewiston. Many old, unreinforced brick buildings and other older structures and homes, generally in poor repair with weak mortar, were heavily damaged.

The town of Richmond, 15 miles north of Logan, population about 1,000, suffered the greatest damage. Large church damaged beyond repair; numerous houses lost walls and at least 9 houses were declared unsafe for occupancy; school damaged; 75 percent of older brick chimneys fell; tombstones fell. A number of buildings in downtown Logan sustained severe damage, principally from cracked and distorted walls. Heavy capstones fell from parapets of the Logan Junior High School; brick and timbers fell through roof of church; minor damage to several buildings at Utah State University. In Lewiston, brick wall fell; much chimney damage. Sugar refinery, about 1½ miles south of Lewiston, sustained major damage when large pieces of cement coping fell from high parapets onto lower roofs, completely penetrating the roofs. Four schools of the Cache County School district most seriously damaged were the North Cache High School and the Park Elementary School, both in Richmond; the Lewiston Junior High School; and the Summit Elementary School at Smithfield. Summarizing damage, the Pacific Fire Rating Bureau reported: "Building damage in the epicentral region was largely confined to brick bearing wall structures with no earthquake bracing. The fall of parapet walls onto lower structures was the cause of much of the spectacular and severe damage. Minor building damage was extensive, but cases of severe damage were rare. Based on building damage observations, the earthquake's maximum intensity was moderate. It would be well to note, however, that many brick buildings have been cracked. Also many walls have shifted and been otherwise loosened. A strong aftershock, or a strong earthquake at some later date, could cause major damage as well as considerable life loss in unrepaired buildings."

To the west of Lewiston, along the Bear River, there were several mud slides covering several acres, and further south, near Trenton, small mud boils were observed along the sand banks of the river. At Cornish, a mud slide cut through an irrigation canal and water from the canal flooded the lowland. At the mouth of Logan Canyon, about 2 miles east of Logan, falling rock broke a water flume and escaping water caused a mud slide which partially blocked U.S. Highway 89. Fallen rock was observed from the mouth of Logan Canyon to Card Canyon, a distance of about 7 miles. Several boulders fell onto the road in Smithfield Canyon and there were minor earth slides in the area. In Cherry Creek Canyon, east of Richmond, huge dust cloud was seen immediately after the shock. It was reported the DeWitt Springs in

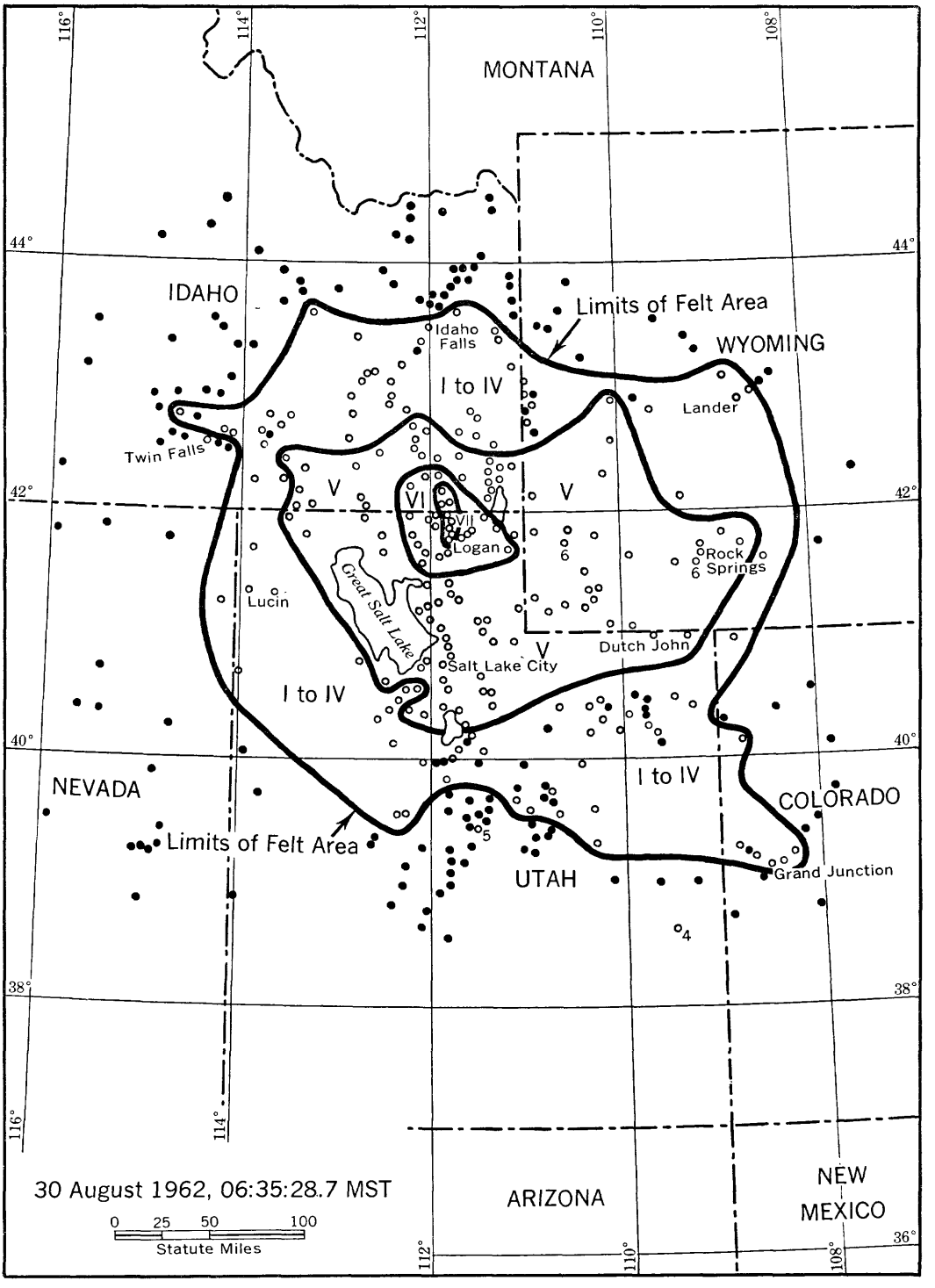

FIGURE 4.—*Area affected by earthquake of August 30.*

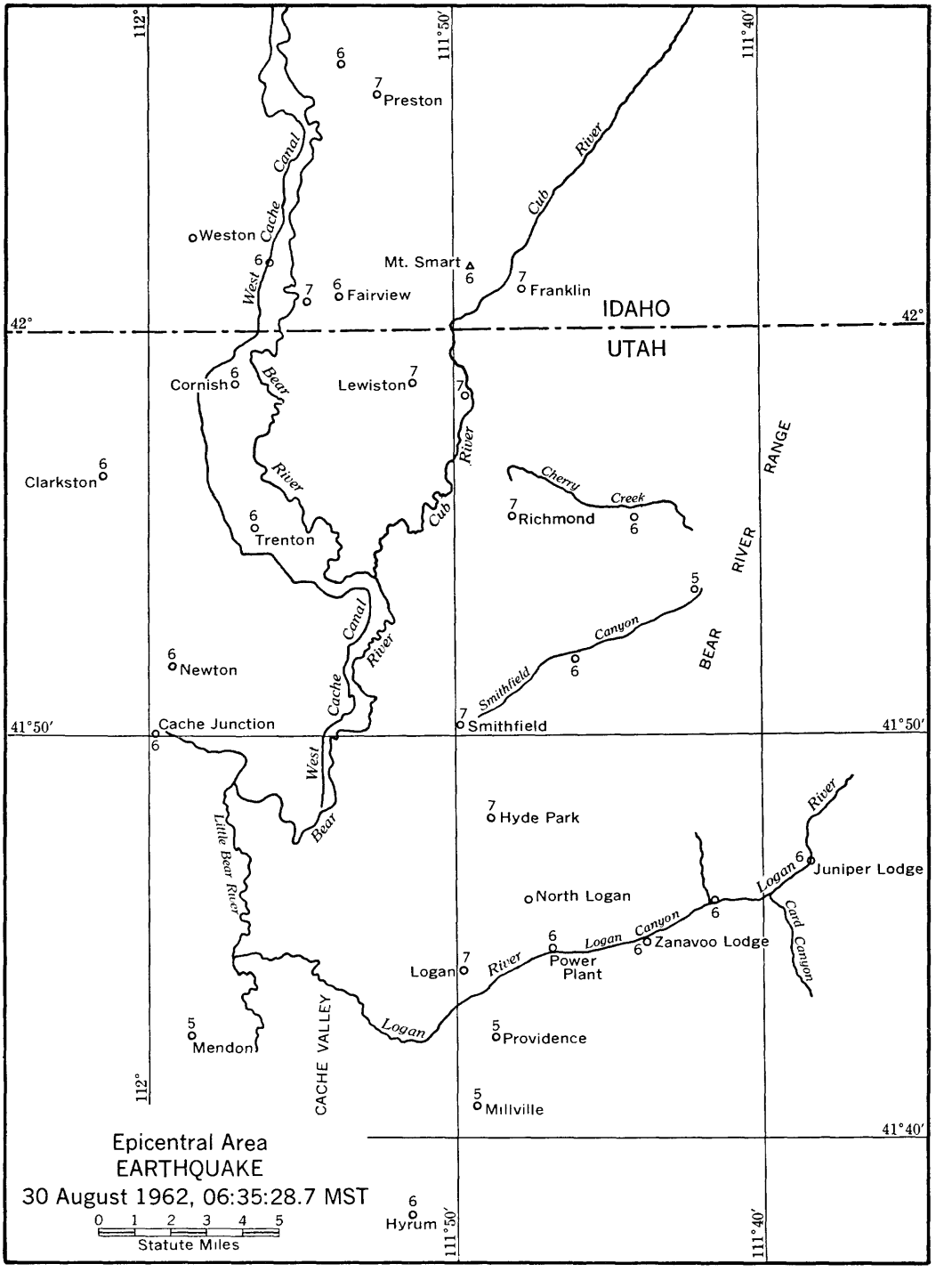

FIGURE 5.—*Epicentral area of earthquake of August 30.*

Logan Canyon increased in flow and water from the springs was muddy. Farmers north of Logan, in the upper Cache Valley, reported a number of wells, which had been dry for years, began flowing good streams of water. No surface faulting was observed.

The Stanford Research Institute, operating three portable seismographs for a period of 14 days in the vicinity of the epicenter of the main shock, reported 302 aftershocks recorded, with six of sufficient magnitude to be felt in Cache Valley. These six shocks were recorded as follows: September 4, 00:07:10; September 5, 10:24:20; September 7, 01:47:20; September 8, 10:03:50; September 9, 07:38:12; September 14, 06:17:00.

It was reported the shock of September 4 at 00:07:10 had an epicenter in the valley of High Creek at 41°57′56″ north, 111°43′24″ west. This location is approximately 2.5 km east of the surface trace of the East Cache fault. Epicenter of the shock of September 14 at 06:17:00 was at 41°56′48″ north, 111°40′45″ west. This location is on the crest of the Bear River range 2 km northwest of Mount Cog and 6.5 km east of the trace of the East Cache fault. It was reported these two aftershocks, 246 hours apart, were probably representative of the locations of many of the aftershocks. Seventy of the 302 recorded shocks had sufficient amplitude for detailed geometrical analysis. In addition to the 302 aftershocks recorded at two or more stations, another 108 seismic events, which may have been aftershocks of the main shock, were observed.

The following reports refer to the main shock unless otherwise stated:

INTENSITY (DAMAGE) VII IN UTAH:

Hyde Park.—Felt by and frightened all in community. Slightly more damage to chimneys and more fallen brick then in Logan. No damage to newer brick structures. Plaster cracked; chimmey fell. Furniture overturned; piano shifted. "Several aftershocks felt."

Lewiston.—Felt by, awakened, and frightened all in community. Upper brick wall section of 2-story building fell. Widespread chimney damage. Extensive plaster cracking; plate glass windows broken; water line broken. At the Amalgamated Sugar Refinery, about 1½ miles south of Lewiston, cement copings weighing as much as 500 pounds, fell from high parapets upon low roofs, causing major damage. Indications of structural failure at school. To the west of Lewiston, along Bear River, there were several mud slides covering several acres, and further south, near Trenton, small mud boils were observed along the sand banks of the river.

Logan and Logan Canyon areas.—Felt by all and frightened many. Several older, unreinforced brick buildings sustained severe damage due to walls moving outward and parapet failure; many others were damaged to some extent. Many buildings cracked; brick veneer fell in various sections of the city; much plate glass breakage. Gable on church fell and crashed into the chapel. Both east and west walls severely damaged. Parapet failure at Logan Junior High School. Major cracks in some walls at Utah State University. Grocery stores suffered major losses from fallen merchandise. Observer in basement of Logan High School reported a 15-ton furnace shifted back and forth. Lumber stacked in east-west direction toppled. Sidewalks bulged in some places where old cracks existed. At the mouth of Logan Canyon, about 2 miles east of Logan City Center, falling rock from steep cliffs broke water flume, causing a mud slide across U.S. Highway 89. Rock falls were noted in the canyon as far as Card Canyon, a distance of about 7 miles.

Richmond (15 miles north of Logan).—Felt by and frightened all. Extensive cracking of brick buildings in business district; some unanchored brick veneer on masonry walls fell; many chimneys damaged and fell (about 75 percent of older brick chimneys). Many tombstones fell in cemetery. Parapet failure at North Cache High School. The Benson Stake Tabernacle was condemned. A west wall of the church moved inward 5–6 inches; building shifted to east; jagged cracks on all sides; on west side daylight could be seen through a large crack in the brick wall; one stained glass window, blown completely out, was a twisted mass of frame and jagged glass. Many dwellings severely damaged. One of the most severely damaged was the home of Lorenzo Bullen, where the adobe of the brick and adobe house completely broke loose and a wall caved into the bedroom. The chimney was violently ripped off and all walls badly twisted. The Charles Burbank home, formerly an old schoolhouse, was completely shattered. Front porch fell and chimney crumbled. Other observers reported heavy garage roof collapsed, pinning car to the ground; refrigerator door flew open; bottles and dishes flew in every direction; chimneys did the "twist." Out of 260 homes only 37 were not noticeably damaged. It was reported a slide of fractured quartzite rock occurred in the lower part of Cherry Creek, about 3½ miles east of Richmond, causing a large cloud of dust immediately after the shock.

Smithfield.—Felt by, awakened, and frightened all. Plaster, walls, and chimneys cracked; bricks fell from the top of most old chimneys. Damage considerable. Several dislodged boulders were observed along the highway in Smithfield Canyon

and deer hunters reported small rock slides in the area. Press reported a 64-ton electric transformer at the Smithfield substation of Utah Power and Light Company shifted about 2 inches, but there was no damage and service was not interrupted. At a warehouse a tank containing 30,000 pounds of honey was moved 4–5 inches.

INTENSITY (DAMAGE) VII IN IDAHO:

Fairview (west of S.B. Lamont Farm).—Press reported two large areas of pasture land, totaling some four acres, were broken loose to a depth of 5 feet and slid 300 yards down a hill. The slippage opened up a number of new springs and reduced the flow of other springs further down the Bear River Valley. Concrete cap of high chimney on church moved a few inches to south.

Franklin.—Felt by and awakened all in community; frightened many. Plaster, walls, and chimneys cracked; twisting and fall of chimneys. Press reported a check of school buildings showed Franklin's school had been the hardest hit. Falling brick tore a hole in the roof; plaster cracked in every room of the 2-story building. Some home foundations cracked. A ground crack was observed on the Darrell LeFevre farm, near the south end of Mount Smart, west of Franklin. Merchandise fell in most stores.

Preston.—Reported as felt by all in Franklin County. Press reported damage in varying degrees occurred throughout the area. Older structures showed the most damage. Few chimneys fell; few homes had cracked walls and fireplaces. Sandstone facing crumbled and a space opened between roof and the stone facing on old rock building on the Preston High School campus. Some cracks appeared in the wall where the newer portion of the Preston High School building joins the older building. One mile north of Preston, pasture land slid into the river. All furniture shifted back and forth, north-south and east-west; pictures on east-west walls shifted the most.

INTENSITY (DAMAGE) VI IN UTAH:

Brigham City.—Felt by all; frightened few. Press reported only minor damage occurred in Brigham City and vicinity.

Cache Junction.—Awakened and frightened all in community. Damage slight. Plaster, windows, walls, chimneys, and cement cracked. Small objects and furnishings shifted; small objects overturned; knickknacks and pictures fell. Trees, bushes shaken strongly. Pendulum clock stopped.

Canteen.—Evidence of fallen rock.

Clarkston.—Felt by and awakened all in community; frightened many. Damage slight. Plaster cracked and fell; walls and chimneys cracked. Small objects and furnishings shifted; small objects overturned. Pendulum clock facing east stopped.

Collinston.—Felt by, awakened, and frightened all in community. Damage slight. Plaster and walls cracked. Trees, bushes shaken moderately.

Corinne.—Felt by and awakened all in community; frightened many. Plaster cracked. Small objects shifted and overturned. Trees, bushes shaken moderately. Hanging objects swung east-west.

Cornish.—Felt by all in community; awakened and frightened many. Damage slight. Chimneys cracked. Pendulum clock facing east stopped. Hanging objects swung east-west. Small objects and furnishings shifted; knickknacks, books, pictures fell. Trees, bushes shaken moderately.

Deweyville.—Felt by all in community; awakened and frightened many. Damage slight. Plaster cracked. Small objects shifted; vases, small objects overturned; pictures fell. Trees, bushes shaken moderately. Hanging objects swung northeast.

Eden.—Felt by and awakened all in home; frightened few in community. Damage slight. Plaster cracked. Furnishings shifted; small objects overturned; books fell.

Hooper.—Felt by and awakened all in community; frightened many. Slight damage. Plaster cracked. Small objects shifted. Hanging objects swung northeast.

Honeyville.—Felt by, awakened, and frightened all in community. Cement cracked. Small objects shifted. Trees, bushes shaken moderately. Hanging objects swung north-south.

Hyrum.—Felt outdoors. It was reported a few loose bricks may have fallen from some chimneys.

Kaysville.—Felt by all and awakened many in community; frightened few. Damage slight to concrete. Trees, bushes shaken moderately. Small objects shifted. Hanging objects swung north-south.

Keller Ranch (head of Logan Canyon, east side of Bear River Range, about 5 miles up the Logan River from U.S. Highway 89).—Felt by and awakened all; frightened few. Rocks rolled over; springs murky; water sloshed from buckets. Small objects shifted and overturned; knickknacks and groceries fell.

Laketown.—Felt by and frightened many in community; awakened few. Porch separated about 2 inches from house; cement garage floor cracked. Small objects shifted. Hanging objects swung east-west.

Manila.—Felt by all in community; awakened and frightened many. Plaster cracked.

Newton.—Felt by, awakened, and frightened all in community. Damage slight. Knickknacks, books, and pictures fell. Trees, bushes

shaken strongly. Water line feeding the joint reservoir of the communities of Newton and Clarkston was broken.

Park City.—Felt throughout the town. Plaster cracked; cement sidewalks and footings cracked.

Portage.—Felt by and awakened many in community; frightened few. Plaster and chimneys cracked. Small objects shifted and overturned; knickknacks fell.

Randolph.—Felt by all in community; awakened and frightened many. Damage slight. Plaster and walls cracked. Small objects shifted; knickknacks fell. Trees, bushes shaken moderately. Pendulum clock facing south stopped.

Riverside.—Felt by and awakened all in community; frightened few. Damage slight to masonry. Plaster and chimneys cracked. Small objects shifted; vases, small objects overturned; knickknacks fell. Trees, bushes shaken strongly.

Trenton and vicinity.—Felt by, awakened, and frightened all in community. In the Bear River bottomlands, a series of small "pots" bubbled up, leaving volcano-shaped mounds of light, blue colored sand. Water had stopped bubbling from the sand boils by September 1. Ground cracks, about 2–3 inches wide and up to several feet long, followed the Bear River for about 5 miles south from Trenton. Near Trenton, along the Bear River, a small landslide occurred when heavy, water-saturated soil was jarred loose. The slide carried fence posts more than 100 feet toward the river. Press reported the faults and earthquake cracks in the Trenton-Cornish area were investigated by Dr. J. S. Williams, Professor of Geology at the Utah State University. Dr. Williams reported the "fault" resulted from soft sand bank of a delta which had been jolted loose by the tremor and slid to the bottomland. Cracks on the Harold Spackman farm, adjacent to the Bear River, west of Richmond, and in adjoining farms bordering the river were caused by drought. The water and sand beneath the baked earth crust was forced upward by the tremor's motion and spurted and flowed like small geysers through some of the cracks. Some of the eruptions carried the odor of gas. In one area the crust was forced upward about a foot, but settled within 24 hours after the shock. Dr. Williams said the cracks appeared in the same area where similar results were noted after the 1934 earthquake, which centered in the Hansel Valley, 60 miles to the west. Chimneys twisted and cracked; plaster cracked; slight concrete damage; dishes and windows broken. Slight damage. Small objects and furnishings shifted; knickknacks and pictures fell. Pendulum clock stopped. Trees, bushes shaken strongly.

Wellsville.—Felt by observer outdoors (active); frightened few. Damage slight. Plaster, windows, walls, and chimneys cracked. Knickknacks, books, pictures, and plaster fell. Small objects and furnishings shifted; vases, etc., small objects overturned.

INTENSITY (DAMAGE) VI IN IDAHO:

Albion.—Awakened all and frightened many in community. Walls cracked. Damage slight. Small objects shifted.

Banida.—Felt by and frightened all in community. Small crack in side of brick house. Small objects shifted. Lights went out.

Bern.—Awakened all and frightened many in community. Ceiling and cement basement floor cracked.

Dingle (Utah Power Company Dam).—Strongly felt. River gages indicated water level change. Heavy concrete flood gates swung.

Downey.—Felt by, awakened, and frightened many in community. Damage slight. Press reported chimney on hotel fell and roof damaged. Small objects overturned; flowerpots fell from shelves.

Malad City.—Frightened all in community; awakened many. Damage slight. Plaster cracked. Furnishings shifted; knickknacks fell.

West Cache Canal (about 4 miles northeast of Cornish, Utah, and about 2 miles southeast of Weston, Idaho.).—Press reported one of the more spectacular results of the shock was the rupture of the West Cache Canal, some 4 miles northeast of Cornish, Utah. The east bank of the large canal was shaken loose for a distance of several rods and slid down into the bottomland. Dr. Williams inspected the slide and stated that the soft sand bank, laid down as a delta by old Lake Bonneville, had been jolted loose by the shock.

INTENSITY (DAMAGE) VI IN WYOMING:

Elkol.—Felt by and awakened all. Foundation cracked. Small objects shifted and overturned; furnishings shifted.

Point of Rocks.—Felt by all; awakened and frightened many in community. Walls cracked.

Quealy.—Felt by all; awakened and frightened few in community. Plaster fell. Damage slight. Small objects shifted and overturned; knickknacks fell.

INTENSITY (DAMAGE) V IN UTAH: Arcadia, Bear River City, Bountiful, Cedar Valley, Centerville, Clearfield, Coalville (Pine Cliff Inn), Croydon, Devils Slide, Draper, Dutch John, Echo, Eden, Ephraim, Farmington, Fielding, Fort Douglas, Garden City, Garland, Grantsville, Heber, Henefer, Howell, Huntsville, Lakota (2 miles north of Garden City), Lark, Lehi, Liberty, Magna, Mendon, Midvale, Midway, Millville, Nutter Ranch and Nine Mile area (about 30 miles northeast of Price), Oakley, Ogden and vicinity, Ophir, Paradise, Park Valley,

Payson, Peoa, Pleasant Grove, Promontory (18 miles west of Brigham City), Providence, Provo, Randolph (Sage Creek Junction area), Riverton, Roy, Saltair (about 10 miles west of Salt Lake City), Salt Lake City and vicinity, Tremonton and 14 miles west of in Howell Valley, Upton, Vernal, Wallsburg, Wasatch, Wellington, Wendover, Willard, Woods Cross, and Yost.

INTENSITY (DAMAGE) V IN IDAHO: Alameda, Arbon, Arimo, Atomic City, Bloomington, Bridge, Cleveland, Clifton, Conda, Dayton, Fish Haven, Geneva, Lava Hot Springs, McCammon, Malta, Mink Creek, Montpelier, Ovid, Oxford, Paris, Pingree, Pocatello, Roy, Saint Charles, Samaria, Standrod, Swan Lake, Thatcher, Virginia, and Weston.

INTENSITY (DAMAGE) V IN WYOMING: Altamont, Big Piney, Cokeville, Daniel, Diamondville, Evanston, Fort Bridger, Granger, LaBarge, Lonetree, Lyman, McKinnon, Mountain View, Opal, Reliance, Robertson, Rock Springs, Sage, and Superior.

INTENSITY (DAMAGE) IV IN UTAH: Beaver Mountain Ski area (about 20 miles northeast of Logan), Bingham Canyon, Castle Rock, Clear Creek, Crescent, Delle, Duchesne, Grouse Creek (extreme northwestern Utah), Jensen, Kenilworth, Layton, Leamington, Lenay (about 15 miles east of Lucin), Lynndyl, Lucin, Mammoth, Moab, Mona, Morgan, Mountain Home, Orrs Ranch (about 10 miles southwest of Saint John, Snowville, Springville, Stockton, Sunnyside, Tabiona, Thistle, Tooele, Vernon, Wanship (about 10 miles south of Coalville), Wattis, and West Jordan.

INTENSITY (DAMAGE) IV IN IDAHO: Aberdeen, Acequia, American Falls, Arco, Bancroft, Blackfoot, Burley, Eden, Elba, Georgetown, Grace, Idaho Falls, Inkom, Nounan, Oakley, Paul, Pegram, Rockland, Rupert (10 miles north and 3 miles west of), Shelley, Soda Springs (about 9 miles southeast of, on Ellis Ranch), Sterling, Stone, and Wendell.

INTENSITY (DAMAGE) IV IN WYOMING: Alpine, Bitter Creek, Carter, Freedom, Green River, Grover, Hudson, Lander, Piedmont (on ranch), and Thayne.

INTENSITY (DAMAGE) IV IN COLORADO: Clifton, Mack, and Rangely.

INTENSITY (DAMAGE) IV IN NEVADA: Montello.

INTENSITY (DAMAGE) I TO III IN UTAH: Altonah, American Fork, Boneta, Kamas, Myton, Orem, Salem, Upalco, and Woodside.

INTENSITY (DAMAGE) I TO III IN IDAHO: Bennington, Chubbuck, Decio, Fort Hall, Hazelton, Minidoka, Palisades, Ririe, Springfield, and Strevell.

INTENSITY (DAMAGE) I TO III IN WYOMING: Boulder, Eden, Etna, Fairview, Fort Washakie, and Kemmerer.

INTENSITY (DAMAGE) I TO III IN COLORADO: Cameo, Fruita, Grand Junction, Sparks Ranch (extreme northwest corner of Colorado, about 12 miles from Utah border).

August 30: (late afternoon and 18:00 about). Logan, Utah. IV. Tremors of a minor nature were reported by several Cache residents on Thursday in the late afternoon, and tremors which rattled windows and caused a distinct vibration were felt at Logan at 6 p.m.

August 31: 03:30. Logan, Utah. IV. Distinct vibration. Windows rattled.

September 4: 20:00 (about). Logan, Utah. V. Mild tremor felt by fire department personnel. Cracks in fire hall widened; plaster fell in one place.

September 5: 09:04:29*. Epicenter 40.7° north, 112.0° west, near Salt Lake City, Utah, W. Magnitude 5.1 Felt over an area of approximately 9,000 square miles of north-central Utah. Maximum intensity (damage) VI. Damage occurred principally in the Granger, Hunter, Magna, and Salt Lake City areas, and, with the exception of three older-type houses, consisted chiefly of minor wall and plaster cracks, chimney damage, broken windows, and loss from fallen merchandise in stores. In Salt Lake City, an outside front wall of an older-type house cracked and fell through ceiling; portions of inside walls and ceiling plaster fell at two other houses. Some large buildings in Salt Lake City sustained slight interior cracks. Inspection of schools revealed that damage, with one exception, was superficial, consisting mainly of plaster cracking and loosened acoustical tile. At the Cyprus High School, parapet required removal; facade of old section pulled about 2 inches away from building; large plaster cracks. Utility officials reported no damage to facilities and no interruption in services. Few injuries were reported. In downtown Salt Lake City a woman suffered a mild heart attack; at Magna a woman fell and broke her leg while running from building; woman hit on head by falling plaster.

INTENSITY (DAMAGE) VI:

Bingham Canyon (open pit copper mine).—Felt by majority of workers; general alarm. Practically all terraces on and in pit area showed small slides of unstable material, causing a dust mask. Slight cracks in freshly painted concrete building walls. Considerable disturbance felt by some miners at depths of several thousand feet in Oquirrh Mountains.

Draper.—Felt by and frightened many in community. Damage slight. Plaster, walls, and cement cracked. Dishes, vases, and pic-

tures shifted; tall plants overturned. Hanging objects swung north-south.

Lark.—Felt by and frightened many in community. Damage slight. Walls cracked; small objects shifted; pictures fell.

Magna.—Felt by and frightened all in community. Plaster, windows, walls, and chimneys cracked; dishes broken. Small objects overturned; knickknacks fell. Hanging objects swung west. Press reported sewer and water pipe broke at one building. Woman running from building slipped on contents of broken bottle and broke her leg.

Midvale.—Felt by all; frightened few. Damage slight. Plaster cracked.

Morgan.—Felt by and alarmed many. Slight wall cracks in few east walls; few loose shingles; gas pipe broken in one building; small cracks in some foundations and cement walks. "The shock was very light in Morgan County. About $200 damage."

Murray.—Felt by all and frightened many in community. Damage slight. Plaster cracked.

Provo.—Felt by many. Damage slight. Bricks fell from chimneys; few reports of small cracks; dishes fell from cupboard. Chair rolled away from desk. Reported as felt more strongly along the bench areas than in the valley.

Salt Lake City.—Press reported an outside front wall of a house at 430 E. 7th South was cracked from ground to roof gable top and inside wall blocks fell through the plaster ceiling. At 271 W. 5th North, the bedroom ceiling plaster and parts of an inner wall fell. At 17 N. 5th West, an inside wall was shattered, sending blocks and ceiling plaster down on bed. It was reported State, City-County, and Federal buildings sustained wall and doorway cracks. The old Salt Lake City-County building had several new interior cracks. The new State Office building had a few hairline cracks along walls. In the "Desert News" offices, 16 windows were broken, a light fixture fell, and there were many small cracks in walls and ceilings. Cyprus and Granger High Schools were closed for structural inspection, but were reopened the following day. Granger, Cyprus, and Brockbank Junior High Schools appeared to be the most seriously damaged. The parapet around the top of Cyprus High School was jarred enough to require removal. On the north and west sides of the building, particularly at the old section, the facade was pulled about 2 inches away from the rest of the building. Inside the old section, cracks up to 2 inches wide and 8–10 feet long were observed in the plaster. Inside the front door the floor of the hall had pulled about 1½ inches away from the floors of the classrooms. Plaster fell in several rooms and seven windows in one room cracked. At Granger High School about 100 feet of acoustical tile on the second floor was jarred loose. Salt Lake City School District reported damage to at least 14 schools, none of it serious, consisting of few interior cracks, plaster cracks, and loosened acoustical tile. Granite School District reported damage to schools was about $1,000; no structural damage. Two cracks in FAA building at Municipal Airport; light fixture, weakened by shock, fell at 11:45 a.m. At North Salt Lake, about 5 miles north of Salt Lake City, felt by and awakened all in community; frightened few. Plaster, windows, walls, and chimneys cracked.

INTENSITY (DAMAGE) V: Clearfield, Coalville, Echo, Grantsville, Kearns (about 9 miles southwest of Salt Lake City Center), Lehi, Mammoth, Riverton, Saint John, Saltair (about 4 miles north of Magna), South Salt Lake (about 4 miles south of Salt Lake City), and Tremonton.

INTENSITY (DAMAGE) IV: American Fork, Bountiful, Cedar Valley, Farmington, Henefer, Hooper, Kaysville, Lucin, Ogden, Ophir, Payson, Park City, Peoa, Roy, Stockton, Thistle, Vernon, Wanship (about 10 miles south of Coalville), Wasatch Resort (about 7 miles southeast of Sandy), West Jordan, Woodruff, and Woods Cross.

INTENSITY (DAMAGE) I TO III: Antelope Island, Croydon, Devils Slide, Heber (about 24 miles east of), Honeyville, Huntsville, Logan, Midway, Salem, Tooele, and Wallsburg.

September 7: (a.m.). Lewiston, Utah. V. "We have felt several aftershocks. Our house had additional damage September 7, in a.m."

September 9: 07:38:13*. Epicenter 41.6° north, 111.7° west, northern Utah, W. Logan, Utah. Described as a slight, brief, firm tremor.

September 24: 08:25. Papoose Creek at Madison River, Mont. (Helland Ranch). IV. Felt by several. Walls creaked. Motion rapid, jerking, duration 1–2 seconds.

October 6: 02:28:17.4*. Epicenter 43.6° north, 110.8° west, Teton County, Wyo., W. IV. Felt by several at Moose. Windows and dishes rattled. Motion slow; faint earth noises heard. At Wilson, felt by and awakened all in home; frightened few. House creaked. Motion rapid; moderate earth noises heard.

October 9: 04:50. Mammoth (Yellowstone National Park), Wyo. IV. Felt by several and awakened few in community. Windows rattled; house creaked. Motion rapid; lasted 1–2 seconds.

October 15: 08:45. Mammoth (Yellowstone National Park), Wyo. IV. Rapid, 1-second shock felt by observer lying down. Windows rattled;

October 17: 10:20:45. Hoover Dam, Nev. IV. Felt by all and frightened few at dam.

Rapid, 3-second shock; vertical direction; moderate earth noises heard.

October 18: 10:00. Mammoth (Yellowstone National Park), Wyo. IV. Rapid, 1-second shock felt by observer lying down. Windows rattled; house creaked.

October 18: 11:03:18.5*, 11:56:32.3*, 13:31:07.1*, and 20:45 (about). Epicenter (1) 44.3° north, 115.3° west; (2) 44.6° north, 116.0° west; (3) 44.3° north, 115.2° west, central Idaho, W. Stanley. III. All shocks were mildly felt by several. Faint earth noises heard.

October 19: 03:43:25.0*. Epicenter 44.6° north, 115.5° west, central Idaho, W. Stanley. III. Mild shock felt by several.

December 4: 10:49:59.4* and 23:27. Epicenter 39.8° north, 104.7° west, northeast of Denver, Colo., W. Magnitude about 3.5 (determined by the Geophysical Observatory, Colorado School of Mines). VI. At Dupont, felt by and frightened many in community. Picture window broken. Bed in upstairs room moved out from west wall about 6 inches to the east. At 23:27, house heaved and a thump was heard underfoot. At Irondale, about 1½ miles northeast of Dupont, windows broken at school (old brick building on sloping street); electrical wall outlets in two rooms shaken out and hung by wires; brick tile loosened. All children very frightened. Intensity (damage) V at Adams City, Boulder, Derby, Henderson, Lakewood (west Denver area), Lyons (2 miles west of, in South St. Vrain Canyon area), and Silver Plume. Intensity (damage) IV at Foxton (42 miles southwest of Denver), Georgetown, Idledale, and Louviers. Also felt at Dumont and Nederland.

December 5: 06:48:00.4*, 17:20, and 17:25. Epicenter of main shock 39.9° north ,104.6° west, W. Magnitude 4.0 (determined by the Geophysical Observatory, Colorado School of Mines). Felt over an area of approximately 6,000 square miles of north-central Colorado. Maximum intensity (damage) VI. Slight damage in the Derby-Dupont area, about 8 miles northeast of Denver City Center, consisted principally of cracked plaster. It was reported this was the strongest shock ever felt in the Denver area.

INTENSITY (DAMAGE) VI:

Derby area.—Awakened all and frightened many in community. Damage slight. Plaster cracked. Knickknacks fell. Church strongly shaken; felt like something hit the building. Loud explosivelike earth noises heard. In the area toward the Rocky Mountain Arsenal, some persons thought the shock on December 4 was stronger than the one on December 5; others thought both shocks were equally as strong.

Dupont.—Felt by, awakened, and frightened all in community; children cried with fright. One crack in wall. Small objects shifted and fell. Loud earth noises heard.

INTENSITY (DAMAGE) V: Adams City, Bennett, Buffalo Creek, Denver, Dumont, Eldorado Springs, Erie, Frederick, Henderson, Idaho Springs, Jamestown, Keenesburg, Kittredge, Littleton, Lyons (2 miles west of, South St. Vrain Canyon area), Silver Plume, and Wheat Ridge.

INTENSITY (DAMAGE) IV: Black Hawk, Brighton, Broomfield, Castle Rock, Central City, Dacono, Deer Trail, Eastlake, Empire, Fort Lupton, Franktown, Georgetown, Hudson, Indian Hills, Lafayette, Louviers, Nederland, Niwot, Parker, Platteville, Pinecliffe, Pueblo, Roggen, Strasburg, and Westminister.

INTENSITY (DAMAGE) I TO III: Arvada, Elizabeth, Firestone, Fort Logan, Foxton, Hoyt, Longmont, Sterling, and Watkins.

December 18: 06:49:40*, 06:50:16*, and 06:52:04*. The shocks were felt principally in the northern Flathead Lake region of northwestern Montana. The shock at 06:52:04* was reported felt slightly at Linfor (near Enaville), Idaho. Maximum intensity (damage) V. At Ferndale, 4 miles east of Bigfork, awakened all and frightened many in community. Windows rattled; walls creaked. Motion rapid, duration 30 seconds; moderate earth noises heard by many few seconds before shock. Felt by all at Proctor. Motion rapid, duration 1 second; direction southwest-northeast; moderate earth noises from southwest heard by many 1 second before shock. Only one shock felt by observer, but others in the community reported feeling three shocks; last shock the sharpest. Intensity (damage) IV at Bigfork (three jolts felt), Rollins (one of the shocks st 06:50), and Somers (two jolts felt). Intensity (damage) I to III at Linfor, Idaho (about 4 miles upstream from Enaville, on Coeur d'Alene River).

December 19: 17:30 and 20:15. Bigfork, Mont. IV. Reported as of same intensity as the shocks felt on December 18. Also felt at Proctor.

December 25: 05:17. Linfor, Idaho. III. Felt by observer lying down. Log cabin shook. Duration about 7 seconds. "Only half as strong as the shock on December 18."

December 28: 03:01:23.6*. Epicenter 48.4° north, 113.9° west, northwestern Montana, W. Bigfork. V. Felt by and awakened many in community. Small objects and furnishings shifted. Two slighter shocks felt about the same time. Intensity (damage) IV at Linfor, Idaho, where to observer lying down it felt like log cabin jumped 6 inches. Two heavy jolts, close together, then strong shaking for 7–8

seconds. "Some mountain 'mush' fell over and slid down a hill." Also felt by another family in the area.

CALIFORNIA AND WESTERN NEVADA

(120TH MERIDIAN OR PACIFIC STANDARD TIME)

NOTE.—All places are in California unless otherwise stated. The *Bulletin of the Seismological Society of America* is referred to as the *BSSA*.

January 1: 09:21:00* (main shock), 09:38, 09:49, 10:12, and 12:56. Epicenter 38°55′ north, 123°16′ west, near Yorkville, B. Magnitude of main shock 4.1. Felt over an area of approximately 1,000 square miles of Mendocino and northern Sonoma counties. Maximum intensity (damage) V. A number of small aftershocks were recorded. At Boonville, felt by many in community; frightened few. Small objects shifted; doors swung north-south. Lasted 2 seconds; faint earth noises heard. At Cloverdale, felt by many; awakened some; general interest. Several jars fell in grocery store; building swayed visibly south-north; bed moved few inches back and forth. Pendulum clock stopped. Swaying, abrupt, 3-second shock accompanied by explosivelike earth noises. "Felt more strongly at Yorkville than elsewhere." Intensity (damage) IV at Annapolis, Hopland, Talmage, and Zeni Ranch (on Anchor Bay Road, about 15 miles west of Yorkville). Intensity (damage) I to III at Asti, Gualala (near Anchor Bay), and Philo. Also reported felt at Ukiah.—(*BSSA, July 1962.*).

January 4: 23:40:55*. Epicenter 37°44′ north, 122°13′ west, near Oakland Airport, B. Magnitude 2.8. San Francisco Bay area. Slight shock felt at Oakland and in the Marina District of San Francisco.

January 8: 02:48:49*. Epicenter 40.2° north, 121.0° west, south of Westwood, B. Caribou (PG&E Powerhouse No. 1). V. Felt by several. Small landslide from hillside into lake. Dishes broken. Visible swaying of buildings; beds swayed northeast-southwest, then west-east. Two shocks; bumping motion; rapid onset; bumping and thundereous earth noises heard before and during shock. Also felt at Hamilton Branch Powerhouse (near Westwood), Prattville (about 8 miles north of Caribou), and Storrie.

January 10: 14:30. San Diego. Radio news broadcast reported an intensity II shock.

January 13: 13:13. Canyon. IV. Slow, south-north motion felt by several in home. Windows rattled; walls creaked.

January 14: 19:13:25*. Epicenter 35°20′ north, 118°53′ west, east of Bakersfield, P. Magnitude about 2.2. Kern Canyon Powerhouse (PG&E, about 10 miles east of Bakersfield). Very slight shock felt.

January 14: 20:32:02*. Epicenter 33°45′ north, 117°13′ west, near Perris, P. Magnitude 3.0. Reported felt in the Banning area.

January 15: 04:45:55*. Epicenter 36°42′ north, 121°28′ west, southwest of Hollister, B. Magnitude 2.5. Hollister. V. Many awakened by minor shock.

January 15: 15:17:21*. Epicenter 37°33′ north, 118°20′ west, north of Laws, P. Magnitude 3.9. Laws. IV. Felt by many and frightened few in community. Windows rattled; walls creaked. Rapid motion in east direction· long duration.

January 15: 20:03:29*. Epicenter 34°10′ north, 119°05′ west, southeast of Oxnard, P; Magnitude 3.0. Reported felt at Oxnard and El Rio.

January 16: 17:35:46.* Epicenter 36°47′ north, 121°25′ west, south of Hollister, B. Hollister (7½ miles south of, Harris Ranch). IV. Slow, slight motion, lasting 30 seconds, felt by observer sitting. Windows and doors rattled; house creaked.

January 17: 03:00 (about). Cazadero (vicinity of). IV. Dishes rattled.

January 24: 07:13:05*. Epicenter 37°52′ north, 122°15′ west, Berkeley, B. Magnitude 3.7. Felt over an area of approximately 700 square miles of the San Francisco Bay area, principally in East Bay communities. Maximum intensity (damage) IV. Felt by all in home at Albany; rapid, 4–10 second motion. Sharply felt at Berkeley; by observers active. Rapid, jolting motion, duration about 3 seconds. At Brisbane, windows rattled; rapid motion, duration 1–2 seconds. Felt by all in home and awakened few in community at Canyon, where wondows and doors rattled; walls creaked; motion rapid, duration 4–5 seconds. Felt by many; awakened and frightened few in communities of Daly City and Colma; rapid, 10-second motion. At Emeryville, a woman said she was thrown to the floor (police received few calls from the area). Felt by all in home and awakened one at Lafayette; rapid, 3-second motion. At Moraga, felt by several in post office building; frightened few; windows and doors rattled; walls creaked; motion rapid. At Oakland, felt by many in widely scattered sections; awakened and frightened some. Windows, doors, and dishes rattled; house creaked. Motion rapid, sharp; loud, booming earth noises heard. Rapid, brief motion felt by all in home at Pacifica. Felt by and frightened observer at Richmond. Windows, doors, and dishes rattled. Rapid, 4-second motion preceded about 4 seconds by

loud earth noises. At San Francisco, very sharp, explosivelike motion felt in concrete and steel building; walls creaked; bed shaken. Rapid motion in east-west direction. Slow motion felt by all in home at San Leandro. Also felt at Bolinas, Clayton, Concord, Hayward, Orinda, Piedmont, Pinole, and South San Francisco.

January 24: 17:43. Santa Rosa (184 Boas Drive). IV. Swaying, brief, north-south motion felt by observer sitting; felt chair and floor move; door rattled. Mild rumble preceded shock by ½ second.

January 25: 18:40. Canyon. IV. Felt by several in home. Windows rattled; walls creaked. Slow, 2–3 second motion.

January 27: 15:07:48.9* and 15:26:14.2*. Epicenter (1) 31.4° north, 114.2° west, (2) 31.2° north, 114.4° west, Gulf of California, W. Magnitudes 5.3 and 4.6, respectively. San Diego (Point Loma District). IV. Rapid motion felt by observer in home. During the second shock, chandelier and all objects suspended by chains swung.

January 29: 12:08:17*. Epicenter 37°43′ north, 122°31′ west, west of San Francisco, B. Magnitude 2.6. Canyon. IV. Windows rattled. At San Francisco, a slight shock was reported felt in the Sunset District and the downtown area.

January 30: 19:17:21*. Epicenter 36°33′ north, 121°13′ west, east of Gonzales, B. Felt over an area of approximately 1,200 square miles of Monterey and San Benito counties. Maximum intensity (damage) IV. Felt by many at Chualar Canyon (9 miles east of Chualar), where windows, doors, and dishes rattled; house creaked. Three shocks; motion rapid; loud rumble from west-east heard. At Gonzales, felt by many in community (some outdoors). Slow, 2–3 second shock in east direction; moderate earth noises heard by many 1 second before shock. Felt by many at Hollister, where house creaked; windows rattled. Rapid, east-west motion, lasting 5–20 seconds. Felt by all in home at Harris Ranch, 7½ miles south of Hollister, where windows, doors, and dishes rattled; house creaked. Slow motion of few seconds duration. Also felt at Hernandez (2 miles northwest of, on ranch) and San Benito.

January 31: 22:37:57*. Epicenter 34°53′ north, 120°41′ west, west of Guadalupe, P. Magnitude 4.5. Felt over an area of approximately 3,000 square miles of the coastal regions of San Luis Obispo and Santa Barbara counties, extending from Bryson (about 20 miles northwest of San Miguel), south to Santa Ynez (about 20 miles southeast of Lompoc). Maximum intensity (damage) V. No damage reported.

INTENSITY (DAMAGE) V:

Arroyo Grande.—Felt by and awakened all in home. Windows, doors, and dishes rattled; house creaked. Hanging objects swung. Moderate, 25-second motion.

Avila Beach.—Felt by all; awakened many; frightened few in community. Windows rattled. Hanging objects swung. Motion slow.

Casmalia.—Awakened many in community. Windows rattled; house creaked. Rapid, 30-second shock in northeast direction.

Grover City.—Felt by many and frightened few in community; awakened all in home. Windows rattled. Vertical, 10-second motion, accompanied by moderate earth noises.

Guadalupe.—Felt by all; awakened and frightened many in community. Windows and doors rattled. Motion rapid, lasted 7 seconds; loud earth noises heard.

Halcyon (about 10 miles north of Guadalupe).—Felt by all in home and frightened few in community. Small objects shifted. Windows rattled; frame creaked. Hanging objects swung east-west. Rapid, 2–3 second motion, accompanied by moderate earth noises from east.

Oceano.—Felt by and awakened all in home; frightened few. Windows, doors, and dishes rattled; house creaked. Motion rapid; moderate earth noises heard.

Point Arguello.—Felt by and awakened all in home; frightened few. Small objects and furnishings shifted (TV, table, and lamps); books fell. Motion rapid; two shakes about 2 seconds apart, duration 2–3 seconds each.

Shell Beach.—Felt by and awakened many in community; frightened few. Windows, doors, and dishes rattled. Rapid motion of long duration, accompanied by loud rumble.

INTENSITY (DAMAGE) IV: Bryson (Ernest Weferling Ranch, about 20 miles northwest of San Miguel), Lompoc, Los Alamos, Nipomo, San Luis Obispo, and Santa Margarita.

INTENSITY (DAMAGE) I TO III: Atascadero, Buellton, Los Olivos, Orcutt, Paso Robles, San Simeon, Santa Maria, and Santa Ynez. Also reported felt at Pismo Beach and Vandenburg Air Force Base.

February 2: 06:26:50*. Epicenter 33°58′ north, 116°36′ west, west of Desert Hot Springs, P. Magnitude 3.2. Reported felt at Palm Springs.

February 5: 08:25:36* and 22:00. Epicenter 35°13′ north, 118°33′ west, south of Caliente, P. Magnitude 3.3. Tehachapi, Light, jarring shocks.

February 6: 00:45:23*. Epicenter 35°07′ north, 118°40′ west, southwest of Tehachapi, P. Magnitude 3.6. Tehachapi. V. Felt by most of the population. Buildings creaked: loose

objects rattled. Bumping, abrupt motion; two shakes, duration 2 seconds; roaring earth noises before and during shock.

February 7: 07:30. San Mateo. IV. Felt by and frightened observer lying down. Windows rattled; walls creaked.

February 18: 19:25:38*. Epicenter 34°12′ north, 119°08′ west, southeast of Oxnard, P. Magnitude 2.9. Sharp jolt felt in Oxnard and Port Hueneme area.—(*BSSA, July 1962.*).

February 22: 14:03:20*. Epicenter 37°28′ north, 118°28′ west, north of Bishop, P. Magnitude 3.4 Laws (about 4 miles northeast of Bishop). IV. Felt by several. Windows and doors rattled; walls creaked. Rapid motion of long duration, accompanied by loud earth noises from north.

February 28: 05:40:33*. Epicenter 38°30′ north, 122°33′ west, west of Saint Helena, B. Magnitude 3.2. Felt over a small area of Napa and Sonoma counties, about 300 square miles. Maximum intensity (damage) IV. At Kenwood, felt by several and awakened few in community. Windows rattled; walls creaked. Motion rapid. At Santa Rosa, scores of calls to police; awakened few in community. Sharp, rapid jolt, duration about 30 seconds; rumble heard. Also felt at Calistoga.

March 4: 23:43:57.9* Epicenter 34.4° north, 121.7° west, off coast near Lompoc, W. Magnitude 4.5. Felt in scattered communities of the coastal region of San Luis Obispo County, from Harmony south to Guadalupe, a distance of about 45 miles. Maximum intensity (damage) V. At Morro Bay, felt by all and awakened many. Windows and doors rattled. Direction northeast. At Pismo Beach, felt by many (some outdoors; quiet); awakened and frightened few. Old plaster crack widened. Windows and doors rattled; house creaked. Moderate motion of long duration. Felt with intensity (damage) IV at Arroyo Grande, Avila Beach, Guadalupe, Harmony, and Shell Beach. "A second shock was reported felt the same day."—(*BSSA, October 1962.*).

March 5: 12:57:52*. Epicenter 40°20′ north 125°02′ west, off Cape Mendocino, B. Magnitude 4.6. Felt over an area of approximately 800 square miles of the coastal region of Humboldt County, from Eureka southeast to Carlotta to Holmes, thence south to Ettersburg. Maximum intensity (damage) V at Fields Landing, where the shock was felt by all; frightened few; windows rattled; frame creaked; motion rapid. Intensity (damage) IV at Ferndale, Holmes, Petrolia, Rio Dell, and Scotia. Also felt at Cape Mendocino, Carlotta, Ettersburg, and Eureka.

March 7: 18:14:44*. Epicenter 37°56′ north 122°00′ west, northeast of Walnut Creek, B. Magnitude 2.6. Reported felt over a small area of Contra Costa County, possibly 150 square miles. Maximum intensity (damage) V at Walnut Creek (2 miles west of), where the shock was felt by all in home; old concrete foundation and floor cracks slightly widened; windows and and doors rattled; house creaked. Motion rapid, duration 1–2 seconds; moderate, brief boom from north-south heard. Intensity (damage) IV at Clayton (about 7 miles southeast of Walnut Creek), where a strong, blastlike jolt was felt.

March 14: 07:23:12.0*. Epicenter 30.8° north, 113.7° west, Gulf of California, W. Magnitude 4.8. Reported felt in the Imperial Valley and at San Diego (Point Loma District).

March 17: 13:38:44*. Epicenter 37°52′ north, 121°46′ west, east of Mount Diablo, B. Magnitude 4.1. Felt over an area of approximately 800 square miles of Contra Costa and Alameda counties, principally in central Contra Costa County. Maximum intensity (damage) V at Mount Diablo State Park, where small objects shifted; windows, doors, and dishes rattled; house creaked; hanging objects and doors swung; motion rapid, lasted 3–4 seconds; preceded by 2–3 seconds by moderate earth noises from north. Intensity (damage) I to III at Antioch (about 3 miles east of, PG&E Contra Costa Power Plant), Canyon, Concord, and Hayward.

March 23: 00:46:19*. Epicenter 37°39′ north, 122°33′ west, southwest of San Francisco, B. Magnitude 3.1. Southern San Francisco and northern San Mateo counties. V. Press reported newspaper and police switchboards were flooded with calls from people abruptly awakened and frightened by the shock, which was described as a 30-second double jolt. At San Francisco, in the Ingleside District, bed moved; windows cracked; dishes fell. At Daly City, in the Westlake District, refrigerator bounced up and down, overturning contents. Dishes, jars, and bottles fell; and an occasional cracked window. Intensity (damage) IV at Daly City (Palisades area), Linda Mar, and San Bruno.

March 26: 14:24. Santa Rosa. IV. Felt by two in home. Door rattled quite noticeably. Two shocks about 2 seconds apart; motion swaying, rolling southeast-northwest; lasted about 3 seconds each.

March 30: 10:33. San Diego. Press reported an earthquake shook San Diego. Also felt on Point Loma at Cabrillo National Monument.

April 1: 01:09:24*. Epicenter 35°14′ north, 118°32′ west, near Woodford, P. Magnitude 3.5. Keene. IV. Felt by all lying down in home. Windows, doors, and dishes rattled. Rapid, 2-second shock, preceded 2 seconds by loud earth noises.

April 1: 19:05:41*. Epicenter 35°15′ north, 118°30′ west, northwest of Tehachapi, P. Magnitude 3.7. V. Felt by all in community at Keene. Windows, doors, and dishes rattled; frame creaked. Rapid, 3-second motion, preceded 2 seconds by moderate earth noises. At Tehachapi, creaking of buildings and rattling of loose objects heard by all. Two shocks. First shock heavy, lasted 3 seconds; second lighter, lasted 1 second; motion bumping and jarring, seemed directly under the house; loud roaring and bumping earth noises heard by all just before the jar.

April 2: 08:42:00*. Epicenter 37°04′ north, 121°28′ west, northeast of Gilroy, B. Magnitude 3.5. Felt over a small area of southern Santa Clara County, approximately 300 square miles. IV. Felt by all in home about 10 miles east of Gilroy, where windows, doors, and dishes rattled; motion rapid. At Gilroy Hot Springs, about 8 miles northeast of Gilroy, felt by several in building; doors rattled. Also felt at Gilroy and San Martin.

April 4: 09:00:24*, 13:47:52*, and 23:08:06*. Epicenter 38°19′ north, 119°16′ west, northwest of Bridgeport, B. Magnitudes 3.5, 3.5, 2.8, respectively. Felt at Bridgeport.

April 5: 03:57:13*, 13:27:50* (main shock), and 14:01:41*. Epicenter 38°19′ north, 119°16′ west, northwest of Bridgeport, B. Magnitudes 2.8, 4.1, 3.6, respectively. Felt over an area of approximately 1,200 square miles of California-Nevada border, principally in northern Mono County. Sparsely settled epicentral region. Maximum intensity (damage) IV. At Bridgeport (13:27:50*), felt by several (observer active) in community. Windows rattled; walls creaked. Trees, bushes shaken slightly. Slow, 10-second shock, with loud and sudden explosivelike earth noises. All the shocks were felt at Bridgeport quite strongly. At Coleville (13:27:50*), felt by several in community. Frame creaked. Moderate earth noises from east heard. Motion slow; long duration. At Topaz (13:27:50*), felt by few in community. Heavy jar. House jolted strongly. Loud and sudden explosivelike earth noises heard. At 14:01:41*, felt by observer at Hetch Hetchy (Yosemite National Park); windows rattled; walls creaked slightly. Duration 4 seconds; moderate earth noises. Also felt at Hawthorne, Nev. (13:27:50*).

April 6: 23:19:36*. Epicenter 37°22′ north, 121°43′ west, northwest of Mount Hamilton, B. Magnitude 3.5. Aptos (3.7 miles north of). IV. Felt by observer lying down. Frame creaked. One mild jolt in east direction, duration 1 second. Also felt in southern section of San Jose.

April 7: 17:03. Felt at Bridgeport.

April 13: 07:38:46* (main shock), 08:31.4*, 08:40:59*, 08:47.6*, 09:06, 09:09, 12:21:07*, 12:23, 12:30. Epicenter 38°19′ north, 119°19′ west, northwest of Bridgeport, B. Magnitudes: (1) 5.1; (2) 3.2; (3) 3.9; (4) 3.4; (7) 3.7. The main shock was felt over an area of approximately 7,500 square miles of northeastern California and western Nevada. (See map, p. 28.) Maximum intensity (damage) V was reported from Bridgeport, where few items fell from grocery store shelves. No damage reported. Sparsely settled epicentral region. Reports are for the main shock unless otherwise stated.

INTENSITY (DAMAGE) V:

Bridgeport.—Felt by all and awakened few in community. Few items fell from grocery store shelves; small objects shifted. Rapid, rolling motion in east, or southwest-northeast direction; faint earth noises from west preceded shock by 2 seconds. Other shocks reported felt at 08:31.4*, 08:40:59*, 08:47.6*, 09:06, 09:09, and 12:23.

INTENSITY (DAMAGE) IV: Arnold, Bass Lake, Camino, Coleville, El Dorado, El Portal, Leevining, Long Barn, Mammoth Lakes, Midpines, Mono Lake, North Fork (Wishon Powerhouse), Omo Ranch, Sacramento, West Point, Wishon, and Yosemite National Park (Park Headquarters).

INTENSITY (DAMAGE) IV IN NEVADA: Hawthorne and Naval Ammunition Depot, Rafter 7 Ranch (about 18 miles northwest of Hawthorne, on East Walker River), Wellington, and Yerington.

INTENSITY (DAMAGE) I TO III: Hetch Hetchy Camp (northwest Yosemite National Park area), Pinecrest, Tahoma, Topaz, and Wawona.

April 14: 07:42:14*. Epicenter 33°50′ north, 118°10′ west, near Long Beach, P. Magnitude 3.0. Felt at Long Beach.

April 15: 00:41:00*. Epicenter 36°31′ north, 120°27′ west, south of Mendota, B. Magnitude 4.7. V. Felt by and awakened many at Idria, where windows, doors, and dishes rattled. Motion rapid; loud rumbling earth noises. Also felt at Panoche (PG&E Substation, about 15 miles northwest of Idria) and Tranquility.

April 18: 05:45. Felt at Gabbs, Nev.

April 18: 22:22:34*. Epicenter 34°18′ north, 119°14′ west, near Ventura, P. Magnitude 3.8. Felt at Oxnard, Santa Paula, and Ventura.

April 22: 09:03:42*. Epicenter 33°48′ north, 118°14′ west, near Long Beach, P. Magnitude 2.8. Long Beach. IV. At the Municipal Airport the control tower swayed slightly. Also felt at Gardena and Torrance.

April 25: 00:48:58* and 17:35. Epicenter 38.5° north, 118.1° west, about 5 miles east of Luning, Nev., W. Magnitude 4.2. Probable felt area approximately 3,000 square miles. Very sparsely settled region to east of epicenter. Maximum intensity (damage) V. At Luning,

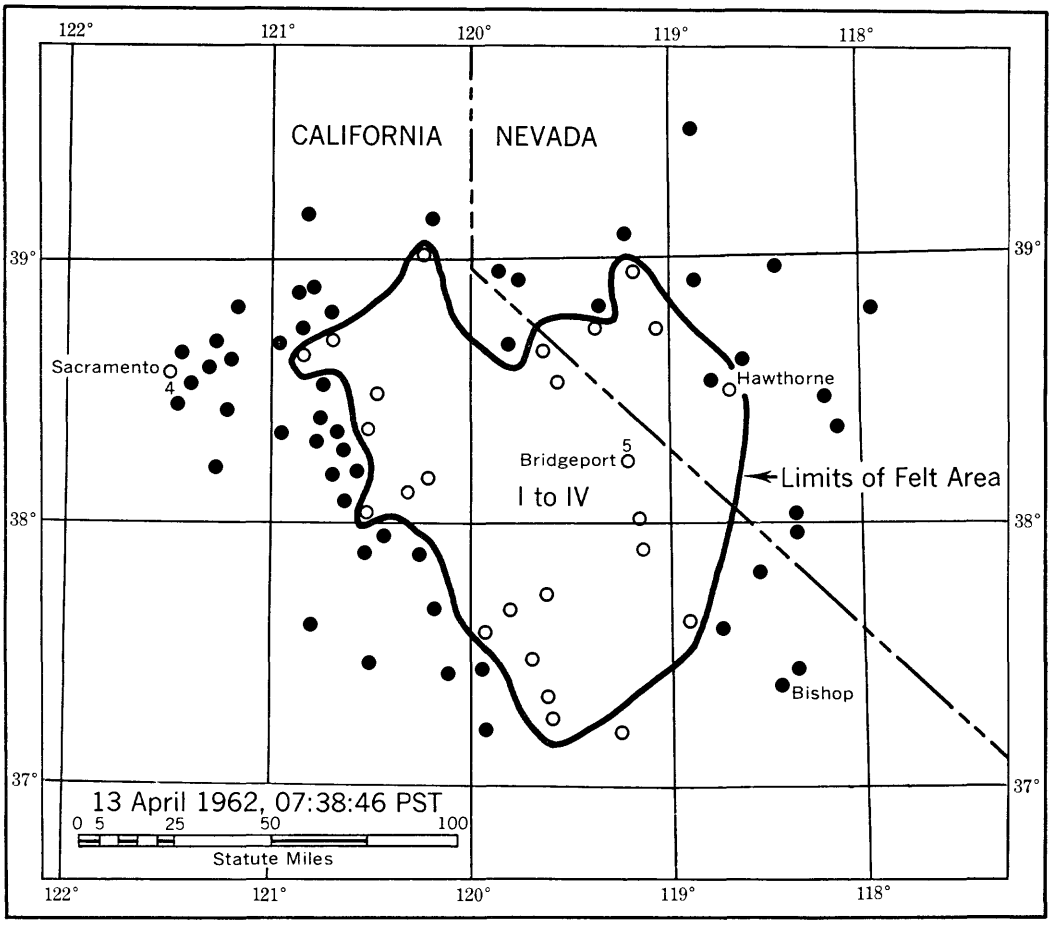

FIGURE 6.—*Area affected by earthquake of April 13.*

awakened many in community. Windows rattled. Motion rapid; momentary duration. Very slight, 3–4 second shock also felt at 17:35. Felt by several and awakened few in community at Mina, where pendulum clock stopped; windows rattled. Felt with intensity (damage) IV at Babbitt and Hawthorne.

April 27: 01:12:32*. Epicenter 33°44′ north, 117°11′ west, near Perris, P. Magnitude 4.1. Felt over an area of approximately 4,500 square miles of southern California, principally in Riverside and San Bernardino counties. (See map, p. 29.) Maximum intensity (damage) VI at two places. Damage slight. At Romoland, windows and dishes broken; at Winchester, plaster, walls, and windows cracked.

INTENSITY (DAMAGE) VI:

Romoland.—Awakened and frightened many in community. Damage slight. Dishes and windows broken. Vases and small objects overturned. Rapid motion in east direction; loud earth noises.

Winchester.—Plaster, windows, and walls cracked. Damage slight. Small objects and furnishings shifted. Rapid motion, preceded 2 seconds by earth noises.

INTENSITY (DAMAGE) V: Alberhill, Banning, Cathedral City, Elsinore, Fallbrook, Forest Falls, Garden Grove, Gilman Hot Springs, Hemet, Homeland, Laguna Beach, Moreno, Murrieta, Nuevo, Pala, Redlands, Riverside, San Bernardino, San Jacinto, Sunnymead, Temecula, and Wildomar.

INTENSITY (DAMAGE) IV: Angelus Oaks, Anza, Beaumont, Big Bear City, Bonsall, Cabazon, Calimesa, Colton, Desert Hot Springs, Fawnskin, Highland, Huntington Beach, Mira Loma, Mountain Center, Mount Baldy, Nightingale Camp (Pinon Flats, about 18 miles southeast of Mountain Center), Norco, North Palm Springs, Palomar Mountain, Patton, Perris, Rancho Mirage, San Juan Capistrano, Thermal, Valley Center, White Water, and Yucca Valley.

INTENSITY (DAMAGE) I TO III: Warner Springs.

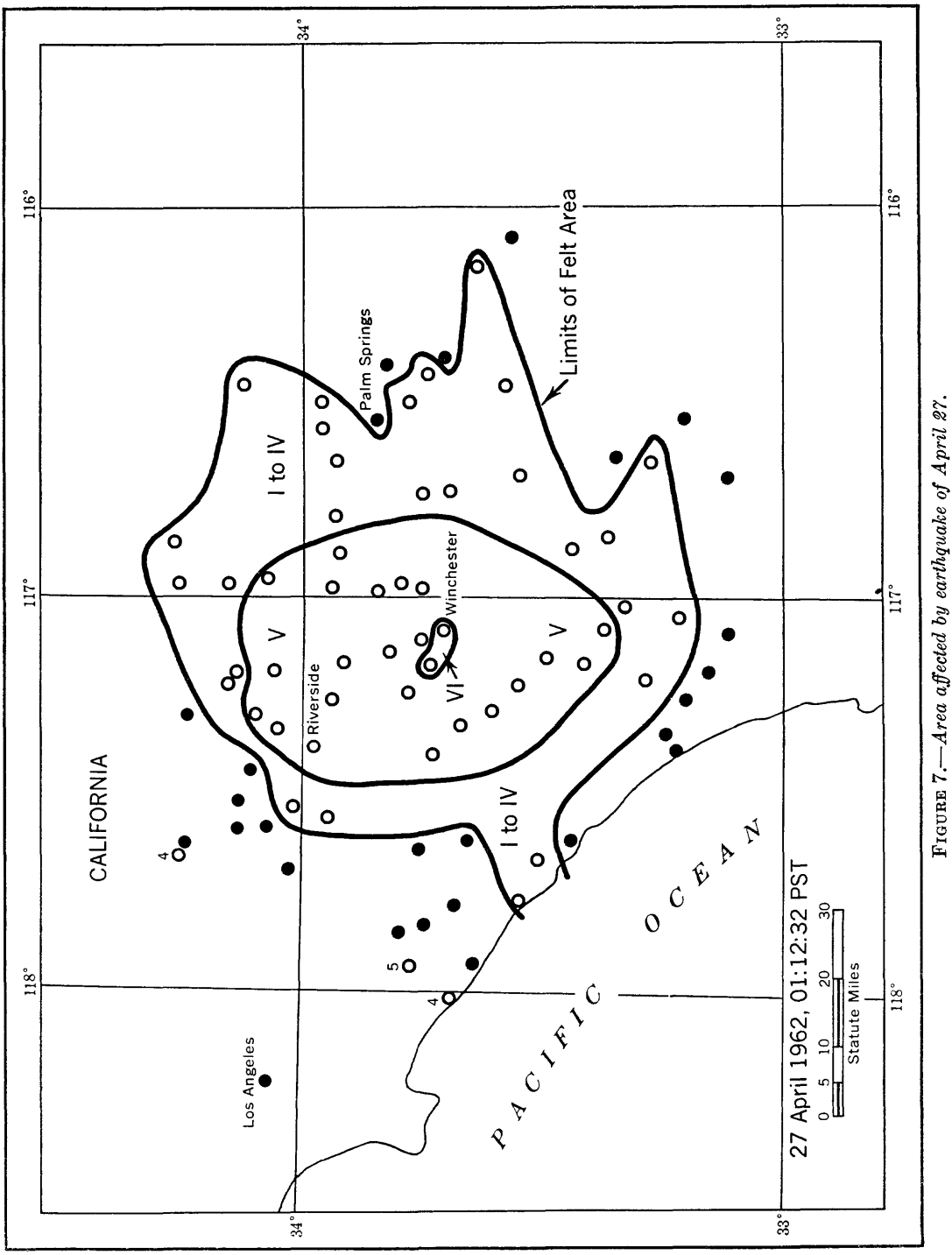

FIGURE 7.—*Area affected by earthquake of April 27.*

April 28: 17:06. Epicenter Gulf of California? San Diego (Point Loma). Felt? Reported as of sufficient intensity to cause hanging objects to swing.

April 29: 12:37:26*. Epicenter 39°47′ north, 120°20′ west, east of Portola, B. Magnitude 3.8. Felt over an area of approximately 800 square miles of Plumas and Sierra counties. IV. At Loyalton, felt by several in home; frightened few; windows, doors, and dishes rattled; hanging objects swung east-west. Momentary shock in east-west direction. Loud earth noises heard at Portola, where house creaked; motion slow, duration 30 seconds. Felt by two in home at Sattley (observer standing). Rapid, rolling underfoot motion; duration 1 second. Sharp jolt, lasting less than 1 second, felt at Sierra City, where windows rattled; moderate earth noises heard. At Storrie, two sharp shocks felt by observer lying down; windows, doors, and dishes rattled; rapid 4–6 second motion; faint earth noises heard. Also felt at Chilcoot, Downieville, Spring Garden, and Vinton.

May 3: 05:48:24*. Epicenter 29.1° north, 115.5° west, near west coast of Baja California, W. Magnitude 5.0. San Diego (Point Loma). Chandeliers swung gently, but motion not felt.

May 5: 05:10:24*. Epicenter 34°01′ north, 117°32′ west, near Ontario, P. Magnitude 2.7. Felt over a small area of southwest San Bernardino County, approximately 300 square miles. Maximum intensity (damage) V at Fontana, where press reported plaster fell from ceiling of store. Intensity (damage) IV reported from three places. At Bloomington, felt by many in community; awakened and frightened few; windows, doors, and dishes rattled; slow, 30-second shock in southeast direction; faint earth noises from southeast. Awakened few at Etiwanda; rapid motion, duration 2 seconds. At Fontana, felt by observer (active); awakened few in community; trees, bushes shaken slightly; rapid motion, duration 2 seconds; moderate earth noises from northeast.

May 5: 06:17:24*. Epicenter 33°42′ north, 116°43′ west, near Idyllwild, P. Magnitude 3.6. Felt over an area of approximately 1,700 square miles of Riverside County. Maximum intensity (damage) V.

INTENSITY (DAMAGE) V:

Anza.—Felt by all and frightened few in community. Windows, doors, and dishes rattled; walls creaked. Motion rapid; loud earth noises heard by many.

Hemet and vicinity.—Felt by and awakened all in home; frightened few. Windows and doors rattled. Motion rapid, duration about 25 seconds; faint earth noises preceded shock by about 4 seconds. At the Sage Fire Control Station, about 15 miles south of Hemet, felt by all at station, where small objects shifted; windows and dishes rattled; frame creaked; doors swung west-east; trees, bushes shaken moderately. Slow, rolling, 2-second motion, preceded 2 seconds by moderate to loud earth noises from east.

Idyllwild.—Felt by all and awakened many in community; frightened few. Windows and doors rattled; trees, bushes shaken moderately. Rapid motion in northeast direction; faint earth noises from east.

Palm Desert.—Felt by all and awakened few in community. Windows, doors, and dishes rattled; house creaked. Hanging objects swung. Motion slow, lasted 20 seconds.

Palm Springs.—Felt by and awakened many in community; frightened few. Small objects shifted. Windows, doors, and dishes rattled; trees, bushes shaken moderately. Rapid, 30-second motion; moderate earth noises from north.

Rancho Mirage.—Felt by all in community; awakened and frightened all in home. Dishes rattled. Very sharp, rapid motion; loud earth noises.

INTENSITY (DAMAGE) IV: Cathedral City, Gilman Hot Springs, Homeland, La Quinta, Morongo Valley, Mountain Center, and Nightingale Camp (Pinon Flats, about 18 miles southeast of Mountain Center).

INTENSITY (DAMAGE) I TO III: Beaumont, Cabazon, and San Jacinto.

May 7: 08:12:01*. Epicenter 33°45′ north, 118°15′ west, Long Beach Harbor, P. Magnitude 2.6. Reported as sharply felt at Compton.

May 21: 18:37:44*. Epicenter 37°44′ north, 122°08′ west, near Lake Chabot, B. Magnitude 2.2. East Oakland. IV. Minor Shock. Dishes rattled. Also felt at San Leandro.

May 30: 02:20:16*. Epicenter 37°47′ north, 122°11′ west, East Oakland, B. Magnitude 2.3. Felt by one at the PG&E Substation, 3729 Park Blvd., Oakland.

June 1: 19:57:16*. Epicenter 37°26′ north, 121°48′ west, northwest of Mount Hamilton, B. Magnitude 3.3. San Jose. Press reported several calls to police.

June 6: 09:50:07*. Epicenter 39°05′ north, 123°04′ west, near Lakeport, B. Magnitude 5.2. Felt over an area of approximately 6,500 square miles of northwestern California, principally in Lake and Mendocino counties. (See map, p. 31.) Maximum intensity (damage) VII in the Scott Creek area, about 2 miles west of Lakeport, where Scott Creek, nearly dry before shock, rose 1½ feet and flowed steadily for 11 days. Several wells in Scott Valley rose 7–10 feet and water was milky white for 3–5 days. Four-inch-high undulating movement of fill soil was observed. Press

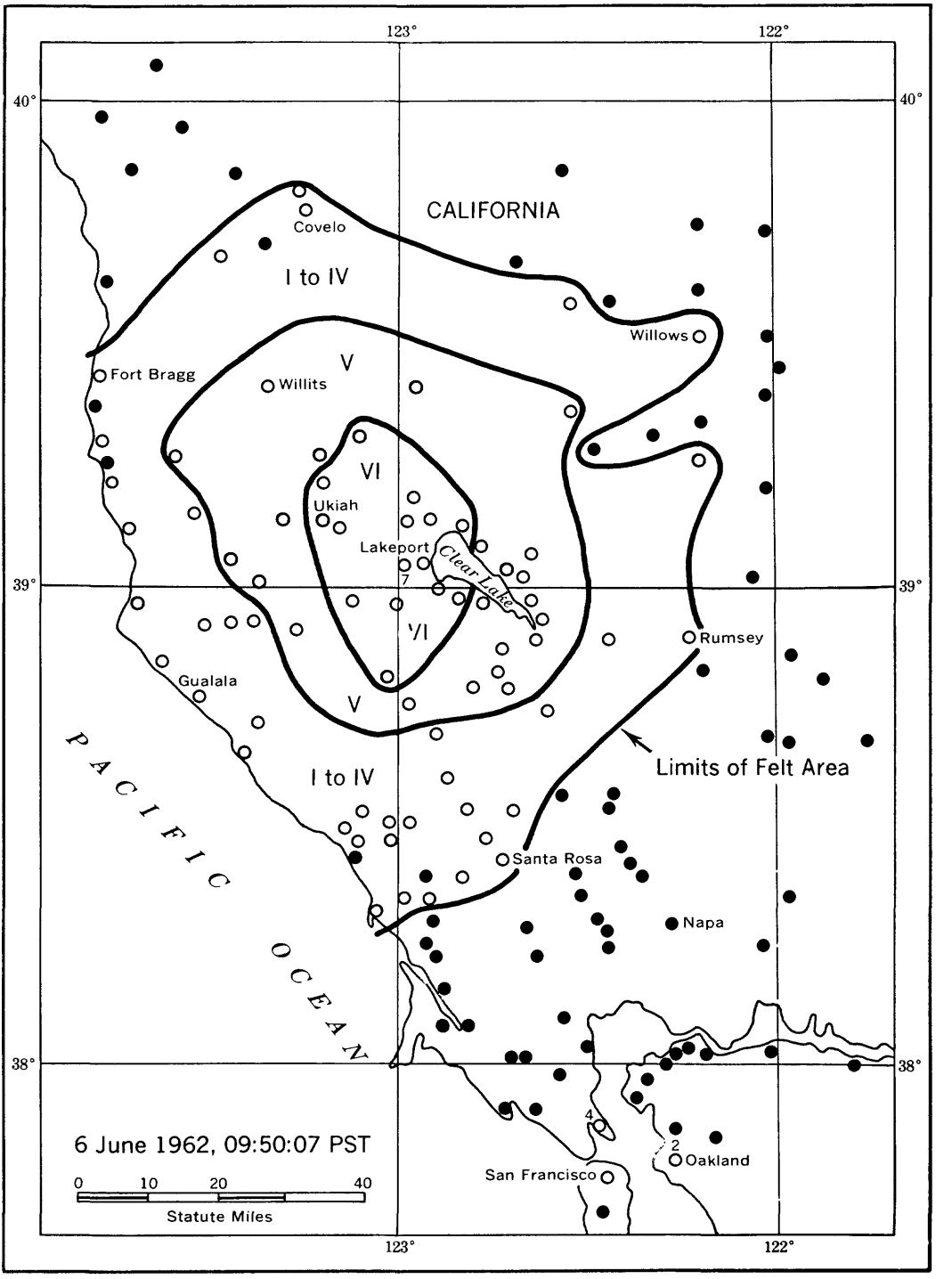

FIGURE 8.—*Area affected by earthquake of June 6.*

reported a geyser-like spout of water was seen in Clear Lake off Buckingham Park, about 10 miles southwest of Lakeport. Small rocks fell from loose, steep banks for several miles on the Lakeport-Hopland road. Only slight building damage occurred, principally in the Lakeport-Ukiah areas, and consisted of few cracked walls; cracked plaster and chimneys. At Finley, about 3 miles southeast of Lakeport, it was reported one chimney fell in valley. Much merchandise fell from store shelves in the Lakeport-Talmage-Ukiah areas.

INTENSITY (DAMAGE) VII:

Scott Creek area (2 miles west of Lakeport).—Report from Exploration Party, U.S. Army Engineers. Felt by and frightened all (outdoors; active). Scott Creek, nearly dry before the shock, rose 1½ feet and flowed steadily for 11 days. Several wells in Scott Valley rose 7–10 feet and water was milky-white for 3–5 days. Shock waves were observed as motion followed through the fill material near drill rig; four or five waves, about 4 inches high, during each shock. Drill rig mast, 37 feet high, swayed 2–3 feet from side to side. Two distinct shocks, duration about 20 seconds; rapid motion in north direction.

INTENSITY (DAMAGE) VI:

Calpella (about 8 miles north of Ukiah).—Felt by and frightened all in community. Trees, bushes shaken strongly. Rapid, 3–4 second shock in north-south direction.

Cloverdale.—Felt by many and frightened few in community. Damage slight. Plaster and chimneys cracked. Stacked lumber toppled in lumber yard north of Cloverdale. Lights swung; wall clocks swayed. Motion slow, swaying and rocking, lasting 5–30 seconds; earth noises, like moving lumber truck, at time of shock.

Finley (about 3 miles southeast of Lakeport).—Frightened many. Damage slight. One chimney fell; few building cracks. Canned goods fell from store shelves; objects fell in homes. Rapid, 30-second motion in northwest-southeast direction; earth noises from northwest.

Hopland.—Felt by all and frightened many in community. Small objects shifted; trees, bushes shaken strongly; hanging objects swung north-south. Motion rapid, duration several seconds; direction south-north; loud earth noises preceded shock by ½ second. Old-time residents thought this was the strongest shock since 1906.

Kelseyville (about 8 miles southeast of Lakeport).—Felt by and frightened all in community. Damage slight. Plaster cracked. Small objects shifted and overturned; knickknacks and books fell. Trees, bushes shaken strongly. Pendulum clock stopped. Loud earth noises preceded shock by 3 seconds; rapid motion, duration 30 seconds.

Lakeport.—Felt by and frightened all in community. Damage slight. Few minor wall cracks; plaster cracked and fell; dishes broken. Much merchandise fell in stores; small objects shifted and overturned in homes. Pendulum clock stopped. On the Lakeport-Hopland Road (about 10 miles southwest of Lakeport), small rocks fell from loose, steep banks for several miles.

Nice (about 7½ miles northeast of Lakeport, on shore of Clear Lake).—Felt by and frightened all in community. Small objects shifted and overturned. Two-story building swayed back and forth. Two rapid, very violent shocks, preceded by loud muffled earth noises; long duration.

Potter Valley.—Felt by many. Plaster cracked. Small objects shifted and overturned; merchandise fell from store shelves. Pendulum clock stopped. Rapid, northeast motion.

Talmage (about 3 miles southeast of Ukiah).—Felt by and frightened all in community. Damage slight. Plaster cracked and fell; chimneys cracked. Small objects, vases shifted and overturned; knickknacks, books, and pictures fell. Trees, bushes shaken strongly. Much merchandise fell from store shelves. Motion rapid, duration few seconds; loud earth noises.

Ukiah.—Felt by all; frightened many. Damage slight. Buildings and homes throughout the area violently shaken. Slight wall cracks; bricks fell from some fireplaces; plaster cracked and fell; dishes and windows broken. Dresser moved from wall; much merchandise fell in stores. Sharp, rolling motion; thunderous earth noises 2 seconds before shock.

Upper Lake.—Frightened many in community. Damage slight. Plaster and chimneys cracked. Furnishings shifted; vases, etc., overturned. Trees, bushes shaken strongly. Motion slow, in north direction.

Upper Lake (about 5 miles west of, at Lower Blue Lake).—Felt by all and frightened many in community. Damage slight. Small objects and furniture overturned; knickknacks, books, and pictures fell. Pendulum clock stopped. Trees, bushes shaken strongly. Strong, rapid motion with definite east-west direction; lasted about 10 seconds; preceded ½ second by moderate earth noises.

Witter Springs (about 3 miles west of Upper Lake).—Felt by all except a few walking outside or riding in cars; frightened many. Damage slight. Plaster cracked and fell. Dishes and furniture broken. Small objects and furnishings shifted; vases, small objects, furniture overturned (table model TV); knickknacks and pictures fell. Pendulum clock stopped. Trees, bushes shaken strongly. Rapid motion in southeast direction; loud earth noises from southeast.

INTENSITY (DAMAGE) V: Adams-Lock Lomond, Asti, Big Geyser Resort (about 10 miles east of Cloverdale), Boonville, Clearlake Highlands, Clearlake Oaks, Clearlake Park, Cobb, Comptche, Duncan Mills, Glenhaven, Lake Pillsbury (Potter Valley Powerhouse), Lucerne, Philo, Redwood Valley, Rio Nido, Stonyford, Villa Grande, Whispering Pines, Willits, and Yorkville.

INTENSITY (DAMAGE) IV: Annapolis, Belvedere-Tiburon, Elk, Geyserville, Gualala, Healdsburg, Lower Lake (about 10 miles northwest of, at Anderson Ranch), Manchester, Maxwell, Mendocino, Middletown, San Francisco, Santa Rosa, Stewarts Point, Willows, Windsor, and Yorkville (about 20 miles west of, at Zeni Ranch).

INTENSITY (DAMAGE) I TO III: Albion, Berkeley, Bodega (about 2 miles due east of), Bodega Bay, Cazadero, Covelo, Dunnigan (2 miles south of), Elk Creek, Fort Bragg, Fulton, Guerneville, Laytonville, Oakland, Rumsey, and Sebastopol.

June 6: 20:20:59*. Epicenter 37°17′ north, 121°43′ west, southwest of Mount Hamilton, B. Magnitude 3.8. Reported felt in few scattered communities from San Francisco southeast to Morgan Hill in Santa Clara County, a distance of about 65 miles. IV. At Daly City in the Palisades area, a single jolt felt by observer; walls creaked; moderate earth noises preceded shock by ½ second. Felt by observer active at Los Altos; house creaked; rapid, 5-second shock in east direction. Rapid, very brief motion felt by many at Milpitas. At Monte Vista (west of San Jose), felt by several in community; house creaked; chain on TV lamp swung for at least 2 minutes. Felt by observer (sitting) at Morgan Hill, where dishes rattled; house creaked; trees, bushes shaken slightly; motion slow; faint earth noises preceded shock by 1 second. At San Francisco, felt by many in the Sunset District; dishes rattled; beds shook; furniture rocked.

June 7: 07:15:53*. Foreshock of June 7 at 22:28:02*. Epicenter 38°19′ north, 119°20′ west, northwest of Bridgeport, B. Magnitude 2.9. Bridgeport. II. Rapid, jolting motion, duration a few seconds, felt by observer in home.

June 7: 22:28:02*. Epicenter 38°16′ north, 119°19′ west, northwest of Bridgeport, B. Magnitude 4.2. V. At Bridgeport, felt by all; awakened many; and frightened few in community. Damage slight. Twelve windows cracked. Small objects and furnishings shifted; vases, etc., overturned; knickknacks fell; small objects fell from shelf at grocery store. Trees, bushes shaken strongly. Motion rapid, lasted few seconds; loud earth noises. Also felt in the Walker River area.

June 8: 00:34:47*. Aftershock of June 7 at 22:28:02*. Epicenter 38°16′ north, 119°19′ west, northwest of Bridgeport, B. Magnitude 3.6. IV. At Bridgeport, awakened few in community; windows, doors, and dishes rattled slightly; house creaked. Slow, 2-second shock in southeast direction; faint earth noises ½ second before shock. Also felt in the Walker River area.

June 10: 04:37:28*. Epicenter 40°23′ north, 124°25′ west, near Ferndale, B. Magnitude 3.8. Maximum intensity (damage) V. Felt over a small area of the coastal region of Humboldt County, approximately 700 square miles. At Alton, felt by and awakened many; motion slow. Felt by and awakened many at Ferndale, where windows and doors rattled; frame creaked; rapid, 5-second motion in east-west direction. At Fortuna, felt by and awakened all in home; house creaked; hanging objects swung northwest; rapid, 2–3 second motion in northwest direction. Felt by and awakened many in community at Petrolia, where dishes rattled; rapid, very brief motion; moderate earth noises heard after shock. At Upper Mattole, felt by and awakened all in community; frightened few in home. Small objects shifted. Rapid, southwest motion; moderate earth noises 1–2 seconds before shock. Felt with intensity (damage) IV at Honeydew, Rio Dell, Rohnerville, Scotia, and Shively. Also felt at South Fork.

June 21: 04:05:51*. Epicenter 34°12′ north, 117°25′ west, northwest of San Bernardino, P. Magnitude 2.8. Etiwanda. IV. Awakened few; rapid, 1-second motion.

July 7: 00:18:07* or 00:19:00*. Epicenter 38.4° north, 123.1° west, north-northeast of Ukiah, B. Magnitudes 2.6 and 2.7, respectively. Redwood Valley. Press reported a slight shock was felt.

July 14: 11:43:50*. Epicenter 40°17′ north, 124°41′ west, off northern California coast, B. Magnitude 5.0. Felt over an area of approximately 2,500 square miles of northwestern California, principally in Humboldt County. Sharply felt, but no damage reported. Maximum intensity (damage) V.

INTENSITY (DAMAGE) V:

Alderpoint.—Felt by all and frightened many in community. Small objects shifted and overturned. Rapid, 15-second motion.

Blocksburg.—Felt by all and frightened few in community. Small objects and furnishings shifted. Rapid, 1-second shock.

Carlotta.—Felt by all in community. Windows, doors, and dishes rattled; walls creaked. Motion slow.

Fields Landing.—Felt by and frightened many. Windows and doors rattled. Rapid motion.

Fort Seward.—Felt by many and frightened few in community. Windows and dishes rattled;

house creaked. Trees, bushes shaken moderately. Observer nearly lost balance. Rapid, rocking, south-north motion, lasted about 15 seconds.

Fortuna.—Felt by nearly all and frightened many in community. Windows, doors, and dishes rattled; frame creaked. Hanging objects swung. Slow, steady motion.

Garberville.—Felt by several in community (some outdoors; active). Small objects and furnishings shifted. Rapid, north-south and east-west motion, duration about 45 seconds.

Harris.—Felt by all and frightened few in community. Rapid, 15–20-second shock.

Holmes.—Felt by all in community. Small objects shifted and overturned; knickknacks and books fell. Rapid, 15-second, east-west motion; moderate earth noises.

Honeydew.—Felt by all and frightened few in community. Small objects overturned; cans fell from shelves. Two slow, south-north shocks, then one hard west-east shock, duration about 7 seconds in all.

Miranda.—Small objects shifted. Trees, bushes shaken moderately. Rapid, 2-second shock.

Petrolia.—Felt by and frightened many in community. Small objects shifted and overturned; knickknacks fell. Rapid, 7-second shock, preceded 3 seconds by moderate earth noises.

Rio Dell.—Felt by and frightened many in community. One window cracked. Trees, bushes shaken moderately. Rapid motion in southwest-northeast direction.

Shively.—Felt by all and frightened few in community. Knickknacks fell. Rapid motion in northwest-southeast direction.

South Fork.—Felt by all and frightened few. Small objects overturned; pictures fell. Rapid, 15-second motion.

Weott.—Felt by all and frightened many in community. Motion slow.

Whitethorn. Felt by and frightened many in community. Small objects and furnishings shifted. Trees, bushes shaken moderately. Rapid, north-south, 2-second motion; moderate earth noises.

Whitlow.—Felt by all and frightened few in community. Doors and dishes rattled; walls creaked. Slow, 10–15 second motion in north-south direction.

INTENSITY (DAMAGE) IV: Alton, Briceland, Ferndale, Hoopa, Loleta, Mendocino, Phillipsville, Rohnerville, Scotia, Westport, and Zenia.

INTENSITY (DAMAGE) I TO III: Covelo (about 20 miles northwest of, at Big Bend Ranch), Ettersburg, Eureka, Forest Glen, and Hydesville.

July 16: 23:53:27*. Epicenter 37°20′ north, 118°17′ west, near Tinemaha, P. Magnitude 3.8. Laws. IV. Felt by several and awakened few in community. Motion rapid; moderate earth noises. Also felt 4 miles from Laws and at Bishop.

July 20: 01:02:03*. Epicenter 39.8° north, 118.1° west, near Dixie Valley, Nev., B. Magnitude 4.9. Felt over an area of approximately 13,500 square miles of western Nevada. Maximum intensity (damage) V. No damage reported. Sparsely settled epicentral region.

INTENSITY (DAMAGE) V:

Austin.—Felt by and awakened many. Windows, doors, and dishes rattled; walls creaked. Motion rapid; moderate earth noises.

Fallon.—Felt by and awakened many in community; frightened few. Pendulum clock stopped. Motion rapid and slow, lasted 10 seconds; direction west-east; rumbling earth noises.

Luning.—Felt by and awakened many in community. Bed moved 2 inches from wall. Strong, rapid, horizontal motion; duration 3–4 seconds; loud rumbling explosivelike earth noises preceded shock by 2 seconds.

INTENSITY (DAMAGE) IV: Eureka, Hazen, Imlay, Lovelock, Nixon, Schurz, Stillwater (1 mile north of), and Winnemucca.

INTENSITY (DAMAGE) I TO III: Wells (about 190 miles northeast of epicenter).

July 20: 09:15:24*. Epicenter 40°15′ north, 124°25′ west, off northern California coast, near Punta Gorda, B. Magnitude 4.1. Felt over an area of approximately 2,000 square miles, principally in Humboldt County. Maximum intensity (damage) V.

INTENSITY (DAMAGE) V:

Ferndale and vicinity.—Felt by many (some outdoors) and frightened few in community. Floor lamp shifted. Pendulum clock stopped. Rapid, 5-second shock in south-north direction; faint earth noises preceded shock by about 3 seconds.

Leggett.—Felt by many. Small objects shifted. Rapid, 30-second motion.

INTENSITY (DAMAGE) IV: Briceland, Forest Glen, Fortuna, Holmes, Island Mountain, Petrolia, Phillipsville, Rio Dell, Rohnerville, Scotia, Shelter Cover (about 8 miles west of Thorn), and Thorn (Bear Harbor Ranch).

INTENSITY (DAMAGE) I TO III: Bayside, Bell Springs, Branscomb, Covelo and Buck Mountain, Elk Creek, Honeydew, Loleta, Weott, and Yager Valley area.

July 26: 20:18:57*. Epicenter 35°12′ north, 118°37′ west, near Bear Mountain, P. Magnitude 2.8. Keene. IV. Felt by all in home.

Windows, doors, and dishes rattled slightly; house creaked slightly. Rapid, 4-second shock preceded by moderate earth noises.

August 3: 22:37:27*. Epicenter 32°38′ north, 117°18′ west, southwest of San Diego, P. Magnitude 3.2. San Diego (Point Loma). IV. Felt by observer and others on Point Loma. Walls creaked. Rapid, 15-second shock in north-south direction.

August 23: 11:29:13*. Epicenter 41°51′ north, 124°20′ west, off Del Norte County coast, near Crescent City, B. Magnitude 5.6. Felt over an area of approximately 15,000 square miles of northwestern California and southwestern Oregon. (See map, p. 36.) Maximum intensity (damage) VI. Considerable slight damage, principally in the Crescent City-Smith River areas of Del Norte County. Damage consisted mainly of cracked chimneys and plaster, broken windows, and loss from fallen merchandise. A press report, quoting the Del Norte County sheriff stated: "Reports we have received indicate that damage in Del Norte County may total around $500,000. They also indicate that about 20 per cent of the buildings in the county were shaken and damaged to some extent." (Reports from the questionnaire coverage indicated overall damage was slight, and it is believed the estimate of $500,000 is considerably in excess of the actual damage caused by this earthquake.) Slight damage was also reported from Brookings and Cave Junction, Oreg. The tops of some giant redwood trees were snapped off. No injuries were reported.

INTENSITY (DAMAGE) VI:

Crescent City.—Felt by and frightened nearly all in community. Damage slight. Plaster, windows, walls, chimneys cracked; floor in store cracked; plaster fell; dishes, windows broken; supporting rods for trusses in large room bent. Considerable merchandise fell in stores, with loss at one store estimated at about $1,000; small objects and knickknacks fell in homes. Trees, bushes shaken strongly. Motion generally reported as rapid, with mostly north or northeast direction given; loud earth noises heard by nearly all.

Smith River.—Felt by all and frightened many in community; some persons ran from homes. Cement patio cracked; barn walls cracked. Small objects and furnishings shifted; small objects overturned; knickknacks fell; mirror fell. Trees, bushes shaken strongly. Motion both rapid and slow, duration 1–30 seconds; direction north and north-south; loud earth noises.

INTENSITY (DAMAGE) VI IN OREGON:

Brookings.—Felt by all and frightened many in community; shoppers ran to the streets. Damage slight. Plaster, windows, walls, chimneys cracked; dishes and windows broken; water pipe in apartment broken; groceries, knickknacks, books, pictures, plaster fell; furniture overturned. Motion rapid, duration 5 seconds; rumbling earth noises.

Cave Junction.—Felt by all and frightened many in community. Damage slight. Plaster, windows, walls and chimneys cracked. Small objects and furnishings shifted; vases, etc., small objects and furniture overturned; knickknacks fell. Pendulum clock stopped. Motion slow, duration 5 seconds to 1 minute; directions south and northeast; loud earth noises during shock.

INTENSITY (DAMAGE) V: Bayside, Cecilville (Sawyer Ranch), Edgewood, Ferndale, Fields Landing, Fort Dick, Freshwater, Gasquet (about 13 miles northeast of Crescent City), Happy Camp (Slater Butte Lookout, and near mouth of Indian Creek), Holmes, Klamath (4 miles north of and 1½ miles north of), Korbel, Orleans, Requa, and Salyer.

INTENSITY (DAMAGE) V IN OREGON: Grants Pass, Harbor, Merlin, Pistol River, and Selma.

INTENSITY (DAMAGE) IV: Arcata, Briceland, Clear Creek, Covelo, Crannell, Cutten, Denny, Eureka and 5 miles south of, Fortuna, Gazelle, Hilts, Honeydew, Hoopa, Horse Creek, Island Mountain, Klamath National Forest (Medicine Mountain Lookout, Ukonom District), Laytonville, Loleta, Montague, Mount Shasta, Orick, Rio Dell, Rohnerville, Samoa, Sawyers Bar, Scotia, Scott Bar and 3 miles up Scott River, Seiad Valley, Somesbar and 3 miles north of, at Offield Mountain Lookout), Trinidad, and Trinity Center (about 7 miles northeast of, at Bonanza King Lookout).

INTENSITY (DAMAGE) IV IN OREGON: Agness, Applegate, Azalea, Bandon (also slight shock at 08.15), Butte Falls (also slight shock at 12:15), Canyonville, Eagle Point, Empire, Gold Beach, Gold Hill, Jacksonville, Kerby, Medford, Murphy, O'Brien, Ophir, Oregon Caves National Monument (about 10 miles southeast of Cave Junction), Powers area, Rogue River (about 8 miles east of Grants Pass), Sunny Valley, Takilma, Umpqua, Wedderburn, Wilderville, and Wolf Creek.

INTENSITY (DAMAGE) I TO III: Alton, Blue Lake, Burnt Ranch, Carlotta, Etna, Ettersburg, Fort Jones, Greenview, Grenada, Helena, Hyampom, Kneeland, Myers Flat, Petrolia, South Fork, Weaverville, Weed, Willow Creek, and Yreka and Baldy Mountain Lookout.

INTENSITY (DAMAGE) I TO III IN OREGON: Central Point, Coos Bay, Coquille and Riverton, Days Creek, Glendale, Myrtle Point, Port Orford, Shady Cove, Sitkum, Sixes, Tenmile, Union Creek (about 10 miles north of, at Union Creek Ranger Station), and Williams.

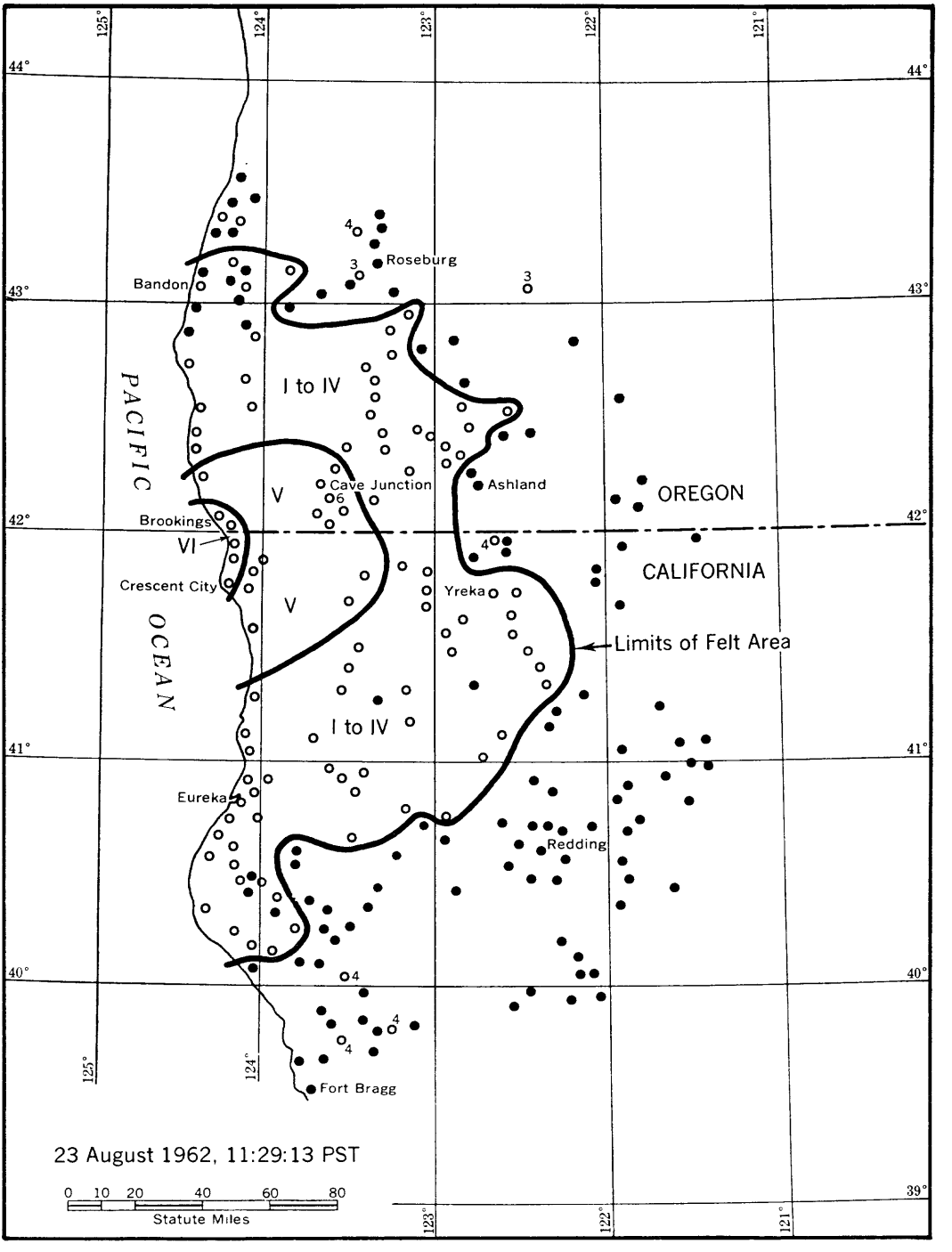

FIGURE 9.—*Area affected by earthquake of August 23.*

August 31: 14:37:48*. Epicenter 32°49′ north, 117°08′ west, near Mission San Diego, P. Magnitude 2.9. San Diego. IV. Felt by several. Walls creaked. Delicately suspended objects swung slightly. Slow, 30-second shock in east-west direction.

September 1: 07:53:44*. Epicenter 33°57′ north, 118°22′ west, near Inglewood, P. Magnitude 3.0. V. Los Angeles County. Generally felt at Baldwin Hills, Culver City, and Inglewood. Police switchboards at Inglewood flooded with calls. Few windows shaken loose in the Leimert Park district; few alarms set off. Loud earth noises preceded shock.

September 3: 02:55:44*. Epicenter 36°48′ north, 121°35′ west, west of Hollister, B. Magnitude 3.1. Press reported the shock was felt in Hollister.

September 3: 09:53:33*. Epicenter 36°28′ north, 121°05′ west, near San Benito, B. Magnitude 2.6. Hollister. II. Felt by several.

September 3: Between 20:30 and 21:00. Showers Pass area (north of Bridgeville). Weak tremor felt by observer.

September 4: 09:17:26*, 09:32:34*. Epicenter 40°58′ north, 124°12′ west, northwest of Arcata, B. Magnitudes 5.0 and 3.7, respectively. Felt over an area of approximately 7,000 square miles of northwestern California, principally in Humboldt County. Maximum intensity (damage) VI. Damage slight. Plaster cracked; window broken; some loss from fallen merchandise in stores. Intensity (damage) V was reported at Cave Junction, Oregon. This was the only place in Oregon reporting the shock as felt.

INTENSITY (DAMAGE) VI:

Eureka.—Felt by and frightened all in community. Damage slight. Plaster fell at the old Post Office and the new Humboldt County Courthouse; walls cracked at the old Eureka High School; window broken and merchandise fell from several grocery stores in the Henderson Center business district. Visible swaying of buildings, trees, and telephone poles; power lines swung for 1 minute; nearly all apples shaken from heavily laden tree. Pendulum clock stopped. Five or six big shocks at 09:17:26*; three small shocks at 09:32:34*; motion rapid, duration 1–10 seconds; moderately loud earth noises preceded shock by 2–3 seconds.

Orick.—Felt by all and frightened many in community. Damage slight. Plaster and walls cracked. Merchandise fell from grocery store shelves. Small objects shifted and overturned; knickknacks fell. Trees, bushes shaken strongly. Motion rapid; loud explosivelike earth noises.

Samoa.—Felt by and frightened all in community. Damage slight. Plaster and walls cracked. Small objects shifted. Trees, bushes shaken moderately. Motion rapid.

INTENSITY (DAMAGE) V. Bayside, Crannell (shock also felt at 09:32:34*), Cutten, Denny, Ferndale (shock also felt at 09:32:34*), Fields Landing, Freshwater, Holmes, Hyampom, Klamath, Kneeland, and Salyer.

INTENSITY (DAMAGE) V IN OREGON: Cave Junction.

INTENSITY (DAMAGE) IV: Arcata, Blue Lake, Burnt Ranch, Carlotta, Fort Dick, Korbel, Loleta, Petrolia, Rio Dell, Sawyers Bar (Forest Service Lookout), Scotia, Somesbar (about 1 mile west of), and Trinidad.

INTENSITY (DAMAGE) I TO III: Alton, Cecilville, Crescent City (about 7 miles east of), Fortuna, Hoopa, Hydesville, Orleans, Showers Pass area (north of Bridgeville), Smith River, Whitlow, and Willow Creek.

September 11: 03:12:32*. Epicenter 37°54′ north, 122°01′ west, east of Walnut Creek, B. Magnitude 2.8. Walnut Creek (3 miles east of, on ranch). V. Felt by observer lying down. Damage slight. Concrete wall cracked. Slow, 2-second shock in north-south direction; moderate earth noises.

September 15: 21:36:16*. Epicenter 35°45′ north, 118°03′ west, near Walker Pass, P. Magnitude 4.9. Felt over an area of approximately 16,000 square miles of south-central California. Maximum intensity (damage) VI reported from one area in the Sierras: Rocks fell along Sierra front from Nine Mile Canyon to Walker Pass Road. Maximum intensity about one-half way up scarp.

INTENSITY (DAMAGE) V:

Badger.—Felt by and awakened many; frightened few. Motion rapid; moderate earth noises.

Bakersfield.—Felt by all; frightened few in home. Small objects and furnishings shifted. Rapid, 1-second shock in east-west direction; loud earth noises.

Bartlett.—Felt by all and frightened few in community. Motion rapid; moderate earth noises.

Bodfish.—Felt by and awakened all in community; frightened few. Small objects shifted and overturned; knickknacks fell. Motion rapid; moderate earth noises.

California Hot Springs.—Felt by and awakened all in community; frightened few. Motion vertical.

Camp Nelson.—Felt by all and frightened many. Small objects shifted. Rapid, 30-second shock in northeast direction; loud earth noises.

China Lake.—Felt by all, awakened few, and frightened many in community. Small objects shifted. Pendulum clock started. Motion rapid, jerky, duration 30 seconds; direction north.

Earlimart.—Felt by all; frightened few. Rapid, 5-second shock.

Exeter.—Felt by many in community. Small objects shifted. Slow, brief shock in north-south direction.

Glennville.—Felt by all; awakened many. Rapid, settling motion; loud earth noises preceded shock.

Inyokern.—Felt by and awakened all in home. Rapid, 30-second shock.

Johnsondale.—Felt by all; awakened many and frightened few in community. Vases overturned. Rapid motion, duration few seconds; direction northeast; moderate earth noises.

Kaweah.—Felt by and awakened all in community; frightened few. Rapid motion in northeast direction; moderate to loud earth noises preceded shock.

Leliter (about 5 miles north of Inyokern).—Frightened few. Small objects and furnishings shifted. Rapid motion in west-east direction; loud earth noises.

Onyx.—Felt by and awakened all; frightened many in community. Small objects shifted and overturned; knickknacks and books fell; book ends broken. Rapid, 10–20 second motion; moderate earth noises preceded shock by 5 seconds. "Small shocks felt for about 36 hours."

Piute Mountain (south of Lake Isabella).—Felt by and awakened all in home. Motion slow, duration 1 minute; loud rumbling earth noises 2 seconds before shock.

Pixley.—Felt by all and awakened few in community. Two shocks, duration 5 seconds each; motion slow.

Posey.—Felt by all in community; awakened all in home.

Randsburg.—Felt by many. Knickknacks fell from shelves. Power poles swayed; door swung; chairs rocked. Rocking, trembling 7-second motion in east-west direction; distant rumbling earth noises preceded shock.

Ridgecrest (about 5 miles southwest of China Lake).—Felt by all and awakened few in community. Small objects shifted. Rapid, jerky 30-second motion preceded 6 seconds by faint earth noises.

Shafter.—Felt by all and frightened few in community. Rapid, 5-second motion in west direction.

Springville.—Felt by, awakened, and frightened many. Slow, 5–6 second motion in west direction.

Trona.—Felt by all and awakened many in community. Motion slow.

Tulare.—Felt by many; frightened few; awakened all in home. Pendulum clock facing south stopped. Slow, 4-second motion in south-north direction; faint earth noises preceded shock by 1 second.

Westend.—Felt by and frightened all in community. Slow, east-west motion; faint earth noises.

Wheeler Ridge.—Felt by all. Slow, 1-second motion.

Woodlake.—Felt by all and frightened few in community; awakened all in home. Rapid motion.

Yosemite National Park (Headquarters Housing, Yosemite Valley).—Felt by several. Small objects shifted. Duration 20 seconds.

INTENSITY (DAMAGE) IV: Arvin, Balch Camp (PG&E, NE. ¼, Sec. 12, T. 12 S., R. 26 E., nearest town, Trimmer), Big Creek, Big Pine, Cantil, Darwin, Di Giorgio, Ducor, Dunlap, Hanford, Johannesburg, Keeler, Keene, Kern Canyon Powerhouse (about 10 miles east of Bakersfield), Kingsburg, Kings Canyon National Park (Grant Grove), Lake Hughes, Lancaster, Lone Pine, Miracle Hot Springs, Miramonte, North Fork, Pond, Porterville, Reedley, Sequoia National Park (Ash Mountain), South Entrance Ranger Station (Yosemite National Park), Tehachapi, Tipton, Visalia, and Wishon.

INTENSITY (DAMAGE) I TO III: Barstow, Bishop (Gorge Power Plant, Birchim Canyon), Buttonwillow, Caliente, Edwards, Frazier Park, Hinkley, Ivanhoe, Kernville, Lemoncove (1 mile east of), Little Lake, McFarland, Madera, Maricopa, Merced, Mojave, Olancha, Panoche (Panoche Substation, PG&E), and Tupman.

Reported felt (no details): "Fresno and Los Angeles".—(*BSSA, January 1963*).

September 16: 10:12:35* (main shock), 10:17:09*, 10:31:17*. Epicenter of first and second shocks 34°29′ north, 119°41′ west; of third shock, 34°31′ north, 119°46′ west, P. All near Santa Barbara. Magnitudes 4.0, 2.2, and 2.9, respectively. Felt over an area of approximately 1,000 square miles, principally in Santa Barbara County in coastal areas from Santa Ynez to Carpinteria. Maximum intensity (damage) V at Los Prietos Ranger Station (about 10 miles northwest of Santa Barbara), where the shock was felt by and alarmed many; pictures swung; cupboard doors opened; dishes fell. Visible swaying of buildings and trees; objects swung northeast-southwest. Sharp, abrupt motion. Shocks at 10:17:09* and 10:31:17* also felt and were preceded by rumbling earth noises. Felt with intensity (damage) IV at Cachuma Village (about 10 miles east of Santa Ynez), Cuyama Peak Lookout (east-northeast Santa Barbara County, about 6 miles south of Ventucopa), and Goleta. Intensity (damage) I to III at Carpinteria, Maricopa, and Santa Ynez.

September 17: 01:30:04*. Aftershock of September 15 at 21:36:16*. Epicenter 35°45′ north, 118°03′ west, near Walker Pass, P. Magnitude 3.0. Onyx. V. Felt by and awakened many. Intensity (damage) IV at Breckenridge Mountain Lookout (southwest of Havilah, Kern County), Randsburg, Shafter, and Tehachapi. Also felt at Fellows and Kernville.

September 21: 21:37:14*. Epicenter 37°44′ north, 122°33′ west, west of San Francisco, B. Magnitude 2.6. Reported felt in the Sunset and West Portal districts of San Francisco and in the Westlake District of Daly City.

September 26: 02:19:31*. Epicenter 36°56′ north, 121°38′ west, east of Watsonville, B. Magnitude 3.6. Felt over a small area of the Gilroy-Watsonville region. Gilroy. V. Felt by and awakened many in community; frightened few; moderate earth noises. Awakened few at Gilroy Hot Springs (about 10 miles northeast of Gilroy). In the Corralitos area (few miles north of Watsonville), felt by several; awakened and frightened few; windows, doors, and dishes rattled; house creaked. Rapid motion; faint earth noises. At Watsonville, slow, 10-second motion felt by observer sitting.

September 27: 07:30:19*. Epicenter 36°52′ north, 121°24′ west, near Hollister, B. Magnitude 2.4. Felt at Hollister.

October 1: 19:51:03*. Epicenter 39°12′ north, 119°36′ west, east of Carson City, Nev., B. Magnitude 4.3. Felt over an area of approximately 2,500 square miles of western Nevada and northeastern California. Maximum intensity (damage) V.

INTENSITY (DAMAGE) V IN NEVADA:

Dayton.—Felt by all and frightened few in community. Small objects shifted. Rapid, 10-second motion; moderate earth noises.

Minden.—Felt by all and frightened few in community. Small objects and furnishings shifted. Rapid, 5-second motion; faint earth noises.

Virginia City.—Felt by and frightened many in community. Hanging objects swung north. Rapid, 8-second motion in north direction.

INTENSITY (DAMAGE) IV IN NEVADA: Carson City, Gardnerville, Genoa, Glenbrook, Silver City, and Zephyr Cove area (lower Kingsbury Grade off U.S. Highway 50).

INTENSITY (DAMAGE) IV: Bijou, Floriston, Stateline, and Tiger Creek Powerhouse (PG&E, about 22 miles northeast of Jackson, in eastern Amador County).

INTENSITY (DAMAGE) I TO III IN NEVADA: Reno and Steamboat.

INTENSITY (DAMAGE) I TO III: Kings Beach, Tahoe Valley, and Tahoe Vista.

October 5: 07:29:03*. Epicenter 33°20′ north, 116°14′ west, north of Borrego, P. Magnitude 4.1. Felt over an area of approximately 2,000 square miles of Riverside County. Maximum intensity (damage) V at La Quinta (about 10 miles west of Coachella), where the shock was felt by many in community; small objects and furnishings shifted; building severely shaken; rapid, 3–5 second motion in southeast-northwest direction. Felt with intensity (damage) IV at Anza, Cathedral City, Hemet, Mountain Center, Moreno, Palm Desert, Thermal, and Winchester. Intensity (damage) I to III at Idyllwild, Indio, Mecca, Rancho Mirage, Thousand Palms, and Yucca Valley.

October 14: 02:14:29*. Epicenter 38°44′ north, 123°54′ west, southwest of Point Arena, B. Magnitude 4.7. Albion. Brief shock felt by observer in home. House creaked. Felt slightly at Elk by one or two in community.

October 18: 10:50:07*. Epicenter 36°45′ north, 121°30′ west, southwest of Hollister, B. Magnitude 3.4. Hollister (7½ miles south of, at Harris Ranch). III. Felt by several in home (observer active). Duration few seconds. Felt slightly by few at Hollister.

October 22: 03:10:59*. Epicenter 33°04′ north, 116°10′ west, near Vallecito, P. Magnitude 3.8. Felt over an area of approximately 1,500 square miles of central San Diego County. IV. Felt by many in community at Borrego Springs. Motion slow; moderate earth noises. At Descanso, felt by several; awakened few in home and community. Pictures on walls tilted. Slow motion of few seconds' duration; thunderous earth noises. Felt by several and awakened few at Pine Valley. Felt by few in home and community at Warner Springs. Very slight horizontal motion. Also felt at San Diego and Santa Ysabel.

October 28: 18:42:54* (main shock), 19:01:40*, 21:35:05*. Epicenters (1) 34°20′ north, 116°52′ west; (2) 34°17′ north, 116°52′ west; (3) 34°19′ north, 116°52′ west; all near Big Bear, P. Magnitudes 4.8, 3.2, and 3.7, respectively. The main shock was felt over an area of approximately 9,500 square miles of southern California, principally in Riverside and San Bernardino counties. Maximum intensity (damage) VI. Very slight damage reported. Press reported one window broken at Big Bear City; groceries fell from shelves in stores; mirrors and pictures fell from walls in some homes. At Redlands a broken water main was tentatively attributed to the shock. It was reported that rocks averaging 2–3 feet in diameter fell onto Highway 18 between Bear Valley and Lucerne Valley. The shocks at 19:01:40* and 21:35:05*

were felt in the Big Bear area and were described as considerably milder. Numerous aftershocks were recorded.

INTENSITY (DAMAGE) VI:

Big Bear City and vicinity.—Felt by and frightened all in community. Damage slight. One window broken. Rocks averaging 2–3 feet in diameter fell onto Highway 18 between Bear Valley and Lucerne Valley. Some canned goods toppled from market shelves; mirrors and pictures fell from walls in some homes. Described as a sharp, rolling motion, accompanied by rumbling earth noises, and lasting about 10 seconds.

Big Bear Lake.—Felt by and frightened all in community. Small objects shifted. Hanging objects swung east-west. Rapid, 7-second motion in west-east direction; moderate earth noises preceded shock by 3 seconds.

Fawnskin.—Felt by and frightened all in community. Clipboard leaning against floor baseboard overturned; picture frame shifted. Rapid, 30-second shock, accompanied by loud rumbling earth noises. Rumbling earth noises with aftershocks throughout October 29. At the Fawnskin Highway Maintenance Camp, observer reported it was the hardest shock felt in 18 years; noise like thunder heard.

Forest Falls (formerly Forest Home and Fallsvale).—Felt by and frightened all in community. Rocks fell near the Big Falls area. Slow, 3–4 second motion in north direction; moderate earth noises preceded shock by 2 seconds.

Sugarloaf.—Felt by and frightened all in community. Hanging objects swung northeast. Slow, 5-second shock with loud earth noises.

INTENSITY (DAMAGE) V: Blue Jay, Bryn Mawr, Colton, Crestline, Fullerton, Hinkley, Newberry, Redlands, Thermal, Twin Peaks, Twentynine Palms, and Valyermo.

INTENSITY (DAMAGE) IV: Adelanto, Amboy, Apple Valley, Arrowbear Lake, Barstow and 14½ miles west of, on Highway 66, Beaumont, Cabazon, Cadiz, Cathedral City, Cedar Glen, Cedarsprings Park, Coachella, Desert Hot Springs, Edwards, El Monte, Elsinore, Fallbrook, Hemet, Hesperia, Idyllwild, Joshua Tree, Lake Arrowhead, Lake Hughes, Lenwood, Littlerock, Loma Linda and vicinity, Lucerne Valley (Highland Road), Ludlow, Mentone, Mountain Center, Mount Baldy Village, Mount Wilson, Newport Beach, Oro Grande, Palm Springs, Palomar Mountain, Pearblossom, Pearson area (about 15 miles southeast of Aguanga), Phelan, Pioneertown, Rimforest, Riverside, Running Springs, San Bernardino, San Diego, San Jacinto, Seven Oaks, Summit, Venice, Victorville, Warner Springs, West Covina, Wrightwood, Yermo, Yucaipa, and Yucca Valley.

INTENSITY (DAMAGE) I TO III: Acton, Borrego Springs, El Mirage area (about 10 miles northwest of Adelanto), Castaic, Etiwanda, Hayfield Reservoir (about 15 miles west of Desert Center), Highland, Hollywood, Indio, Lakeview, Los Angeles, Manhattan Beach, Maywood, Moreno, Monrovia, Nightingale Camp (about 18 miles southeast of Mountain Center in Pinon Flats), North Hollywood, Norwalk, Nuevo, Randsburg, San Clemente, Saugus (Green Valley), South Gate, South Pasadena, Sun Valley, Upland, Van Nuys, Walnut, Wildomar, Wilmington, and White Water.

November 1: 18:48:08* Epicenter 33°15′ north, 116°17′ west, near Borrego, P. Magnitude 3.8. Descanso. IV. Strong jolt felt by observer. Pictures moved. Motion seemed directly underneath house. Also felt at Fawnskin.

November 4: No time given. Descanso. IV. Heavy, rapid jolting motion felt by observer; seemed directly underneath house. Windows rattled. Moderate earth noises.

November 6: 03:57:15.6*. Epicenter 37°30′ north, 118°37′ west, northwest of Bishop, B. Magnitude 4.3. Felt over an area of approximately 3,000 square miles of east-central California. Maximum intensity (damage) V.

INTENSITY (DAMAGE) V:

Big Creek.—Felt by all in home; awakened many in community. Knickknacks fell. Vertical, 10-second motion; faint earth noises.

Bishop.—Felt by, awakened, and frightened many in community. Small objects shifted. Motion sharp, slow, gradual onset, duration 10 seconds.

Laws.—Awakened many. Rapid motion in north direction; loud earth noises.

Long Valley Dam (about 25 miles northwest of Bishop).—Felt by all and awakened many in community. Hanging objects swung northeast. Rapid, 5-second motion in northeast direction, lasting 5 seconds. Second shock 30 seconds later.

INTENSITY (DAMAGE) IV: Balch Camp (PG&E, Eastern Fresno County, nearest town, Trimmer), Bass Lake, Dunlap, Sequoia National Park (Grant Grove), Shaver Lake, and Wishon.

INTENSITY (DAMAGE) I TO III: Badger and Herndon (PG&E substation).

November 10: 17:51:57*. Epicenter 34°22′ north, 116°52′ west, near Big Bear, P. Magnitude 3.4. Big Bear. Felt.

November 26: 08:58:18*. Epicenter 37°50′ north, 122°13′ west, Oakland Hills, B. Magnitude 2.5. Berkeley (University of California). III. Rapid motion felt by observer sitting. Also felt slightly at Lake Temescal, Oakland, and Piedmont.

November 30: 15:51:05*. Epicenter 34°20′ north, 116°55′ west, near Big Bear, P. Magnitude 4.3. Felt at Big Bear.

November 30: 16:35:49*. Epicenter 34°19′ north, 116°53′ west, near Big Bear, P. Magnitude 4.3. V. At Big Bear City, felt by all and frightened few in community. Plaster cracked slightly. Small objects shifted and overturned. Rapid, 30-second motion with loud earth noises. Loud rumbling earth noises at 08:31 on November 30, but no motion felt. Tremors felt throughout night of November 30 and early morning of December 1. (Numerous aftershocks were recorded.) Frightened many in community at Big Bear Lake; rapid, 5-second motion in west-east direction; loud earth noises preceded shock by 2 seconds. Felt with intensity (damage) IV at Angelus Oaks, Colton, East Highlands, Fawnskin, and Sugarloaf. Also felt at Los Angeles, Riverside, and San Bernardino.

December 6: 09:43:35*. Epicenter 40.5° north, 122.2° west, southeast of Redding, B. Magnitude 3.0. Redding. Felt? Redding Press made inquiry regarding a shock at this time.

December 23: 16:16:23.* Epicenter 36°56′ north, 121°38′ west, B. Magnitude 3.8. IV. At Aromas, felt by all in home. Doors rattled. Rapid motion with moderate earth noises. Felt by all in home at Watsonville, where house creaked. Rapid motion in north-south direction. Also felt at Tres Pinos.

WASHINGTON AND OREGON

(120TH MERIDIAN OR PACIFIC STANDARD TIME)

January 14: 21:29:13* Epicenter 47°50′ north, 120°13′ west, 16 miles due west of Chelan, Okanogan County, Wash., close to Navarre Coulee, S. Felt over an area of approximately 3,000 square miles of Chelan, Douglas, and Okanogan counties of north-central Washington. Maximum intensity (damage) V. One report of cracked plaster at Malaga, about 35 miles southeast of the epicenter.

INTENSITY (DAMAGE) V:

Ardenvoir.—Felt by all in community; frightened few in home. Dish fell. Rapid, 10-second motion with loud earth noises.

Chelan.—Felt by all and frightened few in community. Furnishings shifted. Rapid, 10-second shock in northwest direction, preceded 1 second by loud earth noises.

Clelan Falls.—Frightened observer; felt by others in community. Jolted on light of TV lamp. Loud earth noises.

Entiat.—Felt by all in community. Rapid, 10-second motion in eastwest direction, preceded 2 seconds by loud earth noises.

Entiat (2½ miles up Columbia River).—Felt by all in community; awakened and frightened all in home. Rapid, 10-second motion with loud earth noises.

Entiat (Entiat National Fish Hatchery).—Felt by all in community; frightened all in home. Rapid, 10-second motion, preceded 1–2 seconds by loud earth noises.

Entiat (Entiat Ranger Station).—Frightened many in community. Hanging objects swung north-south. Slow, 4-second motion with loud earth noises.

Entiat (Entiat Valley).—Felt by and frightened all in home. Windows, doors, and dishes rattled. Slow, 5-second motion, preceded 2 seconds by loud earth noises.

Entiat (15 miles west of).—Felt by and awakened all in home; frightened few. Doors rattled; walls creaked. Rapid, 10-second motion in west direction with loud earth noises.

Malaga (35 miles southeast of epicenter).—Felt by several; frightened few in community. Plaster cracked. Rapid, north-south motion, duration a few seconds.

Manson (10 miles northeast of epicenter).—Felt by and awakened all; frightened few. Trees, bushes shaken strongly. Rapid, 15-second motion in east-west direction with loud earth noises.

Methow (about 30 miles northeast of epicenter).—Felt by many in community; awakened all in home. Started with a small explosivelike rumble, then a big explosivelike rapid motion and noise, then rolling, waving of floor; duration 1½ minutes.

Navarre Coulee (west of Chelan, close to epicenter).—Felt like being close to a large blast. Horses and sheep very excited.

Waterville.—Felt by all; awakened many and frightened few in community. Rapid, 5-10 second motion, like near explosion, in west-east direction; moderate earth noises preceded shock by 1–2 seconds.

Wenatchee.—Felt by and awakened many in community; frightened few. Small objects shifted. Slow, 10-second shock with moderate rumbling earth noises.

INTENSITY (DAMAGE) IV: Azwell, Brewster, Cashmere, Conconully, Douglas, Dryden, Leavenworth, Monitor (west of), Orondo, Pateros, Peshastin, Rocky Reach Dam (about 10 miles upstream from Wenatchee), and Stehekin.

INTENSITY (DAMAGE) I TO III: Coulee Dam, Okanogan, Omak, and Twisp.

July 16: 06:00 (about). Olympia, Wash. IV. Observer awakened by rattling of water pipe in basement; upon investigation, observed water pipe vibration (like a tightly stretched wire). Noise also heard. Pipe noise reported

by another observer. Rapid motion, duration about 30–40 seconds.

August 11: 08:53. Gifford Pinchot National Forest (Observation Peak Lookout (NE¼, Sec. 14, T. 5 N., R. 6 E.), Skamania County. Wash. IV. Felt by observer. Water rippled in open pan; objects on shelves rattled. Bumping, 1-second motion, abrupt onset; bumping and rumbling earth noises. Also felt at Mowich Butte Lookout (NE. ¼, Sec. 26, T. 4 N., R. 6 E.).

September 4: 21:37.1*. Epicenter about 38 miles east of Corvallis, Oreg. Magnitude 3.5. Lebanon. IV. Felt by several. Dishes rattled and houses shook.

September 12: 15:13. Swift Dam, Wash. (about 6 miles east of Cougar). III. Single jolt felt by several in home.

October 17: 00:33. West Linn, Oreg. II. Felt by few.

November 3: 09:42. Swift Dam Village, Wash. (about 5½ miles east of Cougar). IV. Dishes rattled.

November 5: 19:36:43.5*, 20:15 or 20:25. Epicenter 45°38′ north, 122°40′ west, near Vancouver, Wash., S. Felt over an area of approximately 20,000 square miles of Washington and Oregon. (See map, p. 43.) Maximum intensity (damage) VI. Minor damage, consisting principally of cracked plaster and chimneys (bricks fell from some chimneys); and broken windows.

INTENSITY (DAMAGE) VI IN WASHINGTON:

Battle Ground.—Felt by and frightened many in community. Damage slight. Plaster, windows, walls cracked; plaster fell; dishes and few windows broken. Small objects shifted; small objects, vases, etc., overturned; knickknacks and pictures fell. Pendulum clock stopped. Houses bounced. Rapid, 15–20 second motion in south-north direction; loud earth noises. "This was the strongest shock ever felt by most people in this area."

Brush Prairie.—Felt by and frightened all in community. Damage slight. Plaster cracked. Small objects shifted; vases overturned; knickknacks and books fell. Trees, bushes shaken strongly. Pendulum clock stopped. Slow, 10–15 second motion preceded 3 seconds by moderate earth noises.

Camas and vicinity.—Felt by and frightened many in community. Damage slight. Plaster, windows, and few chinneys cracked. Small objects shifted; vases, etc., overturned. Large windows vibrated back and forth. Rapid motion, duration 10–15 seconds; thunderous earth noises. "People said it was the sharpest jolt they had ever felt."

Heisson.—Felt by and frightened all in community. Damage slight. Plaster and walls cracked; dishes broken; some loss from broken jars of food in grocery store. Many items fell in grocery store; furnishings shifted. Rapid, 15–20 second motion in north direction.

Kelso.—Felt by all and frightened many in community. Damage slight. Small objects shifted; vases overturned; knickknacks fell. Duration 4–5 seconds.

La Center.—Felt by all and frightened many in community. Damage slight. Plaster and chimneys cracked. Knickknacks fell. Rapid, 10-second motion in north-south direction, preceded 2 seconds by loud earth noises.

Longview.—Felt by all and frightened many in community. Damage slight. Plaster cracked. Knickknacks fell; furnishings shifted. Pendulum clock stopped. Rapid, 10-second motion in south-north direction; loud earth noises.

North Bonneville.—Felt by many and frightened few in community. Damage slight. Plaster and chimneys cracked. Knickknacks fell. Trees, bushes shaken strongly. Rapid, 3-second motion in west direction, preceded 2 seconds by loud explosivelike earth noises.

Packwood.—Felt by all; frightened all in home. Concrete driveway cracked. Rapid, 6–7 second motion in north direction; three distinct shocks.

Stevenson.—Felt by all and frightened many in community. Damage slight. One concrete wall cracked. Furnishings shifted; knickknacks fell. Rapid, 12-second shock in east-west direction, with moderate earth noises.

Trout Lake.—Felt by several in home; felt more strongly 100 yards south. Plaster cracked. Stove rocked strongly; house jarred. Sharp, 2–3 second motion in north direction, preceded by rumbling earth noises.

Underwood.—Felt by all and frightened many in community. Damage slight. Plaster and chimneys cracked; chimney fell. Knickknacks and books fell. Strong, rapid 20–30 second motion in east-west direction, preceded 1–2 seconds by loud earth noises.

Vancouver.—Felt by and frightened all in community. Damage slight. Plate glass store windows broken; advertising signs jarred loose; large wall crack on 4th floor of courthouse and large chandelier fell; jail elevator out of service; plaster cracked and fell. Furnishings shifted; knickknacks fell. Trees, bushes shaken strongly. Motion generally described as rapid, lasting 10 seconds to 1 minute; directions southwest to east and south-north; loud earth noises 2 seconds before shock.

White Salmon.—Felt by many and frightened few in community. Damage slight. "Very

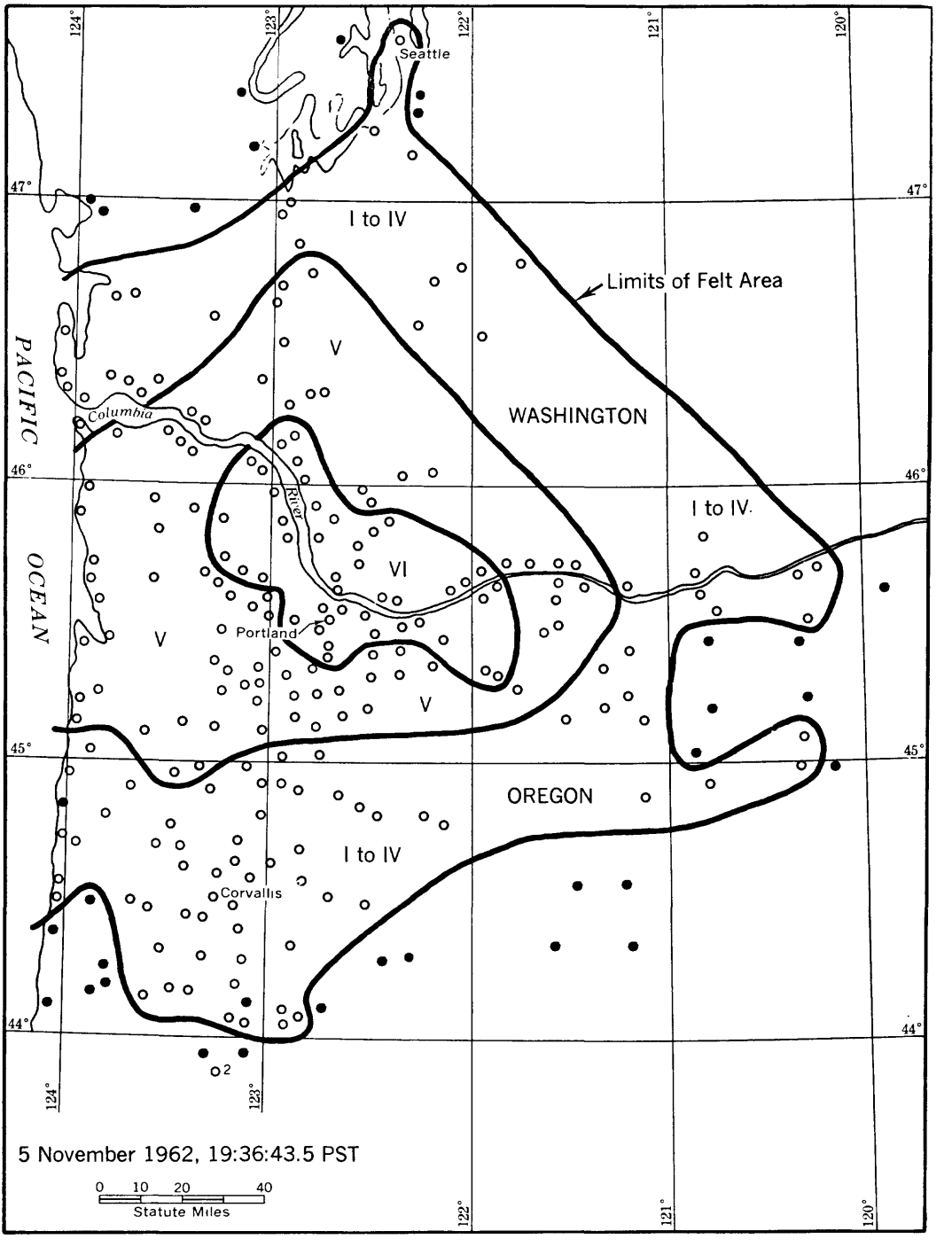

FIGURE 10.—*Area affected by earthquake of November 5.*

little damage to chimneys, walls, etc., in this area." Vases and small objects overturned; knickknacks fell. Rapid, 2–5 second motion; many thought car had hit house.

Woodland.—Felt by and frightened all in community. Minor damage at Woodland and within a 5-mile radius. Basement floors cracked; existing cement-block walls and plaster cracks widened; loss from fallen merchandise in grocery and drug stores. Small objects overturned; knickknacks fell. Chandeliers swung for 4–5 minutes after shock. Rapid, 30-second motion in south-north direction, preceded 3–4 seconds by loud earth noises. Shock on same day at 20:15 felt by some people.

Yacolt.—Felt by all in community. Damage slight. Vases overturned. Pendulum clock stopped. Trees, bushes shaken moderately. Slow, 30-second shock with loud earth noises.

INTENSITY (DAMAGE) VI IN OREGON:

Aurora.—Damage slight. Plaster and walls cracked; plaster and bricks fell. Refrigerator and stove shifted. Slow motion of long duration; loud earth noises.

Banks.—Felt by all and frightened few in community. Damage slight. Few walls and chimneys cracked. Small objects shifted and overturned; knickknacks and books fell. Slow, 12–15 second motion, preceded 5 seconds by moderate earth noises.

Beaverton and vicinity.—Felt by all and frightened many in community. Damage slight. Walls cracked slightly; some loss from fallen merchandise in stores. Small objects and some furniture shifted; small objects overturned; knickknacks fell. Rapid, 15–30 second motion, very sharp, in north direction, preceded few seconds by loud explosivelike earth noises.

Brightwood.—Felt by and frightened all in community. Plaster cracked. Small objects shifted; knickknacks and pictures fell. Rapid, 40-second motion with loud earth noises.

Buxton.—Felt by and frightened many in community. Damage slight. Chimneys cracked. Small objects shifted. Rapid, 15- second motion in south-north direction; moderate earth noises.

Cascade Locks.—Felt by all and frightened few in community. Damage slight. Plaster and chimneys cracked; bricks fell from chimneys; dishes broken. Small objects shifted and overturned. Rapid motion, duration few seconds, preceded 1–2 seconds by moderate earth noises.

Fairview.—Felt by and frightened all in community. Damage slight. Plaster cracked slightly. Small objects shifted. Slow, 17-second motion in north-south direction; loud earth noises.

Forest Grove.—Felt by all and frightened many in community. Damage slight. Small objects shifted; vases, etc., overturned; knickknacks and pictures fell. Rapid, 20-second shock in east-west direction; moderate earth noises.

Goble and few miles south of.—Felt by all in community; frightened few in home. Plaster and chimneys cracked. Rapid, 5-second motion in north-south direction; faint earth noises.

Gresham.—Felt by all and frightened few in community. Merchandise fell; small objects and furnishings shifted; small objects overturned. Doors swung. Rapid motion of momentary duration.

Latourell Falls.—Felt by and frightened all in community. Damage slight to concrete. Light objects shifted. Rapid, 3–5 second motion in northeast direction, preceded about 6 seconds by loud rumbling earth noises. "Strong, steady, continuous shocks. Shook house east-west from side to side and up and down."

Marylhurst.—Felt by all and frightened many in community. Damage slight. Plaster cracked. Small objects shifted and overturned; furniture overturned; knickknacks and books fell. Rapid, 15-second motion; moderate earth noises.

North Plains.—Felt by all and frightened many in community. Damage slight. Plaster cracked. Small objects and furnishings shifted; pictures fell. Rapid, 10-second motion in north-south direction; moderate earth noises.

Odell.—Felt by and frightened all in community. Plaster and wallpaper cracked; fireplace chimney cracked full length. Canned goods fell in store; pictures and dishes fell. Car slipped around. Rapid, severe, 15–20 second motion in east-west and north-south direction; loud earth noises.

Portland.—Many reports received from all sections of the city, indicating the shock was generally felt; frightened many. Chief Building Inspector of Portland said numerous reports of damage were received in the Bureau of Buildings department. Large numbers of chimneys broken off, cracked badly or shaken down; several buildings had tile ceilings fall; other damage such as cracked plaster and windows. Acoustical tile fell from about two-thirds of the 30-foot-high ceiling area of the 900-seat auditorium of reinforced concrete church at SE. 20th Avenue and Madison Street; light fixtures damaged; walls cracked. Six light fixtures in grocery store at 2526 NE. 15th Avenue, fell, causing an estimated damage of $500. Large wall cracks on 4th floor wall of the "Journal" newsroom; 4th floor partitions at City Hall cracked. At the State Office Building, 10th floor, three 10 x 10 inch ceiling tile fell near "seismic joint." Plaster cracked on every floor near seismic joint. Plaster cracked and fell in a number of large buildings. No damage to utilities was reported. The

sudden upsurge in the use of telephones immediately following the shock caused a temporary disruption in service in some areas. Motion generally reported as rapid, in south-north or north-south direction, lasting up to 30 seconds. Loud, rumbling earth noises, from all directions, a few seconds before shock. Slight shock felt at 20:25.

Rainier.—Frightened all. Damage slight. Plaster cracked. Small objects and furnishings shifted. Rapid, 10-second motion in east direction; preceded 2 seconds by moderate earth noises.

Rhododendron.—Felt by all; frightened few. Fireplace chimney cracked. Small objects and furnishings shifted. Doors swung. Moderate roaring earth noises, then rolling motion, followed 2–3 seconds later by a rather violent twist.

Saint Helens.—Felt by all and frightened many in community. Plaster cracked in some houses; one new house severely damaged. Rapid, south-north motion, lasting fraction of second.

Saint Paul.—Felt by all and frightened many in community. Plaster cracked. Small objects overturned. Rapid, 12-second shock in north direction; moderate earth noises.

Seaside.—Felt by many and frightened few in community. Plaster cracked. Small objects shifted. City Hall strongly shaken. Motion slow, duration 1 minute.

Sheridan.—Felt by all in home. Damage slight. Plaster cracked. Small objects shifted. Rapid motion of few seconds' duration, in north-south direction.

Tillamook.—Felt by all in home; frightened few. Several concrete walls cracked; some chimneys damaged; plaster cracked; windows broken. Barn walls and floor at nearby ranch cracked. Crack in road between Tillamook and Oceanside about 1½ inches wide and 20 feet long. Rapid, 10-second motion in east-west direction (objects also swung in circular motion), preceded 3 seconds by loud roaring earth noises which seemed overhead.

Veronia.—Felt by all and frightened many in community. Damage slight. Plaster, windows, chimneys cracked; few dishes and windows broken. Small objects and furnishings shifted. Rapid, 15-second motion, preceded 15 seconds by faint earth noises.

Warren.—Felt by and frightened all in community. Damage slight to brick. Chimneys cracked. Dishes broken. Small objects shifted; vases overturned; knickknacks fell. Rapid motion of several seconds' duration, preceded 5 seconds by loud earth noises.

West Linn.—Felt by and frightened all in community. Damage slight. Furnishings shifted; small objects shifted and overturned. Rapid, 4–5 second motion in north-south direction with loud earth noises.

Wilsonville.—Felt by all in community; frightened few in home. Damage slight. Plaster cracked in some houses. Hanging objects swung north-south. Rapid motion of few seconds' duration; moderate earth noises.

Zigzag.—Felt by all and frightened many in community. Damage slight. Cement patio and some chimneys cracked; some plumbing broken. All houses shaken. Rapid motion of several seconds' duration, in east-west and southeast directions. Sounded like heavy blast under observer's house, followed by shaking; others heard more of a rumbling sound.

INTENSITY (DAMAGE) V IN WASHINGTON: Amboy (also felt shock at 20:16), Carrolls and Mount Pleasant, Carson, Castle Rock, Cathlamet, Centralia, Chehalis, Cougar, Deep River, Goldendale, Kalama, Maryhill, Mount Rainier National Park (about 3 miles west of Park boundary), Ocean Park, Orchards, Ridgefield, Ryderwood, Skamania, Skamokawa, Swift Dam (about 5½ miles east of Cougar), Toutle, Vader, Washougal, and Winlock.

INTENSITY (DAMAGE) V IN OREGON: Aloha, Alpine, Astoria, Bay City, Beaverbrook, Birkenfeld, Bonneville, Boring, Bridal Veil, Brooks, Canby, Cannon Beach, Clifton, Corbett, Dallas, Deer Island, Dundee, Eagle Creek, Falls City, Foster, Gales Creek, Garibaldi, Gaston, Gladstone, Glenwood, Government Camp, Grand Ronde, Hillsboro, Jewell, Lake Oswego, Lee's Camp (about 18 miles northeast of Tillamook), Manhattan Beach, Manning, Marquam, Mill City, Milwaukie, Mosier, Mount Hood, Mulino, Neskowin, Netarts, Newberg, Noti, Oak Grove, Oregon City, Orenco, Pacific City, Rockaway, Sandy, Scappoose, Sherwood, Sublimity, Tangent, Troutdale, Waldport, Walton, Warrenton, Waterloo, Wauna, Wemme, Westport, and Yamhill.

INTENSITY (DAMAGE) IV IN WASHINGTON: Ariel, Chinook, Cook, Dallesport, Grays River, Long Beach, Morton, Naselle, Olympia, Pe Ell, Randle, Raymond, Roseburg, Silverlake, Tenino, and Tumwater.

INTENSITY (DAMAGE) IV IN OREGON: Alsea, Antelope, Arlington, Aumsville, Barlow, Blodgett, Cascadia, Cheshire, Colton, Corvallis, Creswell, Detroit, Donald, Dufur, Estacada, Eugene, Fall Creek, Fossil, Gates, Halsey, Hammond, Harrisburg, Hebo, Hood River, Hubbard, Idanda, Kernville, Lacomb, Lake Grove, Leaburg, Lebanon, Lowell, Marcola, Marion, Maupin and 7 miles west of, Maysville, Mehama, Molalla, Monitor, Monmouth, Nehalem, Newport, Olex,

Parkdale, Perrydale, Philomath, Pratum, Rose Lodge, Rufus, Salem, Scotts Mills, Shedd, South Junction, Tigard, Toledo, Turner, Tygh Valley, Valsetz, Wamic, and Wasco.

INTENSITY (DAMAGE) I TO III IN WASHINGTON: Ilwaco, Mineral, Onalaska, Puyallup, Seattle, South Bend, and Tacoma.

INTENSITY (DAMAGE) I TO III IN OREGON: Albany, Coburg, Curtin, Dexter, Elmira, Friend, Horton, Kings Valley, McMinnville, Mapleton, Monroe, Oceanside, Seal Rock, Shanko, and Veneta.

November 6: 05:30. Woodland, Wash. Felt by some.

November 9: 05:53, 06:12. Swift Dam Village, Wash. (about 5½ miles east of Cougar). (05:53) IV. Rapid, 3-second motion felt by observer sitting. Windows rattled. Both shocks felt at Swift Dam.

December 31: 12:49:36.0*, 19:30 (about). Epicenter 47°00′ north, 122°02′ west, 5 miles due west of the northwest corner of Mount Rainier National Park, S. Felt over an area of approximately 13,000 square miles of west-central Washington. Maximum intensity (damage) VI. Slight damage reported from a number of places, mainly in Pierce County, and consisted principally of cracked plaster and chimneys.

INTENSITY (DAMAGE) VI:

Alderton.—Felt by many and frightened few in community. Damage slight. Plaster cracked. Small objects shifted and overturned; knickknacks fell. Trees, bushes shaken strongly. Rapid, 10-second motion with loud earth noises.

Auburn.—Felt by all and frightened many in community. Columns twisted. Small objects and furnishings shifted; small objects overturned. Rapid motion, seemed about ½ inch east-west; duration 6 seconds.

Buckley.—Felt by all and frightened many in community. Damage slight. Walls cracked. Furnishings shifted; small objects overturned; pictures fell. Rapid, 15-second motion, in north-south direction, preceded 2 seconds by loud earth noises.

Buckley (near, Sec. 4 and 9, T. 18 N., R. 7 E.).—Felt by all in community. Several rocks of 4-inch diameter fell out of cut bank onto road. Small objects shifted. Rapid, 10-second motion in northeast-southwest direction, preceded 1 second by loud earth noises.

Carbonado.—Felt by and frightened all in community. Damage slight. Plaster cracked; dishes broken. Small objects and furnishings shifted; vases and small objects overturned; knickknacks fell. Rapid, 15-second motion in north-south direction.

Carbonado (north of).—Felt by all; awakened and frightened few in community. Damage slight. Small objects shifted; vases overturned; knickknacks fell. Five-second motion in southeast direction, preceded few seconds by moderate earth noises.

Carbon River Ranger Station (2 miles west of, Mount Rainier National Park, northwest section).—Felt by and frightened all in home; children screamed. Child knocked down. Small objects shifted. Rapid, vertical motion, preceded less than 1 second by loud cracking and rumbling earth noises.

Fife.—Felt by all and frightened few in community. Plaster cracked. Motion slow, lasting 1½ minutes.

Gooseprairie area.—Felt by several in home and community at Bumping Dam, where plaster cracked; damage slight to masonry; trees, bushes shaken moderately. Rapid, 30-second motion in northwest direction with moderate earth noises. Felt by all indoors at the Double K Mountain Ranch; rapid, 15–20 second motion, resembling a sonic boom at first.

Graham.—Strong shock felt by all in garage. Man thought power poles swayed as much as 8 feet.

Mud Mountain Dam (about 4 miles south of Enumclaw).—Plaster cracked. Small objects shifted. Rapid, blastlike motion in north direction, duration 1–2 seconds; loud blastlike earth noises.

Naches Tavern and Cafe (about 18 miles east of Enumclaw).—Felt by many; frightened few. Damage slight. Chimneys cracked. Trees, bushes shaken moderately. Rapid motion in southwest direction; faint earth noises.

Orting.—Felt by all and frightened few in community. Damage slight. Plaster and chimneys cracked; plaster fell. Furnishings shifted; small objects overturned. Direction southeast; moderate earth noises.

Orting (1½ miles south of, Puyallup River State Salmon Hatchery).—People went outdoors. Power poles swung about 2 feet. Truck jumped and moved violently. Vases overturned. Slow, 15-second motion in northeast direction, preceded 5 seconds by loud cracking and blasting earth noises.

Orting (8 miles south of, Electron Power Station).—Felt by and frightened all. Damage slight. Few dishes broken; small objects and furnishings shifted; knickknacks fell. Rapid, 3-second motion in east-west direction, with loud earth noises at time of shock.

Puyallup (22 miles south of, Barney's Restaurant).—Felt by all in building. Bar on knife rack knocked vertically off two supporting pins; knives fell to floor. Ceiling light fixtures moved

up and down. Direction east-west; loud earth noises. Shock felt later in the evening.

South Prairie.—Felt by all and frightened many in community. Damage slight. Small objects and furnishings shifted; vases, small objects overturned; knickknacks fell. Pendulum clock facing north stopped. Rapid, 8–10 second motion in north direction, preceded by earth noises.

Wilkeson.—Felt by and frightened all in community. Damage slight. Chimneys cracked; bottles and dishes broken. Small objects shifted; vases overturned; knickknacks fell. Coffee spilled from cups. Trees, bushes shaken strongly. Rapid motion, lasting 2 to 10 seconds; directions northeast and south; loud earth noises 1 second before shock. Light shock felt around 19:00.

INTENSITY (DAMAGE) V: Alder, Algona, Ashford, Baring, Bucoda, Cle Elum, Cumberland, Dash Point, Easton, Eatonville, Elbe, Enumclaw, Fairfax (also shock felt in evening), Fort Lewis, Kapowsin, Kent, Lakeview, La Grande (shock also felt about 19:27), Lester, McMillin (also slight shock about 19:30), Manchester, Milton, Naches Ranger Station (36 miles west of Yakima, 46°54′ north, 121°00′ west), North Bend, Olympia and East Olympia, Orillia, Packwood (three strong shocks), Parkland, Pe Ell, Puyallup and 13 miles south of, Rainier, Riffe, Ronald, and Roy.

INTENSITY (DAMAGE) IV: American River Resort (19 miles east of Chinook Pass), Anderson Island, Black Diamond, Bremerton, Burley, Carnation, Chelan, Cinebar, Curtis, Dockton, Dupont, Fox Island, Gate, Glenoma, Grotto, Harper, Kittitas, Kosmos, Lacey, Lakebay, Leavenworth, Lilliwaup, Littlerock, Longmire and vicinity, Maple Valley, Matlock, McKenna, Mercer Island, Midway, Mineral, Morton, Mossyrock, Nisqually, Onalaska, Pacific, Port Orchard, Potlatch, Preston, Randle, Ravensdale, Redondo, Renton, Retsil, Rochester, Roslyn, Salkum, Seabeck, Seattle, Selleck, Shelton, Silver Creek, Skykomish, Snoqualmie and Snoqualmie Falls, South Cle Elum, South Colby, Southworth, Spanaway, Sumner, Tacoma, Tahuya, Tenino, Tillicum, Toledo, Tieton Ranger Station (20 miles west of Naches), Tracyton, Tumwater, Union, Vail, Vashon, Vaughn, Wauna, Wenatchee, White River Ranger Station (east border of Mount Rainier National Park), Yelm, and Zenith.

INTENSITY (DAMAGE) I TO III: Adna, Bellevue, Cashmere, Centralia, Cougar, Des Moines, Ellensburg, Fall City, Galvin, Gig Harbor, Gorst, Hoodsport, Napavine, Olalla, Palmer, Port Blakely, Port Gamble, Poulsbo, Steilacoom, Sultan, Tukwila, Winlock, and Yakima.

ALASKA

(150TH MERIDIAN OR ALASKA STANDARD TIME)

February 26: 19:52:28.5*. Epicenter 63.0° north, 150.0° west, central Alaska, depth about 100 km, W. Felt at Girdwood.

February 28: 08:04:09.0*. Epicenter 51.6° north, 179.6° west, Andreanof Islands, Aleutian Islands, depth about 60 km, W. Felt on Adak.

March 14: 23:04:55*. Anchorage. IV. Felt by many. Buildings creaked; windows and dishes rattled; several observed disturbed objects. Abrupt onset; trembling motion.

March 25: 18:57:04*. Yakutat. IV. Felt by many. One strong jolt; abrupt onset.

March 28: 12:26:41*. Felt at Kenai.

April 6: 02:52:24*. Felt at Manley Hot Springs. Medium shock, duration 10 seconds.

April 13: 15:14:13.7*. Epicenter 59.6° north, 152.1° west, Kenai Peninsula, depth about 78 km, W. Felt at Homer (5 miles northwest of).

May 9: 14:03:40.2*. Epicenter 62.0° north, 150.1° west, southern Alaska, depth about 72 km, W. Magnitude 6 (Brk). Anchorage. V. Felt by many; alarmed few. Dishes fell from shelves. Buildings creaked; loose objects rattled. Trees and buildings swayed. Light fixtures and chairs swayed in east-west direction. Also felt at Fairbanks, Girdwood, McKinley, Mount Susitna, Seward, Talkeetna, and Valdez.

May 21: 01:11:54*. Felt at Girdwood. Slight tremor.

May 22: 06:51:57*. Felt at Talkeetna. Slight tremor.

May 29: 11:00:16.4*. Epicenter 51.8° north, 177.1° west, Andreanof Islands, Aleutian Islands, depth about 25 km, W. Felt on Adak.

June 13: 06:20:34*. Felt at Homer. Slight tremor.

June 17: 20:21:06.1*. Epicenter 60.5° north, 153.7° west, Cook Inlet region, depth about 174 km, W. Felt at Homer.

June 19: 22:21:39*. Felt on Adak. Slight tremor.

June 21: 00:42. Felt at Homer. Slight tremor.

June 22: 06:56:57*. Felt in McKinley Park. Slight tremor.

June 29: 06:28:07.1*. Epicenter 62.4° north, 152.0° west, southern Alaska, depth about 50 km, W. Magnitude 4¾, B. Anchorage. IV. Felt by many; alarmed few. Buildings creaked; loose objects rattled. Disturbed objects observed by many; lamps swung. Rapid onset; swaying motion north-south. Felt at Girdwood and Talkeetna (5 miles west of).

July 6: 08:40:59.4*. Epicenter 60.3° north, 152.1° west, Kenai Peninsula, depth about 67

km, W. Felt at Homer (5 miles northwest of) and Kenai. Slight tremor.

July 8: 23:52:34*. Felt on Umnak. Slight tremor.

July 15: (no time given). Valdez. Slight tremor, duration 10 seconds.

July 16: 02:54:40.6*. Epicenter 62.3° north, 153.1° west, southern Alaska, depth about 39 km, W. Magnitude 6 (Pal). Maximum intensity (damage) V. Slight damage reported.

INTENSITY (DAMAGE) V:

Anchorage.—Felt by and awakened many. Walls cracked slightly; can goods displaced on shelves. Buildings creaked; loose objects, and dishes rattled. Street lights swayed. Abrupt onset; swaying motion southeast-northwest. Roaring sounds heard by many.

Farewell.—Felt by, awakened and frightened all in home. Some vases, small objects and furniture overturned; tools fell. Windows, doors, dishes rattled; walls creaked. Trees, bushes shaken moderately. Observer reported "Lake was smooth, but quake made small waves." Moderate earth noises from southeast.

McGrath.—Felt by all; awakened and frightened few in community. Small objects shifted. Bed shook; hanging objects swung. Slow motion, duration 40 seconds. "Strongest and longest in 15 years."

Puntilla.—Felt. Several landslides reported.

INTENSITY (DAMAGE) I TO IV: Homer (5 miles northwest of), McKinley Park, and Talkeetna (5 miles west of).

August 15: 01:20:44.5*. Epicenter 51.8° north, 177.0° west, Andreanof Islands, Aleutian Islands, depth about 53 km, W. Slight tremor felt on Adak.

August 16: 00:10. Slight tremor felt at Homer.

August 17: 06:30 and 07:00 (about). Sleetmute. IV. Buildings creaked; loose object rattled and swayed. Abrupt onset; rocking motion, direction east-west.

August 18: 06:43:54.3* and 07:46:14.9*. Epicenter 62.3° north, 152.5° west, south central Alaska, depth about 32 km, W. Magnitudes 6–6¼ and 6¼–6½, respectively. Maximum intensity (damage) V.

INTENSITY (DAMAGE) V.

Moose Pass.—Felt by and awakened many in community. Trees, bushes shaken slightly. Windows, doors, dishes rattled; frame creaked. Rapid motion, direction north-south, duration 30 seconds. Moderate earth noises.

Palmer.—Felt by and awakened many; frightened few. Small objects shifted. Windows and dishes rattled; hanging objects swung. Faint to moderate earth noises.

Nancy Lake (5 miles south of Willow).—Felt by and awakened all in home and community. Windows, doors, and dishes rattled; walls creaked. Rapid motion.

INTENSITY (DAMAGE) IV. Anchorage, Farewell, Kenai, and Matanuska (1 mile west of).

INTENSITY (DAMAGE) I TO III. McGrath and Homer.

August 30: 03:09. Slight tremor felt at Homer.

August 31: 07:02:44.4.* Epicenter 51.3° north, 179.7° west, Andreanof Islands, Aleutian Islands, depth about 32 km, W. Magnitude 6¾. Felt on Adak.

August 31: 17:46:05.0*. Epicenter 51.3° north, 179.7° west, Andreanof Islands, Aleutian Islands, depth about 25 km, W. Mangitude 6½. Felt on Adak.

August 31: 18:41:41.5*. Epicenter 51.3° north, 179.9° west, Andreanof Islands, Aleutian Islands, depth about 37 km, W. Felt on Adak.

September 13: 17:30. Slight tremor felt at Kasilof.

September 15: 02:24:10*. Felt at Talkeetna. Slight tremor.

September 23: 05:50:46.4*. Epicenter 60.1° north, 151.2° west, Kenai Peninsula, depth about 86 km, W. Felt at Homer (5 miles northwest of), Kasilof and Seward.

September 25: 01:48:54*. Slight shock felt at Homer (5 miles northwest of).

October 19: 16:00 (about). Felt at Kasilof, Kenai, and Valdez.

October 20: 16:05:22.7*. Epicenter 61.1° north, 149.7° west, vicinity of Anchorage, depth about 80 km, W. VI. Slight damage at Anchorage, Girdwood, and Wasilla.

INTENSITY (DAMAGE) VI:

Anchorage.—Felt by and alarmed many. Slight damage. $2000 to $3000 damage caused by merchandise falling from shelves in stores. Telephone lines damaged, disrupting service. Bells rung. Buildings, towers and flag poles swayed. Disturbed objects observed by many.

Girdwood.—Felt by all; frightened many; awakened few. Slight damage. Plaster in partially completed house cracked; dishes broken. Knickknacks, books, and pictures fell; small objects and furnishings shifted; vases overturned. Pendulum clocks stopped. Trees, bushes shaken strongly.

Wasilla.—Felt by all; frightened few. Slight damage. Rocked barn; knocked down hay. Knickknacks and pictures fell; small objects shifted. Trees, bushes shaken strongly. Windows, doors, and dishes rattled; walls and frame creaked; hanging objects swung.

INTENSITY (DAMAGE) V.

Kenai.—Felt by many. Pendulum clock stopped; small objects shifted; knickknacks fell. Trees, bushes shaken slightly. Windows, doors, dishes rattled; walls and frame creaked. Hanging objects swung northeast.

INTENSITY (DAMAGE) IV. Soldotna and Susitna Station.

November 8: 08:37. Felt on Umnak. Slight tremor.

November 12: 08:34:23*. Felt at Talkeetna (5 miles west of). Slight tremor.

December 12: 12:18. Felt at Summit. Moderate tremor.

December 12: 18:21:21.2*. Epicenter 63.3° north, 149.7° west, south-central Alaska, depth about 47 km, W. Felt at Anchorage and Summit.

December 13: 04:57:27.9*. Epicenter 61.4° north, 147.2° west, Kenai Peninsula, depth about 69 km, W. Maximum intensity (damage) V at Anchorage, where many were aroused from their sleep. Felt by several at Cordova, where overhead light fixtures swayed, and disturbed objects were observed. Also felt at Kenny Lake and Valdez.

HAWAIIAN ISLANDS

(150TH MERIDIAN OR HAWAIIAN STANDARD TIME)

NOTE.—Data on the following local disturbances were determined from seismograph stations on the islands of Hawaii and Maui by the Hawaiian Volcano Observatory of the U.S. Geological Survey. For additional information, see the Hawaiian Volcano Observatory Summary 25 through 28.

January 3: 11:51:41.8*. Epicenter 19°27.0′ north, 155°11.7′ west, 12 km east-northeast of Uwekahuna seismometer at a depth of 25 km. Magnitude 3.1. Felt on the east rim of Kilauea caldera.

January 3: 18:16:41.6*. Epicenter 19°26.6′ north, 155°12.5′ west, 10 km east-northeast of Uwekahuna seismometer at a depth of 25 km. Magnitude 3.1. Felt on the east rim of Kilauea caldera.

January 7: 02:57:53.4*. Epicenter 19°24.5′ north, 155°03.1′ west, 14 km southwest of Pahoa at a depth of 5 km. Magnitude 4.0. Maximum intensity (damage) IV. Felt throughout the island, from Pahala to Pepeekeo. Some awakened at Pahoa. Rattled everything at Kau, Puna and Hilo. Some people at Hilo thought gusty winds had shaken their homes.

January 21: 16:31:08.9*. Epicenter 19°24.1′ north, 155°17.1′ west, beneath Halemaumau crater at a depth of 30 km. Magnitude 2.8. Felt on the east rim of Kilauea caldera.

January 26: 14:04:23.2*. Epicenter 19°15.8′ north, 155°12.8′ west, 2 km west of Apua Point at a depth of 15 km. Magnitude 3.3. Felt from Hilo to the east rim of Kilauea caldera.

February 7: 10:06:35.2*. Epicenter 19°24.1′ north, 155°17.1′ west, beneath Halemaumau crater at a depth of 30 km. Magnitude 3.5. Felt on the east rim of Kilauea caldera.

February 7: 10:10:43.0*. Epicenter 19°24.1′ north, 155°17.1′ west, beneath Halemaumau crater at a depth of 30 km. Magnitude 3.5. Felt on the east rim of Kilauea caldera.

February 7: 15:26:39.3*. Epicenter 19°24.1′ north, 155°17.1′ west, beneath Halemaumau crater at a depth of 30 km. Magnitude 2.9. Felt on the east rim of Kilauea caldera.

March 9: 21:39:02.2*. Epicenter 19°20′ north, 155°05′ west, southeastern flank of Kilauea at a shallow depth. Magnitude 3.3. Felt on the east rim of Kilauea caldera.

March 9: 23:46:19.0*. Epicenter 19°47.8′ north, 155°50.3′ west, 2 km north-northeast of Puu Waawaa at a depth of 15 km. Magnitude 4.0. Felt over half of the island.

March 22: 16:35:42.1*. Epicenter 19°14.3′ north, 154°57.8′ west, 13 km south-southeast of Kalapana at a depth of 45 km. Magnitude 3.4. Felt on the east rim of Kilauea caldera.

March 23: 14:56:46.6*. Epicenter 19°24.1′ north, 155°17.1′ west, beneath Halemaumau crater at a depth of 30 km. Magnitude 4.4. Felt throughout the island.

March 23: 18:47:03.8*. Epicenter 19°24.1′ north, 155°17.1′ west, beneath Halemaumau crater at a depth of 30 km. Magnitude 3.0. Felt on the east rim of Kilauea caldera.

March 24: 19:47:53.3*. Epicenter 19°24.1′ north, 155°17.1′ west, beneath Halemaumau crater at a depth of 30 km. Magnitude 2.9. Felt on the east rim of Kilauea caldera.

March 28: 15:52:40.0*. Epicenter 19°16.9′ north, 155°13.4′ west, 5 km northwest of Apua Point at a depth of 5 km. Magnitude 3.4. Felt on the east rim of Kilauea caldera.

March 30: 18:15:55.1*. Epicenter 19°24.1′ north, 155°17.4′ west, beneath Halemaumau crater at a depth of 30 km. Magnitude 4.5. Felt throughout the island.

April 11: 23:19:16.5*. Epicenter 19°44.5′ north, 155°08.5′ west, 7 km northwest of Hilo at a depth of 20 km. Magnitude 3.0. Felt at Hilo.

April 24: 03:04:50.1*. Epicenter 19°24′ north, 155°25′ west, Kaoiki fault system at a depth of 5 km. Magnitude 4.0. Felt island-wide.

May 10: 05:56:04.9*. Epicenter 19°24.1′ north, 155°17.1′ west, beneath Halemaumau crater at a depth of 30 km. Magnitude 4.3. Felt island-wide.

May 11: 06:37:23.4*. Epicenter 19°24.1′ north, 155°17.1′ west, beneath Halemaumau

crater at a depth of 30 km. Magnitude 3.7. Felt over eastern half of island.

May 16: 21:25:44.1*. Epicenter 19°27.9′ north, 154°52.7′ west, 9 km southeast of Ahua seismometer at a shallow depth. Magnitude 2.4. Felt at Pahoa.

May 23: 11:17:05.5*. Epicenter 19°32.5′ north, 155°55.5′ west, 3 km north of Kealakekua at a depth of 12.5 km. Magnitude 3.5. Felt at Kona.

May 23: 22:58:09.9*. Epicenter 19°15.1′ north, 155°23.1′ west, 10 km south of Desert seismometer at a depth of 45 km. Magnitude 3.7. Felt island-wide.

May 26: 13:13:45.8*. Epicenter 19°26.0′ north, 154°55.3′ west, 8 km south-southeast of Pahoa at a depth of 5 km. Magnitude 2.9. Felt at Pahoa.

May 29: 21:11:08.3*. Epicenter 19°23.2′ north, 155°30.0′ west, 14 km northwest of Desert seismometer at a depth of 8 km. Magnitude 3.6. Felt at Mt. View.

May 31: 23:02:03.8*. Epicenter 20°03.3′ north, 155°17.5′ west, 22 km east of Honokaa at a depth of 12.5 km. Magnitude 2.9. Felt at Honokaa.

June 4: 23:35:21.3*. Epicenter 19°13′ north, 155°13′ west, 20 km south-southeast of Ahua seismometer at a depth of 5 km. Magnitude 3.9. Felt at Hilo, Pohakuloa, Puna, Pahala and on the east rim of Kilauea caldera.

June 7: 10:02:58.8*. Epicenter 19°17.7′ north, 155°23.1′ west, 5 km south of Desert seismometer at a depth of 45 km. Magnitude 3.4. Felt at Pahala.

June 8: 21:43;16.5*. Epicenter 19°24′ north 155°25′ west, Kaoiki fault system at a depth of 5 km. Magnitude 3.5. Felt at Pahala and Hilo.

June 11: 21:04:54.1*. Epicenter 19°25.5′ north, 155°00.4′ west, 10 km southwest of Pahoa at a depth of 8 km. Magnitude 2.8. Felt at Kapoho.

June 11: 21:41:18.3*. Epicenter 19°25.5′ north, 155°00.4′ west, 10 km southwest of Pahoa at a depth of 8 km. Magnitude 1.9. Felt at Kapoho.

June 13: 16:34:55.3*. Epicenter 19°24.1′ north, 155°17.1′ west, beneath Halemaumau crater at a depth of 30 km. Magnitude 4.3. Felt island-wide.

June 14: 20:31:18 9*. Epicenter 19°24.1′ north, 155°17.1 west, beneath Halemaumau crater at a depth of 30 km. Magnitude 2.7. Felt on the east rim of Kilauea caldera.

June 27: 18:27:14.3*. Epicenter 19°24′ north, 155°25′ west, Kaoiki fault system at a depth of 5 km. Magnitude 6.1. Felt on Hawaii, Maui, and Oahu. Maximum intensity (damage) VI on Hawaii, where the shock broke crockery, cracked windows, walls and plaster. A slide at Kawalii Gulch near Laupahoehoe covered part of the Hamakua coast highway, and a section about 25 feet wide plummeted about 1,000 feet down the face of a cliff on Kealakekua Bay. It left a bright orange streak of fresh rock, but caused no damage. Slides were also reported in remote Waipio Valley in the north end of the island.

INTENSITY (DAMAGE) VI:

Hilo.—Felt by and alarmed many. Several hundred dollars damage to stocks and wares in stores. Three windows in hospital shattered; small cracks in walls and tiling; plaster chipped; terracotta from store front fell; furniture shifted; books toppled; dishes broken. Alarm set off in store. Water splashed out of fish bowls.

Kapala Ranch area.—Felt. Dishes shattered; canned goods fell from shelves; furniture shifted and overturned; appliances "moved everywhere."

Kona area.—Felt by and frightened nearly all. Part of cliff at Napoopoo Beach tumbled into ocean. Majority of people reported water sloshed from storage tanks. Buildings shook and visibly swayed; mirror fell from wall and smashed; canned goods knocked from shelves; large chandeliers swayed; weights on grandfather clock banged together.

INTENSITY (DAMAGE) V:

Bird Park (top of Kaoiki fault).—Felt by several. Picnic park's shelter and water tank swayed; cars did a lively "twist." Water splashed from pan on stove. Undulating motion underfoot, started gradually and swelled in intensity.

Keaau.—Felt. Ripe mangoes shaken from tree. "Strongest I have ever felt."

Pihonua.—House shook. Statue knocked from shelf; crockery rattled; cat very disturbed.

Kilauea Military Camp.—Felt. Cars on a parking area bobbed with the movement of the quake along the fault.

INTENSITY (DAMAGE) IV: Kailua and Kurtistown.

INTENSITY (DAMAGE) I TO III: Kohala, Honokaa, Pahala, Pahoa, and Pohakuoa.

June 28: 03:36:56.7*. Epicenter 19°24′ north, 155°25′ west, Kaoiki fault system at a depth of 5 km. Magnitude 3.7. Felt at Hilo.

July 3: 02:07:13.2*. Epicenter 19°34.8′ north, 155°11.6′ west, 8 km west-northwest of Mt. View at a depth of 12½ km. Magnitude 2.7. Felt at Mt. View.

July 3: 18:40:41.3*. Epicenter 19°15. 0′ north, 155°37. 7′ west, 21 km north-northwest of Naalehu at a depth of 5 km. Magnitude 3.5. Felt at Pahala.

July 14: 05:48:33.6*. Epicenter 19°24.1′ north, 155°17.1′ west, beneath Halemaumau

crater at a depth of 30 km. Magnitude 2.9. Felt in Kilauea caldera region.

July 14: 07:37:53.1*. Epicenter 19°44.4′ north, 155°38.2′ west, 18 km south-southeast of Waikii at a depth of 10 km. Magnitude 4.0. Felt island-wide. No damage reported. Buildings shook in Kona and Hilo and other areas. It was reported felt strongest in Laupahoehoe in the Hamakua area, where the police station rocked.

July 15: 02:35:22.6*. Epicenter 19°24′ north, 155°25′ west, Kaoiki fault system at a depth of 5 km. Magnitude 2.2. Felt at Hilo.

July 23: 23:52:41.1*. Epicenter 19°28.9′ north, 155°59.2′ west, 8 km west-southwest of Kealakekua at a shallow depth. Magnitude 4.5. Felt at Kona.

July 24: 17:48:14*. Felt throughout island of Hawaii. At Captain Cook, felt by and alarmed many. Houses shook; loose objects rattled. Merchandise fell from store shelves; few top-heavy ornaments knocked over in some homes.

July 27: 00:04:44.2*. Epicenter 19°24′ north, 155°25′ west, Kaoiki fault system at a depth of 5 km. Magnitude 3.0. Felt at Hilo, Pahala, and Naalehu.

July 27: 22:06:41.7*. Epicenter 19°24.1′ north, 155°17.1′ west, beneath Halemaumau crater at a depth of 30 km. Magnitude 3.4. Felt at Pahala and in the Kilauea caldera region.

July 28: 05:44:36.8*. Epicenter 19°20′ north, 155°05′ west, southeastern flank of Kilauea at a shallow depth. Magnitude 2.1. Felt at Kapoho.

July 30: 22:58:56.3*. Epicenter 19°52.5′ north, 155°19.3′ west, 5 km south-southeast of Keanakolu at a depth of 8 km. Magnitude 2.7. Felt at Paauilo.

July 31: 02:46:48.0*. Epicenter 19°25. 5′ north, 155°00.0′ west, 8 km southwest of Pahoa at a shallow depth. Magnitude 3.5. Felt at Kapoho.

July 31: 03:24:15.8*. Epicenter 19°20′ north, 155°05′ west, southeastern flank of Kilauea at a shallow depth. Magnitude 3.7. Felt at Hilo.

August 2: 04:38:13.1*. Epicenter 19°28.8′ north, 155°01.7′ west, 8 km west-southwest of Pahoa at a depth of 8 km. Magnitude 1.9. Felt at Pahoa.

August 16: 17:15:07.5*. Epicenter 19°23.2′ north, 154°53.6′ west, 14 km south-southeast of Pahoa at a shallow depth. Magnitude 2.6. Felt at Kapoho.

August 16: 18:31:39.5*. Epicenter 19°23.2′ north, 154°53.6′ west, 14 km south-southeast of Pahoa at a shallow depth. Magnitude 2.7. Felt at Kapoho.

August 17: 23:30:06.5*. Epicenter 19°10.8′ north, 155°32.0′ west, 14 km northeast of Naalehu at a depth of 8 km. Magnitude 4.0. Felt at Hilo, Kau, and Kona.

August 18: 16:58:41.8*. Epicenter 19°18.2′ north, 155°11.7′ west, 11 km southeast of Ahua seismometer at a depth of 8 km. Magnitude 4.6. Felt island-wide.

August 22: 23:22:34.9*. Epicenter 19°20′ north, 155°05′ west, southeastern flank of Kilauea at a shallow depth. Magnitude 3.3. Felt in the Kilauea caldera region.

September 2: 17:17:05.2*. Epicenter 19°28.5′ north, 155°15.0′ west, 7 km northeast of Uwekahuna seismometer at a depth of 30 km. Magnitude 3.1. Felt in Kilauea caldera region.

September 8: 01:42:12.8*. Epicenter 19°27.3′ north, 154°50.1′ west, 13 km southeast of Pahoa at a depth of 3 km. Magnitude 2.8. Felt at Pahoa.

September 8: 03:58:58.0*. Epicenter 19°02.3′ north, 155°08.5′ west, 25 km south-southeast of Apua Point at a depth of 8 km. Magnitude 4.1. Felt at Hilo and in Kilauea caldera region.

September 10: 19:11:15.0*. Epicenter 19°-20.0′ north, 155°06.3′ west, 18 km east-southeast of Ahua seismometer at a depth of 3 km. Magnitude 3.6. Felt at Hilo and Puna.

September 11: 07:22:49.8*. Epicenter 19°-28.6′ north, 155°14.0′ west, 9 km northeast of Uwekahuna seismometer at a depth of 25 km. Magnitude 3.7. Felt island-wide.

September 11: 07:25:27.5*. Epicenter 19°-28.6′ north, 155°14.0′ west, 9 km northeast of Uwekahuna seismometer at a depth of 25 km. Magnitude 3.6. Felt island-wide.

September 19: 16:02:37.3*. Epicenter 19°-18.5′ north, 155°04.7′ west, 45 km south of Hilo at a depth of 12½ km. Magnitude 3.7. Felt at Hilo.

September 25: 13:22:50.4*. Epicenter 19°-15.1′ north, 155°30.2′ west, 8 km northwest of Pahala at a depth of 8 km. Magnitude 3.5. Felt at Hilo and Pahala.

September 27: 18:04:17.7*. Epicenter 19°-24.1′ north, 155°17.1′ west, beneath Halemaumau crater at a depth of 30 km. Magnitude 3.2. Felt at Kukuihaele and in the Kilauea caldera region.

October 19: 06:43:29.0*. Epicenter 19°40.1′ north, 156°06.0′ west, 25 km northwest of Kealakekua at a depth of 12½ km. Magnitude 3.6. Felt in north Kona.

October 24: 02:00:26.6*. Epicenter 19°17.6′ north, 155°27.3′ west, 10 km southwest of Desert seismometer at a depth of 10 km. Magnitude 3.0. Felt at Pahala and Hilo.

October 31: 13:30:50.0*. Epicenter 19°11.8′ north, 155°33.2′ west, 15 km north-northeast of

Naalehu at a depth of 3 km. Magnitude 3.7. Felt at Naalehu.

November 2: 22:50:28.9*. Epicenter 19°09.8′ north, 155°34.6′ west, 11 km north of Naalehu at a depth of 8 km. Magnitude 2.6. Felt at Naalehu.

November 6: 00:16:26.4*. Epicenter 19°-18.6′ north, 155°05.5′ west, 45 km south of Hilo at a depth of 12½ km. Magnitude 2.7. Felt at Hilo.

November 6: 05:56:13.5*. Epicenter 19°-11.8′ north, 155°28.7′ west, 1 km south of Pahala at a depth of 3 km. Magnitude 2.8. Felt at Pahala.

November 6: 21:55:31.9*. Epicenter 19°-24.1′ north, 155°00.6′ west, 12 km southwest of Pahoa at a depth of 3 km. Magnitude 3.0. Felt at Pahoa.

November 8: 00:06:52.3*, 00:08:27.0*, and 00:09:21.5*. Epicenter 19°27.9′ north, 154°56.7′ west, 4 km south of Pahoa at a depth of 3 km. Magnitudes 2.7, 2.7 and 2.5, respectively. Felt at Pahoa.

November 20: 01:56:55.2*. Epicenter 20°-00.1′ north, 155°53.4′ west, 8 km southwest of Kawaihae at a depth of 12½ km. Magnitude 3.7. Felt at Kamuela and Kohala.

November 22: 05:18:21.7*. Epicenter 19°20′ north, 155°05′ west, southeastern flank of Kilauea at a depth of 5 km. Magnitude 4.1. Felt from Kilauea caldera region to Hilo.

November 26: 06:56:04.3*. Epicenter 19°-27.0′ north, 154°58.0′ west, 6 km south-southwest of Pahoa at a depth of 3 km. Magnitude 3.2. Felt at Opihikao and Pahoa.

December 3: 07:30:55.0*. Epicenter 19°-23.5′ north, 155°18.5′ west, 6 km west-northwest of Ahua seismometer at a depth of 12½ km. Magnitude 2.3. Felt on the eastern rim of Kilauea caldera.

December 7: 23:37:38.5*. Epicenter 19°-59.3′ north, 155°19.8′ west, 10 km west of Laupahoehoe at a depth of 12½ km. Magnitude 2.6. Felt at Paauilo.

December 9: 00:08:00.5*. Epicenter 19°-51.2′ north, 155°23.0′ west, 20 km southwest of Laupahoehoe at a depth of 45 km. Magnitude 3.0. Felt at Puu Anahulu.

December 10: 20:15:39.0*. Epicenter 19°-58.5′ north, 155°20.5′ west, 12 km west-southwest of Laupahoehoe at a depth of 3 km. Magnitude 2.3. Felt at Honokaa.

December 12: 02:36:10.0*. Epicenter 19°-12.9′ north, 155°21.5′ west, 12 km east-northeast of Pahala at a depth of 3 km. Magnitude 2.8. Felt on the east rim of Kilauea caldera.

December 13: 20:21:31.7*. Epicenter 19°-13.3′ north, 155°21.2′ west, 13 km east-northeast of Pahala at a depth of 3 km. Magnitude 3.5. Felt at Kapapala and Kohala.

December 13: 21:36:18.7*. Epicenter 19°-24.1′ north, 155°17.1′ west, beneath Halemaumau crater at a depth of 30 km. Magnitude 3.7. Felt island-wide.

December 28: 01:06:10.1*. Epicenter 19°-18.5′ north, 155°05.0′ west, 13 km east-northeast of Apua Point at a depth of 8 km. Magnitude 4.1. Felt over half of the island.

December 30: 17:47:19.0*. Epicenter 19°-14.0′ north, 155°35.8′ west, 18 km north of Naalehu at a depth of 3 km. Magnitude 4.0. Felt over half of the island.

December 31: 06:02:03.5*. Epicenter 19°-24.1′ north, 155°45.5′ west, 21 km southeast of Kealakekua at a shallow depth. Magnitude 3.0. Felt over half of the island.

PANAMA CANAL ZONE

(75TH MERIDIAN TIME)

March 12: 04:41:33.9*. Epicenter 8.2° north, 82.8° west, near south coast of Panama and Costa Rica, depth about 25 km, W. Slight damage at Puerto Armuelles and David, Panama. Also felt in Panama City and its environs. Intensity (damage) V at Balboa Heights, where the shock awakened many.

March 12: 06:40:12.2*. Epicenter 8.1° north, 82.9° west, near south coast of Panama and Costa Rica, depth about 30 km, W. Magnitude 6¾. Slight damage at Puerto Armuelles and David, Panama. Also felt in Panama City and its environs. Intensity (damage) IV at Balboa Heights, where buildings shook. Captain of the *SS AVIS FAITH* reported the shock was felt on board ship at 7°44′ north, 82°57′ west, with very explosivelike motion. A tsunami with a range of less than one foot was recorded at Puerto Armuelles, Panama, and San Cristobal, Galapagos Islands.

June 4: 13:50:41.5*. Epicenter 7.7° north, 80.6° west, near south coast of Panama, depth about 54 km, W. Intensity (damage) IV at Balboa Heights.

July 26: 03:14:44.8*. Epicenter 7.4° north, 82.7° west, south of Panama, depth about 33 km, W. Magnitude 6¾. Intensity (damage) V at Balboa Heights, where the shock was felt by and awakened many. Walls shook; dishes rattled. Also felt at Aguadulce (many alarmed), Panama City, and El Volcan, Panama.

July 30: 15:18:52.3*. Epicenter 5.2° north, 76.4° west, western Colombia, depth about 69 km, W. Magnitude 6¾. Forty-seven killed, many injured, and extensive property damage in

Caldas Province, Colombia. Intensity (damage) V reported at Balboa Heights.

August 29: 05:14:12.5*. Epicenter 7.3° north, 80.5° west, near south coast of Panama, depth about 33 km. Intensity (damage) II at Balboa Heights.

September 17: 19:29:05.5*. Epicenter 7.4° north, 82.3° west, near south coast of Panama, depth about 33 km, W. Magnitude 7. Slight damage in Chiriqui Province, Panama. Intensity (damage) IV at Balboa Heights. Three ships, *MS STOVE TRANSPORT, JAHI, and MGE* in the vicinity of 7°20′ north, 82°20′ west, reported violent shaking at approximately the same time.

October 25: 10:52:29.9°*. Epicenter 8.4° north, 82.6° west, Panama, depth about 51 km, W. Magnitude 5¼–5½. Intensity (damage) II at Balboa Heights. Felt at El Volcan, Panama.

PUERTO RICO

(60TH MERIDIAN TIME)

April 20: 01:47:55.3*. Epicenter 20.6° north, 72.2° west, near north coast of Haiti, depth about 25 km, W. Magnitude 6½–6¾. Two injured and minor damage at Port-au-Prince. In Puerto Rico, felt by many at Ponce where buildings shook, beds moved, and china rattled. Also felt at San Juan.

July 23: 18:11:54.6*. Epicenter 19.0° north, 65.1° west, Virgin Islands region, depth about 25 km, W. Felt strongly on St. Thomas and in eastern Puerto Rico.

MISCELLANEOUS ACTIVITIES

GEODETIC WORK OF SEISMOLOGICAL INTEREST

The program of repeating geodetic control surveys for the purpose of detecting horizontal movement in the earth's crust was continued in 1962.

A resurvey was made over the arc from San Luis Obispo to Avenal, California. Previous observations made in 1932 and 1951 indicate that slippage near the fault was about 5 cm. for the 20 year interval. The 1962 observations for five lines crossing the fault indicate the same 5 cm. displacement for the period from 1951 to 1962. In each case, the displacement is to the southeast on the east side of the fault and to the northwest on the west side. At several stations south of the fault line, differences between the 1932 and 1951 observations indicated slight movement. The 1962 observations, at all points where this movement was indicated, were in very close agreement with the 1932 observations. Observations at points northeast of the fault show a close agreement between the three surveys.

A survey for the purpose of studying horizontal movement along the Wasatch fault south of Salt Lake City was started in 1962 and completed early in 1963. Quadrilaterals about four lines on a side straddle the fault for approximately 20 miles. Tentative plans have been made to reobserve the net in about five years.

TIDAL DISTURBANCES OF SEISMIC ORIGIN

Two minor tsunamis were reported during the year. Of these one was recorded on the tide gages for which the Coast and Geodetic Survey serves as a record repository.

Following the earthquake near the south coast of Panama on March 12, 1962 (8.1° north, 82.9° west) a tsunami with a range of less than one foot was recorded at Puerto Armuelles, Panama, and San Cristobal, Galapagos Islands.

The earthquake of May 11, 1962, near the coast of Mexico (17.0° north, 99.7° west) generated a tsunami that was recorded at Acapulco. Maximum amplitude reported was 2.8 feet.

FLUCTUATIONS IN WELL WATER LEVELS

INTRODUCTION

The following data are tabulated for the purpose of associating fluctuations in well-water levels with earthquakes. The data are made available by the Ground Water Branch of the U.S. Geological Survey. Complete information on earthquakes may be obtained from the *Preliminary Determination of Epicenter* cards issued by the Coast and Geodetic Survey or from registers of seismographic stations nearest the locality.

Similar data for 1943 were published by the Coast and Geodetic Survey in *United States Earthquakes*, 1943, and those for 1944 through 1949 appeared in *United States Earthquakes*, 1949. Data for the years subsequent to 1950 were published annually in *United States Earthquakes*, 1950 through 1961.

WELL DESCRIPTIONS

CALIFORNIA

Well No. 4S/16 E–32D1, Chuckwalla Valley. Owner, Walter Palladine. Depth, 733 feet; plugged back to 610 feet; diameter, 14 inches to 733 feet; finish, gravel pack, perforated 137–597 feet. Aquifer, Pleistocene(?).

Well No. 5S/16 E–7M2, Chuckwalla Valley. Depth, 789 feet; diameter, 14 inches to 300 feet, 12 inches to 789 feet; finish, gravel pack, perforated 280–789 feet. Aquifer, Pleistocene(?).

Well No. 15/16–20R1, Fresno County, SE SE Sec. 20, T. 15 S., R. 16 E, MDB & M. Owner, Tranquility Irrigation District. Depth, 1250 feet; drilled, 365 feet; diameter, 16 inches; finish, perforated 490–1,203 feet. Aquifer, undifferentiated Recent and Pleistocene (?); alluvium, upper-water bearing zone.

Well No. 15/16–34E1, Fresno County, SE NE Sec. 34, T. 15 S., R. 16 E, MDB & M. Owner, James Irrigation District. Diameter, 12 inches.

Well No. 25/26–1A2, Kern County, NE NE Sec. 1, T. 25 S., R. 26 E., MDB &M. Owner, Setrakian Bros. Depth, 875 feet; diameter, 14–12 inches; finish, perforated 595–863 feet, 12 inches; 200–600 feet, 14 inches. Aquifer, alluvium, confined and semiconfined.

Well No. 25/26–1K2, Kern County, SW NE Sec. 1, T. 25 S., R. 26 E., MDB &M. Owner, Mid-State Hort. Depth, 2800 feet; diameter, 16 to 14 to 12 inches; finish, perforated 1000–2800 feet. Aquifer, undifferentiated Recent and Pleistocene (?); alluvium.

Well No. 19/16/23–P2, Fresno County, SE SW Sec. 23, T. 19 N., R. 16 E., MDB &M. Owner, San Joaquin Cotton Oil Company. Depth, 722 feet; diameter, 10 inches. Aquifer, undifferentiated Recent and Pleistocene (?); alluvium.

IDAHO

Well No, 6N–29E–8bc1, non-artesian, Butte County, 5.5 miles north and 1.5 miles west of Howe, Idaho, 93°52′ north, 113°3′ west. Owner, W. D. Scogings. Depth, 186 feet; diameter, 16 inches; depth of casing, 0–191 feet; finish, perforated 95–191 feet, open end. Aquifer, Snake River Group; Quaternary basalt.

Well No. 13S–21E–18bb1, non-artesian, Cassia County, 3.75 miles north and 8.5 miles west of Oakley, Idaho, 42°18′ north, 114°3′ west. Owner, Grigg and Anderson. Depth, 850 feet; diameter, 22 inches; depth of casing, 0–20 feet; finish, open hole. Aquifer, Paleozoic limestone.

INDIANA

Well No. Pu6(29/4W–4L1), artesian, Pulaski County, NE SW Sec. 4, T. 29 N., R. 4 W. Owner, Earl Overmeyer. Depth, 663 feet; diameter 8 inches; finish, open hole. Land surface datum is about 685 feet above msl. Aquifer, Niagaran limestone of Silurian age.

TABLE 1.—*Fluctuations in well-water levels, January 1 through December 31, 1962*

NOTE.—Complete information on earthquakes possibly associated with the following tabulations may be obtained from the *Preliminary Determination of Epicenter* cards issued by the Coast and Geodetic Survey, or from the registers of seismographic stations nearest the locality.

ALASKA

Well No.	Date	Time G.M.T.	Depth to water				Amplitude of fluctuation
			Before disturbance	After disturbance	At highest point	At lowest point	
Anc64	Jan. 11, 1962	07:00	13.26	13.26	13.25	13.28	0.03
Anc64	Apr. 18, 1962	18:15	+16.40	+16.40	+16.39	+16.40	.01
Anc590	do	18:15	−0.02	−0.02	−0.02	−0.02	.00
Anc590	Apr. 19, 1962	12:00	−0.06	−0.05	−0.04	−0.06	.02
Anc64	do	20:00	+16.36	+16.35	+16.34	+16.36	.02
Anc50	May 10, 1962	00:05	+61.40	+61.40	+61.21	+61.40	.19
Anc64	do	00:05	+16.71	+16.70	+16.70	+16.71	.01
Ancl11A	do	00:05	+9.45	+9.45	+9.42	+9.48	.06
Anc590	do	00:05	+0.28	+0.28	+0.28	+0.28	.00
Anc64	July 16, 1962	11:00	12.34	12.34	12.34	12.35	.01
Ancl11A	do	11:00	11.60	11.59	11.56	11.65	.09
Ancl14	do	13:00	42.50	42.50	42.49	42.52	.03
Anc64	July 20, 1962	24:00	12.32	12.32	12.32	12.34	.02
Anc316b	Aug. 18, 1962	16:10	6.77	6.76	6.76	6.77	.01
Anc316b	do	17:30	6.77	6.77	6.76	6.78	.02
Ancl14	do	17:45	43.36	43.36	43.35	43.37	.02
Ancl14	do	18:45	43.35	43.35	43.36	43.28	.08
Anc316b	Aug. 21, 1962	16:30	6.80	6.81	6.80	6.81	.01
Anc316b	Aug. 23, 1962	21:30	6.70	6.70	6.65	6.75	.10
Anc316b	Sept. 2, 1962	03:30	6.81	6.81	6.78	6.93	.15
Anc316b	Sept. 9, 1962	18:30	6.67	6.67	6.67	6.67	.00
Anc316b	Sept. 18, 1962	01:00	6.70	6.70	6.66	6.80	.14
Anc316b	do	06:05	6.70	6.70	6.70	6.71	.01
Anc64	Oct. 6, 1962	06:00	13.56	13.56	13.56	13.56	.00
Anc64	Oct. 21, 1962	01:00	14.05	14.06	14.05	14.07	.02
Anc316b	do	01:00	6.92	6.90	6.85	7.02	.17
Anc64	Nov. 22, 1962	02:30	14.59	14.60	14.59	14.61	.02
Ancl11A	Dec. 17, 1962	22:00	12.43	12.43	12.42	12.44	.02
Ancl11A	Dec. 21, 1962	08:00	12.74	12.74	12.71	12.78	.07
Ancl11A	Dec. 22, 1962	16:00	12.82	12.82	12.80	12.83	.03

ARIZONA

(D-4-2)13bcc	May 26, 1962	12:00	76.12	76.12	76.10	76.15	0.05
(D-5-8)16dda	July 4, 1962	07:00	123.80	123.80	123.78	123.82	.04
(D-4-2)13bcc	do	13:00	76.16	76.16	76.13	76.21	.08
(A-18-19)21	July 6, 1962	17:00	35.22	35.22	35.21	35.25	.04
(D-4-2)13bcc	July 15, 1962	16:00	76.04	76.04	76.01	76.08	.07
(D-4-2)13bcc	July 24, 1962	04:00	74.95	74.95	----------	75.00	----------
(A-18-19)21	July 26, 1962	07:00	35.90	35.90	35.80	36.00	.20
(D-5-8)16dda	July 31, 1962	01:00	122.93	122.93	122.91	122.96	.05
(D-4-2)13bcc	Aug. 25, 1962	02:00	73.34	73.34	73.32	73.36	.04
(D-5-8)16dda	Sept. 3, 1962	22:00	122.06	122.05	122.04	122.10	.06

See footnotes at end of table.

TABLE 1.—*Fluctuations in well-water levels, January 1 through December 31, 1962*—Con.

CALIFORNIA

Well No.	Date	Time G.M.T.	Depth to water				Amplitude of fluctuation
			Before disturbance	After disturbance	At highest point	At lowest point	
9/10-34H1	Jan. 23, 1962	16:00	36.04	36.04	36.02	36.08	0.06
9/10-34H1	do	17:00	36.04	36.04	36.04	36.05	.01
26/40-22N1	Feb. 14, 1962	02:00	71.68	71.68	71.61	71.80	.19
6/30-29D3	Apr. 21, 1962	18:00	6.59	6.60	6.59	6.62	.03
7/34-21E1	May 24, 1962	01:30	28.55	28.56	28.54	28.59	.05
15/16-34E1	July 11, 1962	01:00	189.11	189.11	189.08	189.15	.07
15/16-20R1	do	01:00	78.79	78.82	78.76	79.00	.24
26S/40E-22P1	Aug. 7, 1962	01:00	69.76	69.77	69.76	69.77	.01
8N/10W-8R3	do	20:50	59.22	59.22	59.22	59.32	.01
26S/40E-22P1	Aug. 8, 1962	24:00	69.78	69.79	69.78	69.79	.01
26S/40E-22P1	Aug. 14, 1962	02:00	69.87	69.89	69.87	69.89	.02
4S/16E-32D1	do	07:00	83.92	83.92	83.90	83.98	.08
26S/40E-22P1	Aug. 15, 1962	10:00	70.00	70.00	70.00	70.00	.00
26S/40E-22P1	Sept. 2, 1962	07:00	70.18	70.18	70.18	70.18	.00
26S/40E-22P1	do	09:00	70.17	70.16	70.16	70.17	.01
26S/40E-22P1	Sept. 4, 1962	09:00	70.22	70.22	70.22	70.22	.00
7/34-21E1	Sept. 22, 1962	08:00	47.98	47.97	47.95	48.01	.06
9N/10W-12R1	Oct. 3, 1962	21:00	48.29	48.29	48.28	48.30	.02
26S/40E-22N1	Oct. 4, 1962	09:00	73.71	73.71	73.65	73.86	.21
8N/10W-8R3	Oct. 7, 1962	11:00	59.74	59.75	59.74	59.76	.02
26S/40E-22N1	Oct. 10, 1962	13:00	73.69	73.69	73.61	71.83	.22
26S/40E-22N1	Oct. 18, 1962	08:00	73.55	73.55	73.54	73.56	.02
9N/10W-12R1	Oct. 19, 1962	18:00	48.38	48.38	48.37	48.38	.01
8N/10W-8R3	Oct. 30, 1962	09:00	59.63	59.62	59.62	59.63	.01
8N/10W-8R3	Nov. 4, 1962	07:00	59.59	59.58	59.58	59.59	.01

NORTHERN FLORIDA

T35	Jan. 8, 1962	01:08	29.30	29.30	29.25	29.45	0.20
O47	do	01:10	8.01	8.02	8.00	8.03	.03
S9	do	08:00	7.63	7.63	7.60	7.66	.06
O47	Feb. 14, 1962	07:20	9.20	9.20	9.19	9.21	.02
V31	Feb. 27, 1962	21:00	6.53	6.53	6.34	6.65	.31
T35	Mar. 12, 1962	12:02	31.40	31.40	31.35	31.45	.10
O47	do	12:05	10.75	10.75	10.74	10.76	.02
T35	do	12:30	31.40	31.40	31.37	31.42	.05
O47	Apr. 20, 1962	05:20	11.43	11.40	11.36	11.46	.10
T35	do	05:20	27.59	27.60	27.52	27.62	.10
L7	do	05:20	160.22	160.20	160.15	160.28	.13
P246	do	05:30	26.42	26.40	26.38	26.44	.06
L7	May 11, 1962	13:40	161.41	161.34	161.33	161.60	.27
O47	do	13:50	12.75	12.82	12.73	12.82	.09
P246	do	13:50	27.03	27.08	26.98	27.12	.14
V31	do	14:30	8.01	8.02	8.00	8.04	.04
T35	do	14:40	29.56	29.54	29.36	29.70	.34
H30	July 16, 1962	19:08	+6.16	+6.17	+6.35	+5.82	.53
O47	July 26, 1962	08:00	12.02	12.01	11.96	12.07	.11
P246	do	08:00	26.66	26.60	26.56	26.70	.14
L7	do	08:00	164.13	164.12	163.96	164.27	.31
O47	Sept. 17, 1962	01:10	9.78	9.79	9.75	9.80	.05
P246	Oct. 13, 1962	06:00	26.60	26.59	26.54	26.67	.13
T36	do	06:30	12.53	12.55	12.46	12.57	.11
L7	do	07:00	164.48	164.46	164.12	164.80	.68
V31	do	09:15	5.25	5.26	5.20	5.34	.14

See footnotes at end of table.

TABLE 1.—*Fluctuations in well-water levels, January 1 through December 31, 1962*—Con.

SOUTHERN FLORIDA [1]

Well No.	Date	Time G.M.T.	Depth to water				Amplitude of fluctuation
			Before disturbance	After disturbance	At highest point	At lowest point	
G820	Jan. 8, 1962	01:00	−1.23	−1.23	−1.17	−1.25	0.08
S68	do	01:00	−1.80	−1.80	−1.79	−1.83	.04
S329	do	01:00	1.62	1.64	1.65	1.61	.04
F291	do	01:00	0.98	0.98	1.03	0.94	.09
S19	do	01:00	0.06	0.06	0.08	0.04	.04
F291	Apr. 20, 1962	05:45	1.17	1.17	1.21	1.13	.08
S19	do	05:45	−0.65	−0.65	−0.62	−0.68	.06
S68	do	05:45	−2.42	−2.42	−2.38	−2.46	.08
G820	do	05:45	−0.40	−0.40	−0.38	−0.42	.04
F291	May 11, 1962	14:30	1.10	1.10	1.14	1.06	.08
S19	do	14:30	−0.90	−0.90	−0.81	−0.99	.18
S68	do	14:30	−2.46	−2.46	−2.42	−2.50	.08
G820	do	14:30	−1.20	−1.20	−0.81	−1.59	.78
IDAHO							
8S-26E-33bc1	Apr. 7, 1962	21:00	107.14	107.15	107.11	107.20	0.09
13S-21E-18bb1	May 8, 1962	06:00 08:00	387.66	387.66	387.61	387.75	.14
1S-19E-3cc2	May 11, 1962	10:00 12:00	18.79	18.79	18.74	18.84	.10
13S-21E-18bb1	do	11:00 13:00	387.60	387.60	387.58	387.63	.05
7N-36E-22ab4	do	11:00 13:00	6.56	6.56	6.55	6.58	.03
7N-38E-23db1	do	12:00 14:00	44.70	44.70			
7S-20E-24dd1	do	12:00 16:00	52.62	52.62	52.00	53.25	1.25
6N-29E-8bc1	do	13:00 15:00	96.34	96.34	96.32	96.37	.05
7N-34E-4cd1	do	14:00	8.55	8.55	8.50	8.62	.12
5S-17E-26ac1	do	14:00 16:00	208.86	208.86	208.84	208.88	.04
4N-45E-13ad1	do	16:30	187.56	187.56	187.43	187.67	.24
7N-38E-23db1	May 19, 1962	13:00 15:00	44.32	44.32			
7S-20E-24dd1	do	13:00 15:00	52.69	52.69	51.94	53.28	1.34
7N-34E-4cd1	do	14:30	10.65	10.64	10.59	10.67	.08
4N-45E-13ad1	do	18:00	177.36	177.36	177.24	177.47	.23
8S-27E-31dd1	July 26, 1962	05:00 07:00	23.83	23.83	23.80	23.87	.07
7N-38E-23db1	do	07:00 09:00	40.68	40.68	40.64	40.72	.08
1S-19E-3cc2	Aug. 30, 1962	10:00 12:00	8.76	8.76	8.75	8.78	.03
2S-20E-1ac2	do	10:00 12:00	139.70	139.70	139.69	139.71	.02
8S-19E-5da1	do	10:00 12:00	269.70	269.70	269.68	269.72	.04
7N-38E-23db1	do	10:00 12:00	39.65	39.65	39.60	39.73	.13
7S-30E-24dd1	do	11:00 13:00	63.45	63.45	63.33	63.52	.19
4N-45E-13ad1	do	14:30	173.47	173.47	173.43	173.52	.09
7N-34E-4cd1	do	18:30	20.73	20.72	20.68	20.77	.09
7S-30E-24dd1	Sept. 1, 1962	17:00 19:00	64.12	64.12	64.09	64.15	.06
6N-29E-8bc1	Sept. 7, 1962	17:00 19:00	100.14	100.14	100.02	100.50	.48
6N-29E-8bc1	Sept. 27, 1962	05:00 07:00	100.05	100.05	100.04	100.08	.04

See footnotes at end of table.

TABLE 1.—*Fluctuations in well-water levels, January 1 through December 31, 1962*—Con.

INDIANA

Well No.	Date	Time G.M.T.	Depth to water				Amplitude of fluctuation
			Before disturbance	After disturbance	At highest point	At lowest point	
Pu6(29/4W-4L1)	Mar. 12, 1962	12:10	7.13	7.13	7.13	7.13	0.00
Pu6(29/4W-4L1)	Mar. 17, 1962	20:45	7.60	7.60	7.60	7.61	.01
Ma32	May 11, 1962	14:30	10.03	10.01	9.83	10.17	.34
Pu6(29/4W-4L1)	do	14:30	7.25	7.26	7.24	7.27	.03
Pu6(29/4W-4L1)	May 19, 1962	15:15	8.94	8.94	8.94	8.95	.01
Pu6(29/4W-4L1)	July 26, 1962	08:35	9.09	9.10	9.09	9.10	.01

MICHIGAN

7N.7E.17-1	Jan. 8, 1962	01:30	25.26	25.26	25.25	25.28	0.03
7N.7E.17-1	Mar. 12, 1962	11:00	24.92	24.92	24.89	24.95	.06
7N.7E.17-1	Mar. 24, 1962	14:00	25.23	25.23	25.21	25.25	.04
7N.7E.17-1	Apr. 20, 1962	06:00	24.48	24.48	24.47	24.49	.02
7N.7E.17-1	May 11, 1962	03:00	25.06	25.06	25.04	25.07	.03

NEW JERSEY [1]

26.22.4.4.4	Jan. 8, 1962	01:10	+27.16	+27.17	+27.18	+27.14	0.04
26.22.4.4.4	Jan. 9, 1962	07:00	+24.68	+24.68	+24.68	+24.67	.01
26.22.4.4.4	Jan. 23, 1962	16:45	+25.09	+25.09	+25.09	+25.08	.01
26.22.4.4.4	Feb. 14, 1962	06:55	+24.22	+24.22	+24.24	+24.18	.06
26.22.4.4.4	Feb. 17, 1962	21:00	+26.21	+26.22	+26.25	+26.18	.07
26.22.4.4.4	May 10, 1962	19:30	+24.74	+24.74	+24.75	+24.73	.02
26.22.4.4.4	May 11, 1962	14:30	+24.73	+24.73	+24.77	+24.70	.07
26.22.4.4.4	May 19, 1962	16:00	+25.90	+25.90	+25.92	+25.88	.04
26.22.4.4.4	May 21, 1962	13:00	+27.63	+27.63	+27.63	+27.62	.01
26.22.4.4.4	do	18:45	+25.60	+25.60	+25.61	+25.59	.02
26.22.4.4.4	July 25, 1962	05:45	+25.69	+25.69	+25.70	+25.68	.02
26.22.4.4.4	Aug. 6, 1962	01:50	+24.97	+24.97	+24.96	+24.98	.02
26.22.4.4.4	Sept. 18, 1962	01:10	+23.90	+23.90	+23.93	+23.88	.05
26.22.4.4.4	Dec. 21, 1962	09:15	+23.27	+23.27	+23.29	+23.25	.04

+Water surface above mean sea level or land surface datum.
−Water surface below mean sea level.
[1] Values refer to mean sea level.

SEISMOLOGICAL OBSERVATORY RESULTS

The Coast and Geodetic Survey publishes the results of its teleseismic stations and cooperating stations in the monthly *Seismological Bulletin*. All seismogram interpretations are tabulated together with epicenters based on the published data and instrumental results received from seismological stations in all parts of the world. Instrumental results are published for the following stations:

Albuquerque, N. Mex.
Balboa Heights
(The Panama Canal Co.)
Boulder City, Nev.
(Bureau of Reclamation)
Bozeman, Mont.
(Montana State College)
Butte, Mont.
(Montana School of Mines)
Byrd, Antarctica
Chicago, Ill.
(University of Chicago and U.S. Weather Bureau)
College, Alaska
College-Outpost, Alaska
Columbia, S.C.
(University of South Carolina)
Eureka, Nev.
(Eureka Corporation Limited)
Flaming Gorge, Utah
(Bureau of Reclamation)
Glen Canyon, Ariz.
(Bureau of Reclamation)
Guam, Mariana Islands
Honolulu, Hawaii
Hungry Horse, Mont.
(Bureau of Reclamation)
Kipapa, Hawaii
Philadelphia, Pa.
(The Franklin Institute)
Rapid City, S. Dak.
(South Dakota State School of Mines and Technology)
Salt Lake City, Utah
(University of Utah)
San Juan, Puerto Rico
Sitka, Alaska
South Pole, Antarctica
Thule, Greenland
(U.S. Army Ionosphere Station)
Tucson, Ariz.
Tucson-Telemeter, Ariz.
Ukiah, Calif.
(International Latitude Observatory)
Washington, D.C.

Albuquerque, Byrd, College, College-Outpost, Guam, Honolulu, Kipapa, San Juan, Sitka, South Pole, Tucson, Tucson-Telemeter, Ukiah, and Washington are Coast and Geodetic Survey stations.

Balboa Heights, Boulder City, Bozeman, Butte, Chicago, Columbia, Eureka, Flaming Gorge, Glen Canyon, Hungry Horse, Philadelphia, Rapid City, Salt Lake City, and Thule are cooperating stations.

For detailed instrumental data regarding these stations, including instrumentation, constants, and other information, see *Seismological Bulletin*, MSI–265, January 1963. Those desiring to receive this publication as issued should request addition of their name to the CGS–7 mailing list. All requests should be made to the Director, Coast and Geodetic Survey, Washington, D.C., 20230.

TABLE 2.—*Summary of instrumental epicenters for 1962*

NOTE.—The origin time, coordinates of provisional epicenter and focal depth (h) are computed using an electronic computer. The origin time is computed such that the average residual (average difference between computed and observed arrival time at stations) is not greater than 2.0 seconds. All magnitudes are determined by Pasadena, except where quoted by Palisades (Pal) and Berkeley (Brk).

1962	Origin Time G.M.T.	Region, focal depth, and remarks	Coordinates of provisional epicenter	
			Latitude	Longitude
	h m s		° ′	° ′
Jan. 1	02 41 11.6	Rat Islands, Aleutian Islands. Depth about 48 km	52.2 N.	177.7 E.
1	05 17 37.8	Near east coast of Honshu, Japan. Depth about 33 km	38.7 N.	141.6 E.
1	06 49 57.6	Rat Islands, Aleutian Islands. Depth about 33 km	52.0 N.	177.6 E.
1	10 17 02.5	----do----	51.8 N.	177.6 E.
1	12 15 52.0	Kermadec Islands region. Depth about 33 km	27.2 S.	175.2 W.
1	13 24 41.9	Colombia. Depth about 176 km	6.9 N.	73.0 W.
1	15 31 11.8	Loyalty Islands region. Depth about 98 km	22.4 S.	171.5 E.
1	17 21 00*	Near Yorkville, Calif. Felt. Mag. 4.1 (Brk)	38 55 N.	123 16 W.
1	23 40 23.4	Rat Islands, Aleutian Islands. Depth about 33 km	52.2 N.	177.7 E.
2	02 15 29.7	Near northeast coast of New Guinea. Depth about 104 km	4.1 S.	143.9 E.
2	05 23 41.5	Peru-Chile border region. Felt at Arequipa. Depth about 77 km	18.1 S.	70.6 W.
2	05 52 48.5	Tonga Islands. Depth about 33 km	20.2 S.	174.7 W.
2	11 47 30.0	Loyalty Islands region. Depth about 56 km	21.9 S.	169.7 E.
2	12 22 58.3	Svalbard region. Depth about 33 km	79.7 N.	22.7 E.
2	19 03 06.4	Mariana Islands. Depth about 154 km	19.2 N.	145.4 E.
2	23 11 50.7	Leeward Islands region. Depth about 33 km	18.7 N.	60.5 W.
3	02 04 59.7	Loyalty Islands region. Depth about 33 km	22.1 S.	169.6 E.
3	06 49 45.7	----do----	21.6 S.	169.9 E.
3	06 53 16.2	Near coast of southern Peru. Felt at Arica. Depth about 77 km	18.7 S.	71.0 W.
3	11 20 55.3	Tonga Islands. Depth about 33 km	20.6 S.	174.5 W.
3	11 24 54.1	Loyalty Islands region. Depth about 18 km	21.6 S.	170.1 E.
3	11 39 48.5	Loyalty Islands region. Depth about 22 km	21.8 S.	169.9 E.
3	13 36 19.3	Solomon Islands region. Depth about 69 km	9.9 S.	159.8 E.
3	17 53 05.3	Rat Islands, Aleutian Islands. Depth about 68 km	52.2 N.	177.5 E.
3	19 54 00.6	New Hebrides Islands. Depth about 66 km	14.1 S.	166.4 E.
3	23 50 27.2	Loyalty Islands region. Depth about 33 km	21.5 S.	169.9 E.
4	01 12 43.3	Near coast of Sumatra. Depth about 143 km	0.1 S.	100.4 E.
4	04 16 02.6	Near south coast of Honshu, Japan. Felt. Depth about 161 km	35.0 N.	139.1 E.
4	04 36 41.3	Near east coast of Shikoku, Japan. Felt. Depth about 43 km. Mag. 6½.	33.7 N.	135.2 E.
4	07 34 45.6	Banda Sea. Depth about 205 km	5.2 S.	130.0 E.
4	20 00 54.4	Near coast of Sumatra. Depth about 59 km	1.6 S.	99.6 E.
4	21 24 54.5	Near east coast of Formosa. Depth about 38 km	24.6 N.	121.9 E.
5	00 23 32.1	Fiji Islands region. Depth about 24 km. Mag. 6¼	15.5 S.	177.7 W.
5	04 27 03.8	Hindu Kush. Depth about 125 km	36.3 N.	71.4 E.
5	07 40 55*	San Francisco Bay area, Calif. Felt at Oakland and in the Marina District of San Francisco. Mag. 2.8 (Brk).	37 44 N.	122 13 W.
5	08 08 06.9	Samoa Islands region. Depth about 33 km. Mag. 6¼	15.1 S.	172.7 W
5	11 51 36.8	New Hebrides Islands. Felt on Santo. Depth about 139 km.	15.1 S.	167.4 E.
5	14 01 41.7	Near coast of Sumatra. Depth about 25 km	1.6 S.	100.0 E.
5	15 47 48.0	----do----	1.5 S.	100.1 E.
5	23 08 31.0	Rat Islands, Aleutian Islands. Depth about 60 km	52.2 N.	177.5 E.
6	07 35 31.1	Near coast of central Chile. Depth about 100 km	29.3 S.	70.8 W.
7	01 14 15.6	Near Kodiak Island. Depth about 33 km	55.2 N.	152.9 W.
7	01 30 34.5	Rat Islands, Aleutian Islands. Depth about 55 km	52.0 N.	177.8 E.
7	08 40 37.5	North Atlantic Ocean. Depth about 33 km	27.6 N.	44.0 W.
7	10 03 14.3	Yugoslavia. 2 killed, 19 injured. Moderate damage at Makarska. Depth about 33 km.	43.3 N.	17.1 E.
7	13 08 37.2	Flores region. Depth about 45 km	8.5 S.	125.0 E.
7	13 18 31.0	Colombia. Depth about 33 km	8.1 N.	73.1 W.
7	22 00 34.4	Chile-Argentina border region. Depth about 129 km	37.7 S.	71.7 W.
8	01 00 22.7	Dominican Republic. 1 killed, 6 injured. Damage at San Jose de Ocoa and Azua. Depth about 32 km. Mag. 6½.	18.4 N.	70.4 W.
8	01 34 50.7	Dominican Republic. Depth about 48 km	18.0 N.	70.6 W.
8	02 05 21.1	Dominican Republic. Depth about 50 km	18.5 N.	70.6 W.
8	05 43 02.2	Tonga Islands region. Depth about 133 km	24.2 S.	177.7 W.
8	10 44 22.3	Peru. Depth about 100 km	4.1 S.	77.4 W.

See footnote at end of table.

TABLE 2.—*Summary of instrumental epicenters for 1962*—Continued

1962	Origin Time G.M.T.	Region, focal depth, and remarks	Coordinates of provisional epicenter	
			Latitude	Longitude
	h m s		° ′	° ′
Jan. 8	10 48 49*	South of Westwood, Calif. Felt	40.2 N.	121.0 W.
8	17 03 16.9	Near northeast coast of New Guinea. Depth about 60 km	6.2 S.	147.4 E.
8	22 09 03.3	Nicaragua. Depth about 103 km	12.2 N.	85.4 W.
8	22 25 11.1	Hindu Kush. Depth about 208 km	36.5 N.	70.9 E.
9	02 09 51.2	Dominican Republic. Depth about 25 km	18.6 N.	70.6 W.
9	06 45 16.6	North Atlantic Ocean. Depth about 33 km	32.6 N.	40.6 W.
9	12 40 49.3	Hokkaido, Japan. Depth about 53 km	43.0 N.	144.9 E.
9	14 53 13.3	Volcano Islands. Depth about 26 km	24.5 N.	143.1 E.
9	19 49 33.4	Mascarene Islands region. Depth about 33 km	20.1 S.	66.6 E.
9	21 57 28.8	Mariana Islands. Felt. Depth about 57 km	13.0 N.	147.2 E.
9	22 13 50.4	Sea of Okhotsk. Depth about 436 km	48.2 N.	147.4 E.
9	23 55 49.2	Fiji Islands. Depth about 603 km	22.2 S.	179.5 W.
10	01 15 03.0	Ryukyu Islands. Depth about 29 km	27.0 N.	128.7 E.
10	02 19 58.3	Fox Islands, Aleutian Islands. Depth about 33 km	52.8 N.	169.1 W.
10	02 55 01.2	Peru-Bolivia border region. Depth about 208 km	17.3 S.	68.7 W.
10	06 28 40.4	Off coast of Oregon. Depth about 33 km. Mag. 4¾ (Pal)	44.3 N.	128.7 W.
10	06 33 59.6	Off coast of Oregon. Depth about 33 km	44.6 N.	128.7 W.
10	12 36 37.5	Off south coast of Greece. Depth about 107 km	36.2 N.	22.6 E.
11	02 54 14.0	Rat Islands, Aleutian Islands. Depth about 57 km	51.5 N.	176.9 E.
11	03 01 31.7	Nepal. Felt at Katmandu. Depth about 39 km	27.9 N.	84.9 E.
11	05 05 04.1	Yugoslavia. 1 killed, 20 injured. Moderate damage at Podgora, Ploce, and Makarska. Depth about 33 km. Mag. 5¾.	43.3 N.	17.1 E.
11	06 49 10.6	Andreanof Islands, Aleutian Islands. Depth about 62 km. Mag. 5¼ (Pal).	51.4 N.	179.4 W.
11	23 14 34.3	Tonga Islands region. Depth about 151 km	18.7 S.	174.8 W.
12	08 50 26.5	Mariana Islands. Depth about 51 km	20.3 N.	145.9 E.
12	09 54 42.8	Chile-Argentina border region. Depth about 24 km	31.9 S.	70.2 W.
12	10 55 01.7	Rat Islands, Aleutian Islands. Depth about 33 km	52.3 N.	177.7 E.
12	11 16 14.8	South Pacific Ocean. Depth about 33 km	34.6 S.	111.9 W.
12	13 38 12.4	Hokkaido, Japan. Depth about 79 km	42.5 N.	142.8 E.
12	20 48 32.9	Yugoslavia. Depth about 33 km	43.0 N.	17.0 E.
13	00 45 07.8	Near coast of northern Chile. Depth about 102 km	22.9 S.	69.6 W.
13	03 04 55.7	Fiji Islands. Depth about 546 km	19.1 S.	177.6 W.
13	04 48 36.8	Rat Islands, Aleutian Islands. Depth about 32 km	52.2 N.	177.5 E.
13	05 31 03.4	Luzon, Philippine Islands. Depth about 83 km	13.8 N.	120.3 E.
13	08 18 18.7	Celebes Sea. Depth about 25 km	2.9 N.	124.8 E.
13	11 05 20.1	Near coast of North Island, New Zealand. Depth about 25 km	37.5 S.	178.7 E.
13	11 41 10.1	Tonga Islands region. Depth about 25 km	15.1 S.	174.0 W.
13	13 01 24.5	Yugoslavia. Depth about 33 km	43.1 N.	17.3 E.
14	07 24 47.6	Near east coast of Hokkaido, Japan. Depth about 30 km	43.1 N.	145.1 E.
14	08 17 08.1	Banda Sea. Depth about 18 km	5.3 S.	129.0 E.
14	09 17 21.7	Solomon Islands. Depth about 49 km	7.5 S.	158.6 E.
14	10 37 30.9	Solomon Islands. Depth about 59 km	10.1 S.	161.0 E.
14	13 34 09.0	Near west coast of Hokkaido, Japan. Depth about 246 km	44.5 N.	140.7 E.
14	18 41 49.5	Santa Cruz Islands. Depth about 229 km	11.4 S.	166.5 E.
15	03 13 25*	East of Bakersfield, Calif. Felt. Mag. 2.2	35 20 N.	118 53 W.
15	04 32 02*	Near Perris, Calif. Felt. Mag. 3.0	33 45 N.	117 13 W.
15	05 29 13*	West of Chelan, Okanogan County, Wash. Felt	47 50 N.	120 13 W.
15	08 22 14.3	Windward Islands. Felt on St. Vincent. Depth about 62 km	13.1 N.	60.4 W.
15	12 45 55*	Southwest of Hollister, Calif. Felt. Mag. 2.5 (Brk)	36 42 N.	121 28 W.
15	18 21 11.1	Near coast of New Guinea. Felt at Henganofi, Madang, and Lae. Depth about 102 km.	5.8 S.	146.8 E.
15	22 16 13.6	Kermadec Islands. Depth about 60 km	31.0 S.	178.1 W.
15	23 17 21*	North of Laws, Calif. Felt. Mag. 3.9	37 33 N.	118 20 W.
16	04 03 29*	Southeast of Oxnard, Calif. Felt. Mag. 3.0	34 10 N.	119 05 W.
16	11 35 41.3	Kermadec Islands. Felt on Raoul Island. Depth about 39 km. Mag. 6½.	30.5 S.	177.9 W.
16	15 15 01.9	Easter Islands region. Depth about 25 km	22.2 S.	114.5 W.
16	16 06 52.1	Ceram. Depth about 100 km	2.7 S.	129.8 E.
16	16 51 25.4	Hindu Kush. Depth about 221 km	36.3 N.	70.5 E.
16	18 17 29.7	Mid-Atlantic Ocean. Depth about 30 km	7.8 N.	36.0 W.
17	01 35 46*	South of Hollister, Calif. Felt	36 47 N.	121 25 W.
17	11 30 28.9	Fiji Islands. Depth about 571 km	20.8 S.	178.5 W.

See footnote at end of table.

TABLE 2.—*Summary of instrumental epicenters for 1962*—Continued

1962	Origin Time G.M.T.			Region, focal depth, and remarks	Coordinates of provisional epicenter			
					Latitude		Longitude	
	h	*m*	*s*		° ′		° ′	
Jan. 17	13	19	29.9	Timor. Depth about 33 km	8.8	S.	126.4	E.
17	15	29	20.7	Molucca Passage. Depth about 63 km	3.6	N.	126.7	E.
17	15	43	18.9	Molucca Passage. Depth about 80 km	3.5	N.	126.6	E.
17	23	34	07.2	Nicaragua. Depth about 97 km	11.9	N.	86.3	W.
18	08	16	35.8	Fiji Islands. Depth about 561 km	21.7	S.	178.1	W.
18	15	42	28.2	New Britain region. Depth about 52 km	5.3	S.	153.7	E.
18	15	45	47.5	New Britain region. Depth about 47 km	5.4	S.	153.6	E.
18	21	59	44.1	Banda Sea. Depth about 21 km	4.4	S.	129.5	E.
19	06	01	09.5	Off southeast coast of Kamchatka. Depth about 29 km	51.5	N.	161.1	E.
19	10	27	29.1	Near coast of Colombia. Depth about 90 km	3.3	N.	78.2	W.
19	13	22	37.0	Tonga Islands. Depth about 25 km	21.5	S.	174.6	W.
19	19	38	04.1	Greece. Felt in western and central Greece. Depth about 38 km	38.5	N.	22.1	E.
19	20	43	26.8	Negros, Philippine Islands. Depth about 79 km	10.5	N.	122.2	E.
19	21	18	54.5	Near North coast of New Guinea. Depth about 76 km	2.9	S.	139.0	E.
19	22	97	48.5	Macquarie Islands region. Depth about 33 km	49.6	S.	163.2	E.
19	22	18	26.7	Greece. Felt in western and central Greece. Depth about 46 km	38.4	N.	22.2	E.
20	03	31	24.6	Iran. Depth about 33 km	31.2	N.	48.9	E.
20	20	14	33.9	New Britain region. Depth about 33 km	6.5	S.	152.0	E.
21	02	51	34.8	Yugoslavia. Slight damage at Makarska. Depth about 33 km	43.0	N.	16.9	E.
21	12	51	52.1	Fiji Islands. Depth about 558 km	17.7	S.	178.8	W.
21	17	53	29.2	Near east coast of Hokkaido, Japan. Depth about 75 km	42.8	N.	144.5	E.
22	07	26	43.5	Lake Baikal region. Depth about 33 km	52.4	N.	100.3	E.
22	09	59	32.0	Leyte, Philippine Islands. Depth about 125 km	11.4	N.	125.4	E.
22	20	22	17.6	Tibet-India border. Depth about 25 km	30.7	N.	80.6	E.
22	21	30	19.5	New Britain. Felt at Rabaul. Depth about 66 km	4.5	S.	152.8	E.
23	15	59	27.4	Fox Islands, Aleutian Islands. Depth about 65 km	52.8	N.	169.0	W.
23	17	31	38.7	Veneto Province, Italy. Felt at Rimini, Ancone, and Trieste. Depth about 30 km.	44.5	N.	12.4	E.
24	03	01	19.2	Southern Bolivia. Depth about 219 km	21.6	S.	66.7	W.
24	04	46	29.3	New Hebrides Islands. Felt on Lamap and Santo. Depth about 137 km.	15.6	S.	167.6	E.
24	05	28	54.1	Alaska Peninsula. Depth about 25 km	59.2	N.	154.8	W.
24	14	32	33.2	Oaxaca, Mexico. Depth about 41 km	15.6	N.	95.9	W.
24	15	13	05*	San Francisco Bay area, Calif. Felt. Mag. 3.7 (Brk)	37 52	N.	122 15	W.
24	15	39	48.9	Near northeast coast of Formosa. Depth about 72 km	24.7	N.	121.8	E.
24	17	43	51.9	Molucca Passage. Depth about 33 km	1.1	N.	126.0	E.
25	00	29	32.0	Shumagin Islands region. Depth about 33 km	55.1	N.	157.2	W.
25	01	50	08.7	Solomon Islands. Depth about 33 km	10.7	S.	161.8	E.
25	07	26	04.6	Bolivia. Depth about 190 km	15.7	S.	69.6	W.
25	09	25	20.6	Mariana Islands region. Depth about 51 km	12.3	N.	141.9	E.
25	10	03	06.8	Line Islands region. Depth about 33 km	4.6	S.	152.6	W.
25	12	14	57.6	Fiji Islands. Depth about 574 km	23.2	S.	179.9	E.
25	22	36	16.2	Fiji Islands. Depth about 620 km	18.5	S.	177.9	W.
26	05	22	51.0	South of Honshu, Japan. Depth about 333 km	32.2	N.	138.1	E.
26	06	09	33.0	Tonga Islands region. Depth about 214 km	23.4	S.	176.1	W.
26	08	17	39.9	Crete region. Depth about 33 km. Mag. 5-5¼ (Pal)	35.4	N.	22.7	E.
26	11	48	21.2	Off northeast coast of North Island, New Zealand. Depth about 60 km.	35.6	S.	179.4	E.
26	14	34	45.7	Off coast of Chile. Depth about 60 km	36.9	S.	88.9	W.
26	18	40	23.0	South of Guatemala. Depth about 45 km	10.3	N.	90.6	W.
27	20	27	53.4	New Guinea. Depth about 51 km	4.6	S.	144.5	E.
27	22	02	33.1	Off coast of Oregon. Depth about 25 km	44.6	N.	130.5	W.
27	23	07	48.9	Gulf of California. Felt at San Diego, Calif. Depth about 36 km. Mag. 5.3.	31.4	N.	114.2	W.
27	23	26	14.2	Gulf of California. Felt at San Diego, Calif. Depth about 39 km. Mag. 4.6.	31.2	N.	114.4	W.
27	23	51	06.0	Loyalty Islands region. Depth about 160 km	21.5	S.	170.5	E.
28	03	54	10.0	Near northeast coast of New Guinea. Depth about 60 km	4.3	S.	143.9	E.
28	05	22	43.6	Off coast of Guatemala. Depth about 52 km	13.5	N.	92.1	W.
28	05	40	08.2	Samoa Islands region. Felt at Apia. Depth about 25 km. Mag. 6¼.	17.2	S.	172.0	W.
28	08	02	01.9	Rat Islands, Aleutian Islands. Depth about 33 km	51.3	N.	176.4	E.
28	11	40	58.0	Southwestern Montana. Depth about 39 km	44.8	N.	112.5	W.

See footnote at end of table.

TABLE 2.—*Summary of instrumental epicenters for 1962*—Continued

1962	Origin Time G.M.T.	Region, focal depth, and remarks	Coordinates of provisional epicenter	
			Latitude	Longitude
	h m s		° ′	° ′
Jan. 28	16 41 13.3	Celebes region. Depth about 101 km	0.1 S.	123.9 E.
29	04 56 44.1	Tonga Islands. Depth about 33 km	22.1 S.	175.4 W.
29	06 07 22.0	Near coast of Peru. Depth about 100 km	9.3 S.	79.1 W.
29	11 43 06.7	Solomon Islands. Depth about 63 km	9.1 S.	157.7 E.
29	13 25 03.8	Santa Cruz Islands. Depth about 100 km	12.5 S.	165.1 E.
29	20 08 17*	West of San Francisco, Calif. Felt. Mag. 2.6 (Brk)	37 43 N.	122 31 W.
29	21 07 57.4	Tonga Islands region. Depth about 25 km	15.4 S.	172.7 W
30	06 59 36.9	Near east coast of Kamchatka. Depth about 76 km	54.5 N.	158.9 E.
30	08 34 23.9	Near west coast of Nicaragua. Felt at Managua. Depth about 49 km. Mag. 4¾-5 (Pal).	12.7 N.	97.5 W
30	13 51 27.7	Near northeast coast of New Guinea. Depth about 162 km	5.3 S.	146.8 E.
30	15 01 12.4	Fiji Islands. Depth about 383 km	16.2 S.	176.0 W.
30	15 22 49.4	Mariana Islands region. Depth about 187 km	20.7 N.	144.5 E.
30	17 15 29.4	Laptev Sea. Depth about 33 km	78.9 N.	125.8 E.
30	18 30 52.3	New Hebrides Islands. Felt at Port Vila. Depth about 79 km	18.8 S.	168.5 E.
31	00 05 58.4	Tadzhik S. S.R. Depth about 73 km	38.4 N.	70.1 E.
31	03 17 21*	East of Gonzales, Calif. Felt in Monterey and San Benito counties.	36 33 N.	121 13 W.
31	03 46 49.0	New Hebrides Islands. Depth about 46 km	17.6 S.	168.0 E.
Feb. 1	00 39 54.6	Kermadec Islands. Depth about 30 km	31.7 S.	177.3 W.
1	06 37 57*	West of Guadalupe, Calif. Felt in coastal regions of San Luis Obispo and Santa Barbara counties. Mag. 4. 5.	34 53 N.	120 41 W.
1	11 25 16.6	Sangihe Islands region. Depth about 37 km	3.7 N.	125.6 E.
1	18 06 49.8	Gulf of California. Depth about 45 km	26.1 N.	109.2 W.
2	03 32 48.3	Bismarck Sea. Depth about 161 km	5.4 S.	147.3 E.
2	05 41 38.7	Kurile Islands. Depth about 37 km	45.7 N.	151.6 E.
2	06 43 28.8	Northwestern Tennessee. Felt in Arkansas, Illinois, Kentucky, Missouri, and Tennessee. Depth about 25 km.	36.3 N.	89.4 W.
2	07 59 57.8	Kazakh S.S.R. Depth about 0 km	49.7 N.	78.1 E.
2	14 26 50*	West of Desert Hot Springs, Calif. Felt. Mag. 3.2	33 58 N.	116 36 W.
2	17 20 12.7	Kurile Islands. Depth about 38 km	43.8 N.	148.4 E.
2	23 03 58.9	Off coast of Colima, Mexico. Depth about 17 km	18.2 N.	104.9 W.
3	00 37 57.4	North of New Guinea. Depth about 33 km	1.3 S.	137.5 E.
3	11 36 17.6	Mascarene Islands region. Depth about 33 km	17.5 S.	66.6 E.
3	13 25 12.2	Tonga Islands region. Depth about 25 km	21.2 S.	175.5 W.
3	20 02 25.0	Off coast of Peru. Depth about 33 km	12.9 S.	79.9 W.
3	21 38 17.7	Northern Colombia. Depth about 160 km	6.8 N.	73.0 W.
4	01 02 34.6	Kermadec Islands. Depth about 43 km	29.1 S.	177.2 W.
4	02 54 44.3	Celebes. Depth about 89 km	4.6 S.	118.9 E.
4	12 59 51.8	New Britain. Felt at Rabaul. Depth about 81 km	5.3 S.	151.6 E.
4	16 16 40.9	Near north coast of new Guinea. Depth about 85 km	5.7 S.	152.1 E.
4	17 47 45.2	South of Panama. Depth about 89 km	7.3 N.	82.0 W.
4	20 40 05.8	Off coast of Ecuador. Depth about 33 km	3.5 N.	82.8 W.
4	21 29 37.2	Atlantic Ocean. Depth about 33 km	0.5 S.	20.2 W.
5	01 07 40.7	New Britain. Depth about 46 km	5.9 S.	151.4 E.
5	02 30 24.9	New Hebrides Islands region. Felt on Santo. Depth about 91 km.	14.0 S.	168.0 E.
5	14 45 51.1	Southwestern Colorado. Felt at Cimarron, Montrose, and Ridgeway. Depth about 25 km.	38.2 N.	107.6 W.
5	16 25 36*	South of Caliente, Calif. Felt. Mag. 3.3	35 13 N.	118 33 W.
5	18 45 03.2	South of Honshu, Japan. Depth about 142 km	32.2 N.	140.1 E.
5	22 55 51.9	Central Honshu, Japan. Felt. Depth about 136 km	35.9 N.	139.1 E.
6	01 55 50.4	Ryukyu Islands region. Depth about 40 km	29.5 N.	130.4 E.
6	02 58 23.5	Guatemala. Depth about 33 km	14.6 N.	90.8 W.
6	03 32 50.3	Northern Honshu, Japan. Depth about 372 km	37.8 N.	140.4 E.
6	04 40 57.5	Kodiak Island region, Alaska. Depth about 80 km	56.8 N.	156.0 W.
6	07 47 28.4	Ryukyu Islands. Depth about 33 km	24.2 N.	124.7 E.
6	08 10 53.8	Jujuy Province, Argentina. Depth about 234 km	23.1 S.	66.7 W.
6	08 45 23*	Southwest of Tehachapi, Calif. Felt. Mag. 3.6	35 07 N.	118 40 W.
7	03 22 35.0	Tsinghai Province, China. Depth about 33 km	37.4 N.	97.0 E.
7	07 35 55.3	Chile-Bolivia border. Depth about 108 km	20.7 S.	69.2 W.
8	08 28 26.8	Off coast of Ecuador. Depth about 45 km	1.7 S.	84.6 W.
8	11 49 11.6	New Guinea. Depth about 40 km	3.2 S.	141.1 E.
8	16 42 04.4	New Hebrides Islands region. Felt on Santo. Depth about 43 km	19.2 S.	169.1 E.

See footnote at end of table.

TABLE 2.—*Summary of instrumental epicenters for 1962*—Continued

1962	Origin Time G.M.T.			Region, focal depth, and remarks	Coordinates of provisional epicenter			
					Latitude		Longitude	
	h	*m*	*s*		° ′		° ′	
Feb. 8	19	40	29.7	Sumatra. Depth about 48 km	0.6	N.	98.6	E.
8	22	50	17.3	Central New Guinea. Depth about 160 km	3.5	S.	141.0	E.
9	00	14	13.9	Santa Cruz Islands. Depth about 111 km	11.9	S.	166.5	E.
9	01	01	37.0	Central Honshu, Japan. Depth about 25 km	34.5	N.	140.9	E.
9	12	02	33.5	Kermadec Islands region. Depth about 541 km	24.2	S.	179.5	E.
9	18	14	32.7	Andreanof Islands, Aleutian Islands. Depth about 25 km	51.2	N.	178.4	W.
9	21	51	22.3	Celebes region. Depth about 121 km	0.1	N.	123.8	E.
10	04	19	21.2	Chile-Bolivia border. Depth about 161 km	21.1	S.	68.6	W.
10	06	43	25.0	New Ireland region. Depth about 40 km	5.9	S.	152.1	E.
10	12	58	18.3	Sandwich Islands region. Depth about 33 km	56.4	S.	25.6	W.
10	19	31	55.7	Leeward Islands. Depth about 71 km	17.9	N.	62.2	W.
10	19	46	07.4	Chile-Argentina border. Depth about 123 km	33.1	S.	69.8	W.
11	02	42	36.5	South of Honshu, Japan. Depth about 401 km. Mag. 6¼	29.6	N.	139.1	E.
11	10	01	44.8	Fox Islands, Aleutian Islands. Depth about 50 km	52.0	N.	168.0	W.
11	11	06	46.7	Maldive Islands region. Depth about 33 km	0.6	S.	67.3	E.
11	13	57	00.4	New Ireland region. Depth about 120 km	4.3	S.	153.5	E.
11	18	55	32.8	New Ireland region. Felt. Depth about 111 km. Mag. 6 (Brk)	4.5	S.	153.5	E.
11	19	48	41.6	New Ireland region. Depth about 107 km	4.6	S.	153.6	E.
11	22	41	18.8	New Ireland region. Felt at Rabaul. Depth about 120 km	4.4	S.	153.5	E.
12	04	56	13.5	New Ireland region. Depth about 107 km	4.5	S.	153.8	E.
12	06	45	00.4	Halmahera. Depth about 169 km	2.0	N.	128.1	E.
12	11	57	53.3	Near coast of Hokkaido, Japan. Depth about 113 km	44.0	N.	146.5	E.
12	13	44	41.8	New Ireland region. Depth about 104 km	4.3	S.	153.6	E.
12	17	26	02.6	South of Honshu, Japan. Depth about 300 km	34.0	N.	137.6	E.
12	22	05	34.9	Mariana Islands region. Depth about 73 km	12.6	N.	139.8	E.
12	23	24	56.0	Bonin Islands region. Depth about 140 km	26.6	N.	141.0	E.
13	00	46	20.5	North Atlantic Ocean. Depth about 33 km	54.3	N.	35.2	W.
13	02	22	17.4	Kurile Islands. Depth about 46 km	49.1	N.	156.2	E.
13	07	42	30.6	Tsinghai Province, China. Depth about 33 km	33.6	N.	94.8	E.
13	20	33	42.6	Near coast of Hokkaido, Japan. Depth about 105 km	42.7	N.	145.3	E.
14	01	53	33.9	New Ireland region. Depth about 119 km	4.3	S.	153.5	E.
14	02	09	28.5	Near coast of Mindanao, Philippine Islands. Depth about 101 km	6.2	N.	126.8	E.
14	02	47	33.1	Northern Celebes. Depth about 88 km	0.2	N.	123.8	E.
14	06	36	04.6	Near coast of Chile. Moderate property damage in central Chile. Depth about 45 km. Mag. 7¼.	37.8	S.	72.5	W.
14	07	08	18.0	Near coast of Chile. Depth about 20 km	38.1	S.	73.0	W.
14	07	38	09.9	New Ireland region. Felt at Rabaul. Depth about 137 km	4.2	S.	153.4	E.
14	08	11	59.9	Near coast of Chile. Depth about 33 km	38.1	S.	74.9	W.
14	08	28	59.5	----do----	38.1	S.	73.3	W.
14	11	43	38.8	Near coast of Mindanao, Philippine Islands. Depth about 150 km	5.7	N.	126.0	E.
15	00	59	45.1	Eastern tip of New Guinea. Depth about 60 km	8.9	S.	147.7	E.
15	07	12	42.9	Arizona-Utah border. Felt at Kanab, Orderville, and Rockville, Utah. Depth about 26 km. Mag. 4.5.	36.9	N.	112.4	W.
15	09	03	38.6	Near coast of Chile. Depth about 40 km	37.9	S.	74.1	W.
15	09	06	45.1	Arizona-Utah border. Depth about 21 km	37.0	N.	112.9	W.
15	09	56	03.1	Prince Edward Islands region. Depth about 33 km	48.4	S.	31.1	E.
15	14	11	08.7	Fiji Islands. Depth about 600 km	17.5	S.	178.3	W.
15	15	25	29.5	New Ireland region. Felt at Namatanai and Rabaul. Depth about 109 km.	4.4	S.	153.8	E.
15	15	29	55.6	Fiji Islands region. Depth about 555 km	23.7	S.	179.7	W.
15	16	41	37.4	New Ireland region. Depth about 104 km	4.5	S.	153.8	E.
15	20	28	47.2	Near coast of Chile. Depth about 40 km	38.1	S.	73.2	W.
15	20	56	03.4	Tonga Islands region. Depth about 33 km	24.0	S.	176.6	W.
15	23	40	39.4	South of Honshu, Japan. Depth about 257 km	31.9	N.	137.9	E.
16	02	55	06.0	Near coast of Chile. Depth about 31 km	38.0	S.	72.9	W.
16	15	54	37.2	Kurile Islands. Depth about 45 km	49.4	N.	156.1	E.
16	19	08	57.2	New Hebrides Islands. Depth about 183 km	15.6	S.	168.1	E.
17	03	29	26.9	Southern Utah. Depth about 33 km	38.6	N.	111.6	W.
17	03	43	45.1	Macquarie Island region. Depth about 25 km	61.6	S.	162.9	E.
17	11	07	03.8	Ceram. Depth about 46 km	2.9	S.	130.2	E.
17	18	16	06.2	Near coast of Chile. Depth about 40 km	38.0	S.	73.5	W.
17	22	01	56.3	Kurile Islands. Depth about 51 km	49.2	N.	156.1	E.
17	22	28	22.8	Fox Islands, Aleutian Islands. Depth about 29 km	52.7	N.	169.7	W.
18	01	28	38.7	Kurile Islands. Depth about 62 km	49.3	N.	156.3	E.

See footnote at end of table.

TABLE 2.—*Summary of instrumental epicenters for 1962*—Continued

1962	Origin Time G.M.T.			Region, focal depth, and remarks	Coordinates of provisional epicenter			
					Latitude		Longitude	
	h	*m*	*s*		° ′		° ′	
Feb. 18	07	00	15.9	Tunisia. Depth about 33 km	36.2	N.	9.3	E.
18	10	42	34.3	Near coast of Hokkaido, Japan. Depth about 56 km	41.4	N.	142.4	E.
18	17	25	14.8	Northern Colombia. Felt at Bogota and Medellin. Depth about 41 km.	8.1	N.	74.8	W.
18	22	26	06.5	New Hebrides Islands. Depth about 45 km	15.5	S.	166.8	E.
18	23	08	41.6	Northern Chile. Depth about 128 km	23.3	S.	70.0	W.
18	23	25	20.8	Galapagos Islands. Depth about 33 km	0.7	S.	91.7	W.
18	23	59	50.9	New Hebrides Islands. Depth about 54 km	13.1	S.	165.8	E.
19	02	58	46.9	Near east coast of Kamchatka. Depth about 32 km	52.3	N.	158.4	E.
19	03	25	38*	Southeast of Oxnard, Calif. Felt. Mag. 2.9	34 12	N.	119 08	W.
19	04	57	40.2	New Ireland region. Felt at Rabaul. Depth about 117 km	4.2	S.	153.3	E.
19	05	31	48.3	Macquarie Islands region. Depth about 33 km	59.4	S.	160.9	E.
19	11	04	46.6	Tonga Islands. Depth about 95 km	20.2	S.	175.1	W.
19	11	11	06.9	Burma. Depth about 33 km	22.2	N.	94.6	E.
19	20	16	07.0	Off west coast of Nicaragua. Felt in El Salvador. Depth about 33 km.	11.9	N.	88.2	W.
20	03	01	43.2	Chile-Bolivia border. Depth about 148 km	20.8	S.	68.8	W.
20	05	51	06.5	Fiji Islands region. Depth about 35 km	16.1	S.	178.1	E.
20	06	40	20.3	Santa Cruz Islands. Depth about 81 km	11.4	S.	166.4	E.
20	09	15	58.3	Nicobar Islands. Depth about 33 km	6.7	N.	92.4	E.
20	09	22	37.6	Santa Cruz Islands region. Depth about 102 km	12.0	S.	165.9	E.
20	10	07	26.9	Fiji Islands region. Depth about 651 km	25.7	S.	178.2	E.
20	14	11	43.6	Chile-Argentina border. Depth about 76 km	29.4	S.	69.8	W.
20	16	02	13.6	Northern Colombia. Felt at Barinas, Venezuela. Depth about 150 km.	6.8	N.	73.1	W.
20	16	05	45.4	Near coast of Hokkaido, Japan. Felt. Depth about 56 km	43.1	N.	144.8	E.
20	17	05	38.9	Sumatra. Depth about 25 km	4.0	S.	104.2	E.
20	19	08	39.8	Kurile Islands. Depth about 22 km	46.8	N.	152.8	E.
20	20	11	13.7	South of Australia. Depth about 31 km	50.6	S.	110.8	E.
20	22	02	39.6	Northern Burma. Depth about 33 km	25.8	N.	96.8	E.
21	00	06	02.4	Tonga Islands region. Depth about 38 km	24.8	S.	177.1	W.
21	09	50	05.4	About 850 km west of Macquarie Islands. Depth about 25 km	56.8	S.	146.7	E.
21	09	53	12.2	Rat Islands, Aleutian Islands. Depth about 40 km	51.2	N.	179.5	E.
21	10	01	18.5	Santa Cruz Islands. Depth about 33 km	12.1	S.	166.1	E.
21	11	26	00.7	Santa Cruz Islands. Depth about 23 km	12.1	S.	166.2	E.
21	17	22	10.6	Chiapas, Mexico. Depth about 202 km	16.7	N.	93.0	W.
21	23	46	49.4	South of Panama. Depth about 25 km	3.0	N.	86.5	W.
22	09	50	25.3	Kermadec Islands. Depth about 246 km	32.7	S.	179.7	W.
22	10	35	01.4	About 1300 km southwest of Mascarene Islands. Depth about 25 km.	25.6	S.	69.8	E.
22	16	38	01.4	Ryukyu Islands. Depth about 25 km	29.4	N.	131.1	E.
22	21	55	12.7	About 1500 km southwest of Mascarene Islands. Depth about 25 km.	27.8	S.	73.4	E.
22	22	03	20*	North of Bishop, Calif. Felt. Mag. 3.4	37 28	N.	118 28	W.
23	11	40	49.5	Near coast of northeast New Guinea. Felt at Kaiapit. Depth about 33 km.	6.1	S.	147.7	E.
23	18	05	29.3	New Ireland. Depth about 33 km	4.0	S.	152.4	E.
23	19	29	15.1	Samar, Philippine Islands. Depth about 100 km	11.1	N.	125.8	E.
23	20	00	30.4	Samar, Philippine Islands. Depth about 98 km	10.9	N.	125.8	E.
23	20	21	28.6	New Britain. Felt at Namatanai and Rabaul. Depth about 25 km.	3.8	S.	152.0	E.
24	00	20	50.7	Northern Colombia. Depth about 213 km	6.0	N.	72.7	W.
24	01	03	17.6	Off coast of El Salvador. Felt in southern El Salavador. Depth about 40 km.	12.2	N.	88.8	W.
24	06	05	43.4	Near coast of Sumatra. Depth about 33 km	0.7	S.	99.3	E.
24	12	22	50.5	Kurile Islands. Depth about 56 km	49.2	N.	156.2	E.
24	13	48	56.2	Near coast of Panay, Philippine Islands. Depth about 33 km	11.9	N.	121.1	E.
24	14	27	01.4	Solomon Islands. Depth about 50 km	10.7	S.	161.3	E.
24	15	10	56.0	New Britain. Depth about 25 km	5.6	S.	153.6	E.
24	17	57	13.5	Solomon Islands. Depth about 25 km	10.8	S.	161.6	E.
24	18	06	45.1	Afghanistan-Pakistan border. Depth about 25 km	34.3	N.	70.1	E.
24	19	34	33.9	Near coast of northeast New Guinea. Felt at Kaiapit. Depth about 45 km.	5.5	S.	146.0	E.

See footnote at end of table.

TABLE 2.—*Summary of instrumental epicenters for 1962*—Continued

1962	Origin Time G.M.T.			Region, focal depth, and remarks	Coordinates of provisional epicenter			
					Latitude		Longitude	
	h	*m*	*s*		° ′		° ′	
Feb. 25	06	05	44.8	Vancouver Island region. Depth about 25 km	49.3	N.	129.2	W.
25	06	06	32.2	New Hebrides Islands. Felt on Santo. Depth about 187 km	14.9	S.	167.5	E.
25	06	22	06.9	Mindoro, Philippine Islands. Depth about 25 km	11.7	N.	120.9	E.
25	06	40	35.7	Tonga Islands. Depth about 434 km	21.9	S.	177.6	W.
25	14	00	43.9	New Hebrides Islands. Felt at Port Vila. Depth about 24 km	17.1	S.	168.4	E.
25	17	17	38.9	Western Montana. Felt at Bozeman. Depth about 25 km	45.2	N.	111.2	W.
25	20	10	56.3	Tonga Islands. Depth about 60 km	17.7	S.	174.1	W.
26	01	13	11.7	South of Hokkaido, Japan. Depth about 71 km	41.7	N.	141.9	E.
26	02	17	38.6	D'Entrecasteaux Islands. Depth about 47 km	9.3	S.	152.9	E.
26	02	30	37.6	Kermadec Islands. Depth about 25 km	33.0	S.	178.4	W.
26	08	44	54.8	Northern Celebes. Depth about 80 km	0.4	S.	122.2	E.
26	13	21	55.0	Baja California. Depth about 25 km	27.4	N.	115.1	W.
26	15	55	43.5	Kurile Islands. Depth about 130 km	44.2	N.	146.7	E.
26	16	43	25.8	New Hebrides Islands region. Depth about 33 km	13.9	S.	172.2	E.
26	21	29	42.3	New Britain. Depth about 60 km	6.9	S.	150.5	E.
27	00	04	43.5	Northern Peru. Depth about 61km	6.2	S.	77.0	W.
27	01	39	03.6	Solomon Islands. Depth about 25 km	7.1	S.	155.2	E.
27	05	40	53.6	Hindu Kush. Depth about 111 km	36.3	N.	71.3	E.
27	05	52	28.5	Central Alaska. Felt at Girdwood. Depth about 100 km	63.0	N.	150.0	W.
27	06	34	54.7	Szechwan Province, China. Depth about 33 km	27.6	N.	101.9	E.
27	08	42	56.0	Puerto Rico region. Depth about 32 km	19.3	N.	67.7	W.
27	09	20	36.0	Afghanistan-Pakistan border. Depth about 122 km	35.7	N.	70.5	E.
27	12	40	50.2	Near coast of Chile. Depth about 63 km. Mag. 6¼-6½	37.4	S.	72.5	W.
27	14	03	31.5	Southern Bolivia. Depth about 188 km	18.9	S.	68.4	W.
27	14	21	26.7	Ceram region. Depth about 69 km	2.9	S.	129.7	E.
27	21	34	10.8	Romania. Depth about 146 km	45.7	N.	26.4	E.
28	05	19	54.1	Near north coast of New Guinea. Depth about 25 km	2.5	S.	140.5	E.
28	07	19	51.7	South of Honshu, Japan. Depth about 60 km	32.2	N.	139.6	E.
28	13	40	33*	West of St. Helena, Calif. Felt. Mag. 3.2 (Brk)	38 30	N.	122 33	W.
28	13	44	42.0	Peru. Depth about 33 km	8.9	S.	75.8	W.
28	18	04	09.0	Andreanof Islands, Aleutian Islands. Felt on Adak. Depth about 60 km.	51.6	N.	179.6	W.
28	18	32	12.6	Chile-Bolivia border. Depth about 143 km	19.7	S.	68.8	W.
28	20	34	21.1	Near north coast of Dominican Republic. Depth about 33 km	19.2	N.	69.3	W.
28	20	44	22.4	Near coast of New Guinea. Depth about 25 km	2.9	S.	140.7	E.
Mar. 1	02	12	37.3	Near coast of southern Peru. Depth about 64 km	15.7	S.	74.3	W.
1	04	51	59.3	Ryukyu Islands region. Depth about 33 km	26.1	N.	125.0	E.
1	07	20	13.1	Andreanof Islands, Aleutian Islands. Depth about 33 km	51.2	N.	179.2	W.
1	12	21	16.6	Kurile Islands region. Depth about 86 km	49.4	N.	155.3	E.
1	18	35	12.9	Near east coast of Hokkaido, Japan. Depth about 48 km	43.0	N.	146.2	E.
1	20	38	31.1	Near coast of central Chile. Depth about 25 km	38.0	S.	74.0	W.
1	22	20	03.5	Near south coast of Spain. Depth about 25 km	37.3	N.	4.9	W.
1	23	41	11.5	Santa Cruz Islands region. Depth about 33 km. Mag. 6	14.0	S.	172.1	E.
2	00	28	11.3	Near southeast coast of Mindanao, Philippine Islands. Depth about 92 km.	6.1	N.	125.6	E.
2	02	15	05.9	Andreanof Islands, Aleutian Islands. Depth about 25 km	51.7	N.	173.5	W.
2	04	17	55.2	Celebes. Depth about 33 km	0.4	S.	122.4	E.
2	08	57	19.3	Andreanof Islands, Aleutian Islands. Depth about 34 km	51.4	N.	178.1	W.
2	13	03	09.6	Off south coast of Mindanao, Philippine Islands. Depth about 96 km.	5.6	N.	126.7	E.
3	00	54	24.4	Sinkiang Province, China. Depth about 63 km	27.6	N.	100.9	E.
3	04	53	55.7	Celebes region. Depth about 33 km	0.1	S.	122.0	E.
3	10	01	21.7	Molucca Passage. Depth about 52 km	0.1	S.	126.6	E.
3	10	40	18.2	Near east coast of Kamchatka. Depth about 42 km	55.0	N.	162.7	E.
3	12	14	55.3	Near east coast of Mindanao, Philippine Islands. Felt at Surigao, Dumaguete, and Mambajao. Depth about 87 km. Mag. 5¾ (Brk).	7.4	N.	126.6	E.
3	16	01	55.0	Fiji Islands region. Depth about 613 km	21.5	S.	179.1	W.
3	16	13	56.9	Tonga Islands. Depth about 129 km	16.1	S.	174.2	W.
4	00	41	42.0	Central Peru. Depth about 33 km	10.6	S.	75.2	W.
4	08	26	14.4	Celebes. Depth about 144 km	1.4	S.	120.2	E.
4	11	40	27.9	Near northeast coast of Chukotsky Peninsula, U.S.S.R. Depth about 33 km.	67.5	N.	171.6	W.

See footnote at end of table.

TABLE 2.—*Summary of instrumental epicenters for 1962*—Continued

1962	Origin Time G.M.T.			Region, focal depth, and remarks	Coordinates of provisional epicenter			
					Latitude		Longitude	
	h	*m*	*s*		° ′		° ′	
Mar. 4	12	49	56.9	Ryukyu Islands. Depth about 33 km	27.1	N.	129.2	E.
4	14	14	14.2	Celebes. Depth about 140 km	0.9	S.	121.4	E.
4	16	20	32.7	Near coast of central Chile. Depth about 40 km	38.1	S.	72.8	W.
5	00	48	08.7	Near coast of central Chile. Depth about 51 km	38.1	S.	73.4	W.
5	01	50	58.8	Off coast of Jalisco, Mexico. Depth about 33 km	16.8	N.	105.0	W.
5	03	42	35.1	Near south coast of Sumatra. Depth about 72 km	4.3	S.	103.1	E.
5	04	23	06.7	Central Colorado. Depth about 25 km	39.2	N.	106.8	W.
5	06	45	49.7	Sandwich Islands. Depth about 33 km	55.6	S.	27.0	W.
5	07	43	57.9	Off coast of California. Felt. Depth about 33 km. Mag. 4.5	34.4	N.	121.7	W.
5	08	45	56.1	Sandwich Islands. Depth about 33 km	55.7	S.	28.2	W.
5	10	15	22.1	Sandwich Islands. Depth about 25 km	55.9	S.	27.9	W.
5	14	59	55.8	Off east coast of Leyte, Philippine Islands. Depth about 70 km	11.3	N.	126.4	E.
5	16	46	27.2	Near north coast of Luzon, Philippine Islands. Depth about 33 km	19.3	N.	121.2	E.
5	20	57	52*	Off Cape Mendocino, Calif. Felt in Humboldt County. Mag. 4.6 (Brk).	40 20	N.	125 02	W.
6	05	55	44.8	Andaman Islands. Depth about 33 km	13.6	N.	93.4	E.
6	13	12	59.2	Off coast of northern California. Depth about 33 km	41.7	N.	127.0	W.
6	15	32	33.0	Mariana Islands. Depth about 33 km	12.5	N.	143.9	E.
6	18	49	22.0	Santa Cruz Islands. Depth about 60 km	12.1	S.	167.8	E.
7	01	42	48.6	Southwest of Iceland. Depth about 33 km	61.9	N.	26.6	W.
7	02	07	10.6	Southwest of Iceland. Depth about 35 km	62.1	N.	26.5	W.
7	08	16	37.7	Kirghiz S.S.R. Depth about 25 km	40.2	N.	77.2	E.
7	10	36	47.7	Solomon Islands. Depth about 25 km	5.3	S.	153.9	E.
7	11	01	04.6	Mariana Islands. Depth about 685 km. Mag. 7	19.2	N.	145.1	E.
7	13	58	32.4	Mariana Islands. Depth about 41 km	17.2	N.	147.1	E.
7	15	15	56.1	Off southeast coast of Kamchatka. Depth about 29 km	51.3	N.	160.6	E.
7	17	34	22.6	New Guinea. Depth about 33 km	2.1	S.	133.8	E.
7	19	08	46.9	Andreanof Islands, Aleutian Islands. Depth about 25 km	52.4	N.	174.5	W.
7	19	20	01.1	Hindu Kush. Depth about 100 km	36.4	N.	71.6	E.
7	21	08	03.1	Near coast of southern Iran. Depth about 33 km	26.9	N.	57.2	E.
7	21	57	18.6	Molucca Sea. Depth about 102 km	0.1	N.	124.5	E.
8	01	54	41.9	Mozambique Channel. Depth about 33 km	22.3	S.	39.2	E.
8	02	14	44*	Northeast of Walnut Creek, Calif. Felt. Mag. 2.6 (Brk)	37 56	N.	122 00	W.
8	08	11	12.9	Mariana Islands. Depth about 131 km	17.9	N.	146.5	E.
8	10	33	47.6	Off northeast coast of North Island, New Zealand. Depth about 33 km.	34.6	S.	180.0	
8	10	47	07.8	Kurile Islands. Depth about 56 km	46.1	N.	152.7	E.
8	18	00	07.7	Solomon Islands region. Depth about 89 km	6.7	S.	154.5	E.
8	20	48	38.1	Off coast of southern Chile. Depth about 25 km	44.9	S.	79.4	W.
8	20	52	38.1	Molucca Passage. Depth about 43 km	1.2	N.	126.1	E.
8	21	38	35.8	Republic of the Congo. Depth about 35 km	3.6	S.	29.2	E.
9	06	57	10.6	Fiji Islands region. Depth about 443 km	18.6	S.	177.9	W.
9	07	41	40.5	Fox Islands, Aleutian Islands. Depth about 72 km	52.5	N.	169.3	W.
9	08	31	27.6	Solomon Islands. Depth about 117 km	6.4	S.	154.7	E.
9	17	29	44.3	Fiji Islands region. Depth about 385 km	24.2	S.	179.1	W.
9	22	07	35.6	Near east coast of New Guinea. Felt. Depth about 76 km	5.8	S.	146.4	E.
9	22	40	45.7	Mariana Islands. Depth about 196 km	18.7	N.	145.4	E.
10	00	57	22.3	Banda Sea. Depth about 202 km	6.5	S.	129.4	E.
10	01	12	44.2	Antarctic Ocean, east of Balleny Islands. Depth about 33 km	64.8	S.	171.2	W.
10	03	01	21.2	Sumatra. Depth about 50 km	3.9	N.	97.8	E.
10	04	59	27.5	Kermadec Islands. Depth about 69 km	31.2	S.	178.3	W.
10	07	04	52.2	Jujuy Province, Argentina. Depth about 236 km	23.3	S.	66.8	W.
10	08	07	22.5	Near coast of southern California. Depth about 33 km	34.8	N.	121.4	W.
10	08	44	00.1	Formosa. Felt. Depth about 31 km	23.2	N.	120.6	E.
10	12	08	07.1	Santa Cruz Islands. Depth about 25 km	11.0	S.	165.6	E.
10	12	25	35.8	Formosa. Felt at Alishan and Yushan. Depth about 70 km	23.1	N.	120.5	E.
11	02	25	52.8	Near west coast of Guatemala. Depth about 94 km	14.2	N.	91.1	W.
11	05	59	03.0	Samoa Islands. Depth about 33 km	13.9	S.	172.2	W.
11	07	18	56.7	New Hebrides Islands region. Depth about 133 km	13.9	S.	172.1	E.
11	15	23	40.7	Rat Islands, Aleutian Islands. Depth about 135 km	52.3	N.	178.0	E.
11	16	16	23.3	Mariana Islands region. Depth about 383 km	19.3	N.	144.7	E.
11	19	19	09.4	Near east coast of Mindanao, Philippine Islands. Felt. Depth about 51 km.	9.0	N.	126.5	E.

See footnote at end of table.

TABLE 2.—*Summary of instrumental epicenters for 1962*—Continued

1962	Origin Time G.M.T.			Region, focal depth, and remarks	Coordinates of provisional epicenter			
					Latitude		Longitude	
	h	*m*	*s*		° ′		° ′	
Mar. 1	19	58	38.5	Near east coast of Mindanao, Philippine Islands. Depth about 32 km.	9.0	N.	126.5	E.
11	21	23	10.5	Near east coast of Mindanao, Philippine Islands. Depth about 157 km.	8.7	N.	126.2	E.
12	01	07	41.1	Celebes Sea. Depth about 33 km	4.8	N.	126.0	E.
12	01	52	37.0	Near coast of southern Peru. Depth about 91 km	13.9	S.	72.6	W.
12	02	11	09.6	Afghanistan-Pakistan border. Depth about 34 km	24.1	N.	70.9	E.
12	09	41	33.9	Near south coast of Panama and Costa Rica. Felt at Balboa Heights, C.Z. Depth about 25 km.	8.2	N.	82.8	W.
12	11	40	12.2	Near south coast of Panama and Costa Rica. Felt at Balboa Heights, C.Z. Slight tsunami. Depth about 30 km. Mag. 6¾.	8.1	N.	82.9	W.
12	12	10	49.8	Sea of Okhotsk. Depth about 360 km	50.8	N.	152.5	W.
12	13	23	35.8	Chile-Bolivia border. Depth about 100 km	22.9	S.	68.9	W.
12	13	42	40.9	Near south coast of Panama. Depth about 56 km	9.0	N.	82.7	W.
12	16	57	46.8	Near coast of Peru. Depth about 25 km	2.9	S.	80.2	W.
12	17	20	10.0	New Hebrides Islands. Depth about 177 km	16.2	S.	167.9	E.
12	19	29	23.9	Solomon Islands region. Depth about 100 km	10.7	S.	161.6	E.
13	05	35	12.4	Loyalty Islands region. Depth about 53 km	21.9	S.	170.9	E.
13	06	07	47.4	Honshu, Japan. Depth about 42 km	37.3	N.	138.3	E.
13	11	29	58.0	Molucca Sea. Depth about 213 km	2.9	N.	128.6	E.
13	21	45	24.9	Near east coast of Mindanao, Philippine Islands. Depth about 80 km.	9.1	N.	126.4	E.
14	03	04	19.3	Near south coast of Panama. Depth about 33 km	7.6	N.	83.6	W.
14	08	27	22.4	Mindanao, Philippine Islands. Depth about 18 km	8.7	N.	126.8	E.
14	12	24	16.5	Central Peru. Depth about 140 km	8.2	S.	75.0	W.
14	15	17	32.7	New Britain region. Felt at Rabaul. Depth about 57 km	4.9	S.	152.4	E.
14	15	23	12.0	Gulf of California. Felt in Imperial Valley. Depth about 33 km	30.8	N.	113.7	W.
14	18	25	34.1	Santa Cruz Islands region. Depth about 33 km	11.5	S.	165.2	E.
14	20	20	16.6	Near south coast of Panama. Depth about 33 km	8.6	N.	82.9	W.
15	00	35	03.3	Fox Islands, Aleutian Islands. Depth about 15 km	53.5	N.	163.5	W.
15	01	51	22.9	Kurile Islands region. Depth about 52 km	45.8	N.	151.3	E.
15	04	36	43.9	Fox Islands, Aleutian Islands. Depth about 33 km	53.7	N.	163.3	W.
15	13	07	06.9	Fiji Islands region. Depth about 623 km	20.6	S.	178.8	W.
15	14	37	10.2	700 km west of Maldive Islands. Depth about 33 km	9.5	S.	67.1	E.
15	15	01	40.1	Near coast of southern Iran. Depth about 20 km	28.4	N.	51.6	E.
15	21	13	04.1	Near south coast of Java. Depth about 83 km	7.1	S.	106.1	E.
15	22	47	13.8	Rat Islands, Aleutian Islands. Depth about 33 km	51.1	N.	177.9	E.
15	22	58	05.4	Solomon Islands. Depth about 71 km	10.5	S.	162.5	E.
16	05	17	36.1	Central Alaska. Depth about 33 km	61.4	N.	152.5	W.
16	05	23	14.7	New Hebrides Islands. Felt at Norsup. Depth about 62 km	16.2	S.	168.4	E.
16	09	42	30.3	Ryukyu Islands region. Depth about 177 km	27.3	N.	127.2	E.
16	15	25	48.6	Loyalty Islands region. Depth about 83 km	21.8	S.	173.3	E.
16	19	42	39.2	Santa Cruz Islands region. Depth about 25 km	10.8	S.	165.7	E.
17	03	45	50.1	Loyalty Islands region. Depth about 35 km	21.2	S.	173.3	E.
17	09	14	04.4	Western Colorado. Depth about 33 km	38.3	N.	108.1	W.
17	11	26	33.1	Burma-India border region. Depth about 39 km	26.0	N.	96.6	E.
17	17	57	04.2	Fiji Islands region. Depth about 539 km	17.9	S.	178.0	W.
17	17	58	42.5	Near coast of southern Kamchatka. Depth about 59 km	51.4	N.	159.1	E.
17	18	56	40.8	Near west coast of Negros Island, Philippine Islands. Depth about 33 km.	9.7	N.	122.0	E.
17	20	47	32.3	North Atlantic Ocean. Depth about 33 km. Mag. 7.	10.9	N.	43.2	W.
17	21	28	58.7	Loyalty Islands region. Depth about 28 km	22.6	S.	170.9	E.
17	21	38	44*	East of Mount Diablo, Calif. Felt in Contra Costa and Alameda Counties. Mag. 4.1 (Brk).	37 52	N.	121 46	W.
18	00	40	28.6	Kermadec Islands region. Depth about 35 km	30.0	S.	177.8	W.
18	01	26	51.0	Kermadec Islands region. Depth about 89 km	27.7	S.	177.3	W.
18	03	06	18.8	New Hebrides Islands. Felt. Depth about 14 km	16.5	S.	168.2	E.
18	05	28	21.3	Off coast of northern Honshu, Japan. Depth about 33 km	40.6	N.	142.4	E.
18	13	38	38.1	Loyalty Islands region. Depth about 76 km	22.2	S.	173.8	E.
18	14	55	03.4	Mindanao, Philippine Islands. Depth about 50 km	9.1	N.	126.3	E.
18	15	30	35.5	Near coast of southern Albania. 15 killed, 154 injured. Moderate damage in Tepolene region. Felt in Italy, Yugoslavia and Greece. Depth about 33 km.	40.9	N.	19.5	E.

See footnote at end of table.

TABLE 2.—*Summary of instrumental epicenters for 1962*—Continued

1962	Origin Time G.M.T.			Region, focal depth, and remarks	Coordinates of provisional epicenter			
					Latitude		Longitude	
	h	*m*	*s*		°		°	
Mar. 18	20	18	54.6	Kwangtung Province, China. 1 killed and 2 injured in Canton. Felt in Hong Kong and Macao with minor damage. Depth about 25 km.	23.8	N.	114.6	E.
19	02	33	30.8	Samoa Islands region. Felt. Depth about 33 km	14.9	S.	173.3	W.
19	04	49	33.7	700 km southwest of Macquarie Islands. Depth about 33 km	57.4	S.	147.8	E.
19	05	54	36.9	Near south coast of Minahoosa Peninsula, Celebes. Depth about 150 km.	0.2	N.	123.6	E.
19	08	42	27.5	Fiji Islands region. Depth about 626 km	23.4	S.	179.6	E.
19	14	00	08.9	Central Ecuador. Depth about 119 km	2.3	S.	77.1	W.
19	15	34	50.2	Kermadec Islands region. Depth about 490 km	31.6	S.	179.5	E.
19	20	57	21.3	Near east coast of Sumatra. Depth about 74 km	4.2	S.	103.1	E.
19	21	04	16.6	Near coast of southern Peru. Depth about 33 km	16.8	S.	73.5	W.
19	23	05	14.8	Northern Iran. Depth about 48 km	37.5	N.	54.2	E.
20	01	00	25.7	Off coast of Baja California. Depth about 33 km	25.3	N.	117.9	W.
20	01	36	59.4	Vera Cruz, Mexico. Depth about 218 km	17.1	N.	94.8	W.
20	10	03	59.9	Near coast of Sonora, Mexico. Depth about 33 km	28.0	N.	111.3	W.
20	10	59	24.5	South Pacific Ocean. Depth about 30 km	44.4	S.	82.8	W.
20	15	39	33.8	Near southeast coast of Honshu, Japan. Depth about 83 km	33.4	N.	137.3	E.
20	16	31	46.3	Queen Charlotte Sound area. Depth about 33 km	50.6	N.	130.3	W.
20	18	52	55.8	Mariana Islands region. Depth about 98 km	22.8	N.	143.2	E.
20	20	56	39.4	Argentina-Chile border region. Depth about 110 km	31.2	S.	70.1	W.
20	23	10	39.5	Tibet. Depth about 31 km	31.9	N.	94.5	E.
21	01	53	13.3	Near Cook Inlet, Alaska. Depth about 122 km	62.1	N.	152.7	W.
21	02	30	18.5	Loyalty Islands region. Depth about 25 km	22.2	S.	170.4	E.
21	03	18	29.1	New Britain region. Depth about 25 km	6.6	S.	150.1	E.
21	05	55	46.3	1750 km northwest of Galapagos Islands. Depth about 33 km	8.4	N.	103.4	W.
21	06	11	24.0	Near coast of northern Peru. Depth about 58 km	4.4	S.	80.7	W.
21	21	04	29.3	Kurile Islands. Depth about 166 km	48.2	N.	153.2	E.
21	22	57	53.9	Java Sea. Depth about 630 km	6.1	S.	112.9	E.
21	23	10	19.7	Java Sea. Depth about 596 km	5.9	S.	112.9	E.
22	00	19	43.2	Java Sea. Depth about 575 km	6.0	S.	113.0	E.
22	00	37	36.0	Java Sea. Depth about 590 km	5.9	S.	112.9	E.
22	01	50	52.4	Tonga Islands region. Depth about 60 km	18.9	S.	173.1	W.
22	06	21	08.1	New Hebrides Islands. Felt at Norsup. Depth about 15 km	15.8	S.	167.6	E.
22	06	35	03.6	Svalbard region. Depth about 36 km	84.8	N.	4.2	E.
22	07	14	25.0	Near northern coast of New Guinea. Felt at Lae. Depth about 33 km.	6.6	S.	147.1	E.
22	10	33	12.0	Hindu Kush. Depth about 144 km	36.3	N.	69.3	E.
22	12	05	03.2	New Hebrides Islands. Felt. Depth about 45 km	16.3	S.	167.5	E.
22	12	07	07.3	Near coast of central Chile. Depth about 48 km	29.8	S.	71.5	W.
22	15	13	13.5	Near north coast of New Guinea. Felt at Aitape and Lumi. Depth about 100 km. Mag. 5¾ (Brk).	3.3	S.	142.7	E.
22	16	16	26.0	Near north coast of New Guinea. Depth about 33 km	1.9	S.	139.2	E.
22	17	46	09.0	Near north coast of New Guinea. Depth about 32 km	2.0	S.	139.4	E.
22	18	58	50.4	LaRioja Province, Argentina. Depth about 101 km	28.3	S.	68.9	W.
22	19	47	20.4	Near north coast of New Guinea. Depth about 57 km	2.1	S.	139.0	E.
22	20	50	36.9	Southern Peru. Depth about 119 km	14.9	S.	70.7	W.
23	00	15	34.4	Fiji Islands region. Depth about 576 km	17.4	S.	178.9	W.
23	01	51	40.8	Near north coast of New Guinea. Depth about 33 km	3.1	S.	142.8	E.
23	05	34	40.5	Near coast of southern Chile. Depth about 67 km	38.0	S.	72.8	W.
23	08	46	19*	Southwest of San Francisco, Calif. Slight damage at Daly City, Millbrae and San Francisco. Mag. 3.1 (Brk).	37 39	N.	122 33	W.
23	11	16	47.2	Off coast of southern Chile. Depth about 33 km	48.5	S.	76.1	W.
23	14	45	27.6	Norfolk Island region. Depth about 23 km	28.5	S.	167.6	E.
23	15	08	45.5	Fiji Islands region. Depth about 608 km	22.8	S.	179.4	E.
23	23	36	45.6	Near south coast of Panama. Depth about 33 km	8.0	N.	82.6	W.
24	01	34	07.9	Tonga Islands region. Depth about 25 km	17.8	S.	173.0	W.
24	12	59	32.3	Near north coast of New Guinea. Felt. Depth about 98 km	5.7	S.	145.2	E.
24	15	25	16.1	Near north coast of New Guinea. Depth about 84 km	2.1	S.	138.8	E.
24	20	42	47.3	Solomon Islands. Depth about 53 km	6.7	S.	155.3	E.
25	05	28	38.5	Banda Sea. Depth about 99 km	5.9	S.	130.7	E.
25	08	12	38.0	Fox Islands, Aleutian Islands. Depth about 45 km	51.2	N.	169.8	W.
25	11	00	14.6	Santa Cruz Islands. Depth about 33 km	11.3	S.	165.3	E.

See footnote at end of table.

TABLE 2.—*Summary of instrumental epicenters for 1962*—Continued

1962	Origin Time G.M.T.			Region, focal depth, and remarks	Coordinates of provisional epicenter			
					Latitude		Longitude	
	h	*m*	*s*		° ′		° ′	
Mar. 25	11	44	28.3	About 750 km northwest of Bouvet Island. Depth about 33 km	49.3	S.	8.7	W.
25	13	38	56.3	Eastern India-Tibet border region. Depth about 25 km	28.2	N.	96.1	E.
25	15	28	54.1	Northern Colombia. Depth about 92 km	8.5	N.	73.3	W.
25	20	49	10.1	Sinkiang Province, China. Depth about 33 km	27.6	N.	99.5	E.
25	21	38	26.7	Tyrrhenian Sea, northeast of Sicily. Depth about 343 km	39.1	N.	14.7	E.
25	21	44	40.2	Molucca Passage. Depth about 33 km	1.7	N.	126.7	E.
26	03	10	53.5	----do	1.6	S.	127.5	E.
26	09	22	07.2	Ionian Islands. Felt. Depth about 33 km	38.5	N.	20.7	E.
26	12	04	58.3	Mid-Atlantic Ocean. Depth about 33 km	0.3	S.	19.5	W.
26	15	20	46.5	Near northeast coast of New Guinea. Felt at Lae. Depth about 122 km.	5.6	S.	147.7	E.
26	16	32	43.6	Near coast of southern Chile. Felt. Depth about 32 km	40.6	S.	73.3	W.
26	21	13	20.2	Southern Turkey. Depth about 25 km	37.2	N.	36.5	E.
27	05	22	30.7	Ceram. Depth about 84 km	3.8	S.	129.1	E.
27	06	14	59.0	Sinkiang Province, China. Depth about 33 km	39.7	N.	77.9	E.
27	10	10	26.1	Kurile Islands. Depth about 31 km	44.1	N.	147.3	E.
27	14	50	16.3	Fiji Islands region. Depth about 500 km	20.2	S.	177.6	W.
27	19	20	35.6	Near coast of Guerrero, Mexico. Depth about 78 km	17.1	N.	100.0	W.
27	21	19	30.7	Near coast of Guerrero, Mexico. Depth about 30 km	17.0	N.	99.8	W.
28	00	51	54.7	Hindu Kush. Depth about 108 km	36.6	N.	71.6	E.
28	04	05	19.3	Near west coast of Sumatra. Depth about 33 km	1.3	N.	97.3	E.
28	06	17	10.2	Kermadec Islands. Depth about 375 km	28.7	S.	179.9	W.
28	10	53	59.3	Near coast of Guerrero, Mexico. Depth about 33 km	17.6	N.	99.0	W.
28	13	26	21.1	Kazakh S.S.R. Depth about 33 km	45.7	N.	83.2	E.
28	14	12	45.8	Kermadec Islands. Depth about 104 km	32.7	S.	178.0	W.
28	14	14	58.4	Off coast of Jalisco, Mexico. Depth about 122 km	19.9	N.	108.6	W.
29	01	52	22.7	Near south coast of Kamchatka. Depth about 123 km	5.7	N.	157.3	E.
29	03	07	02.0	Off coast of southeastern Alaska. Depth about 33 km	58.4	N.	137.9	W.
29	13	32	30.8	South of Panama. Depth about 69 km	5.4	N.	81.9	W.
29	19	31	09.3	Svalbard region. Depth about 33 km	79.0	N.	2.9	E.
29	20	09	03.3	Molucca Sea. Depth about 33 km	0.5	S.	127.5	E.
29	21	15	13.3	North of Luzon, Philippine Islands. Depth about 34 km	20.7	N.	120.7	E.
29	22	38	27.8	Loyalty Islands region. Depth about 51 km	20.1	S.	169.0	E.
30	00	05	56.1	Mariana Islands region. Depth about 134 km	12.9	N.	143.0	E.
30	05	04	37.6	Near south coast of Kamchatka. Depth about 66 km	62.8	N.	157.5	E.
30	07	59	01.6	Loyalty Islands region. Depth about 33 km	22.3	S.	173.0	E.
30	14	23	41.6	Kermadec Islands region. Depth about 370 km	28.6	S.	179.3	W.
31	01	16	42.9	Tonga Islands region. Depth about 107 km	15.9	S.	173.9	W.
31	07	44	35.8	Off west coast of Negros, Philippine Islands. Depth about 140 km	9.8	N.	121.4	E.
31	12	02	07.5	Sandwich Islands. Depth about 16 km	57.1	S.	25.6	W.
31	16	35	46.4	Banda Sea. Depth about 33 km	7.6	S.	130.7	E.
31	23	36	44.3	Western Iran. Depth about 25 km	34.0	N.	48.0	E.
Apr. 1	00	45	14.6	Eastern Iran. 2 killed, 3 injured. Minor damage at Tajkough and Mousavieh. Depth about 33 km.	33.6	N.	59.0	E.
1	01	39	19.7	Turkey. Felt. Depth about 25 km	40.6	N.	36.0	E.
1	02	18	31.8	Tanimbar Islands region. Depth about 30 km	7.6	S.	130.9	E.
1	05	01	56.0	Near south coast of Hokkaido, Japan. Depth about 55 km	41.9	N.	143.4	E.
1	09	09	24*	Near Woodford, Calif. Felt at Keene. Mag. 3.5	35 14	N.	118 32	W.
1	09	26	35.6	North Polar region. Depth about 25 km	81.5	N.	119.5	E.
1	12	00	04.1	Fox Islands, Aleutian Islands. Depth about 36 km	53.4	N.	164.5	W.
1	12	11	09.2	Near north coast of New Guinea. Felt. Depth about 80 km	4.2	S.	143.6	E.
1	12	11	51.0	Central Alaska. Depth about 100 km	63.1	N.	152.3	W.
1	15	37	02.5	New Hebrides Islands. Felt at Port Vila. Depth about 53 km	17.9	S.	167.2	E.
2	00	14	50.4	Mariana Islands. Depth about 205 km	18.6	N.	145.5	E.
2	03	05	41*	Northwest of Tehachapi, Calif. Felt at Keene and Tehachapi. Mag. 3.7.	35 15	N.	118 30	W.
2	16	42	00*	Northeast of Gilroy, Calif. Felt in Santa Clara County. Mag. 3.5 (Brk).	37 04	N.	121 28	W.
2	18	33	52.4	Near north coast of New Guinea. Depth about 60 km	6.1	S.	146.7	E.
3	01	21	34.8	Peru. Depth about 125 km	9.6	S.	74.7	W.
3	15	40	12.1	Near north coast of New Guinea. Felt at Ambunti and Dreikikir. Depth about 80 km.	4.5	S.	143.2	E.
3	16	24	55.6	Santa Cruz Islands region. Depth about 36 km. Mag. 5½ (Pal)	10.6	S.	164.9	E.

See footnote at end of table.

TABLE 2.—*Summary of instrumental epicenters for 1962*—Continued

1962	Origin Time G.M.T.	Region, focal depth, and remarks	Coordinates of provisional epicenter	
			Latitude	Longitude
	h m s		° ′	° ′
Apr. 3	18 37 47.5	Loyalty Islands. Depth about 40 km	20.8 S.	169.4 E.
4	05 41 16.1	Crete. Depth about 56 km	34.5 N.	24.9 E.
4	09 28 30.4	Fiji Islands region. Depth about 268 km	22.0 S.	178.2 W.
4	14 02 32.2	Near south coast of Panama and Costa Rica. Depth about 23 km	8.0 N.	83.0 W.
4	15 16 07.9	Near south coast of Panama and Costa Rica. Depth about 25 km	7.7 N.	82.9 W.
4	17 00 24*	Northwest of Bridgeport, Calif. Felt. Mag. 3.5 (Brk)	38 19 N.	119 16 W.
4	19 55 12.8	Crete. Depth about 27 km	35.0 N.	26.6 E.
4	20 51 05.2	Crete. Depth about 21 km	34.7 N.	25.5 E.
4	20 59 36.1	Crete. Depth about 25 km	34.6 N.	25.5 E.
4	21 47 52*	Northwest of Bridgeport, Calif. Felt. Mag. 3.5 (Brk)	38 19 N.	119 16 W.
5	03 40 08.9	Unimak Island region. Depth about 65 km	53.7 N.	163.6 W.
5	07 08 06*	Northwest of Bridgeport, Calif. Felt. Mag. 2.8 (Brk)	38 19 N.	119 16 W.
5	11 57 13*	----do----	38 19 N.	119 16 W.
5	12 24 34.5	Near coast of southern Chile. Depth about 25 km	44.9 S.	75.3 W.
5	18 10 23.9	Off coast of Sumatra. Depth about 36 km	5.2 S.	102.1 E.
5	19 45 58.4	New Hebrides Islands. Felt. Depth about 35 km	16.2 S.	167.5 E.
5	20 04 15.0	New Hebrides Islands. Felt on Santo. Depth about 119 km	15.2 S.	167.7 E.
5	21 27 50*	Northwest of Bridgeport, Calif. Felt in Mono County, Calif., and Hawthorne, Nev. Mag. 4.1 (Brk).	38 19 N.	119 16 W.
5	22 01 41*	Northwest of Bridgeport, Calif. Felt. Mag. 3.6 (Brk)	38 19 N.	119 16 W.
6	04 26 08.6	Fiji Islands. Depth about 593 km	17.7 S.	178.8 W.
6	06 50 52.6	New Guinea. Depth about 63 km	4.2 S.	143.3 E.
6	14 13 03.4	Fiji Islands region. Depth about 538 km	24.0 S.	179.5 W.
6	16 50 14.2	Easter Islands region. Depth about 33 km	26.7 S.	113.2 W.
6	20 24 40.6	Fiji Islands region. Depth about 566 km	23.4 S.	179.7 W.
7	02 10 02.2	Near coast of northern Peru. Depth about 25 km	6.3 S.	79.9 W.
7	06 21 38.4	Mariana Islands region. Depth about 50 km. Mag. 6	10.0 N.	144.4 E.
7	07 19 36*	Northwest of Mount Hamilton, Calif. Felt. Mag. 3.5 (Brk)	37 22 N.	121 43 W.
7	08 04 20.6	New Hebrides Islands. Felt at Port Vila. Depth about 23 km	18.7 S.	168.7 E.
7	10 32 28.1	Fiji Islands region. Depth about 446 km	15.2 S.	177.6 W.
7	13 00 26.3	Central Chile. Depth about 108 km	35.1 S.	70.8 W.
7	19 44 44.9	Solomon Islands region. Depth about 75 km	10.3 S.	161.4 E.
7	20 56 48.4	Tanimbar Islands region. Depth about 25 km	7.3 S.	130.4 E.
7	21 35 30.4	Albania. Depth about 47 km	40.8 N.	19.9 E.
7	22 14 46.5	Hindu Kush. Depth about 105 km	36.6 N.	71.4 E.
7	23 04 12.2	Windward Islands. Depth about 77 km	15.0 N.	60.5 W.
8	00 53 16.6	New Hebrides Islands. Depth about 67 km	16.1 S.	167.3 E.
8	01 43 49.3	Near coast of central Chile. Depth about 54 km	37.6 S.	73.9 W.
8	03 56 14.4	Andreanof Islands, Aleutian Islands. Depth about 25 km	51.4 N.	177.8 W.
8	04 28 40.5	New Guinea. Depth about 115 km	4.1 S.	14.15 E.
8	05 15 03.0	Tonga Islands. Depth about 70 km	20.3 S.	175.7 W.
8	20 58 51.6	Near coast of central Chile. Depth about 43 km	37.9 S.	73.2 W.
8	21 50 28.9	Off coast of Mexico. Depth about 48 km	15.6 N.	99.6 W.
8	22 09 31.4	Unimak Island region. Depth about 25 km	54.8 N.	164.0 W.
9	04 14 23.0	Mariana Islands. Depth about 200 km	18.6 N.	145.5 E.
9	08 54 22.7	Sawoe Sea. Depth about 46 km	8.6 S.	124.1 E.
9	10 23 49.9	Near coast of Mindanao, Philippine Islands. Depth about 100 km	8.7 N.	126.5 E.
9	20 15 45.0	Fiji Islands region. Depth about 630 km	21.0 S.	177.3 W.
9	22 33 29.2	Near coast of Samar, Philippine Islands. Depth about 44 km	12.8 N.	124.9 E.
10	04 36 27.5	Chile-Argentina border. Depth about 130 km	28.6 S.	68.8 W.
10	10 31 58.5	Near south coast of Kamchatka. Depth about 33 km	51.1 N.	157.7 E.
10	12 34 50.8	Near coast of southern Chile. Felt in southern Chile. Depth about 67 km.	37.3 S.	72.6 W.
10	13 10 34.6	Kermadec Islands. Depth about 46 km	30.1 S.	177.7 W.
10	14 09 18.8	Near coast of southern Chile. Depth about 25 km	37.5 S.	73.8 W.
10	14 30 48.1	Western Vermont. Slight damage at Montpelier. Also felt in Maine, New Hampshire, New York, and Massashusetts. Depth about 33 km.	44.1 N.	73.4 W.
10	17 07 11.9	Fiji Islands region. Depth about 383 km	16.7 S.	175.5 W.
10	20 32 19.4	Vancouver Island region. Depth about 25 km	49.1 N.	128.5 W.
10	21 37 12.6	Ionian Sea. Felt on Ionian Islands and in Ipiros, Greece. Depth about 35 km. Mag. 5–5¼ (Pal).	37.9 N.	20.1 E.
10	22 10 50.3	Ionian Sea. Depth about 25 km	38.1 N.	20.4 E.

See footnote at end of table.

TABLE 2.—*Summary of instrumental epicenters for 1962*—Continued

1962	Origin Time G.M.T.	Region, focal depth, and remarks	Coordinates of provisional epicenter	
			Latitude	Longitude
	h m s		° ′	° ′
Apr. 10	23 35 59.9	Ionian Sea. Depth about 25 km	37.8 N.	20.7 E.
10	23 54 12.0	Sea of Japan. Depth about 382 km	37.4 N.	135.4 E.
11	01 35 46.6	Ionian Sea. Depth about 25 km	37.8 N.	20.4 E.
11	11 09 22.0	Ryukyu Islands. Depth about 25 km	26.9 N.	127.1 E.
11	09 33 36.4	Hindu Kush. Depth about 97 km	36.5 N.	71.6 E.
11	10 47 34.0	Ionian Sea. Felt on Ionian Islands and in Ipiros, Greece. Depth about 43 km.	38.2 N.	20.0 E.
11	10 57 37.8	Near east coast of Mindanao, Philippine Islands. Depth about 31 km.	9.0 N.	126.9 E.
11	20 43 17.5	Hindu Kush. Depth about 158 km	35.9 N.	71.1 E.
11	23 21 26.3	Galapagos Islands. Depth about 25 km. Mag. 7-7¼	0.2 S.	91.5 W.
12	00 01 45.4	Ionian Sea. Depth about 25 km	37.7 N.	20.0 E.
12	00 52 44.8	Near east coast of Honshu, Japan. Felt at Sendai and Tokyo. Depth about 48 km. Mag. 7-7¼.	38.1 N.	142.3 E.
12	05 16 05.0	Near east coast of Honshu, Japan. Depth about 26 km	38.2 N.	142.5 E.
12	05 53 29.6	New Hebrides Islands. Depth about 104 km	14.3 S.	166.8 E.
12	07 00 44.6	Near coast of Honshu, Japan. Depth about 33 km	38.4 N.	142.1 E.
12	11 20 02.3	South of Java. Depth about 84 km	10.4 S.	105.0 E.
12	16 36 08.4	Near coast of northern Chile. Depth about 34 km	28.7 S.	71.9 W.
13	02 19 07.9	Celebes. Depth about 37 km	1.0 N.	122.3 E.
13	15 38 46*	Northwest of Bridgeport, Calif. Minor damage at Bridgeport. Also felt in western Nevada. Mag. 5.1 (Brk).	38 19 N.	119 19 W.
13	16 40 59*	Northwest of Bridgeport, Calif. Felt. Mag. 3.9 (Brk)	38 19 N.	119 19 W.
13	18 35 58.3	Sinkiang Province, China. Depth about 28 km	49.1 N.	87.2 E.
13	20 21 07*	Northwest of Bridgeport, Calif. Felt. Mag. 3.7 (Brk).	38 19 N.	119 19 W.
13	22 54 33.9	Near east coast of Honshu, Japan. Depth about 35 km	37.8 N.	142.8 E.
14	01 14 13.7	Kenai Peninsula. Felt 5 miles northwest of Homer. Depth about 78 km.	59.6 N.	152.1 W.
14	07 53 15.7	Off coast of northern California. Depth about 18 km	40.3 N.	125.1 W.
14	15 42 14*	Long Beach, Calif. Felt. Mag. 3.0	33 50 N.	118 10 W.
14	16 50 05.8	Near east coast of Honshu, Japan. Depth about 53 km	38.2 N.	142.5 E.
14	18 42 56.9	Near east coast of Honshu, Japan. Depth about 44 km	37.7 N.	142.8 E.
15	07 32 11.4	Honshu, Japan. Felt at Tokyo. Depth about 69 km	36.3 N.	140.8 E.
15	08 41 00*	San Benito County, Calif. Felt at Idria, Panoche, and Tranquillity. Depth about 25 km. Mag. 4.7 (Brk).	36 31 N.	120 27 W.
15	11 35 21.1	Luzon, Philippine Islands. Depth about 40 km	13.7 N.	120.6 E.
15	18 08 27.3	Ascension Island region. Depth about 25 km	2.7 S.	11.6 W.
15	18 45 17.4	----do----	2.9 S.	11.9 W.
15	20 28 48.9	New Britain. Depth about 36 km	6.8 S.	149.5 E.
15	22 31 06.2	Sandwich Islands. Depth about 25 km	56.6 S.	26.2 W.
16	00 15 15.7	Ionian Sea. Felt on Zante and Cephalonie. Depth about 25 km	38.2 N.	20.4 E.
16	07 18 54.1	Dodecanese Islands. Depth about 33 km	35.8 N.	26.5 E.
16	11 35 08.8	Solomon Islands. Depth about 53 km	10.5 S.	161.6 E.
16	13 20 15.1	South of Honshu, Japan. Depth about 176 km	30.6 N.	140.6 E.
16	17 54 49.2	Prince Edward Islands. Depth about 25 km	44.8 S.	37.2 E.
17	06 48 44.7	South of Honshu, Japan. Depth about 23 km	31.3 N.	142.6 E.
17	07 51 09.4	Near east coast of Kamchatka. Depth about 25 km	54.8 N.	160.7 E.
17	10 03 46.9	Adriatic Sea. Depth about 25 km	42.3 N.	17.3 E.
17	11 15 17.1	Ionian Sea. Depth about 25 km	37.5 N.	19.5 E.
17	11 33 51.0	----do----	37.8 N.	19.9 E.
17	11 51 17.3	East Pakistan. Depth about 165 km	25.7 N.	95.1 E.
17	14 54 35.3	Ionian Sea. Depth about 25 km	38.2 N.	20.6 E.
17	15 15 10.2	Banda Sea. Depth about 140 km	7.0 S.	129.1 E.
17	17 43 03.4	South Island, New Zealand. Depth about 25 km	42.6 S.	174.0 E.
17	18 49 24.6	Off east coast of Honshu, Japan. Depth about 25 km	36.5 N.	143.5 E.
17	20 54 08.3	Near east coast of Honshu, Japan. Depth about 43 km	38.1 N.	142.5 E.
17	22 34 56.7	Mid-Atlantic Ocean. Depth about 25 km	1.5 S.	14.9 W.
18	04 04 18.0	Tonga Islands. Depth about 166 km	18.8 S.	175.4 W.
18	10 44 41.3	Ionian Sea. Felt on Cephalonie. Depth about 25 km	38.1 N.	20.5 E.
18	16 36 01.3	South of Honshu, Japan. Depth about 65 km	31.8 N.	141.6 E.
18	19 14 35.6	Near coast of Peru. 9 killed, moderate damage in Casma area. Depth about 23 km.	9.9 S.	78.9 W.
18	21 08 18.5	New Hebrides Islands. Depth about 33 km	13.3 S.	167.3 E.

See footnote at end of table.

TABLE 2.—*Summary of instrumental epicenters for 1962*—Continued

1964	Origin Time G.M.T.	Region, focal depth, and remarks	Coordinates of provisional epicenter	
			Latitude	Longitude
	h m s		° ′	° ′
Apr. 19	02 05 59.4	Ionian Sea. Depth about 25 km	38.5 N.	20.5 E.
19	20 18 55.9	Near coast of Peru. Minor damage in Casma area. Depth about 23 km.	9.8 S.	78.9 W.
19	06 22 34*	Near Ventura, Calif. Felt. Mag. 3.8	34 18 N.	119 14 W.
19	08 09 27.1	Near east coast of Honshu, Japan. Depth about 25 km	38.2 N.	142.7 E.
19	11 55 27.3	Eastern Turkey. Depth about 25 km	38.6 N.	44.0 E.
19	20 18 20.5	Near coast of Peru. Depth about 25 km	9.4 S.	79.0 W.
19	22 15 20.9	New Hebrides Islands. Felt on Santo. Depth about 213 km	15.8 S.	168.0 E.
19	23 16 07.0	Siberia, U.S.S.R. Depth about 17 km	69.8 N.	138.8 E.
20	05 47 55.3	Near north coast of Haiti. 2 injured, minor damage at Port-au-Prince. Felt at San Juan, Puerto Rico. Depth about 25 km. Mag. 6½–6¾.	20.6 N.	72.2 W.
20	14 25 18.8	New Hebrides Islands. Depth about 87 km	17.9 S.	169.9 E.
21	03 33 53.8	New Guinea. Depth about 86 km	6.1 S.	146.1 E.
21	07 46 18.5	Fiji Islands region. Depth about 559 km	23.7 S.	180.0
21	14 21 44.9	New Ireland. Depth about 294 km	4.3 S.	151.5 E.
21	21 18 01.7	New Guinea. Depth about 42 km	6.5 S.	144.6 E.
22	02 10 11.3	New Hebrides Islands region. Depth about 259 km	18.7 S.	169.4 E.
22	04 29 37.8	Chile-Argentina border region. Depth about 105 km	44.2 S.	72.6 W.
22	04 45 20.3	Near coast of Chiapas, Mexico. Depth about 69 km. Mag. 5¼–5½.	15.5 N.	93.1 W.
22	16 03 09.5	Fiji Islands. Depth about 578 km	21.1 S.	178.7 W.
22	16 38 23.4	New Britain. Depth about 61 km	5.3 S.	153.7 E.
22	17 03 42*	Near Long Beach, Calif. Felt. Mag. 2.8	33 48 N.	118 14 W.
22	19 15 34.1	Kyushu, Japan. Depth about 181 km	32.7 N.	130.6 E.
23	03 54 41.1	Honshu, Japan. Felt at Tokyo. Depth about 80 km	36.6 N.	139.5 E.
23	05 58 04.9	Hokkaido, Japan. Felt. Depth about 25 km. Mag. 7–7¼	42.9 N.	143.4 E.
23	09 51 17.6	Near southeast coast of Kamchatka. Depth about 19 km	51.6 N.	159.6 E.
23	14 51 26.0	Banda Sea. Depth about 83 km	6.9 S.	128.4 E.
23	16 04 31.8	Near southeast coast of Kamchatka. Depth about 31 km	51.6 N.	159.6 E.
23	21 06 04.2	Bismarck Sea. Depth about 51 km	5.9 S.	148.4 E.
24	14 19 53.8	Hindu Kush. Depth about 32 km	37.4 N.	71.1 E.
24	16 06 23.7	Ecuador-Peru border. Depth about 175 km	2.2 S.	76.1 W.
24	18 09 30.0	Solomon Islands. Depth about 92 km	5.8 S.	154.6 E.
25	03 28 56.1	Kamchatka. Depth about 29 km	54.0 N.	160.3 E.
25	04 44 55.2	Southeastern France. Felt in southeastern France. Minor damage at Grenoble. Depth about 33 km.	45.4 N.	5.8 E.
25	05 55 20.4	Tonga Islands. Depth about 103 km	20.9 S.	175.1 W.
25	06 22 28.0	Ionian Sea. Depth about 25 km	38.1 N.	20.6 E.
25	08 48 58.2	Mineral County, Nev. Felt. Depth about 25 km. Mag. 4.2	38.5 N.	118.1 W.
25	15 47 29.4	Honshu, Japan. Depth about 56 km	38.4 N.	142.5 E.
25	19 49 49.3	Honshu, Japan. Depth about 46 km	37.8 N.	143.3 E.
26	02 44 10.8	Bismarck Sea. Depth about 68 km	5.8 S.	147.3 E.
26	03 11 33.8	Kazakh S.S.R. Depth about 25 km	44.4 N.	78.4 E.
26	07 26 31.3	Fiji Islands. Depth about 657 km	17.3 S.	179.1 W.
26	15 10 55.5	Near southeast coast of Kamchatka. Depth about 25 km	51.7 N.	159.3 E.
26	15 53 12.2	Southern Iran. Depth about 41 km	28.5 N.	57.2 E.
27	06 30 24.9	Fiji Islands region. Depth about 576 km	23.1 S.	179.2 E.
27	06 47 27.0	Near coast of southern Chile. Depth about 31 km	44.4 S.	74.8 W.
27	09 12 32*	Near Perris, Calif. Slight damage in Riverside and San Bernardino counties. Mag. 4.1.	33 44 N.	117 11 W.
27	16 28 18.7	Kermadec Islands region. Depth about 25 km	33.2 S.	179.3 W.
27	17 19 14.0	Near northwest coast of Honshu, Japan. Depth about 25 km	40.8 N.	139.5 E.
28	07 37 27.8	New Guinea. Depth about 124 km	2.6 S.	139.3 E.
28	09 01 10.4	Hokkaido, Japan. Depth about 127 km	44.0 N.	146.1 E.
28	11 18 57.4	Dodecanese Islands. Depth about 40 km	36.4 N.	26.6 E.
28	12 43 49.1	Dodecanese Islands. Depth about 48 km	36.3 N.	26.7 E.
29	07 05 26.3	Tonga Islands. Depth about 79 km	18.1 S.	173.9 W.
29	15 10 24.9	Santa Cruz Islands. Depth about 72 km	12.4 S.	166.5 E.
29	20 37 26*	East of Portola, Calif. Felt in Plumas and Sierra counties. Mag. 3.8 (Brk).	39 47 N.	120 20 W.
30	02 26 30.0	Honshu, Japan. 1 killed, many injured. Moderate property damage in Sendai area. Depth about 104 km. Mag. 6½–6¾.	38.8 N.	140.9 E.

See footnote at end of table.

TABLE 2.—*Summary of instrumental epicenters for 1962*—Continued

1962	Origin Time G.M.T.			Region, focal depth, and remarks	Coordinates of provisional epicenter			
					Latitude		Longitude	
	h	*m*	*s*		° ′		° ′	
Apr. 30	07	48	46.2	Colombia. Depth about 130 km	6.9	N.	73.0	W.
30	09	44	17.4	Mariana Islands. Depth about 109 km	17.0	N.	147.3	E.
30	10	40	16.4	Loyalty Islands. Depth about 49 km	20.1	S.	169.0	E.
30	16	16	51.2	Tonga Islands region. Depth about 33 km. Mag. 6½	18.1	S.	176.1	W.
30	18	31	05.9	Tonga Islands region. Depth about 92 km	18.1	S.	176.2	W.
30	20	39	45.1	Banda Sea. Depth about 28 km	6.4	N.	124.0	E.
30	22	41	40.7	Honshu, Japan. Depth about 124 km	39.0	N.	140.4	E.
30	23	50	33.5	Svalbard region. Depth about 25 km	72.0	N.	7.2	E.
May 1	00	00	28.4	Svalbard region. Depth about 64 km	73.1	N.	5.7	E.
1	02	45	22.8	Mariana Islands. Depth about 25 km	17.5	N.	146.7	E.
1	09	54	20.6	Banda Sea. Depth about 621 km	5.8	S.	125.5	E.
1	10	00	00.0	Southern Algeria. Depth about 0 km	24.2	N.	5.1	E.
1	11	53	58.6	Ionian Islands. Depth about 92 km	38.2	N.	20.5	E.
1	21	08	16.1	Mascarene Islands region. Depth about 39 km	20.0	S.	65.7	E.
2	02	43	25.9	Kodiak Island, Alaska region. Depth about 25 km	55.9	N.	156.1	W.
2	06	15	18.4	Sakhalin. Depth about 36 km	52.6	N.	142.0	E.
2	08	56	31.6	Jujuy Province, Argentina. Depth about 177 km	23.7	S.	66.4	W.
2	10	21	05.9	Sakhalin. Depth about 72 km	52.5	N.	142.0	E.
2	11	05	13.5	Luzon, Philippine Islands. Depth about 82 km	14.5	N.	120.2	E.
2	12	33	08.3	Jujuy Province, Argentina. Depth about 177 km	23.8	S.	66.6	W.
2	20	43	53.8	South of Fiji Islands. Depth about 183 km	26.3	S.	177.7	W.
2	23	18	28.4	Arctic Ocean, west of Svalbard. Depth about 23 km	74.9	N.	9.0	E.
3	02	37	56.6	Off southeast coast of Hokkaido, Japan. Depth about 49 km	42.6	N.	144.6	E.
3	03	12	14.7	Panama-Costa Rica border. Depth about 32 km	8.2	N.	82.8	W.
3	03	34	49.0	Sandwich Islands region. Depth about 20 km. Mag. 5¾–6 (Pal)	60.0	S.	32.9	W.
3	13	48	23.9	Near west coast of Baja California. Felt at San Diego, Calif. Depth about 25 km. Mag. 5.0.	29.1	N.	115.5	W.
3	17	00	32.9	Sandwich Islands region. Depth about 33 km	60.5	S.	33.2	W.
3	22	49	11.9	Alaska. Depth about 55 km	63.6	N.	151.7	W.
3	23	27	16.1	Off north coast of Spain. Depth about 33 km	44.1	N.	7.3	W.
4	05	48	29.3	Hokkaido, Japan. Depth about 37 km	42.8	N.	143.7	E.
4	13	25	27.8	Fiji Islands region. Depth about 592 km	20.3	S.	177.8	W.
4	17	38	53.9	Andreanof Islands, Aleutian Islands. Depth about 23 km	51.2	N.	176.6	W.
4	23	08	05.3	Near coast of Ecuador. Depth about 74 km	0.9	S.	80.8	W.
4	23	41	16.6	Honshu, Japan. Depth about 45 km	38.7	N.	140.9	E.
5	11	11	49.3	Near south coast of Honshu, Japan. Depth about 57 km	34.1	N.	139.3	E.
5	13	10	24*	Near Ontario, Calif. Felt in southwest San Bernardino County. Mag. 2.7.	34 01	N.	117 32	W.
5	14	17	24*	Near Idyllwild, Calif. Felt in Riverside County. Mag. 3.6.	33 42	N.	116 43	W.
5	16	43	00.0	Near south coast of Honshu, Japan. Depth about 272 km	35.8	N.	137.0	E.
5	23	05	56.9	Kermadec Islands region. Depth about 41 km	31.6	S.	176.7	W.
6	00	35	27.8	New Britain region. Depth about 25 km	6.0	S.	151.6	E.
6	03	13	49.3	South Pacific Ocean, about 2300 miles southeast of New Zealand. Depth about 23 km.	54.3	S.	136.6	W.
6	03	33	47.0	South Pacific Ocean, about 2300 miles southeast of New Zealand. Depth about 25 km.	54.2	S.	136.5	W.
6	05	20	59.6	Near coast of southern Chile. Depth about 25 km	37.8	S.	73.4	W.
6	06	42	10.4	Ionian Islands. Depth about 61 km	38.0	N.	20.5	E.
6	07	10	14.1	New Britain. Felt at Rabaul. Depth about 98 km	5.7	S.	151.6	E.
6	12	08	45.6	Fiji Islands region. Depth about 587 km	20.8	S.	178.7	W.
6	19	00	13.5	Sandwich Islands region. Depth about 33 km. Mag. 7	60.2	S.	33.5	W.
6	21	53	49.8	Sandwich Islands region. Depth about 33 km	60.1	S.	33.3	W.
6	23	34	47.9	Sandwich Islands region. Depth about 34 km	60.4	S.	33.6	W.
7	04	56	38.4	Near north coast of New Guinea. Depth about 113 km	4.1	S.	143.7	E.
7	08	07	55.8	Mariana Islands. Depth about 116 km	19.3	N.	145.4	E.
7	13	06	54.2	Kermadec Islands region. Depth about 25 km	32.0	S.	176.5	W.
7	16	12	01*	Long Beach Harbor, Calif. Felt at Compton. Mag. 2.6	33 45	N.	118 15	W.
7	17	39	50.3	Kurile Islands. Depth about 20 km. Mag. 6¾	45.2	N.	146.9	E.
7	19	03	32.1	Sandwich Islands. Depth about 25 km	59.5	S.	25.6	W.
7	22	54	51.4	Kurile Islands region. Depth about 31 km	44.8	N.	146.8	E.
8	07	49	27.9	Mariana Islands. Felt on Guam. Depth about 70 km	14.4	N.	145.1	E.
8	07	57	30.3	Fiji Islands. Depth about 409 km	17.9	S.	177.7	W.
8	16	25	13.1	Off east coast of Honshu, Japan. Depth about 121 km	43.6	N.	144.7	E.

See footnote at end of table.

TABLE 2.—*Summary of instrumental epicenters for 1962*—Continued

1962	Origin Time G.M.T.			Region, focal depth, and remarks	Coordinates of provisional epicenter			
					Latitude		Longitude	
	h	*m*	*s*		° ′		° ′	
May 8	18	10	01.3	Fiji Islands. Depth about 451 km	17.8	S.	177.3	W.
8	19	38	30.2	West Pakistan. Depth about 49 km	33.6	N.	72.3	E.
8	23	53	59.0	Sea of Crete. Felt on Crete. Depth about 86 km	35.5	N.	24.1	E.
9	11	19	02.1	Kurile Islands. Depth about 40 km	46.2	N.	153.0	E.
9	12	12	33.5	Hindu Kush. Depth about 96 km	36.6	N.	68.3	E.
9	18	20	06.7	Ryukyu Islands. Depth about 48 km	29.2	N.	130.3	E.
10	00	03	40.2	Alaska. Felt at Anchorage and Cordova. Depth about 72 km. Mag. 6 (Brk).	62.0	N.	150.1	W.
10	00	27	17.5	South Island, New Zealand. Depth about 54 km	41.8	S.	171.6	E.
10	05	12	15.9	Fox Islands, Aleutian Islands. Depth about 43 km. Mag. 6 (Brk)	52.4	N.	170.9	W.
10	08	44	25.9	Near east coast of Kamchatka. Depth about 154 km	53.0	N.	159.8	E.
10	11	14	25.0	North Atlantic Ocean, north of Azores. Depth about 25 km	49.2	N.	28.5	W.
10	14	17	30.0	----do	49.2	N.	28.6	W.
10	18	30	58.1	Yugoslavia-Albania border. Felt at Titograd, Yugoslavia. Depth about 25 km.	42.1	N.	19.2	E.
11	01	05	31.6	Italy. Depth about 25 km	44.4	N.	11.1	E.
11	04	52	43.4	New Guinea. Depth about 37 km	6.4	S.	143.6	E.
11	07	05	52.5	Near north coast of New Guinea. Depth about 42 km	6.6	S.	147.7	E.
11	12	06	42.1	New Hebrides Islands region. Depth about 623 km	14.3	S.	170.4	E.
11	13	35	31.3	Kermadec Islands. Depth about 115 km	28.5	S.	177.6	W.
11	14	11	54.1	Near coast of Mexico. 4 dead, many injured, and extensive property damage in south-central Mexico. Seismic sea wave, with maximum amplitude about 2.8 feet reported at Acapulco. Depth about 40 km. Mag. 7.	17.0	N.	99.6	W.
11	16	11	33.2	Near coast of Mexico. Depth about 25 km	16.5	N.	98.6	W.
11	20	01	05.8	South Atlantic Ocean. Depth about 33 km	26.9	S.	13.5	W.
12	10	16	53.4	Near coast of Mexico. Depth about 25 km	17.2	N.	99.1	W.
12	17	36	50.4	Hindu Kush. Depth about 193 km	36.5	N.	70.6	E.
12	18	44	30.3	South Atlantic Ocean. Depth about 25 km	26.5	S.	13.6	W.
12	20	35	45.1	Fiji Islands. Depth about 600 km	17.7	S.	178.2	W.
12	22	03	40.7	Fiji Islands. Depth about 603 km	18.0	S.	178.0	W.
13	09	12	34.3	Colombia. Felt at Bogota and Bucaramanga. Depth about 183 km.	6.9	N.	73.0	W.
13	10	46	23.5	Ceram. Depth about 41 km	3.2	S.	129.0	E.
13	18	48	55.3	Northern Honshu, Japan. Felt. Depth about 31 km	39.0	N.	140.8	E.
14	01	25	15.0	New Hebrides Islands region. Felt at Port Vila. Depth about 58 km.	18.4	S.	168.3	E.
14	10	33	25.5	Sumbawa. Depth about 30 km	9.0	S.	118.7	E.
14	11	07	11.2	Off coast of Honshu, Japan. Depth about 157 km	33.8	N.	141.1	E.
14	13	57	49.4	Kurile Islands. Depth about 126 km	46.3	N.	149.8	E.
14	15	19	11.0	Northern Honshu, Japan. Felt. Depth about 80 km	36.9	N.	139.9	E.
14	15	53	06.2	North Atlantic Ocean. Depth about 25 km	49.0	N.	28.8	W.
14	21	06	52.7	South of Honshu, Japan. Depth about 82 km	33.5	N.	140.6	E.
14	22	07	39.3	Andreanof Islands, Aleutian Islands. Depth about 25 km	51.5	N.	176.2	W.
14	23	23	08.6	Fiji Islands region. Depth about 65 km	14.0	S.	178.2	W.
15	03	34	35.3	Near coast of Honshu, Japan. Depth about 77 km	36.4	N.	141.6	E.
15	05	23	46.4	Banda Sea. Depth about 34 km. Mag. 7-7¼	7.3	S.	128.3	E.
15	06	42	58.9	Banda Sea. Depth about 52 km	7.2	S.	128.3	E.
15	07	31	13.5	Arafura Sea. Depth about 57 km	8.2	S.	129.2	E.
15	08	40	21.2	Near coast of central Chile. Depth about 25 km	35.1	S.	73.1	W.
15	09	55	16.5	Banda Sea. Depth about 30 km	7.2	S.	128.2	E.
15	12	52	19.1	Kurile Islands. Depth about 36 km	44.9	N.	148.3	E.
15	12	55	36.6	Banda Sea. Depth about 35 km	7.8	S.	127.9	E.
15	13	22	49.2	----do	7.3	S.	128.4	E.
15	16	16	19.1	Unimak Island, Alaska region. Depth about 25 km	53.2	N.	164.7	W.
15	16	54	01.9	Banda Sea. Depth about 34 km	7.4	S.	128.0	E.
15	19	32	22.5	Near east coast of Kamchatka. Depth about 30 km	53.4	N.	159.6	E.
15	20	33	29.3	Unimak Island, Alaska region. Depth about 25 km	53.5	N.	164.0	W.
15	21	31	00.4	Banda Sea. Depth about 38 km	7.2	S.	128.1	E.
16	05	16	46.0	New Hebrides Islands. Depth about 52 km	13.6	S.	167.3	E.
16	08	18	30.7	Spice Islands. Depth about 34 km	0.9	S.	127.0	E.
16	14	35	29.6	Banda Sea. Depth about 34 km	7.3	S.	128.1	E.
16	17	33	05.5	New Hebrides Islands. Depth about 35 km	13.4	S.	167.3	E.

See footnote at end of table.

TABLE 2.—*Summary of instrumental epicenters for 1962*—Continued

1962	Origin Time G.M.T.			Region, focal depth, and remarks	Coordinates of provisional epicenter			
					Latitude		Longitude	
	h	*m*	*s*		° ′		° ′	
May 16	19	09	04.2	Sumbawa. Depth about 47 km	9.3	S.	118.4	E.
16	21	41	35.8	Near coast of South Australia. Felt. Depth about 25 km	35.6	S.	137.7	E.
16	23	05	21.1	New Hebrides Islands. Felt on Santo. Depth about 136 km	15.1	S.	167.6	E.
17	02	19	57.8	Near coast of South Island, New Zealand. Felt. Depth about 41 km.	41.9	S.	171.5	E.
17	04	08	18.0	South Pacific Ocean. Depth about 25 km	55.1	S.	128.8	W.
17	09	02	04.2	Banda Sea. Depth about 35 km	7.2	S.	128.0	E.
17	12	00	28.8	Chagos Archipelago region. Depth about 33 km	7.1	S.	68.0	E.
17	16	00	37.4	Sandwich Islands. Depth about 23 km	55.8	S.	27.0	W.
18	02	49	50.4	Fiji Islands region. Depth about 549 km	21.2	S.	178.8	W.
18	07	13	00.6	Kermadec Islands. Depth about 218 km	29.3	S.	178.6	W.
18	07	49	44.0	Near coast of central Chile. Depth about 40 km	38.6	S.	74.7	W.
18	12	11	59.8	North Atlantic Ocean. Depth about 25 km	48.6	N.	28.7	W.
18	14	46	40.1	Off coast of central Chile. Depth about 61 km	38.5	S.	74.2	W.
18	18	46	40.1	Kurile Islands. Depth about 60 km	46.1	N.	148.5	E.
18	23	18	46.9	Tonga Islands region. Depth about 25 km	16.0	S.	173.0	W.
19	14	58	15.0	Near coast of Mexico. 3 dead, 16 injured, and extensive property damage in south-central Mexico. Depth about 33 km. Mag.7–7¼.	17.2	N.	99.5	W.
19	20	43	56.9	Solomon Islands. Depth about 70 km	6.3	S.	155.0	E.
19	20	48	32.2	Greece. Felt. Depth about 29 km	38.0	N.	22.4	E.
19	20	50	09.0	Sinkiang Province, China. Depth about 45 km	39.5	N.	73.9	E.
19	21	28	39.7	Assam, India. Depth about 15 km	26.7	N.	92.2	E.
19	23	56	32.4	Near coast of Peru. Depth about 70 km	13.4	S.	76.7	W.
20	00	40	38.3	Crete. Depth about 25 km	34.8	N.	22.3	E.
20	06	48	53.3	Santa Cruz Islands region. Depth about 40 km	10.9	S.	164.3	E.
20	08	09	14.4	Fiji Islands region. Depth about 608 km	21.3	S.	179.1	W.
20	15	01	20.7	Off coast of Puerto Rico. Depth about 38 km	20.5	N.	66.0	W.
20	16	22	29.4	New Hebrides Islands. Depth about 108 km	15.2	S.	167.2	E.
20	16	49	46.8	Near coast of Mindanao, Philippine Islands. Depth about 133 km	6.2	N.	125.8	E.
20	18	30	38.9	Kermadec Islands. Depth about 25 km	30.0	S.	177.5	W.
21	01	54	06.2	Mariana Islands. Depth about 85 km	19.4	N.	145.6	E.
21	12	02	50.6	Tsinghai Province, China. Depth about 25 km. Mag. 7–7¼	37.3	N.	96.0	E.
21	12	36	19.7	Tsinghai Province, China. Depth about 25 km	37.0	N.	95.9	E.
21	13	15	39.4	----do----	37.0	N.	95.7	E.
21	13	28	55.8	Tsinghai Province, China. Depth about 35 km	37.3	N.	95.9	E.
21	15	41	46.8	Tsinghai Province, China. Depth about 36 km	37.1	N.	95.9	E.
21	18	15	29.9	Tsinghai Province, China. Depth about 35 km	36.9	N.	96.4	E.
21	19	29	10.0	Tsinghai Province, China. Depth about 25 km	37.4	N.	95.5	E.
21	19	46	01.2	Tsinghai Province, China. Depth about 35 km	36.7	N.	95.8	E.
21	20	11	22.8	Tsinghai Province, China. Depth about 25 km	37.1	N.	95.7	E.
21	21	08	20.6	----do----	37.1	N.	95.7	E.
21	21	15	30.0	Fiji Islands region. Depth about 342 km. Mag. 6¾–7	19.8	S.	177.4	W.
21	21	21	01.7	Tsinghai Province, China. Depth about 33 km	36.8	N.	96.2	E.
22	00	20	02.4	Tonga Islands. Depth about 52 km	16.8	S.	174.3	W.
22	02	04	20.3	Mariana Islands. Depth about 52 km	12.3	N.	144.2	E.
22	02	20	10.4	Samoa Islands region. Depth about 46 km	14.7	S.	173.0	W.
22	02	37	44*	Near Lake Chabot, Calif. Felt at East Oakland and San Leandro. Mag. 2.2 (Brk).	37 44	N.	122 08	W.
22	04	34	53.0	Tsinghai Province, China. Depth about 35 km	37.4	N.	95.8	E.
22	04	40	14.4	South Pacific Ocean. Depth about 42 km	55.5	S.	138.3	W.
22	06	17	05.4	Off coast of Formosa. Depth about 25 km	22.7	N.	121.5	E.
22	07	40	38.1	Tsinghai Province, China. Depth about 26 km	37.1	N.	95.9	E.
22	07	50	03.4	Solomon Islands. Depth about 105 km	10.2	S.	161.5	E.
22	08	06	38.8	Santa Cruz Islands. Felt at Vanikoro. Depth about 136 km. Mag. 6½–6¾.	12.3	S.	166.6	E.
22	11	02	33.9	Tsinghai Province, China. Depth about 25 km	37.2	N.	95.7	E.
22	17	57	03.6	Tsinghai Province, China. Depth about 35 km	37.1	N.	95.5	E.
22	22	03	32.1	New Britain. Felt at Palmalmal. Depth about 54 km	5.4	S.	151.9	E.
22	23	15	46.1	New Britain. Felt at Palmalmal. Depth about 65 km	5.0	S.	151.3	E.
23	00	53	02.9	Tsinghai Province, China. Depth about 39 km	37.2	N.	95.8	E.
23	01	42	12.2	Tsinghai Province, China. Depth about 50 km	37.1	N.	96.0	E.
23	05	03	47.0	New Britain. Depth about 55 km	5.4	S.	151.9	E.

See footnote at end of table.

TABLE 2.—*Summary of instrumental epicenters for 1962*—Continued

1962	Origin Time G.M.T.			Region, focal depth, and remarks	Coordinates of provisional epicenter			
					Latitude		Longitude	
	h	*m*	*s*		° ′		° ′	
May 23	06	34	00.4	New Britain. Felt at Rabaul. Depth about 70 km	5.4	S.	152.0	E.
23	06	43	28.9	New Britain. Depth about 33 km	5.7	S.	152.4	E.
23	07	10	51.7	Banda Sea. Depth about 25 km	7.3	S.	128.4	E.
23	08	19	00.7	Kermadec Islands region. Depth about 363 km	25.4	S.	179.3	W.
23	20	48	03.3	About 1200 miles south of Australia. Depth about 25 km	48.2	S.	119.4	E.
23	21	04	19.1	----do----	49.1	S.	121.3	E.
24	02	11	35.8	New Britain. Felt. Depth about 55 km	5.4	S.	151.9	E.
24	04	24	49.8	Vancouver Island region. Depth about 25 km	49.1	N.	129.4	W.
24	07	11	59.5	Tonga Islands. Depth about 25 km	18.7	S.	173.2	W.
25	00	48	58.3	South of Greenland. Depth about 33 km	58.6	N.	31.4	W.
25	01	07	11.5	----do----	59.1	N.	31.4	W.
25	01	09	58.1	New Britain. Depth about 25 km	5.6	S.	152.2	E.
25	04	19	57.0	Tonga Islands. Depth about 281 km	20.7	S.	174.3	W.
25	07	05	27.4	New Hebrides Islands. Felt. Depth about 33 km	18.2	S.	168.2	E.
25	09	40	28.1	New Britain. Depth about 77 km	5.1	S.	151.9	E.
25	11	35	07.6	Tsinghai Province, China. Depth about 25 km	38.0	N.	95.9	E.
25	14	19	45.4	Kermadec Islands. Depth about 61 km	30.8	S.	178.0	W.
25	17	21	57.6	Fiji Islands region. Depth about 576 km	24.1	S.	179.1	E.
25	21	28	28.1	Jujuy Province, Argentina. Depth about 69 km	24.3	S.	65.2	W.
26	02	13	01.5	Fiji Islands. Depth about 561 km	19.7	S.	177.8	W.
26	12	51	01.4	Off coast of southern Chile. Depth about 38 km	43.2	S.	75.6	W.
26	19	44	15.7	Nicobar Islands. Depth about 30 km	6.7	N.	94.6	E.
27	01	45	34.7	Baja California. Depth about 25 km. Mag. 5½	31.7	N.	115.6	W.
27	05	30	44.4	Ceram. Depth about 82 km	3.2	S.	129.5	E.
27	14	33	03.7	Kerguelen Islands. Depth about 25 km	41.4	S.	80.6	E.
28	01	19	52.3	Hokkaido, Japan. Depth about 18 km	42.7	N.	144.5	E.
28	02	48	13.1	Luzon, Philippine Islands. Felt at Dagupan, Lingayen, and Binmaley. Depth about 25 km.	16.4	N.	120.4	E.
28	03	08	07.4	Bismarck Sea. Depth about 25 km	3.3	S.	146.0	E.
28	10	09	57.6	South of Honshu, Japan. Depth about 158 km	31.1	N.	140.9	E.
28	16	07	59.8	Santa Cruz Islands. Depth about 25 km	10.8	S.	165.8	E.
28	21	45	18.5	Banda Sea. Depth about 65 km	7.0	S.	128.9	E.
28	23	49	01.0	San Juan Province, Argentina. Depth about 94 km	31.3	S.	68.3	W.
29	21	00	16.4	Andreanof Islands, Aleutian Islands. Felt on Adak. Depth about 25 km.	51.8	N.	177.1	W.
29	21	52	50.0	Easter Island region. Depth about 25 km	26.3	S.	113.7	W.
29	23	44	19.5	Ionian Islands. Felt in Greece. Depth about 58 km	38.0	N.	20.7	E.
30	04	57	46.2	Off coast of northern California. Depth about 25 km	44.6	N.	129.5	W.
30	09	16	14.9	About 1500 miles southeast of Galapagos Islands. Depth about 25 km.	8.9	S.	106.1	W.
30	10	02	53.0	North Atlantic Ocean. Depth about 33 km. Mag. 5 (Pal)	29.9	N.	43.7	W.
30	10	20	16*	East Oakland, Calif. Felt. Mag. 2.3 (Brk)	37 47	N.	122 11	W.
30	16	57	35.9	Fiji Islands. Depth about 480 km	18.9	S.	177.9	W.
31	01	57	04.5	Off coast of west Pakistan. Depth about 33 km	24.7	N.	66.0	E.
31	03	17	57.2	Kermadec Islands. Depth about 15 km	31.1	S.	177.1	W.
31	05	11	17.6	Mindanao, Philippine Islands. Depth about 40 km	7.7	N.	124.0	E.
31	06	28	26.1	Volcano Islands region. Depth about 258 km. Mag. 6½	22.0	N.	142.7	E.
31	08	37	25.8	Kermadec Islands. Depth about 42 km	30.8	S.	177.3	W.
31	21	19	09.8	Central Chile. Depth about 67 km	38.0	S.	72.8	W.
June 1	01	22	18.6	New Guinea. Depth about 71 km	3.3	S.	137.7	E.
1	01	59	53.2	Kodiak Island region. Depth about 25 km	57.6	N.	150.8	W.
1	06	48	30.6	Near coast of El Salvador. Felt at San Salvador. Depth about 80 km.	13.0	N.	88.0	W.
1	09	01	57.4	Banda Sea. Depth about 149 km	7.0	S.	129.1	E.
1	13	07	25.4	Salta Province, Argentina. Depth about 197 km	24.0	S.	66.8	W.
2	02	02	55.2	Galapagos Islands region. Depth about 33 km	2.9	N.	97.7	W.
2	03	57	16*	Northwest of Mount Hamilton, Calif. Felt at San Jose. Mag. 3.3 (Brk).	37 26	N.	121 48	W.
2	05	35	36.6	Bismarck Sea. Depth about 49 km	3.4	S.	145.3	E.
2	09	18	47.9	New Britain. Felt at Rabaul. Depth about 57 km	5.3	S.	151.7	E.
2	11	49	50.1	Vancouver Island region. Depth about 32 km	50.1	N.	129.2	W.
2	12	26	11.0	Vancouver Island region. Depth about 33 km. Mag. 5¾ (Pal)	49.9	N.	129.7	W.
2	12	35	49.7	Vancouver Island region. Depth about 38 km	49.9	N.	129.6	W.

See footnote at end of table.

TABLE 2.—*Summary of instrumental epicenters for 1962*—Continued

1962	Origin Time G.M.T.			Region, focal depth, and remarks	Coordinates of provisional epicenter			
					Latitude		Longitude	
	h	*m*	*s*		° ′		° ′	
June 2	17	15	13.8	Ryukyu Islands region. Depth about 54 km	29.9	N.	130.7	E.
3	07	07	07.3	Hindu Kush. Depth about 182 km	36.6	N.	69.7	E.
3	09	00	23.1	New Hebrides Islands. Depth about 160 km	15.0	S.	167.3	E.
3	10	13	54.9	Kurile Islands region. Depth about 86 km	49.4	N.	156.4	E.
3	13	42	30.5	New Britain region. Depth about 62 km	6.4	S.	148.0	E.
3	14	25	45.3	Fiji Islands region. Depth about 493 km	23.5	S.	179.8	W.
3	15	02	26.4	North Atlantic Ocean. Depth about 33 km. Mag. 6 (Brk)	22.3	N.	45.1	W.
3	17	31	56.8	Leeward Islands. Depth about 52 km	17.7	N.	61.6	W.
3	19	18	62.0	Southern Utah. Depth about 33 km	38.0	N.	113.0	W.
3	23	43	43.8	North Atlantic Ocean. Depth about 33 km	49.1	N.	28.4	W.
4	05	31	26.8	Adriatic Sea. Depth about 33 km	42.4	N.	15.8	E.
4	15	21	55.3	Central West Pakistan. Depth about 33 km	30.0	N.	70.0	E.
4	16	53	11.4	Near coast of southern Peru. Depth about 65 km	16.7	S.	73.2	W.
4	18	50	41.5	Near south coast of Panama. Felt at Balboa Heights, C.Z. Depth about 54 km.	7.7	N.	80.6	W.
5	10	51	19.7	Sinkiang Province, China. Depth about 140 km	38.9	N.	75.5	E.
5	16	43	48.7	Banda Sea. Depth about about 155 km	7.0	S.	129.2	E.
5	22	29	45.0	Southern Utah. Depth about 33 km	38.0	N.	112.1	W.
6	00	17	09.0	----do	37.5	N.	113.0	W.
6	02	29	04.8	Solomon Islands region. Depth about 60 km	8.8	S.	153.9	E.
6	08	48	51.6	Loyalty Islands region. Depth about 17 km	20.0	S.	169.1	E.
6	10	34	05.5	Near coast of southern Chile. Depth about 48 km	38.3	S.	72.8	W.
6	10	57	34.0	Northern Arizona. Depth about 33 km	36.0	N.	112.5	W.
6	17	50	07*	Northwestern California. Slight damage in Lake and Mendocino counties. Mag. 5.2 (Brk).	39 05	N.	123 04	W.
6	19	38	20.4	Kurile Islands. Depth about 78 km	44.9	N.	148.9	E.
6	20	02	37.0	Bonin Islands region. Depth about 421 km	28.1	N.	139.8	E.
7	00	22	39.2	Gulf of California. Depth and 33 km	29.9	N.	113.5	W.
7	04	20	59*	Southwest of Mount Hamilton, Calif. Felt. Mag. 3.8 (Brk)	37 17	N.	121 43	W.
7	05	35	47.3	Rat Islands, Aleutian Islands. Depth about 50 km	51.9	N.	175.9	E.
7	15	15	53*	Northwest of Bridgeport, Calif. Felt. Mag. 2.9 (Brk)	38 19	N.	119 20	W.
7	15	00	02.0	Leeward Islands. Depth about 78 km	17.2	N.	62.0	W.
8	01	31	59.9	Fiji Islands region. Depth about 603 km	18.1	S.	178.4	W.
8	06	28	02*	Northwest of Bridgeport, Calif. Slight damage. Mag. 4.2 (Brk)	38 16	N.	119 19	W
8	08	34	47*	Northwest of Bridgeport, Calif. Felt. Mag. 3.6 (Brk)	38 16	N.	119 19	W.
8	09	11	11.5	Ryukyu Islands. Depth about 19 km	28.4	N.	129.8	E.
8	15	19	21.4	Solomon Islands. Depth about 54 km	7.3	S.	155.7	E.
8	16	04	23.4	Near east coast of Honshu, Japan. Depth about 52 km	37.8	N.	141.3	E.
8	19	14	07.0	Southern Utah. Depth about 33 km	37.5	N.	113.0	W
8	19	17	23.5	Near coast of Leyte, Philippine Islands. Depth about 52 km	11.2	N.	126.0	E.
8	19	21	27.0	Southern Utah. Depth about 33 km	37.5	N.	112.5	W.
8	20	49	18.4	Sandwich Islands. Depth about 25 km	55.6	S.	26.1	W.
9	01	35	49.0	Andreanof Islands, Aleutian Islands. Depth about 25 km	51.6	N.	177.2	W.
9	06	04	55.8	Fiji Islands. Depth about 339 km	21.1	S.	178.3	E.
9	07	40	22.2	Near northern tip of Mindanao, Philippine Islands. Depth about 100 km.	9.0	N.	126.5	E.
9	10	25	40.3	New Britain region. Depth about 72 km	5.9	S.	147.0	E.
9	13	25	48.1	Jujuy Province, Argentina. Depth about 184 km	23.3	S.	66.4	W.
9	19	57	23.0	Off coast of El Salvador. Depth about 33 km	12.8	N.	91.1	W.
10	02	59	44.8	Loyalty Islands region. Depth about 31 km	20.9	S.	170.8	E.
10	12	37	28*	Near Ferndale, Calif. Felt. Mag. 3.8 (Brk)	40 23	N.	124 25	W.
10	13	53	57.5	Bonin Islands region. Depth about 363 km	30.1	N.	138.7	E.
10	17	24	51.3	Loyalty Islands region. Depth about 309 km	24.7	S.	170.6	E.
11	00	52	47.3	Vancouver Island region. Depth about 25 km	49.7	N.	129.3	W.
11	02	05	43.3	New Hebrides Islands. Depth about 85 km	19.0	S.	168.8	E.
11	04	35	00.6	Fiji Islands region. Depth about 370 km	19.6	S.	177.7	W.
11	07	15	41.4	Central Yugoslavia. 10 injured, extensive damage at Sarajevo. Felt along coast to Trieste, Italy. Depth about 33 km. Mag. 5-5¼ (Pal).	43.6	N.	18.3	E.
11	08	51	27.4	Central Yugoslavia. Depth about 21 km	43.6	N.	18.3	E.
11	12	54	56.6	Sonora, Mexico. Depth about 33 km	28.0	N.	109.2	W.
11	17	02	09.8	Santa Cruz Islands. Depth about 46 km	10.4	S.	165.0	E.
11	21	46	46.7	Mariana Islands region. Depth about 45 km	17.0	N.	147.3	E.

See footnote at end of table.

TABLE 2.—*Summary of instrumental epicenters for 1962*—Continued

1962	Origin Time G.M.T.			Region, focal depth, and remarks	Coordinates of provisional epicenter			
					Latitude		Longitude	
	h	*m*	*s*		° ′		° ′	
June 12	01	26	41.4	Off coast of Iceland. Depth about 33 km	67.9	N.	12.3	W.
12	02	37	02.7	Gulf of California. Depth about 33 km	30.3	N.	113.2	W.
12	09	46	30.3	Iceland. Depth about 33 km	65.0	N.	16.7	W.
12	13	45	40.6	Santa Cruz Islands region. Depth about 233 km	13.2	S.	167.2	E.
13	12	14	10.0	Central Utah. Depth about 33 km	39.5	N.	110.5	W.
13	19	08	46.6	Tongo Islands region. Depth about 33 km	24.0	S.	176.5	W.
14	07	51	53.3	Komandorskie Islands region. Depth about 30 km. Mag. 6-6¼	54.4	N.	169.1	E.
14	07	55	51.8	Komandorskie Islands region. Depth about 60 km. Mag. 6	54.3	N.	169.2	E.
14	08	30	51.4	Leeward Islands region. Depth about 57 km	19.3	N.	64.9	W.
14	15	07	50.4	Adriatic Sea. Depth about 33 km	44.1	N.	14.6	E.
14	17	14	23.2	Komandorskie Islands region. Depth about 63 km	54.2	N.	169.2	E.
14	20	18	06.2	Ecuador-Peru border region. Depth about 160 km	1.9	S.	76.9	W.
14	22	14	14.2	Ryukyu Islands region. Depth about 33 km	26.4	N.	126.0	E.
15	06	30	35.7	Near coast of northern Chile. Depth about 33 km. Mag. 5 (Pal)	20.5	S.	70.6	W.
15	11	56	19.3	Santa Cruz Islands region. Depth about 211 km	13.3	S.	167.0	E.
15	12	10	20.5	Tonga Islands region. Depth about 147 km	21.4	S.	175.0	W.
15	17	31	56.2	Solomon Islands. Depth about 112 km	10.3	S.	161.6	E.
15	21	29	32.4	Off southeast coast of Hokkaido, Japan. Depth about 25 km	42.6	N.	143.6	E.
16	05	21	15.0	Ryukyu Islands. Depth about 33 km	26.2	N.	126.0	E.
16	06	27	34.8	Molucca Sea. Depth about 191 km	0.1	S.	122.8	E.
16	11	10	46.0	Near coast of Honduras and El Salvador border. Depth about 33 km.	13.3	N.	87.3	W.
16	14	13	34.3	Near coast of central Peru. Depth about 31 km	9.7	S.	79.1	W.
16	17	48	47.1	New Hebrides Islands. Depth about 25 km	16.6	S.	167.7	E.
16	21	42	07.3	Gulf of Aden. Depth about 33 km	14.3	N.	53.6	E.
17	04	27	43.2	Indian Ocean, north of Crozet Island. Depth about 33 km	40.1	S.	46.0	E.
17	04	39	30.1	Kashmir. Felt at Rawalpindi and Lahore. Depth about 34 km	33.1	N.	75.9	E.
17	13	22	16.5	Santa Cruz Islands. Depth about 59 km	10.9	S.	165.9	E.
17	14	26	29.7	Sinkiang Province, China. Depth about 50 km	43.2	N.	88.0	E.
17	14	33	55.9	Jujuy-Salta Provinces, Argentina. Depth about 205 km	23.8	S.	66.7	W.
17	20	12	03.0	Off coast of Jalisco, Mexico. Depth about 33 km	18.1	N.	109.0	W.
17	22	28	10.3	Rat Islands, Aleutian Islands. Depth about 33 km	52.1	N.	177.3	E.
18	06	21	06.1	Cook Inlet region, Alaska. Felt at Homer. Depth about 174 km	60.5	N.	153.7	W.
18	12	27	02.7	Andreanof Islands, Aleutian Islands. Depth about 65 km	52.4	N.	174.6	W.
18	13	22	04.1	Near east coast of Nicaragua. Depth about 33 km	14.5	N.	83.0	W.
18	16	59	11.7	Near north coast of New Guinea. Depth about 25 km	0.8	S.	133.8	E.
18	23	42	37.1	New Britain region. Depth about 100 km. Mag. 6¾	4.9	S.	152.0	E.
19	00	47	32.0	Southern Utah. Depth about 33 km	37.5	N.	112.5	W.
19	00	59	14.8	Off south coast of Panama. Depth about 33 km	6.3	N.	82.6	W.
19	03	32	01.8	New Britain. Depth about 130 km	5.6	S.	151.5	E.
19	15	45	03.2	Tonga Islands region. Depth about 29 km	17.0	S.	172.5	W.
19	16	39	21.4	Fiji Islands region. Depth about 405 km	20.9	S.	177.8	W.
20	00	05	47.3	Tonga Islands. Depth about 226 km	19.3	S.	175.6	W.
20	02	16	04.9	Loyalty Islands region. Depth about 109 km	20.7	S.	169.5	E.
20	04	34	41.1	Off northwest coast of Hokkaido, Japan. Depth about 287 km	46.4	N.	143.3	E.
20	06	16	24.3	Banda Sea. Depth about 291 km	7.0	S.	126.7	E.
20	13	44	44.0	Off coast of central Oregon. Depth about 33 km	44.8	N.	129.9	W.
20	19	25	57.2	----do----	44.6	N.	130.1	W.
20	22	59	04.7	Near coast of Chiapas, Mexico. Depth about 119 km	14.9	N.	92.6	W.
21	02	06	47.7	Southern Quebec, Canada. Felt in southern Quebec and northern Vermont. Depth about 33 km (Ott).	45 22	N.	72 42	W.
21	03	23	25.8	Celebes Sea. Depth about 636 km	4.6	N.	122.8	E.
21	04	43	43.3	South of Panama. Depth about 23 km. Mag. 6¼	5.7	N.	82.6	W.
21	05	13	17.3	Near south coast of Panama. Depth about 58 km	8.1	N.	82.8	W.
21	07	55	46.0	Alaska. Depth about 32 km	61.3	N.	153.4	W.
21	12	05	51*	Northwest of San Bernardino, Calif. Felt. Mag. 2.8	34 12	N.	117 25	W.
21	08	38	28.4	Tonga Islands. Depth about 67 km	20.8	S.	175.6	W.
21	10	19	05.6	Fiji Islands region. Depth about 587 km	19.9	S.	177.9	W.
21	15	40	23.4	Ecuador. Depth about 194 km	1.2	S.	77.4	W.
21	15	56	21.1	Near east coast of Kamchatka. Depth about 42 km	53.0	N.	159.1	E.
21	16	45	19.6	Solomon Islands. Depth about 69 km	7.0	S.	155.7	E.
21	18	58	19.4	Near coast of Chile. Depth about 50 km	38.7	S.	72.4	W.
21	22	52	51.7	Tanimbar Island region. Depth about 33 km	7.5	S.	129.9	E.

See footnote at end of table.

TABLE 2.—*Summary of instrumental epicenters for 1962*—Continued

1962	Origin Time G.M.T.			Region, focal depth, and remarks	Coordinates of provisional epicenter			
					Latitude		Longitude	
	h	*m*	*s*		° ′		° ′	
June 22	08	16	46.4	New Hebrides Islands. Depth about 242 km	18.8	S.	169.7	E.
22	11	48	56.8	Off east coast of Honshu, Japan. Depth about 33 km	32.2	N.	142.2	E.
22	14	55	41.1	Near northeast coast of New Guinea. Felt at Lae, Wau, and Bulolo. Depth about 93 km.	7.0	S.	147.0	E.
22	17	57	19.7	Fiji Islands region. Depth about 609 km	17.2	S.	178.8	W.
23	04	23	42.8	Near east coast of Honshu, Japan. Felt. Depth about 60 km	37.1	N.	141.3	E.
23	05	04	59.2	Persian Gulf. Depth about 40 km	29.7	N.	49.2	E.
23	09	44	38.9	Ryukyu Islands. Depth about 33 km. Mag. 5 3/4 (Brk)	25.5	N.	128.3	E.
23	09	58	27.0	Near north coast of Luzon, Philippine Islands. Felt at Calayan and Aparri. Depth about 45 km.	19.2	N.	121.3	E.
23	15	03	16.7	Near coast of Chile. Felt. Depth about 42 km	33.5	S.	72.3	W.
23	17	11	04.0	Western Colorado. Depth about 33 km	38.5	N.	108.5	W.
24	01	21	17.9	Yunnan Province, China. Depth about 33 km	25.6	N.	101.2	E.
24	01	43	50.6	Fiji Islands region. Depth about 527 km	17.3	S.	178.9	W.
24	03	01	47.6	New Guinea. Felt at Lae and Kaiapit. Depth about 50 km	6.8	S.	146.8	E.
24	11	56	24.7	Kermadec Islands region. Depth about 52 km	27.7	S.	177.1	W.
24	14	13	02.4	Near east coast of Kamchatka. Depth about 24 km	55.8	N.	162.6	E.
24	15	08	18.6	Gulf of Aden. Depth about 33 km	13.0	N.	48.6	E.
24	17	03	14.9	New Hebrides Islands. Depth about 130 km	15.3	S.	167.6	E.
25	01	31	41.9	Fiji Islands region. Depth about 645 km	20.8	S.	179.2	W.
25	02	49	01.6	Near coast of northern Chile. Depth about 40 km	20.6	S.	70.8	W.
25	06	26	49.3	Near coast of southern Chile. Depth about 36 km	37.4	S.	73.3	W.
25	11	10	26.0	Near coast of Formosa. Felt. Depth about 33 km. Mag. 5¾	24.2	N.	122.5	E.
25	12	49	44.0	Celebes Sea. Depth about 26 km	3.7	N.	126.4	E.
25	18	58	35.6	Near east coast of Nicaragua. Depth about 25 km. Mag. 4½-4¾ (Pal).	14.5	N.	82.4	W.
25	22	58	12.8	Svalbard region. Depth about 33 km	76.0	N.	9.5	E.
26	02	51	21.7	Ryukyu Islands. Depth about 35 km	27.9	N.	129.2	E.
26	08	05	34.5	Near northeast coast of New Guinea. Depth about 82 km	4.8	S.	146.9	E.
26	09	54	35.1	New Britain region. Depth about 59 km	7.1	S.	149.6	E.
26	14	54	21.4	Bulgaria. Depth about 33 km	42.7	N.	24.0	E.
27	00	19	13.9	Near coast of Black Sea, Georgian S.S.R. Depth about 33 km	43.6	N.	41.2	E.
27	01	28	55.7	Southern Illinois. Felt in Illinois, Kentucky, and Missouri. Depth about 25 km. Mag. 5¼-5½ (Pal).	37.7	N.	88.5	W.
27	03	30	01.9	Near south coast of New Britain. Felt at Kandrian. Depth about 55 km.	6.1	S.	148.8	E.
27	05	11	48.8	Off coast of Oregon. Depth about 33 km	43.0	N.	126.4	W.
27	08	17	50.3	Kermadec Islands. Depth about 69 km	30.0	S.	177.7	W.
27	08	30	42.9	Off coast of Kamchatka. Depth about 33 km	50.2	N.	158.9	E.
27	12	21	40.0	New Britain region. Depth about 110 km	4.6	S.	151.4	E.
27	13	33	20.4	Off coast of southern Chile. Depth about 33 km	39.1	S.	74.5	W.
27	13	38	30.8	Indian Ocean, southwest of Australia. Depth about 33 km	47.9	S.	99.4	E.
27	19	47	28.8	Jujuy Province, Argentina. Depth about 200 km	23.2	S.	66.8	W.
27	23	26	46.7	Near east coast of Formosa. Felt at Ilan and Taitung. Depth about 33 km.	23.8	N.	122.8	E.
28	04	13	51.6	Near southern coast of Kyushu, Japan. Depth about 26 km	31.4	N.	131.3	E.
28	04	27	14.3	Kaoiki Fault System, Hawaii. Slight damage on Hawaii. Also felt on Maui and Oahu. Depth of 5 km. Mag. 6.1.	19 24	N.	155 25	W.
28	06	51	05.6	Southern Albania. Felt in Albania and Greece. Depth about 40 km.	40.7	N.	20.7	E.
28	11	02	50.5	Molucca Sea. Depth about 72 km	2.4	S.	127.7	E.
28	11	17	48.6	Near south coast of Java. Depth about 94 km	7.7	S.	107.9	E.
28	17	51	01.5	Near coast of northern Hokkaido, Japan. Depth about 55 km	43.8	N.	144.5	E.
28	18	50	27.5	Molucca Sea. Depth about 58 km	0.2	S.	124.3	E.
28	20	47	30.3	Tonga Islands. Depth about 223 km	17.8	S.	175.1	W.
29	00	52	12.0	New Hebrides Islands. Felt on Santo. Depth about 122 km	15.1	S.	166.9	E.
29	03	30	18.8	Sandwich Islands. Depth about 25 km	56.2	S.	26.9	W.
29	10	28	46.6	Southeast of Easter Island. Depth about 25 km	35.2	S.	106.0	W.
29	12	09	32.5	New Hebrides Islands. Depth about 44 km	17.9	S.	167.8	E.
29	13	49	16.9	Banda Sea. Depth about 80 km	7.9	S.	127.3	E.
29	15	48	11.9	Off coast of northern Honshu, Japan. Depth about 33 km	38.2	N.	143.1	E.
29	16	28	07.1	Southern Alaska. Felt at Anchorage. Depth about 50 km. Mag. 4¾ (Brk).	62.4	N.	152.0	W.

See footnote at end of table.

TABLE 2.—*Summary of instrumental epicenters for 1962*—Continued

1962	Origin Time G.M.T.	Region, focal depth, and remarks	Coordinates of provisional epicenter	
			Latitude	Longitude
	h m s		° ′	° ′
June 29	20 58 19.3	South Indian Ocean. Depth about 33 km	41.9 S.	79.8 E.
29	22 35 21.0	Off coast of Guerrero, Mexico. Depth about 33 km	15.3 N.	105.2 W.
29	22 35 42.3	Western Iran. Felt at Shushtar and Masjed Soleyman. Depth about 52 km.	32.0 N.	48.8 E.
30	01 09 47.7	Off east coast of Honshu, Japan. Depth about 52 km	34.0 N.	141.5 E.
30	09 45 50.2	Southern Iran. Depth about 25 km	27.6 N.	57.7 E.
30	19 29 57.9	Near east coast of Luzon, Philippine Islands. Felt. Depth about 82 km.	16.3 N.	122.1 E.
July 1	01 32 11.0	New Hebrides Islands. Depth about 156 km	14.1 S.	167.2 E.
1	01 56 15.6	New Ireland region. Depth about 24 km	3.8 S.	150.4 E.
1	03 37 36.2	Sikang Province, China. Depth 25 km	30.1 N.	102.8 E.
1	05 07 37.0	Tonga Islands region. Depth about 25 km	23.8 S.	176.9 W.
1	11 46 29.8	Caspian Sea. Depth about 46 km	40.8 N.	49.9 E.
1	13 35 05.1	Tonga Islands region. Depth about 65 km	15.7 S.	172.6 W.
1	21 23 41.7	Sinkiang Province, China. Depth about 25 km	40.0 N.	75.4 E.
2	08 32 43.1	Santa Cruz Islands. Felt on Vanikoro. Depth about 114 km. Mag. 6½–6¾.	10.6 S.	166.0 E.
2	15 42 22.1	Celebes region. Depth about 136 km	0.2 S.	123.1 E.
3	03 16 55.6	Hindu Kush. Depth about 200 km	36.7 N.	70.9 E.
3	06 23 36.0	Tonga Islands region. Depth about 25 km	17.5 S.	173.2 W.
3	06 31 08.5	Iran. Depth about 25 km	28.0 N.	56.2 E.
3	08 34 28.5	Tonga Islands region. Depth about 25 km	17.2 S.	170.8 W.
3	18 13 35.6	South Pacific Ocean. Depth about 25 km	56.3 S.	142.5 W.
3	18 22 06.3	----do----	54.6 S.	132.3 W.
3	20 59 04.8	New Hebrides Islands. Depth about 23 km	17.8 S.	167.8 E.
3	21 17 00.2	Mid-Atlantic Ocean. Depth about 33 km	3.8 N.	31.7 W.
4	07 07 53.7	Off coast of Guatemala. Depth about 25 km	14.3 N.	93.2 W.
4	07 57 45.3	About 600 km south of Greenland. Depth about 25 km	54.5 N.	36.7 W.
4	12 55 52.9	Off coast of southern Chile. Depth about 25 km	44.0 S.	79.2 W.
4	17 00 53.5	New Hebrides Islands. Depth about 62 km	14.9 S.	167.8 E.
4	23 17 38.0	Kermadec Islands. Depth about 25 km	28.5 S.	177.5 W.
5	07 32 33.2	Santa Cruz Islands. Felt on Vanikoro. Depth about 33 km	11.3 S.	166.5 E.
5	10 32 28.8	New Guinea. Depth about 25 km	0.6 S.	139.0 E.
5	12 09 28.5	Macquarie Island region. Depth about 25 km	54.9 S.	156.3 E.
5	17 40 55.3	South of Honshu, Japan. Depth about 23 km	30.9 N.	141.4 E.
5	20 49 29.4	Off coast of Sinaloa, Mexico. Depth about 33 km	23.9 N.	107.7 W.
6	01 15 34.8	South of Honshu, Japan. Depth about 62 km	32.6 N.	139.7 E.
6	02 12 12.0	Arabian Sea, east of Socotra. Depth about 33 km	11.6 N.	57.5 E.
6	09 16 15.0	Ionian Islands. Felt. Depth about 30 km. Mag. 5 (Pal)	38.0 N.	20.2 E.
6	12 12 03.1	Tonga Islands region. Depth about 36 km	16.6 S.	173.6 W.
6	13 27 52.1	Kermadec Islands region. Depth about 25 km	25.0 S.	176.7 W.
6	15 11 21.8	Northern Ryukyu Islands. Depth about 25 km	30.5 N.	130.8 E.
6	15 54 36.4	Ionian Sea. Depth about 129 km	37.9 N.	20.2 E.
6	18 40 59.4	Kenai Peninsula, Alaska. Felt at Homer and Kenai. Depth about 67 km.	60.3 N.	152.1 W.
6	23 05 32.2	Hindu Kush. Felt in Afghanistan, Pakistan, and Tadzhik S.S.R. Minor damage. Depth about 203 km. Mag. 6 (Pal).	36.6 N.	70.4 E.
7	03 00 22.6	Tibet. Depth about 25 km	30.7 N.	84.4 E.
7	06 12 48.9	Rat Islands, Aleutian Islands. Depth about 60 km	51.3 N.	178.6 E.
7	07 14 35.3	Rat Islands, Aleutian Islands. Depth about 61 km	51.1 N.	178.9 E.
7	08 18 07*	North-northeast of Ukiah, Calif. Either this shock or following shock felt at Redwood Valley. Mag. 2.6 (Brk).	38.4 N.	123.1 W.
7	08 19 00*	North-northeast of Ukiah, Calif. Mag. 2.7 (Brk)	38.4 N.	123.1 W.
7	11 47 19.4	Banda Sea. Depth about 30 km	7.3 S.	128.3 E.
7	12 47 07.7	Ionian Sea. Depth about 33 km	37.5 N.	19.8 E.
7	19 04 16.7	Santa Cruz Islands. Depth about 25 km	11.3 S.	164.8 E.
7	21 20 57.7	Near south coast of Kamchatka. Depth about 33 km	51.9 N.	158.6 E.
8	02 25 55.8	Near coast of southern Peru. Depth about 88 km	14.4 S.	75.5 W.
8	03 22 07.3	Rat Islands, Aleutian Islands. Depth about 91 km	51.3 N.	178.7 E.
8	04 03 56.8	Sandwich Islands. Depth about 25 km	55.5 S.	30.1 W.
8	05 29 12.0	Ecuador. Depth about 21 km	2.6 S.	78.0 W.
8	07 30 49.7	North Atlantic Ocean. Depth about 25 km	8.1 N.	38.0 W.
8	12 02 33.2	Fiji Islands. Depth about 600 km	22.0 S.	179.8 W.

See footnote at end of table.

TABLE 2.—*Summary of instrumental epicenters for 1962*—Continued

1962	Origin Time G.M.T.	Region, focal depth, and remarks	Coordinates of provisional epicenter	
			Latitude	Longitude
	h m s		° ′	° ′
July 8	13 00 23.7	Guerrero, Mexico. Depth about 192 km	18.1 N.	99.9 W.
8	15 58 15.8	Southern Nevada. Depth about 33 km	37.7 N.	115.2 W
8	17 20 01.2	Celebes. Depth about 58 km	0.3 S.	121.8 E.
8	22 54 44.7	Kermadec Islands region. Depth about 25 km	28.1 S.	176.5 W.
8	23 21 51.5	Near east coast of Kamchatka. Depth about 22 km	54.0 N.	160.5 E.
9	09 59 07.8	Macquarie Island region. Depth about 25 km	56.0 S.	158.1 E.
9	13 53 00.0	Kurile Islands. Depth about 66 km	44.0 N.	147.8 E.
10	04 21 12.9	Off coast of central Chile. Depth about 33 km	39.1 S.	74.2 W.
10	05 12 06.4	Fiji Islands. Depth about 584 km	20.8 S.	178.7 W.
10	10 06 04.5	Aegean Sea. Felt on Chios and Lesbos. Depth about 33 km	38.6 N.	26.1 E.
10	12 56 03.8	Tonga Islands. Depth about 333 km	22.3 S.	177.2 W.
10	19 21 36.9	Central Peru. Depth about 46 km	6.5 S.	75.2 W.
11	01 03 59.3	Afghanistan. Depth about 25 km	31.8 N.	66.9 E.
11	07 17 27.4	Kamchatka. Depth about 69 km	53.2 N.	159.6 E.
11	12 40 30.7	Panay, Philippine Islands. Felt. Depth about 25 km	11.9 N.	122.1 E.
11	13 58 28.8	Colombia. Felt at Bogota. Depth about 132 km	7.0 N.	73.1 W.
11	16 52 44.8	Kermadec Islands region. Depth about 37 km	31.9 S.	178.5 W.
12	01 40 37.9	Tonga Islands region. Depth about 321 km	19.9 S.	177.5 W.
12	08 16 42.0	Luzon, Philippine Islands. Depth about 95 km	18.9 N.	121.4 E.
12	09 33 21.8	Fiji Islands region. Depth about 545 km	17.9 S.	178.7 W
12	22 50 58.8	South Pacific Ocean. Depth about 25 km. Mag. 5 (Pal)	3.9 S.	104.1 W.
13	03 31 56.6	Panay, Philippine Islands. Felt. Depth about 52 km	9.9 N.	122.6 E.
13	04 10 49.9	Kermadec Islands region. Depth about 87 km	32.4 S.	179.7 W.
13	05 01 08.6	Tibet-India border. Depth about 25 km	30.5 N.	79.6 E.
13	22 19 23.3	Komandorskie Islands region. Depth about 59 km	56.2 N.	164.0 E.
13	22 55 48.4	Peru. Depth about 91 km	11.9 S.	75.1 W.
14	01 02 57.5	Rat Islands, Aleutian Islands. Depth about 72 km	51.5 N.	179.1 E.
14	02 23 42.6	Southern Missouri. Depth about 18 km	36.4 N.	89.8 W.
14	06 44 26.5	Iran. Depth about 30-km	27.3 N.	56.7 E.
14	15 58 53.7	Tibet-India border. Depth about 40 km	30.4 N.	79.5 E.
14	19 43 50*	Off coast of northern California. Felt in Humboldt County. Mag. 5.0 (Brk).	40 17 N.	124 41 W.
14	20 23 14.6	Southern Mexico. Depth about 25 km	16.9 N.	99.1 W.
14	20 38 01.3	Kurile Islands. Depth about 60 km	50.2 N.	155.8 E.
14	23 34 33.7	Mariana Islands. Depth about 198 km	18.7 N.	145.5 E.
15	06 47 22.5	Honshu, Japan. Depth about 103 km	39.8 N.	140.9 E.
15	08 06 24.7	New Hebrides Islands region. Depth about 632 km	14.1 S.	172.2 E.
15	09 33 42.9	Mariana Islands region. Depth about 57 km	14.6 N.	146.5 E.
15	11 59 21.9	Wyoming-Montana border. Felt in Yellowstone National Park. Depth about 25 km.	45.0 N.	110.2 W.
15	12 37 38.0	Tonga Islands. Depth about 33 km	20.2 S.	173.7 W.
15	14 43 50.1	Near coast of Peru. Depth about 80 km	9.3 S.	78.9 W.
15	15 12 44.1	Honshu, Japan. Depth about 55 km	40.2 N	142.4 E.
15	17 03 13.9	Andreanof Islands, Aleutian Islands. Depth about 25 km	51.3 N.	178.4 W.
15	19 34 09.4	Loyalty Islands. Depth about 24 km	20.3 S.	169.2 E.
15	21 52 24.5	Gulf of Aden. Depth about 33 km	14.3 N.	53.3 E.
16	02 04 52.6	South of Tasmania. Depth about 14 km	52.1 S.	138.9 E.
16	04 49 21.5	Near coast of Peru. Depth about 75 km	11.2 S.	79.8 W.
16	06 17 04.4	Bonin Islands region. Depth 38 km	28.2 N.	142.5 E.
16	07 03 50.5	Southern Greece. Felt. Depth about 99 km	38.2 N.	22.6 E.
16	07 50 09.8	Fiji Islands region. Depth about 519 km	17.8 S.	178.4 W.
16	08 28 10.8	Santa Cruz Islands. Felt on Vanikoro. Depth about 57 km	11.8 S.	166.4 E.
16	09 25 58.7	New Hebrides Islands region. Felt on Banks Islands. Depth about 208 km.	13.2 S.	167.1 E.
16	12 54 40.6	Southern Alaska. Felt. Depth about 39 km. Mag. 6 (Pal)	62.3 N.	153.1 W.
16	16 16 40.9	850 km south of Easter Island. Depth about 25 km	34.8 S.	108.6 W.
16	20 07 13.4	Tonga Islands region. Depth about 114 km	19.9 S.	175.7 W.
17	00 18 14.5	Fiji Islands. Depth about 538 km	17.3 S.	178.8 W.
17	04 12 45.4	Nicaragua. Depth about 25 km	11.6 N.	87.1 W.
17	05 32 08.8	Near coast of southern Chile. Depth about 26 km	43.0 S.	74.9 W.
17	07 53 27*	Near Tinemaha, California. Felt at Laws and Bishop. Mag. 3.8	37 20 N.	118 17 W.
17	09 40 51.0	Near coast of Chiapas, Mexico. Depth about 33 km	14.5 N.	93.0 W.
17	15 53 37.4	New Hebrides Islands. Depth about 164 km	15.7 S.	168.2 E.

See footnote at end of table.

TABLE 2.—*Summary of instrumental epicenters for 1962*—Continued

1962	Origin Time G.M.T.	Region, focal depth, and remarks	Coordinates of provisional epicenter	
			Latitude	Longitude
	h m s		° ′	° ′
July 17	17 20 22.9	Hokkaido, Japan. Depth about 30 km. Mag. 4¾-5 (Pal)	43.1 N.	144.5 E.
17	23 12 09.9	New Britain region. Depth about 42 km	7.8 S.	148.1 E.
18	00 13 22.6	Panay, Philippine Islands. Depth about 164 km	11.2 N.	121.9 E.
18	01 21 02.8	New Britain region. Felt at Rabaul. Depth about 51 km	4.3 S.	152.9 E.
18	05 53 48.1	Sumba. Depth about 68 km	9.6 S.	119.8 E.
18	09 23 33.2	Flores Sea. Depth about 533 km	7.3 S.	119.7 E.
18	10 10 12.7	Mariana Islands region. Depth about 16 km	15.3 N.	148.1 E.
18	14 41 45.0	Tonga Islands region. Depth about 218 km	21.5 S.	175.8 W.
19	00 52 13.9	New Britain region. Depth about 49 km	5.1 S.	153.6 E.
19	03 39 45.3	Tonga Islands region. Depth about 15 km	17.3 S.	173.3 W.
19	12 02 31.3	Bolivia-Chile border region. Depth about 160 km	20.6 S.	68.7 W.
19	22 05 45.0	Honshu, Japan. Depth about 93 km	39.8 N.	140.7 E.
20	04 36 41.0	Fox Islands, Aleutian Islands. Depth about 25 km	51.5 N.	173.6 W.
20	09 02 03*	Near Dixie Valley, Nev. Felt. Mag. 4.9 (Brk)	39.8 N.	118.1 W.
20	16 27 20.9	Tonga Islands region. Depth about 28 km	21.0 S.	174.8 W.
20	17 15 24*	Off coast of northern California near Punta Gorda. Felt Mag. 4.1 (Brk).	40 15 N.	124 25 W.
20	23 31 37.8	Banda Sea. Depth about 297 km	5.6 S.	128.7 E.
21	03 07 03.5	Northern Iran. Depth about 33 km	37.0 N.	55.4 E.
21	17 28 42.7	Hindu Kush. Depth about 107 km	36.5 N.	71.6 E.
22	00 16 07.2	Western New Guinea. Depth about 104 km	3.2 S.	137.5 E.
22	00 21 00.8	North of Franz Josef Land. Depth about 33 km	86.9 N.	50.8 E.
22	00 21 30.9	New Britain region. Depth about 81 km	5.9 S.	151.7 E.
22	13 36 56.6	Solomon Islands. Depth about 144 km	8.5 S.	158.9 E.
22	18 09 57.7	South of Fiji Islands. Depth about 634 km	24.0 S.	180.0
22	23 49 27.0	Bismarck Sea. Depth about 28 km	3.5 S.	145.6 E.
23	01 12 52.6	Off coast of Costa Rica. Depth about 44 km	10.7 N.	86.5 W.
23	06 05 18.4	Southern Missouri. Felt in Arkansas, Missouri, and Tennessee. Depth about 18 km.	36.1 N.	89.8 W.
23	07 19 35.0	Northern Chile. Depth about 193 km	22.9 S.	67.8 W.
23	22 11 54.6	Virgin Islands region. Felt on St. Thomas and in eastern Puerto Rico. Depth about 25 km.	19.0 N.	65.1 W.
23	23 09 12.4	New Hebrides Islands. Felt on Santo. Depth about 99 km	14.1 S.	166.8 E.
24	03 59 35.4	Costa Rica. Depth about 173 km	11.2 N.	85.7 W.
24	16 23 10.8	Sulu Sea. Depth about 21 km	10.3 N.	121.5 E.
24	21 08 22.1	Mexico-Guatemala border region. Depth about 131 km. Mag. 5½ (Brk).	15.4 N.	92.5 W.
25	00 11 52.2	Near coast of southern Peru. Depth about 46 km	14.4 S.	76.1 W.
25	04 37 46.5	West of Jamaica. Depth about 33 km. Mag. 6	19.0 N.	81.2 W.
25	06 05 15.9	Near coast of southern Peru. Depth about 100 km	14.3 S.	75.5 W.
25	06 55 56.7	Near coast of southern Peru. Depth about 33 km	16.3 S.	75.0 W.
26	02 33 17.8	Off coast of northern Peru. Depth about 33 km	4.7 S.	80.9 W.
26	04 23 11.9	Kurile Islands. Depth about 35 km	47.1 N.	153.9 E.
26	05 02 14.0	New Britain. Depth about 93 km	5.5 S.	151.1 E.
26	07 01 01.8	New Britain. Depth about 71 km	5.3 S.	150.8 E.
26	08 14 44.8	South of Panama. Felt at Balboa Heights, C.Z. Depth about 33 km. Mag. 6¾.	7.4 N.	82.7 W.
26	21 32 17.9	Sandwich Islands region. Depth about 25 km	56.4 S.	25.7 W.
27	01 16 50.8	North of Mariana Islands. Depth about 100 km	21.7 N.	144.4 E.
27	04 18 57*	Near Bear Mountain, Calif. Felt at Keene. Mag. 2.8	35 12 N.	118 37 W.
27	06 11 55.3	New Hebrides Islands. Felt on Santo. Depth about 205 km	14.8 S.	167.6 E.
27	11 51 41.0	New Hebrides Islands. Depth about 139 km	15.5 S.	167.2 E.
27	12 38 35.1	Andreanof Islands, Aleutian Islands. Depth about 60 km	51.6 N.	174.1 W.
27	19 26 34.6	Santa Cruz Islands region. Depth about 286 km	13.2 S.	167.1 E.
28	00 05 10.8	Samoa Islands region. Felt at Apia. Depth about 40 km. Mag. 5½ (Pal).	16.2 S.	173.2 W.
28	02 32 26.0	Ecuador. Depth about 110 km	4.1 S.	79.7 W.
28	06 02 12.6	San Juan Province, Argentina. Depth about 53 km	31.6 S.	71.4 W.
28	12 17 36.5	Southern Greece. Depth about 113 km	37.8 N.	21.3 E.
28	13 58 39.3	Near coast of Chiapas, Mexico. Depth about 63 km. Mag. 4½ (Pal).	14.3 N.	93.0 W.
28	19 43 00.3	Off east coast of Honshu, Japan. Depth about 39 km	36.9 N.	141.9 E.
28	20 46 26.0	Kurile Islands. Depth about 32 km	44.6 N.	148.6 E.

See footnote at end of table.

TABLE 2.—*Summary of instrumental epicenters for 1962*—Continued

1962	Origin Time G.M.T.			Region, focal depth, and remarks	Coordinates of provisional epicenter			
					Latitude		Longitude	
	h	*m*	*s*		° ′		° ′	
July 28	21	54	42.4	Hokkaido, Japan. Depth about 48 km	42.5	N.	142.8	E.
29	03	37	24.4	Ryukyu Islands. Depth about 184 km	25.5	N.	125.4	E.
29	08	57	46.1	Kwangtung Province, China. Felt at Hong Kong. Depth about 65 km.	23.6	N.	114.3	E.
29	18	19	49.9	South Island, New Zealand. Depth about 75 km	41.4	S.	173.2	E.
30	00	46	31.7	Near coast of southern Chile. Depth about 30 km	37.1	S.	72.4	W.
30	06	58	35.6	Ecuador-Peru. Depth about 146 km	2.5	S.	77.0	W.
30	10	19	38.3	Near coast of Chiapas, Mexico. Depth about 46 km. Mag. 4½–5 (Pal).	14.6	N.	93.1	W.
30	10	51	03.2	Honshu, Japan. Depth about 37 km	39.7	N.	141.8	E.
30	14	04	38.2	Tonga Islands. Depth about 33 km	19.8	S.	176.9	W.
30	17	16	47.4	Near north coast of New Guinea. Felt. Depth about 33 km. Mag. 6¾–7.	3.4	S.	143.7	E.
30	18	57	50.7	Central Colombia. Depth about 204 km	6.6	N.	73.0	W.
30	20	18	52.3	Western Colombia. 47 killed, 300 injured in Caldas Province; property damage over 400,000 square mile area. Felt. at Balboa Heights, C.Z. Depth about 69 km. Mag. 6¾.	5.2	N.	76.4	W.
31	01	25	32.7	Near south coast of Greece. Depth about 109 km	36.5	N.	22.7	E.
31	02	19	08.7	Near north coast of New Guinea. Depth about 33 km	3.1	S.	143.7	E.
31	05	09	17.5	Near coast of Shikoku, Japan. Depth about 33 km	32.5	N.	132.1	E.
31	05	13	04.1	Near north coast of Luzon, Philippine Islands. Depth about 39 km.	18.8	N.	120.8	E.
31	07	22	46.1	Off east coast of Honshu, Japan. Depth about 66 km	40.1	N.	143.0	E.
31	11	25	03.8	Southern Bolivia. Depth about 267 km	19.4	S.	66.7	W.
Aug. 1	03	49	11.9	Kermadec Islands region. Depth about 33 km	27.0	S.	176.4	W.
1	04	28	26.7	Near coast of Mindanao, Philippine Islands. Depth about 33 km.	5.5	N.	125.3	E.
1	04	36	57.6	Near north coast of New Guinea. Felt. Depth about 33 km. Mag. 6½–6¾.	3.2	S.	143.7	E.
1	05	21	25.5	Kermadec Islands region. Depth about 34 km	27.1	S.	176.3	W.
1	10	32	42.7	New Ireland region. Felt at Rabaul. Depth about 51 km	3.8	S.	153.1	E.
1	12	47	46.6	Kermadec Islands region. Depth about 33 km	27.1	S.	176.3	W.
1	15	47	45.5	Tsinghai Province, China. Depth about 25 km	39.1	N.	98.6	E.
1	16	38	57.3	Iraq. Depth about 37 km	36.2	N.	41.5	E.
2	04	41	46.7	Cayman Islands region. Depth about 47 km. Mag. 4¼–4½ (Pal)	19.3	N.	81.0	W.
2	13	26	42.4	New Britain region. Depth about 79 km	4.8	S.	152.1	E.
2	15	32	20.9	West Pakistan. Felt at Rawalpindi. Depth about 33 km	33.4	N.	73.5	E.
2	18	51	21.6	Banda Sea. Depth about 563 km	4.5	S.	125.0	E.
3	04	06	08.4	Western Colombia. Felt at Manizales and Pereira. Depth about 79 km.	5.2	N.	76.4	W.
3	07	37	52.6	Prince Edward Islands region. Depth about 33 km	44.8	S.	34.6	E.
3	08	00	09.8	Rat Islands, Aleutian Islands. Depth about 40 km	51.2	N.	176.4	E.
3	08	56	17.1	Northern Chile-Argentina border. Felt. Depth about 107 km. Mag. 7–7¼	23.3	S.	68.1	W.
3	10	04	44.6	Solomon Islands. Felt at Honiara. Depth about 40 km	10.1	S.	161.2	E.
3	10	16	26.3	Loyalty Islands region. Depth about 33 km	23.2	S.	171.1	E.
3	11	04	03.6	Kirghiz S.S.R. Depth about 25 km	40.9	N.	73.3	E.
3	12	04	59.8	Sandwich Islands region. Depth about 33 km	55.8	S.	27.3	W.
3	18	02	45.8	Hindu Kush. Depth about 209 km	36.6	N.	71.1	E.
3	22	46	19.2	Off coast of Guatemala. Depth about 33 km	12.8	N.	92.8	E.
4	02	49	44.7	Off coast of Guatemala. Depth about 30 km	14.1	N.	93.0	W.
4	05	39	20.7	Tonga Islands region. Depth about 135 km	17.4	S.	174.7	W.
4	06	37	27*	Southwest of San Diego, Calif. Felt at San Diego. Mag. 3.2	32 38	N.	117 18	W.
5	09	08	45.8	Novaya Zemlya. Depth about 0 km. Mag. 5–5¼ (Pal)	74.2	N.	52.5	E.
5	15	08	34.1	New Hebrides Islands. Depth about 60 km	13.7	S.	166.6	E.
6	01	35	30.5	North Atlantic Ocean. Depth about 48 km. Mag. 6¼	32.0	N.	40.8	W.
6	08	41	16.2	Sandwich Islands region. Depth about 42 km	58.2	S.	25.3	W.
6	09	23	30.9	Northern Honshu, Japan. Depth about 60 km	39.7	N.	140.6	E.
6	15	27	20.0	New Hebrides Islands. Felt on Santo. Depth about 120 km	15.3	S.	167.5	E.
6	19	23	07.6	New Britain region. Depth about 39 km	6.1	S.	151.2	E.
6	20	51	56.8	Kermadec Islands region. Depth about 50 km. Mag. 6 (Brk)	26.9	S.	177.1	W.
7	00	25	37.8	New Britain region. Depth about 63 km	5.3	S.	152.4	E.
7	03	01	52.4	Andaman Islands region. Depth about 33 km	12.2	N.	92.5	E.
7	05	15	45.9	Near south coast of Turkey. Depth about 33 km	36.1	N.	30.4	E.
7	06	19	27.9	Fiji Islands region. Depth about 600 km	21.1	S.	179.1	W.

See footnote at end of table.

TABLE 2.—*Summary of instrumental epicenters for 1962*—Continued

1962	Origin Time G.M.T.			Region, focal depth, and remarks	Coordinates of provisional epicenter			
					Latitude		Longitude	
	h	*m*	*s*		° ′		° ′	
Aug. 7	08	44	43.7	Talaud Islands region. Depth about 33 km	4.8	N.	127.8	E.
7	19	22	46.2	Near north coast of Panama. Depth about 33 km	9.6	N.	82.5	W.
7	22	32	35.1	Baja California. Depth about 33 km	31.5	N.	116.1	W.
8	09	19	22.4	Fiji Islands. Depth about 493 km	16.4	S.	179.5	W.
8	10	54	56.3	Fox Islands, Aleutian Islands. Depth about 40 km	52.1	N.	170.5	W.
8	12	00	15.1	New Hebrides Islands. Felt at Port Vila. Depth about 30 km	17.8	S.	168.0	E.
8	12	12	22.5	New Hebrides Islands. Felt at Port Vila. Depth about 33 km	17.9	S.	168.0	E.
8	13	35	11.2	----do	18.0	S.	168.1	E.
8	17	16	31.5	Mariana Islands. Depth about 385 km	18.8	N.	144.8	E.
8	17	55	37.9	Near east coast of Honshu, Japan. Depth about 53 km	37.0	N.	141.5	E.
9	00	21	10.7	Northern Chile. Depth about 160 km	22.4	S.	70.0	W.
9	04	21	55.4	Colombia. Felt. Depth about 180 km	6.7	N.	73.1	W.
9	06	19	51.4	Salta Province, Argentina. Depth about 128 km	24.1	S.	66.5	W.
9	10	44	00.5	Ryukyu Islands. Depth about 198 km	30.1	N.	129.0	E.
9	17	24	48.5	Near coast of southern Chile. Depth about 33 km	44.5	S.	73.4	W.
9	22	31	45.5	Near east coast of Kamchatka. Depth about 33 km	52.1	N.	158.9	E.
10	21	03	59.2	North Atlantic Ocean. Depth about 33 km. Mg. 4½ (Pal)	49.4	N.	27.9	W.
11	01	47	39.6	Fiji Islands. Depth about 638 km	20.0	S.	178.8	W.
11	06	47	41.7	Tonga Islands region. Depth about 157 km	15.7	S.	172.9	W.
11	08	15	43.7	Ryukyu Islands region. Depth about 140 km. Mag. 6	25.2	N.	123.3	E.
11	18	12	53.7	Banda Sea. Depth about 173 km	6.6	S.	130.3	E.
12	03	36	46.5	Santa Cruz Islands. Depth about 24 km	11.4	S.	166.5	E.
12	04	49	28.4	Turkey. Depth about 33 km	37.5	N.	30.7	E.
12	05	13	33.1	Off west coast of Nicaragua. Depth about 33 km	12.2	N.	87.8	W.
12	10	38	01.8	Sandwich Islands region. Depth about 33 km	58.2	S.	25.1	W.
12	19	01	30.7	New Hebrides Islands. Depth about 70 km	19.1	S.	169.1	E.
12	20	35	17.0	Central Chile. Depth about 43 km	36.0	S.	72.4	W.
13	06	35	56.0	Off coast of Ecuador. Depth about 33 km. Mag. 6½-6¾	2.1	N.	83.5	W.
13	10	09	18.4	Off coast of Chiapas, Mexico. Depth about 55 km	14.5	N.	93.0	W.
13	14	44	33.3	Halmahera region. Depth about 33 km	1.9	N.	127.5	E.
13	20	11	41.6	Lake Baikal region. Depth about 33 km	53.8	N.	108.6	E.
14	01	10	50.5	About 500 km north of Macquarie Islands. Depth about 43 km. Mag. 5¼-5½ (Pal).	49.9	S.	163.0	E.
14	07	27	44.8	Iran. Depth about 43 km	28.0	N.	55.6	E.
14	19	54	56.6	Off south coast of Java. Depth about 182 km	9.3	S.	110.3	E.
15	02	45	33.9	South of Honshu, Japan. Depth about 155 km	31.4	N.	139.2	E.
15	03	11	15.7	Komandorskie Islands. Depth about 33 km	55.3	N.	167.0	E.
15	08	19	37.8	Near east coast of Kamchatka. Depth about 52 km	54.6	N.	161.5	E.
15	08	29	46.7	Celebes Sea. Depth about 620 km	4.7	N.	122.6	E.
15	10	06	53.6	Manchuria, China. Depth about 37 km	45.2	N.	132.6	E.
15	11	20	44.5	Andreanof Islands, Aleutian Islands. Felt on Adak. Depth about 53 km.	51.8	N.	177.0	W.
15	13	08	41.2	Socotra Island region. Depth about 28 km	14.6	N.	56.5	E.
15	16	22	12.3	Near coast of central Chile. Depth about 33 km	37.5	S.	73.6	W.
15	20	15	29.9	Fiji Islands region. Depth about 600 km	21.2	S.	179.3	W.
16	08	45	10.4	Mariana Islands. Depth about 111 km	19.4	N.	145.6	E.
17	00	32	26.9	Samoa Islands. Depth about 33 km	15.8	S.	172.9	W.
17	03	07	46.7	Venezuela. Depth about 17 km	7.9	N.	71.4	W.
17	03	23	33.6	San Juan Province Argentina. Felt. Depth about 33 km	31.5	S.	67.9	W.
17	03	56	21.7	Santa Cruz Islands. Depth about 93 km	12.4	S.	166.5	E.
17	05	04	31.5	Panay region, Philippine Islands. 1 killed on Panay Island. Depth about 33 km. Mag. 5¼-5½ (Pal).	10.6	N.	121.6	E.
17	07	26	33.4	Peru-Ecuador border. Depth about 96 km	4.7	S.	79.4	W.
17	11	48	47.3	Fiji Islands region. Depth about 391 km	15.2	S.	178.6	W.
17	16	19	47.3	Fiji Islands region. Depth about 528 km	19.3	S.	177.5	W.
17	22	55	55.4	Samoa Islands region. Depth about 33 km	15.4	S.	172.7	W.
18	02	06	49.2	Loyalty Islands. Depth about 78 km	19.9	S.	170.2	E.
18	04	01	33.5	Fiji Islands region. Depth about 516 km	21.9	S.	179.3	W.
18	04	29	03.7	Turkey. Depth about 113 km	37.0	N.	32.6	E.
18	05	42	02.8	New Ireland region. Depth about 19 km	3.5	S.	150.5	E.
18	06	59	33.2	Off coast of Ecuador. Depth about 33 km	0.8	N.	82.3	W.
18	08	22	13.3	New Britain region. Depth about 82 km	4.7	S.	150.2	E.
18	09	11	23.8	Panay region, Philippine Islands. Depth about 44 km	10.7	N.	121.6	E.

See footnote at end of table.

TABLE 2.—*Summary of instrumental epicenters for 1962*—Continued

1962	Origin Time G.M.T.			Region, focal depth, and remarks	Coordinates of provisional epicenter			
					Latitude		Longitude	
	h	*m*	*s*		° ′		° ′	
Aug. 18	16	43	54.3	South-central Alaska. Felt. Depth about 32 km. Mag. 6–6¼	62.3	N.	152.5	W.
18	17	46	14.9	South-central Alaska. Felt. Depth about 32 km. Mag. 6¼–6½	62.3	N.	152.5	W.
18	20	44	27.2	Loyalty Islands region. Depth about 82 km	22.7	S.	173.1	E.
18	22	49	47.5	Solomon Islands. Depth about 60 km	7.3	S.	156.1	E.
18	23	20	17.6	Andreanof Islands, Aleutian Islands. Depth about 33 km	52.5	N.	172.3	W.
19	00	23	03.9	Bolivia. Depth about 240 km	19.9	S.	66.9	W.
19	02	58	41.8	Hawaii. Felt throughout the Island. Depth about 8 km. Mag. 4.6.	19 18	N.	155 12	W.
19	04	14	10.9	Tonga Islands region. Depth about 33 km	16.1	S.	173.4	W.
19	06	28	39.1	Vancouver Island region. Depth about 33 km	50.6	N.	129.5	W.
19	06	42	29.1	Honshu, Japan. Depth about 49 km	34.8	N.	134.8	E.
19	10	39	44.5	New Britain region. Depth about 33 km	6.8	S.	149.5	E.
19	18	26	38.6	Sinkiang Province, China. Depth about 33 km. Mag. 5¾–6 (Pal)	44.6	N.	81.7	E.
19	21	19	54.6	Celebes Sea. Depth about 552 km	4.5	N.	123.2	E.
19	23	12	53.0	Near coast of northern Chile. Depth about 65 km. Mag. 4¾ (Pal)	26.7	S.	70.3	W.
20	09	02	14.1	Novaya Zemlya. Depth about 0 km. Mag. 4¾ (Pal)	74.3	N.	51.5	E.
20	10	43	23.2	Gulf of California. Depth about 14 km. Mag. 5–5¼	31.1	N.	114.1	W.
20	11	22	39.8	Fiji Islands. Depth about 605 km	20.9	S.	178.8	W.
20	12	58	21.4	Off south coast of Java. Depth about 65 km	12.4	S.	112.0	E.
20	13	15	14.6	Guatemala-Mexico border. Depth about 130 km	15.1	N.	92.2	W.
20	15	15	15.6	Western New Guinea. Depth about 33 km	1.7	S.	133.8	E.
20	23	18	39.8	New Hebrides. Felt on Santo. Depth about 52 km	14.7	S.	166.6	E.
21	02	12	42.0	Off coast of northern California. Depth about 33 km	41.3	N.	127.1	W.
21	02	36	43.6	Central Utah. Depth about 33 km	39.3	N.	111.0	W.
21	02	57	38.6	Off coast of Oregon. Depth about 40 km	42.3	N.	126.6	W.
21	04	28	26.1	Near east coast of Formosa. Depth about 25 km	23.9	N.	121.7	E.
21	16	10	08.7	Kermadec Islands region. Depth about 57 km	28.2	S.	176.7	W.
21	17	04	35.2	Samoa Islands region. Depth about 33 km	15.5	S.	172.6	W.
21	17	30	14.0	Central Alaska. Depth about 42 km	62.4	N.	152.6	W.
21	18	09	06.8	Italy. Depth about 36 km	41.5	N.	15.4	E.
21	18	19	33.3	Italy. 20 dead, 200 injured. Major property damage at Naples. Depth about 34 km. Mag. 6.	41.4	N.	15.5	E.
21	18	44	56.4	Italy. Depth about 31 km	41.2	N.	15.2	E.
21	21	06	00.1	Kermadec Islands region. Depth about 55 km	28.7	S.	176.8	W.
21	21	09	50.3	Easter Island region. Depth about 33 km. Mag. 6¼–6½	29.6	S.	111.9	W.
21	22	04	42.0	Kermadec Islands region. Depth about 55 km	28.8	S.	176.5	W.
22	04	32	29.1	Volcano Islands region. Depth about 29 km	26.1	N.	142.5	E.
22	05	29	26.6	Kermadec Islands region. Depth about 55 km	28.6	S.	176.7	W.
22	09	00	04.2	Novaya Zemlya. Depth about 0 km	74.0	N.	53.3	E.
22	09	12	49.7	Fiji Islands. Depth about 503 km	20.3	S.	177.8	W.
22	11	11	56.3	About 2000 km southwest of Australia. Depth about 33 km	49.7	S.	117.5	E.
22	12	05	54.9	Kermadec Islands region. Depth about 56 km	28.6	S.	176.7	W.
22	14	31	44.2	Easter Island region. Depth about 33 km	29.5	S.	112.3	W.
22	17	33	42.3	Solomon Islands region. Depth about 179 km	6.4	S.	154.1	E.
22	21	08	22.9	Mindanao, Philippine Islands. Depth about 125 km	8.3	N.	123.8	E.
23	03	57	18.0	Komandorskie Islands. Depth about 33 km	55.3	N.	167.3	E.
23	12	35	34.2	Near Islands, Aleutian Islands. Depth about 33 km	51.7	N.	173.8	E.
23	12	46	22.7	Central Alaska. Depth about 25 km	62.2	N.	152.8	W.
23	13	03	44.5	Fiji Islands. Depth about 571 km	17.5	S.	178.7	W.
23	15	29	46.6	Near south coast of Formosa. Depth about 17 km	22.9	N.	120.8	E.
23	16	48	46.3	Fiji Islands. Depth about 587 km	21.4	S.	179.1	W.
23	19	17	26.6	Samoa Islands region. Depth about 33 km	15.6	S.	172.2	W.
23	19	29	13*	Del Norte County, Calif. Felt in northern California and southern Oregon. Moderate damage in Del Norte County. Depth about 33 km. Mag. 5.6 (Brk).	41 51	N.	124 20	W.
23	20	52	51.8	Sandwich Islands region. Depth about 33 km	56.1	S.	26.6	W.
24	01	24	30.0	Chiapas, Mexico. Depth about 174 km	16.6	N.	93.0	W.
24	01	45	35.9	Off east coast of Kamchatka. Depth about 33 km	52.3	N.	160.6	E.
24	03	58	46.2	Santa Cruz Islands. Depth about 32 km	11.2	S.	165.0	E.
24	06	47	08.1	Fiji Islands region. Depth about 526 km	24.5	S.	178.8	E.
24	09	04	22.5	Samoa Islands. Felt at Apia. Depth about 33 km. Mag. 5¼–5½ (Pal).	14.9	S.	173.5	W.
24	13	15	37.0	Peru-Bolivia border region. Depth about 92 km	17.5	S.	70.4	W.

See footnote at end of table.

TABLE 2.—*Summary of instrumental epicenters for 1962*—Continued

1962	Origin Time G.M.T.			Region, focal depth, and remarks	Coordinates of provisional epicenter			
					Latitude		Longitude	
	h	*m*	*s*		° ′		° ′	
Aug. 24	18	15	01.9	Fiji Islands. Depth about 600 km	17.9	S.	178.5	W.
25	00	29	04.9	Kurile Islands region. Depth about 80 km	44.4	N.	148.7	E.
25	02	11	11.5	Off southeast coast of Alaska Peninsula. Depth about 33 km	55.5	N.	155.9	W.
25	08	31	48.7	Fiji Islands. Depth about 561 km. Mag. 6	20.5	S.	178.5	W.
25	15	07	48.4	Near south coast of Honshu, Japan. Depth about 14 km	34.1	N.	139.0	E.
25	15	46	31.5	Near south coast of Honshu, Japan. Depth abolt 113 km	35.1	N.	138.7	E.
25	19	58	47.9	Near coast of Algeria. Depth about 33 km	36.7	N.	1.6	E.
26	00	45	28.5	Santa Cruz Islands. Depth about 135 km	11.3	S.	166.4	E.
26	01	33	36.6	Ryukyu Islands. Depth about 33 km	27.9	N.	129.3	E.
26	06	48	57.1	Near south coast of Honshu, Japan. Felt at Tokyo. Depth about 38 km.	34.0	N.	139.2	E.
26	07	58	37.6	Northern Celebes. Depth about 185 km	0.1	N.	121.3	E.
26	11	02	40.5	Near Islands, Aleutian Islands. Depth about 33 km	52.2	N.	172.3	E.
26	16	30	47.0	Near coast of Algeria. Depth about 15 km	36.5	N.	1.6	E.
26	22	35	13.9	Near south coast of Honshu, Japan. Depth about 54 km	34.3	N.	139.3	E.
26	23	30	38.0	New Guinea. Depth about 50 km	3.7	S.	140.1	E.
27	02	18	58.8	Sea of Japan. Depth about 274 km	40.2	N.	137.8	E.
27	05	59	10.4	Solomon Islands. Depth about 370 km	5.7	S.	154.9	E.
27	09	00	50.9	Novaya Zemlya region. Depth about 0 km. Mag. 4¾ (Pal)	74.7	N.	50.3	E.
27	09	49	49.4	Kurile Islands region. Depth about 33 km	44.1	N.	149.9	E.
27	15	17	56.9	Ryukyu Islands region. Depth about 33 km	27.1	N.	127.4	E.
27	16	20	04.7	Off east coast of Honshu, Japan. Depth about 40 km	38.3	N.	142.4	E.
27	19	12	49.6	Hindu Kush. Depth about 221 km	36.5	N.	70.2	E.
27	22	13	29.6	Santa Cruz Islands. Depth about 220 km	12.3	S.	167.1	E.
27	23	28	45.2	New Britain region. Felt at Walindi. Depth about 48 km	6.0	S.	149.5	E.
27	23	30	10.4	Loyalty Islands region. Depth about 69 km	21.6	S.	171.5	E.
28	00	13	25.6	Near east coast of Honshu, Japan. Depth about 33 km	35.0	N.	140.2	E.
28	00	18	22.8	Near south coast of Honshu, Japan. Depth about 39 km	34.2	N.	139.7	E.
28	00	29	26.4	Near south coast of Honshu, Japan. Depth about 33 km	34.2	N.	139.7	E.
28	00	40	04.9	Samoa Islands region. Depth about 33 km	15.7	S.	173.7	W.
28	02	49	39.9	Near south coast of Honshu, Japan. Depth about 33 km	34.3	N.	139.6	E.
28	08	13	12.4	Near south coast of Honshu, Japan. Depth about 38 km	34.2	N.	139.3	E.
28	08	20	30.2	Off coast of Jalisco, Mexico. Depth about 41 km. Mag. 4¾-5 (Pal).	18.4	N.	105.8	W.
28	10	59	56.3	Southern Greece. 1 killed, 25 injured. Moderate property damage. Felt in southern Italy, Sicily, Crete, Malta, southern Yugoslavia and Egypt. Depth about 100 km Mag. 6¾.	37.8	N.	22.9	E.
28	22	46	00.8	Chagos Islands region. Depth about 33 km	2.2	S.	67.8	E.
29	02	13	08.6	Near south coast of Honshu, Japan. Depth about 33 km	34.9	N.	140.0	E.
29	07	38	18.8	Salta Province, Argentina. Depth about 187 km	24.2	S.	67.1	W.
29	08	50	32.0	Near coast of Michoacan, Mexico. Depth about 33 km	18.0	N.	103.3	W.
29	09	12	00.4	Chagos Islands region. Depth about 33 km	1.9	S.	67.9	E.
29	10	14	12.5	Near south coast of Panama. Felt at Balboa Heights, C.Z. Depth about 33 km.	7.3	N.	80.5	W.
29	11	30	39.3	Northern India. Depth about 36 km	30.9	N.	78.4	E.
29	12	23	20.8	Peru-Brazil border. Depth about 165 km	8.0	S.	73.6	W.
29	15	14	27.5	Near south coast of Honshu, Japan. Depth about 33 km	34.5	N.	139.8	E.
29	17	39	06.0	----do----	34.3	N.	139.5	E.
29	18	32	49.3	Near south coast of Honshu, Japan. Depth about 38 km	34.2	N.	139.5	E.
29	19	41	03.7	Fiji Islands. Depth about 582 km	19.4	S.	178.1	W.
29	20	20	20.5	Near south coast of Honshu, Japan. Depth about 33 km	34.0	N.	139.3	E.
29	22	04	07.8	Near coast of northern Chile. Depth about 33 km	22.6	S.	71.6	W.
29	22	36	53.9	Near south coast of Honshu, Japan. Depth about 33 km	34.1	N.	139.1	E.
30	06	22	27.6	Southern Peru. Depth about 145 km	17.4	S.	69.8	W.
30	06	27	07.4	Near east coast of Italy. Depth about 33 km	44.1	N.	12.5	E.
30	07	46	27.1	Rumania. Depth about 108 km	45.5	N.	26.0	E.
30	11	21	55.1	Near coast east oJ Honshu, Japan. Depth about 33 km	35.1	N.	140.4	E.
30	11	35	08.9	Near south coast of Honshu, Japan. Depth about 33 km	34.0	N.	139.1	E.
30	11	36	11.3	Southern Chile. Felt at Osorno. Depth about 37 km	40.2	S.	72.6	W.
30	12	10	25.1	Near east coast of Italy. Depth about 33 km	42.4	N.	15.0	E
30	13	35	28.7	Northern Utah. Considerable damage in Cache County, Utah. Also felt in Idaho, Wyoming, Nevada, and Colorado. Depth about 37 km. Mag. 5.7.	41.8	N.	111.8	W.

See footnote at end of table.

TABLE 2.—*Summary of instrumental epicenters for 1962*—Continued

1962	Origin Time G.M.T.			Region, focal depth, and remarks	Coordinates of provisional epicenter			
					Latitude		Longitude	
	h	*m*	*s*		° ′		° ′	
Aug. 30	17	17	51.9	Tonga Islands. Depth about 33 km. Mag. 5½ (Brk)	21.2	S.	174.4	W.
30	19	09	15.9	Prince Edward Islands region. Depth about 33 km	47.7	S.	32.6	E.
30	20	16	01.1	Solomon Islands. Depth about 63 km	9.9	S.	161.8	E.
31	09	00	04.8	Fiji Islands region. Depth about 59 km	15.3	S.	177.2	W.
31	10	33	30.2	Fiji Islands region. Depth about 60 km	15.4	S.	177.3	W.
31	16	26	04.6	Near east coast of Kamchatka. Depth about 48 km	52.5	N.	160.7	E.
31	17	02	44.4	Andreanof Islands, Aleutian Islands. Felt on Adak. Depth about 32 km. Mag. 6¾.	51.3	N.	179.7	W.
31	17	56	08.9	Andreanof Islands, Aleutian Islands. Depth about 43 km	51.2	N.	179.9	W.
31	21	23	14.4	Andreanof Islands, Aleutian Islands. Depth about 33 km	51.4	N.	179.8	W.
31	22	37	48*	Near Mission San Diego, Calif. Felt at San Diego. Mag. 2.9	32 49	N.	117 08	W.
Sept. 1	03	46	05.0	Andreanof Islands, Aleutian Islands. Felt on Adak. Depth about 25 km. Mag. 6½.	51.3	N.	179.7	W.
1	03	58	21.5	Andreanof Islands, Aleutian Islands. Depth about 33 km	51.1	N.	180.0	
1	04	41	41.5	Andreanof Islands, Aleution Islands. Felt on Adak. Depth about 37 km.	51.3	N.	179.9	W.
1	04	52	14.5	New Hebrides Islands. Felt on Santo. Depth about 244 km	15.9	S.	168.2	E.
1	07	42	07.4	Andreanof Islands, Aleutian Islands. Depth about 33 km	51.2	N.	180.0	
1	07	51	08.2	Andreanof Islands, Aleutian Islands. Depth about 42 km. Mag. 6½.	51.3	N.	179.9	W.
1	08	47	06.9	Andreanof Islands, Aleutian Islands. Depth about 29 km	51.4	N.	179.8	W.
1	15	01	04.6	Near coast of West Pakistan. Depth about 46 km	25.8	N.	65.3	E.
1	15	53	44*	Near Inglewood, Calif. Felt in Los Angeles County Mag. 3.0	33 57	N.	118 22	W.
1	19	20	38.7	Northwestern Iran. Over 10,000 killed, many injured, 294 villages wrecked or damaged. Depth about 20 km. Mag. 7¼.	35.6	N.	49.9	E.
1	20	27	40.0	Northwestern Iran. Depth about 31 km	35.6	N.	49.4	E.
1	23	43	24.9	Svalbard region. Depth about 19 km	79.0	N.	2.7	E.
2	03	02	29.3	Andreanof Islands, Aleutian Islands. Depth about 26 km	51.3	N.	179.8	W.
2	05	33	05.4	Ryukyu Islands region. Depth about 58 km	27.5	N.	127.0	E.
2	07	12	02.6	Northwestern Iran. Depth about 31 km	35.6	N.	49.4	E.
2	08	23	28.5	Near east coast of Honshu, Japan. Depth about 33 km	34.2	N.	139.5	E.
2	09	39	11.0	Wyoming-Montana border. Depth about 33 km	44.6	N.	107.6	W.
2	14	53	49.6	Off coast of Oregon. Depth about 39 km	44.6	N.	128.2	W.
2	15	21	55.0	Near south coast of Sumba. Depth about 33 km	10.2	S.	120.3	E.
2	15	38	51.6	Near south coast of Sumba. Depth about 27 km	10.2	S.	120.0	E.
2	16	13	18.1	Chile-Bolivia-Argentina border. Depth about 27 km	22.4	S.	68.1	W.
2	19	52	06.7	Jan Mayen Island region. Depth about 33 km	71.2	N.	12.7	W.
2	20	16	41.7	Off coast of North Island, New Zealand. Depth about 33 km	38.5	S.	179.8	W.
2	20	57	33.4	Near east coast of Honshu, Japan Depth about 33 km	33.9	N.	138.7	E.
2	23	56	53.6	Flores Sea. Depth about 470 km	7.0	S.	124.8	E.
3	10	55	44*	Hollister, Calif. Felt. Mag. 3.1	36 48	N.	121 35	W.
3	16	50	38.2	Near east coast of Honshu, Japan. Depth about 33 km	34.5	N.	139.4	E.
3	17	53	33*	Near San Benito, Calif. Felt at Hollister. Mag. 2.6 (Brk)	36 28	N.	121 05	W.
3	20	36	37.6	Near east coast of Honshu, Japan. Depth about 49 km	34.0	N.	139.0	E.
3	21	17	12.0	Off coast of Jalisco, Mexico. Depth about 33 km	18.5	N.	107.6	W.
3	22	06	08.9	Sandwich Islands. Depth about 33 km	56.6	S.	27.2	W.
4	08	27	48.1	South of Easter Island. Depth about 33 km	32.6	S.	112.5	W.
4	13	30	14.5	Northwestern Iran. Depth about 53 km	35.6	N.	49.7	E.
4	15	11	43.8	Near south coast of Portugal. Depth about 33 km	36.5	N.	8.8	W.
4	15	17	40.1	Mexico-Guatemala border. Depth about 172 km	15.3	N.	92.0	W.
4	17	16	15.1	Near south coast of Sumba. Depth about 100 km	10.0	S.	120.0	E.
4	17	17	26*	Northwest of Arcata, Calif. Felt in Humboldt County, Calif., and Cave Junction, Oreg. Slight damage in Humboldt County. Mag. 5.0 (Brk).	40 58	N.	124 12	W.
4	17	32	34*	Northwest of Arcata, Calif. Felt in Humboldt County, Calif., Mag. 3.7 (Brk).	40 58	N.	124 12	W.
4	19	28	37.0	New Hebrides Islands. Felt on Santo. Depth about 133 km	15.5	S.	167.7	E.
4	21	46	00.7	North Atlantic Ocean. Depth about 39 km	24.0	N.	46.4	W.
4	22	59	19.5	Turkey-Armenia S.S.R. border. 100 injured and moderate property damage at Igdir. Felt at Diijadin and Dogubayazit. Depth about 33 km.	39.9	N.	44.2	E.
5	06	39	11.4	Colombia. Depth about 151 km	6.8	N.	73.0	W.
5	08	35	56.3	Near east coast of Kamchatka. Depth about 101 km	52.7	N.	159.1	E.

See footnote at end of table.

TABLE 2.—*Summary of instrumental epicenters for 1962*—Continued

1962	Origin Time G.M.T.			Region, focal depth, and remarks	Coordinates of provisional epicenter			
					Latitude		Longitude	
	h	*m*	*s*		° ′		° ′	
Sept. 5	11	17	06.7	Near north coast of western New Guinea. Depth about 110 km	3.3	S.	139.9	E.
5	16	04	29.0	Utah. Moderate damage in Salt Lake County. Depth about 14 km. Mag. 5.1.	40.7	N.	112.0	W.
6	06	47	29.1	San Juan Province, Argentina. Depth about 136 km	31.6	S.	69.4	W.
6	10	49	00.7	Tonga Islands region. Depth about 110 km	21.2	S.	174.5	W.
6	11	10	50.3	Buru. Depth about 33 km	4.0	S.	126.4	E.
6	13	39	00.4	Near south coast of Guatemala. Depth about 72 km	14.0	N.	90.6	W.
6	15	03	01.9	Solomon Islands. Felt on New Georgia. Depth about 95 km	8.4	S.	158.8	E.
6	17	38	41.4	Near east coast of Honshu, Japan. Felt at Chosi City. Depth about 33 km.	34.5	N.	139.7	E.
6	18	06	22.9	Kermadec Islands. Depth about 81 km	31.8	S.	178.8	W.
7	07	07	27.8	Ceram Sea. Depth about 216 km	3.2	S.	128.0	E.
7	07	41	48.1	Banda Sea. Depth about 150 km	6.3	S.	130.0	E.
7	08	47	19.0	Northern Utah. Depth about 33 km	40.0	N.	111.0	W.
7	12	03	31.1	Near east coast of Honshu, Japan. Depth about 33 km	34.0	N.	139.3	E.
7	12	11	08.4	Near northeast coast of Shikoku, Japan. Depth about 33 km	34.5	N.	134.8	E.
7	12	38	45.4	New Britain region. Depth about 36 km	6.3	S.	151.6	E.
7	14	00	45.9	Western Maryland. Depth about 38 km	39.7	N.	78.2	W.
7	16	50	28.0	Northern Utah. Depth about 33 km	39.5	N.	110.0	W.
7	19	37	19.7	New Hebrides Islands region. Felt on Santo. Depth about 205 km.	14.7	S.	167.5	E.
7	23	37	44.2	Kermadec Islands. Depth about 448 km	31.8	S.	179.6	E.
7	23	39	12.8	Northern Nevada. Depth about 33 km	41.3	N.	116.7	W.
7	23	52	09.1	Solomon Islands. Depth about 95 km	8.4	S.	159.0	E.
8	07	27	06.7	Loyalty Islands. Depth about 76 km	22.4	S.	171.5	E.
8	10	17	57.7	Novaya Zemlya. Depth about 0 km. Mag. 4¾ (Pal)	73.7	N.	53.8	E.
8	13	03	27.5	Leeward Islands. Depth about 28 km	15.8	N.	60.6	W.
9	01	34	39.2	Near west coast of Panay, Philippine Islands. Depth about 62 km	10.4	N.	121.5	E.
9	02	56	04.5	Fiji Islands region. Depth about 622 km	17.9	S.	178.6	W.
9	03	21	55.2	Near coast of southern Peru. Depth about 93 km	15.7	S.	73.3	W.
9	08	39	38.2	Loyalty Islands region. Depth about 112 km	21.8	S.	171.1	E.
9	11	23	41.6	Near west coast of Panay, Philippine Islands. Depth about 33 km	10.5	N.	121.8	E.
9	14	38	12.9	Northern Utah. Felt at Logan. Depth about 45 km	41.6	N.	111.7	W.
9	14	45	42.3	Near south coast of Guatemala. Depth about 33 km	14.1	N.	90.1	W.
9	15	15	22.7	Mariana Islands region. Depth about 217 km	10.1	N.	147.3	E.
9	19	12	37.1	Alaska. Depth about 57 km. Mag. 4½ (Pal)	62.4	N.	152.4	W.
10	09	36	24.9	Near southeast coast of Crete. Depth about 33 km	34.8	N.	26.9	E.
10	13	50	48.7	Rat Islands, Aleutian Islands. Depth about 62 km	51.2	N.	179.7	E.
10	15	43	57.4	Fiji Islands region. Depth about 612 km. Mag. 6½	21.2	S.	179.1	W.
10	17	10	12.2	Rat Islands, Aleutian Islands. Depth about 60 km	51.3	N.	179.1	E.
10	17	49	16.1	Tonga Islands region. Depth about 33 km	17.5	S.	173.6	W.
10	20	07	57.1	Pacific Ocean, 1250 miles southwest of Galapagos Islands. Depth about 33 km.	13.6	S.	111.7	W.
10	21	52	26.3	Near west coast of Nicaragua. Depth about 176 km	12.3	N.	86.7	W.
10	22	47	07.6	Sikang Province, China. Depth about 33 km	30.7	N.	94.6	E.
11	00	17	38.4	Turkey-Armenia S.S.R. border. Moderate damage at Igdir. Depth about 34 km.	40.0	N.	44.2	E.
11	00	33	13.0	New Britain region. Felt at Walindi. Depth about 62 km	6.1	S.	179.4	E.
11	02	24	22.9	Tonga Islands region. Depth about 33 km	15.2	S.	143.4	W.
11	04	54	05.8	Andreanof Islands, Aleutian Islands. Depth about 33 km	51.5	N.	178.0	W.
11	08	41	12.4	Colombia-Venezuela border region. Depth about 73 km	7.5	N.	73.5	W.
11	11	12	32*	East of Walnut Creek, Calif. Felt. Mag. 2.8 (Brk)	37 54	N.	122 01	W.
11	11	15	04.9	Northern Iran. Depth about 33 km	35.4	N.	49.9	E.
11	17	51	11.4	Bonin Islands region. Depth about 33 km	26.8	N.	142.9	E.
11	19	46	21.5	Loyalty Islands region. Depth about 33 km	22.4	S.	172.3	E.
11	21	56	22.4	Taiwan. Depth about 33 km	23.8	N.	121.3	E.
11	23	40	44.9	Kirghiz S.S.R.-Sinkiang Province, China border. Depth about 32 km.	41.1	N.	76.0	E.
12	04	50	14.0	Ascension Island region. Depth about 33 km	6.9	S.	12.4	W.
12	12	28	02.5	Chile-Bolivia border. Depth about 33 km	22.8	S.	68.3	W.
12	18	18	42.9	Near north coast of New Guinea. Felt at Bogia and on Maram Island. Depth about 32 km.	4.4	S.	145.4	E.

See footnote at end of table.

TABLE 2.—*Summary of instrumental epicenters for 1962*—Continued

1962	Origin Time G.M.T.			Region, focal depth, and remarks	Coordinates of provisional epicenter			
					Latitude		Longitude	
	h	*m*	*s*		° ′		° ′	
Sept. 12	20	57	00.5	Tadzhik S.S.R.-Afghanistan border. Depth about 56 km. Mag. 6½-6¾.	36.3	N.	69.0	E.
12	23	58	46.3	Ascension Island region. Depth about 33 km	7.3	S.	13.2	W.
13	05	02	22.8	Tonga Islands region. Depth about 33 km	21.3	S.	174.7	W.
13	08	07	50.3	Kurile Islands region. Depth about 33 km	47.8	N.	157.0	E.
13	13	59	09.5	Gulf of California. Depth about 33 km	25.8	N.	109.6	W.
13	14	35	03.2	Windward Islands. Felt on Trinidad and Tobago. Depth about 78 km.	11.7	N.	61.3	W.
14	00	33	22.5	Western Turkey. Slight damage at Balikesir and Bursar. Depth about 38 km.	39.4	N.	28.2	E.
14	11	11	56.4	South of Tasmania. Depth about 33 km	51.4	S.	146.3	E.
14	13	17	00.8	Northern Utah. Depth about 40 km	41.8	N.	111.7	W.
14	13	55	47.6	Costa Rica. Depth about 33 km	10.5	N.	84.7	W.
14	15	52	41.2	Fiji Islands region. Depth about 33 km	17.9	S.	176.5	E.
14	17	23	13.4	South of Fiji Islands. Depth about 449 km	26.6	S.	178.5	W.
14	18	17	52.1	Tonga Islands region. Depth about 350 km	19.9	S.	177.6	W.
15	00	55	41.0	Mariana Islands. Depth about 45 km	13.3	N.	141.9	E.
15	08	02	13.9	Novaya Zemlya. Depth about 0 km	74.4	N.	51.5	E.
15	11	18	22.9	Southern Bolivia. Depth about 33 km	20.4	S.	68.2	W.
15	22	50	47.2	Kurile Islands region. Depth about 33 km. Mag. 6½	48.5	N.	156.9	E.
16	03	05	34.4	Jalisco, Mexico. Depth about 111 km. Mag. 4¾-5 (Pal)	19.4	N.	103.2	W.
16	05	36	16*	Near Walker Pass, Calif. Felt in south-central California. Mag. 4.9.	35 45	N.	118 03	W.
16	10	59	10.5	Novaya Zemlya. Depth about 0 km. Mag. 4¾-5 (Pal)	74.2	N.	51.6	E.
16	11	37	11.1	Inyo County, Calif. Depth about 33 km	36.0	N.	117.7	W.
16	12	59	17.7	Rat Islands, Aleutian Islands. Depth about 33 km	51.2	N.	177.0	E.
16	18	12	35*	Near Santa Barbara, Calif. Felt. Mag. 4.0	34 29	N.	119 41	W.
16	18	17	09*	Near Santa Barbara, Calif. Felt. Mag. 2.2	34 29	N.	119 41	W.
16	18	31	17*	Near Santa Barbara, Calif. Felt. Mag. 2.9	34 31	N.	119 46	W.
16	19	06	32.3	Near coast of Burma. Depth about 50 km	16.9	N.	94.2	E.
16	22	45	10.8	Near east coast of Taiwan. Depth about 33 km	22.8	N.	123.5	E.
17	01	10	18.7	Alaska. Depth about 63 km	64.3	N.	149.3	W.
17	04	59	51.5	Fiji Islands. Depth about 576 km	17.7	S.	178.6	W.
17	09	30	04*	Near Walker Pass, Calif. Felt at Onyx. Mag. 3.0	35 45	N.	118 03	W.
17	15	46	45.9	Alaska. Depth about 53 km	66.1	N.	153.9	W.
17	16	31	17.9	Near east coast of Formosa. Depth about 33 km	23.5	N.	121.7	E.
17	17	55	47.0	Fiji Islands region. Depth about 626 km	21.1	S.	179.1	W.
17	19	44	50.2	Southern Yugoslavia. Felt at Bitola and Ohrid. Depth about about 47 km.	41.4	N.	21.1	E.
18	00	29	05.5	Near south coast of Panama. Slight damage in Chiriqui Province. Felt at Balboa Heights, C.Z. Depth about 33 km. Mag. 7.	7.4	N.	82.3	W.
18	02	39	40.0	Near south coast of Panama. Depth about 33 km	7.7	N.	82.1	W.
18	03	16	57.1	----do	7.8	N.	82.3	W.
18	03	22	25.1	----do	7.5	N.	82.2	W.
18	04	55	14.8	Near south coast of Panama. Depth about 27 km	7.2	N.	82.7	W.
18	05	13	35.9	Near south coast of Panama. Depth about 23 km	7.4	N.	82.2	W.
18	05	23	05.2	Hindu Kush. Depth about 47 km	36.5	N.	69.0	E.
18	06	10	26.3	Molucca Passage. Depth about 33 km	2.3	N.	126.9	E.
18	08	29	02.3	Novaya Zemlya. Depth about 0 km	73.2	N.	55.7	E
18	12	19	44.3	Eastern India-northern Burma border. Depth about 76 km	26.4	N.	96.6	E.
18	20	11	49.5	Loyalty Islands region. Depth about 101 km	20.9	S.	169.8	E.
18	21	46	41.6	Tonga Islands region. Depth about 33 km	15.3	S.	176.5	W.
18	22	03	16.5	Tonga Islands region. Depth about 46 km	16.3	S.	173.8	W.
19	00	06	58.7	Sea of Japan. Depth about 436 km	42.0	N.	132.9	E.
19	01	22	35.5	Andreanof Islands, Aleutian Islands. Depth about 33 km	52.3	N.	173.4	W.
19	01	42	15.3	Near south coast of Panama. Depth about 33 km	7.9	N.	81.6	W.
19	05	07	39.1	Near east coast of Sakhalin. Depth about 466 km	48.1	N.	145.1	E.
19	07	28	41.2	Southern Iran. Depth about 34 km	30.2	N.	50.3	E.
19	07	48	35.2	Mariana Islands region. Depth about 61 km	11.5	N.	141.0	E.
19	11	00	56.4	Novaya Zemlya. Depth about 0 km. Mag. 5-5¼ (Pal)	73.8	N.	53.8	E.
19	18	06	42.7	Sumba. Depth about 33 km	10.1	S.	120.3	E.
20	06	03	23.7	Near coast of northern Peru. Depth about 17 km	4.5	S.	80.5	W.
20	06	16	30.4	Near south coast of Kyushu, Japan. Depth about 59 km	30.3	N.	132.3	E.

See footnote at end of table.

TABLE 2.—*Summary of instrumental epicenters for 1962*—Continued

1962	Origin Time G.M.T.			Region, focal depth, and remarks	Coordinates of provisional epicenter			
					Latitude		Longitude	
	h	*m*	*s*		° ′		° ′	
Sept. 20	09	25	26.7	Near coast of southern Peru. Depth about 33 km	15.5	S.	76.1	W.
20	16	38	24.8	Western New Guinea. Depth about 33 km	4.6	S.	139.5	E.
21	00	56	41.6	Near east coast of Mindanao, Philippine Islands. Depth about 146 km.	8.0	N.	126.4	E.
21	02	26	18.5	Near east coast of Kamchatka. Depth about 147 km	53.7	N.	160.3	E.
21	05	04	28.6	Andreanof Islands, Aleutian Islands. Depth about 33 km	51.4	N.	178.0	W.
21	06	01	40.4	Fiji Islands. Depth about 600 km	17.6	S.	178.9	W.
21	08	44	11.0	Fiji Islands. Depth about 624 km	21.2	S.	179.0	W.
21	09	08	45.7	Andreanof Islands, Aleutian Islands. Depth about 33 km	51.4	N.	178.3	W.
21	14	54	51.0	Fiji Islands region. Depth about 536 km	17.7	S.	178.7	W.
21	22	38	50.4	Drake Passage. Depth about 33 km	57.8	S.	64.7	W.
22	03	38	29.9	Rat Islands, Aleutian Islands. Depth about 33 km	51.1	N.	177.9	E.
22	05	37	14*	West of San Francisco, Calif. Felt at San Francisco and Daly City. Mag. 2.6 (Brk).	37 44	N.	122 33	W.
22	06	44	04.9	Salta Province, Argentina. Depth about 168 km	24.3	S.	67.1	W.
22	06	51	32.3	India-Burma border region. Depth about 33 km. Mag. 6 (Pal)	26.5	N.	97.0	E.
22	08	06	31.6	Hindu Kush. Depth about 71 km	36.3	N.	69.0	E.
22	16	02	40.2	Ceram Sea. Depth about 28 km	2.5	S.	126.9	E.
22	16	45	31.0	Near coast of southern Peru. Depth about 137 km	15.5	S.	73.1	W.
22	18	00	57.7	Off south coast of Hokkaido, Japan. Depth about 59 km	41.1	N.	142.8	E.
23	06	59	49.9	Fiji Islands region. Depth about 549 km	23.7	S.	179.9	E.
23	07	01	45.7	New Britain. Felt at Rabaul and Karlai. Depth about 71 km	4.9	S.	151.9	E.
23	11	49	53.5	North Atlantic Ocean. Depth about 33 km	14.7	N.	45.1	W.
23	12	02	34.7	----do----	14.7	N.	45.7	W.
23	12	24	13.6	Ryukyu Islands. Depth about 162 km	25.9	N.	126.6	E.
23	15	50	46.4	Kenai Peninsula, Alaska. Felt at Homer, Kasilof, and Seward. Depth about 86 km.	60.1	N.	151.2	W.
23	20	41	28.3	Near west coast of Crete. Depth about 38 km	35.5	N.	23.3	E.
24	03	26	44.1	Kazakh S.S.R.-Sinkiang Province, China border region. Depth about 70 km.	44.5	N.	80.2	E.
24	05	28	29.0	Near east coast of Mindanao, Philippine Islands. Depth about 57 km.	9.2	N.	126.7	E.
24	09	23	16.5	Central Honshu, Japan. Felt at Tokyo. Depth about 83 km	35.9	N.	139.6	E.
24	13	56	46.1	Chile-Argentina border. Depth about 152 km	23.6	S.	67.6	W.
24	14	22	42.4	Near south coast of Panama. Depth about 36 km	7.7	N.	82.4	W.
24	14	38	22.4	Near east coast of Hokkaido, Japan. Depth about 33 km	42.8	N.	145.5	E.
24	14	45	37.3	----do----	42.9	N.	145.3	E.
24	15	15	04.3	Hindu Kush. Depth about 216 km	36.4	N.	70.9	E.
24	22	01	13.4	Celebes. Depth about 171 km	0.2	N.	124.0	E.
25	00	21	14.6	South Pacific Ocean. Depth about 67 km	55.6	S.	124.3	W.
25	02	37	20.1	Near south coast of Honshu, Japan. Depth about 33 km	34.0	N.	131.7	E.
25	04	48	40.5	Central Tanganyika. Depth about 33 km	75.0	S.	35.1	E.
25	07	30	09.3	Tonga Islands region. Depth about 33 km	24.0	S.	176.6	W.
25	10	22	45.1	South of Honshu, Japan. Depth about 325 km	32.9	N.	137.8	E.
25	13	02	31.7	Novaya Zemlya. Depth about 0 km. Mag. 5¼–5½ (Pal)	73.7	N.	55.0	E.
25	14	49	46.9	Mariana Islands. Depth about 33 km	11.7	N.	138.6	E.
25	18	27	03.0	Near south coast of Ceram. Depth about 33 km	3.6	S.	128.3	E.
26	01	26	41.5	Mid-Atlantic Ocean. Depth about 33 km	1.0	N.	27.6	W.
26	02	21	52.1	Central Alaska. Depth about 61 km	61.8	N.	151.6	W.
26	02	53	29.9	Kurile Islands. Depth about 51 km	46.5	N.	153.0	E.
26	05	07	15.2	Southwestern Montana. Depth about 33 km	44.9	N.	112.6	W.
26	10	19	31*	East of Watsonville, Calif. Felt at Gilroy and Watsonville. Mag. 3.6 (Brk).	36 56	N.	121 38	W.
26	12	44	48.9	Kermadec Islands region. Depth about 33 km	27.5	N.	176.4	W.
26	12	47	30.4	Near coast of central Ecuador. Depth about 33 km	1.5	S.	80.9	W.
26	13	24	30.1	Mariana Islands. Depth about 201 km	18.7	N.	145.4	E.
26	15	42	08.2	Off coast of northern Chile. Depth about 93 km	18.3	S.	70.9	W.
26	21	26	31.4	Andreanof Islands, Aleutian Islands. Depth about 33 km	51.2	N.	176.3	W.
27	06	48	52.8	San Juan Province, Argentina. Depth about 123 km	31.3	S.	68.6	W.
27	06	53	35.6	Prince Edward Islands region. Depth about 33 km	48.1	S.	34.2	E.
27	07	50	28.3	Central Bolivia. Depth about 120 km	17.9	S.	64.9	W.
27	08	03	16.4	Novaya Zemlya. Depth about 0 km. Mag. 5¼–5½ (Pal)	74.3	N.	52.4	E.
27	09	18	29.7	Near south coast of Hokkaido, Japan. Depth about 99 km	42.0	N.	142.4	E.

See footnote at end of table.

TABLE 2.—*Summary of instrumental epicenters for 1962*—Continued

1962	Origin Time G.M.T.			Region, focal depth, and remarks	Coordinates of provisional epicenter			
					Latitude		Longitude	
	h	*m*	*s*		° ′		° ′	
Sept. 27	12	30	59.9	Chile-Peru-Bolivia border region. Depth about 108 km	18.7	S.	69.7	W.
27	12	56	18.6	Sumatra. Depth about 144 km	4.6	S.	104.4	E.
27	13	07	57.8	Near coast of northern Luzon, Philippine Islands. Depth about 80 km.	18.6	N.	121.8	E.
27	13	25	05.6	Fiji Islands. Depth about 507 km	17.6	S.	178.9	W.
27	15	30	19*	Near Hollister, Calif. Felt at Hollister. Mag. 2.4 (Brk)	36 52	N.	121 24	W.
27	18	26	50.5	New Britain region. Felt at Doilene. Depth about 33 km	3.9	S.	151.3	E.
28	02	15	32.6	New Hebrides Islands. Felt at Lamap and Norsup. Depth about 50 km.	16.7	S.	167.5	E.
28	03	35	20.3	Fiji Islands region. Depth about 584 km	17.5	S.	178.8	W.
28	05	16	20.7	Kurile Islands region. Depth about 33 km	44.0	N.	149.6	E.
28	05	34	12.5	Alaska Peninsula region. Depth about 33 km	54.7	N.	161.7	W.
28	06	13	12.3	Sumatra. Depth about 86 km	4.4	S.	102.8	E.
28	18	56	06.4	Western Colombia. Felt. Depth about 106 km	5.2	N.	76.2	W.
28	22	14	52.7	Near coast of central Peru. Depth about 61 km	13.8	S.	76.7	W.
29	05	21	49.6	Southern Bolivia. Depth about 26 km	20.0	S.	68.0	W.
29	06	21	17.9	Greece-Albania border region. Felt. Depth about 33 km	39.8	N.	20.3	E.
29	06	53	56.6	Southern Iran. Depth about 50 km	28.2	N.	57.4	E.
29	07	58	20.7	Near coast of southern Peru. Depth about 33 km	17.1	S.	70.5	W.
29	15	17	47.6	Santiago del Estero Province, Argentina. Depth about 577 km. Mag. 6½.	27.1	S.	63.5	W.
29	20	42	24.8	New Hebrides Islands region. Depth about 198 km	14.2	S.	168.2	E.
30	06	05	04.5	Tadzhik S.S.R. Depth about 147 km	37.9	N.	72.9	E.
30	06	44	00.4	Mariana Islands region. Depth about 94 km	13.5	N.	146.2	E.
30	10	48	10.3	New Britain. Felt at Rabaul, Doilene, and Karlai. Depth about 33 km.	5.2	S.	152.7	E.
30	10	58	37.0	Near south coast of New Britain. Felt at Rabaul, Doilene, and Karlai. Depth about 50 km.	5.9	S.	151.0	E.
30	21	57	24.8	Near north coast of Luzon, Philippine Islands. Felt at Vigan, Aparri, and Laoag. Depth about 51 km.	18.6	N.	120.9	E.
Oct. 1	03	56	52.0	Fiji Islands. Depth about 550 km	17.5	S.	178.9	W.
1	07	50	56.4	Nicobar Islands region. Depth about 27 km	6.9	N.	94.4	E.
1	09	53	32.9	Kurile Islands. Depth about 127 km	47.3	N.	151.5	E.
1	09	57	02.2	New Hebrides Islands. Felt at Port Vila. Depth about 33 km	17.5	S.	167.1	E.
1	12	13	57.4	Southern Iran. Depth about 16 km	27.9	N.	54.9	E.
1	12	49	55.1	Off south coast of Kamchatka. Depth about 80 km	49.0	N.	157.5	E.
1	13	08	28.2	Fox Islands, Aleutian Islands. Depth about 33 km	52.8	N.	167.2	W.
1	15	07	22.1	New Britain. Felt at Rabaul and Karlis. Depth about 49 km	5.5	S.	151.9	E.
1	20	42	36.5	Tonga Islands. Depth about 143 km	19.6	S.	174.5	W.
2	03	51	03*	East of Carson City, Nev. Felt in western Nevada and northeastern California. Mag. 4.3 (Brk).	39 12	N.	119 36	W.
2	08	35	49.1	Fiji Islands. Depth about 616 km	17.6	S.	178.7	W.
2	12	35	47.7	Celebes region. Depth about 33 km	0.6	S.	122.9	E.
2	19	30	34.6	Off east coast of Leyte, Philippine Islands. Depth about 125 km	10.4	N.	126.9	E.
2	19	51	53.4	Molucca Passage. Depth about 35 km	2.1	N.	126.2	E.
3	01	16	46.7	Azores region. Depth about 33 km	40.6	N.	29.7	W.
3	01	19	22.5	---do---	40.7	N.	29.7	W.
3	11	57	21.8	Near northeast coast of New Guinea. Depth about 108 km	4.5	S.	144.6	E.
3	17	13	41.5	Loyalty Islands. Depth about 33 km	21.0	S.	168.4	E.
3	18	48	55.1	Sandwich Islands. Depth about 38 km	57.7	S.	25.6	W.
3	20	14	41.2	Near west coast of Honshu, Japan. Depth about 211 km	37.2	N.	138.5	E.
3	20	59	49.4	Loyalty Islands. Depth about 41 km	21.3	S.	168.3	E.
4	04	42	05.8	Azores region. Depth about 33 km	40.4	N.	29.5	W.
4	07	24	43.4	Black Sea. Felt at Samsun. Depth about 30 km	42.0	N.	35.9	E.
4	09	01	48.2	Solomon Islands. Felt at Honiara. Depth about 79 km	8.8	S.	160.4	E.
4	09	37	53.0	Fiji Islands region. Depth about 611 km	23.3	S.	179.0	E.
4	13	23	34.4	Azores region. Depth about 33 km	40.9	N.	29.7	W.
4	19	46	10.1	Greece. Felt in southern Greece. Depth about 38 km	38.3	N.	22.7	E.
4	20	34	39.6	New Britain. Felt. Depth about 41 km	5.2	S.	151.9	E.
4	22	47	46.3	Colombia. Depth about 166 km	4.2	N.	75.8	W.
5	04	14	39.1	Azores region. Depth about 33 km	40.2	N.	29.5	W.
5	08	39	32.2	---do---	40.7	N.	29.8	W.
5	10	24	27.5	Near west coast of Honshu, Japan. Depth about 200 km	39.0	N.	140.2	E.

See footnote at end of table.

TABLE 2.—*Summary of instrumental epicenters for 1962*—Continued

1962	Origin Time G.M.T.	Region, focal depth, and remarks	Coordinates of provisional epicenter	
			Latitude	Longitude
	h m s		° ′	° ′
Oct. 5	10 39 17.5	Mariana Islands. Depth about 131 km	14.0 N.	145.2 E.
5	13 03 11.4	Solomon Islands. Depth about 147 km	9.3 S.	161.0 E.
5	15 29 03*	North of Borrego, Calif. Felt in Riverside County. Mag. 4.1	33 20 N.	116 14 W.
5	17 44 54.7	Near east coast of Honshu, Japan. Depth about 70 km	37.0 N.	143.6 E.
5	20 02 27.6	Northeastern Iran. 5 killed and many injured. Risteh destroyed; damage at Ahmadabad. Depth about 33 km.	35.2 N.	58.8 E.
5	21 59 40.2	Banda Sea. Depth about 31 km	6.1 S.	130.8 E.
6	03 17 07.2	Azores region. Depth about 33 km. Mag. 4¾-5 (Pal)	40.8 N.	29.5 W.
6	03 54 58.3	---do---	40.5 N.	29.5 W.
6	04 23 24.1	New Hebrides Islands. Felt at Port Vila. Depth about 33 km. Mag. 6½.	17.4 S.	167.7 E.
6	04 35 02.5	New Hebrides Islands. Depth about 33 km	17.4 S.	167.8 E.
6	05 38 37.4	Ryukyu Islands. Depth about 92 km	26.2 N.	126.9 E.
6	07 17 03.3	New Hebrides Islands. Felt at Port Vila. Depth about 33 km	17.4 S.	167.8 E.
6	07 56 20.4	---do---	17.4 S.	167.9 E.
6	08 03 31.7	New Hebrides Islands. Depth about 33 km	17.2 S.	168.0 E.
6	08 31 50.1	New Hebrides Islands. Felt at Port Vila. Depth about 33 km	17.3 S.	167.8 E.
6	09 28 17.4	Teton County, Wyoming. Felt at Moose and Wilson. Depth about 33 km.	43.6 N.	110.8 W.
6	11 00 52.8	New Hebrides Islands. Depth about 209 km	13.3 S.	167.3 E.
6	11 59 42.3	New Hebrides Islands. Felt at Port Vila. Depth about 17 km	17.4 S.	167.8 E.
6	14 05 24.0	Ecuador. Depth about 149 km	1.5 S.	77.4 W.
6	17 35 26.8	Kurile Islands. Depth about 51 km	44.4 N.	148.0 E.
6	18 01 05.4	New Hebrides Islands. Felt at Port Vila. Depth about 33 km	17.6 S.	168.0 E.
6	21 37 57.4	Northeast New Guinea. Depth about 43 km	5.3 S.	145.0 E.
6	23 31 27.7	New Hebrides Islands. Felt at Port Vila. Depth about 42 km	17.5 S.	167.6 E.
7	00 46 55.4	New Hebrides Islands. Depth about 33 km	17.7 S.	167.8 E.
7	05 47 33.0	New Hebrides Islands. Depth about 17 km	17.5 S.	168.0 E.
7	06 45 15.3	Azores region. Depth about 33 km	40.5 N.	29.6 W.
7	08 52 22.8	Near north coast of Panama. Depth about 59 km	9.4 N.	81.8 W.
7	09 49 25.9	Azores region. Depth about 33 km	40.2 N.	29.2 W.
7	10 20 24.8	New Hebrides Islands. Depth about 61 km	20.1 S.	169.5 E.
7	12 35 30.9	North-East New Guinea. Depth about 75 km	4.9 S.	144.3 E.
7	13 51 54.4	New Hebrides Islands. Depth about 17 km	17.3 S.	167.8 E.
7	16 00 20.2	Sandwich Islands. Depth about 33 km	57.8 S.	25.5 W.
7	16 47 22.7	New Hebrides Islands. Felt at Port Vila. Depth about 33 km	17.7 S.	167.5 E.
7	16 52 19.4	New Hebrides Islands. Depth about 39 km	17.9 S.	167.4 E.
8	05 14 20.4	Azores region. Depth about 33 km	40.5 N.	29.5 W.
8	13 20 32.7	New Hebrides Islands. Felt at Port Vila. Depth about 33 km	17.8 S.	167.8 E.
8	14 26 35.9	Bulgaria. Depth about 33 km	41.9 N.	24.3 E.
8	15 11 11.9	Bulgaria. Felt in southern Bulgaria. Depth about 41 km	41.9 N.	24.3 E.
8	17 53 28.6	Fiji Islands. Depth about 243 km	18.7 S.	176.8 W.
8	18 54 36.9	Solomon Islands. Depth about 79 km	10.3 S.	161.4 E.
8	21 56 22.2	Near east coast of Taiwan. Depth about 29 km. Mag. 6	24.3 N.	121.7 E.
8	22 24 06.2	Near east coast of Taiwan. Depth about 33 km	24.1 N.	121.7 E.
9	03 13 44.8	New Hebrides Islands. Depth about 33 km	17.4 S.	167.6 E.
9	04 28 36.2	Near north coast of Hokkaido, Japan. Depth about 288 km	46.2 N.	143.0 E.
9	15 59 14.3	Hindu Kush. Felt at Peshawar. Depth about 209 km	36.4 N.	71.3 E.
9	20 14 37.2	Bismarck Sea. Depth about 33 km. Mag. 6¼	3.2 S.	148.4 E.
9	21 19 19.0	New Hebrides Islands. Depth about 19 km	17.6 S.	167.6 E.
10	04 41 46.9	Indian Ocean. Depth about 33 km	1.6 S.	66.8 E.
10	07 50 18.1	Near south coast of Kyushu, Japan. Depth about 33 km	31.2 N.	131.5 E.
10	09 20 40.8	Fiji Islands. Depth about 558 km	22.2 S.	179.6 W.
10	11 12 37.4	Solomon Islands. Depth about 34 km	10.1 S.	161.3 E.
10	11 42 35.1	Peru-Ecuador border. Depth about 33 km	3.1 S.	78.4 W.
10	13 33 17.2	Off south coast of Java. Depth about 88 km	8.9 S.	110.4 E.
10	14 32 57.3	New Hebrides Islands. Depth about 34 km	17.9 S.	167.8 E.
10	17 16 07.0	New Hebrides Islands. Depth about 33 km	18.0 S.	167.7 E.
10	20 43 37.3	Southern Iran. Felt at Fasa. Depth about 47 km	27.9 N.	54.9 E.
10	20 53 34.5	Mendoza Province, Argentina. Depth about 137 km	34.9 S.	70.1 W.
10	21 52 36.8	Samoa Islands region. Felt at Apia. Depth about 33 km	15.1 S.	173.3 W.
11	00 52 23.4	Fox Islands, Aleutian Islands. Depth about 33 km	52.0 N.	170.0 W.
11	03 40 05.5	---do---	52.0 N.	171.3 W.

See footnote at end of table.

TABLE 2.—*Summary of instrumental epicenters for 1962*—Continued

1962	Origin Time G.M.T.			Region, focal depth, and remarks	Coordinates of provisional epicenter			
					Latitude		Longitude	
	h	*m*	*s*		° ′		° ′	
Oct. 11	05	41	10.1	Off coast of Peru. Depth about 33 km	6.5	S.	81.0	W.
11	06	22	50.6	Near coast of Ecuador. Depth about 75 km	1.3	S.	80.4	W.
11	16	02	33.5	Near east coast of Taiwan. Depth about 33 km	24.0	N.	121.7	E.
12	00	09	49.0	Near coast of Ecuador. Depth about 33 km	4.2	S.	80.7	W.
12	01	44	49.4	Kermadec Islands region. Depth about 37 km	33.1	S.	178.2	W.
12	07	56	01.5	Northern Chile. Depth about 78 km	20.3	S.	68.8	W.
12	09	08	15.9	Ryukyu Islands. Depth about 25 km	27.4	N.	129.1	E.
12	10	48	42.2	Fiji Islands. Depth about 573 km	18.0	S.	178.1	W.
12	11	43	38.2	Fiji Islands. Depth about 295 km	19.4	S.	177.0	W.
12	16	53	33.6	Near coast of northern Chile. Depth about 25 km	28.0	S.	70.6	W.
12	19	03	54.4	Kermadec Islands region. Depth about 134 km	28.9	S.	177.1	W.
12	20	38	58.0	Kermadec Islands region. Depth about 152 km	27.2	S.	178.0	W.
13	07	33	48.8	New Hebrides Islands. Depth about 33 km	16.7	S.	167.9	E.
13	08	28	34.6	Near north coast of North Island, New Zealand. Depth about 184 km.	38.2	S.	175.9	E.
13	10	23	38.2	Northwestern Iran. Felt at Tehran. Depth about 33 km	35.5	N.	49.8	E.
13	11	25	58.9	New Hebrides Islands. Felt at Port Vila. Depth about 33 km	17.4	S.	167.5	E.
13	11	41	54.6	----do----	17.3	S.	167.6	E.
13	13	41	20.5	Near coast of Chiapas, Mexico. Depth about 122 km	15.3	N.	92.8	W.
13	18	47	44.5	Santa Cruz Islands region. Depth about 33 km	12.6	S.	166.6	E.
13	21	49	38.6	Near north coast of Hokkaido, Japan. Depth about 103 km	44.0	N.	146.4	E.
14	00	29	56.0	Kermadec Islands region. Depth about 33 km	33.4	S.	179.3	W.
14	01	38	38.8	Near coast of Sumatra. Depth about 100 km	1.5	N.	99.0	E.
14	02	00	57.6	Near east coast of Kamchatka. Depth about 120 km	54.4	N.	159.8	E.
14	05	03	25.8	New Hebrides Islands. Depth about 33 km	17.5	S.	167.7	E.
14	09	07	18.6	Hindu Kush. Depth about 217 km	36.3	N.	70.4	E.
14	09	41	09.6	Off coast of northern California. Depth about 33 km	38.8	N.	123.5	W.
14	10	14	29*	Southwest of Point Arena, Calif. Felt at Albion and Elk. Mag. 4.7 (Brk).	38 44	N.	123 54	W.
14	14	08	11.3	Halmahera region. Depth about 33 km	1.0	S.	127.2	E.
14	15	08	59.5	Near south coast of Kyushu, Japan. Depth about 33 km	31.8	N.	131.5	E.
14	19	32	17.3	Svalbard region. Depth about 42 km	75.5	N.	5.8	E.
14	21	13	44.2	Honshu, Japan. Depth about 85 km	39.1	N.	141.1	E.
15	00	25	21.3	Loyalty Islands region. Depth about 40 km	22.1	S.	172.1	E.
15	02	56	11.5	Svalbard region. Depth about 33 km	74.8	N.	5.0	E.
15	08	08	36.2	Samoa Islands region. Depth about 33 km	16.1	S.	173.4	W.
15	13	59	54.9	Kermadec Islands region. Depth about 89 km	33.1	S.	178.5	W.
15	17	30	20.8	Kermadec Islands. Depth about 40 km	28.8	S.	176.4	W.
15	20	17	16.4	New Hebrides Islands. Felt at Port Vila. Depth about 65 km	17.7	S.	168.3	E.
15	21	26	20.7	Balleny Islands. Depth about 33 km	65.0	S.	178.2	E.
15	23	36	35.0	Near coast of South Island, New Zealand. Depth about 33 km	43.5	S.	169.8	E.
16	01	08	47.1	New Hebrides Islands. Depth about 33 km	17.0	S.	167.5	E.
16	02	46	44.6	New Hebrides Islands. Depth about 19 km	17.0	S.	167.7	E.
16	02	49	37.0	New Hebrides Islands. Depth about 33 km	17.1	S.	167.7	E.
16	04	58	50.4	Tadzhik S.S.R. Depth about 35 km	39.3	N.	73.2	E.
16	05	21	26.5	New Hebrides Islands. Depth about 33 km	17.1	S.	167.6	E.
16	07	15	32.2	About 1000 km southeast of Mascarene Islands. Depth about 133 km.	28.4	S.	62.5	E.
17	09	50	47.3	New Hebrides Islands. Depth about 261 km	18.9	S.	169.4	E.
16	11	58	51.0	Iran. Depth about 33 km	31.4	N.	57.3	E.
16	18	02	32.9	Andreanof Islands, Aleutian Islands. Depth about 27 km. Mag. 5¼ (Pal).	51.6	N.	175.8	W.
17	09	44	05.5	New Hebrides Islands. Depth about 33 km	17.2	S.	167.7	E.
17	12	39	12.0	South of Honshu, Japan. Depth about 335 km	33.3	N.	137.7	E.
18	02	00	02.7	Burma-India border. Depth about 60 km	28.4	N.	97.3	E.
18	04	06	00.2	Sumbawa. Depth about 33 km	8.9	S.	116.8	E.
18	08	40	55.5	Kurile Islands. Depth about 140 km	46.5	N.	149.6	E.
18	11	22	40.2	Kurile Islands. Depth about 128 km	46.5	N.	149.5	E.
18	18	03	18.5	Idaho. Felt at Stanley. Depth about 33 km	44.3	N.	115.3	W.
18	18	50	07*	Southwest of Hollister, Calif. Felt at Hollister. Mag. 3.4. (Brk).	36 45	N.	121 30	W.
18	18	56	32.3	Idaho. Felt at Stanley. Depth about 33 km	44.6	N.	116.0	W.
18	19	49	56.6	Chiapas, Mexico. Depth about 138 km	16.2	N.	93.8	W.
18	20	31	07.1	Idaho. Felt at Stanley. Depth about 33 km	44.3	N.	115.3	W.

See footnote at end of table.

TABLE 2.—*Summary of instrumental epicenters for 1962*—Continued

1962	Origin Time G.M.T.			Region, focal depth, and remarks	Coordinates of provisional epicenter			
					Latitude		Longitude	
	h	*m*	*s*		° ′		° ′	
Oct. 18	21	26	02.7	Tadzhik S.S.R. Depth about 53 km	39.3	N.	73.1	E.
19	01	34	14.1	Ceram. Depth about 58 km	3.4	S.	129.1	E.
19	04	13	00.0	San Juan Province, Argentina. Felt at Santiago, Chile. Depth about 87 km.	30.9	S.	69.2	W.
19	09	17	12.4	Sikang Province, China. Depth about 29 km	30.6	N.	97.3	E.
19	09	39	41.9	Sandwich Islands. Depth about 86 km	56.3	S.	26.2	W.
19	10	43	25.0	Idaho. Felt at Stanley. Depth about 33 km	44.6	N.	115.6	W.
19	10	44	51.9	Leyte, Philippine Islands. Depth about 50 km	10.6	N.	125.2	E.
19	11	47	24.1	West Pakistan. Depth about 41 km	30.8	N.	70.8	E.
19	14	44	56.2	Bolivia. Depth about 211 km	18.9	S.	66.0	W.
19	17	14	15.1	Kermadec Islands region. Depth about 274 km	33.0	S.	179.7	E.
19	21	21	46.8	Off coast of Jalisco, Mexico. Depth about 46 km	19.7	N.	108.4	W.
19	23	42	35.2	Banda Sea. Depth about 181 km	5.7	S.	130.3	E.
20	03	35	54.8	Fiji Islands. Depth about 580 km	21.0	S.	178.8	W.
20	05	30	41.3	Banda Sea. Depth about 161 km	6.7	S.	129.9	E.
20	06	33	29.2	Peru-Bolivia border. Depth about 153 km	17.2	S.	69.7	W.
21	02	05	22.7	Vicinity of Anchorage, Alaska. Felt. Depth about 80 km	61.1	N.	149.7	W.
21	08	17	13.0	Fiji Islands. Depth about 469 km	20.8	S.	177.8	W.
21	12	32	25.2	Halmahera region. Depth about 102 km	1.8	N.	127.5	E.
21	13	07	27.9	Samoa Islands region. Depth about 33 km	15.5	S.	172.3	W.
21	15	25	11.5	Solomon Islands. Depth about 33 km	10.3	S.	162.1	E.
21	23	10	52.2	Sandwich Islands. Depth about 33 km	55.9	S.	27.8	W.
22	01	09	50.9	Fiji Islands. Depth about 612 km	18.1	S.	177.9	W.
22	04	34	38.6	Near coast of Northeast New Guinea. Depth about 33 km	3.5	S.	145.8	E.
22	05	03	03.9	Southwestern Montana. Depth about 33 km	45.2	N.	111.3	W.
22	05	55	44.0	New Britain. Depth about 59 km	5.1	S.	151.7	E.
22	09	06	12.0	Novaya Zemlya. Depth about 0 km. Mag. 5–5¼ (Pal)	73.7	N.	54.2	E.
22	11	10	59*	Near Vallecito, Calif. Felt in San Diego County. Mag. 3.8	33 04	N	116 10	W.
22	15	23	32.9	Off south coast of Kamchatka. Depth about 19 km	49.8	N.	155.8	E.
22	18	12	29.7	Loyalty Islands. Depth about 33 km	21.0	S.	168.5	E.
22	22	18	50.3	Off east coast of Honshu, Japan. Depth about 38 km	37.9	N.	141.7	E.
23	00	26	02.5	Samoa Islands region. Depth about 53 km	15.3	S.	173.0	W.
23	00	47	27.2	Kurile Islands. Depth about 33 km	46.2	N.	153.2	E.
23	06	46	49.9	Samoa Islands region. Depth about 33 km	15.1	S.	173.4	W.
23	09	02	02.2	Western Venezuela. Depth about 33 km	9.5	N.	70.0	W.
23	09	57	41.0	Mariana Islands. Depth about 150 km	18.4	N.	145.6	E.
23	16	15	58.6	Fiji Islands. Depth about 576 km	16.9	S.	178.8	W.
23	20	10	57.6	Hindu Kush. Depth about 216 km	36.7	N.	71.1	E.
24	01	50	07.0	Mona Passage. Depth about 45 km	19.1	N.	67.1	W.
24	05	03	21.4	New Hebrides Islands. Depth about 33 km	17.3	S.	167.6	E.
24	06	24	16.3	Off coast of Jalisco, Mexico. Depth about 33 km	19.4	N.	108.2	W.
24	22	53	09.9	New Hebrides Islands. Depth about 41 km	17.9	S.	168.4	E.
25	03	38	48.9	New Hebrides Islands. Felt Port Vila. Depth about 33 km	17.8	S.	167.7	E.
25	09	34	14.6	Molucca Passage. Depth about 33 km	3.0	N.	126.7	E.
25	12	36	54.4	Fiji Islands region. Depth about 392 km	15.4	S.	179.0	W.
25	15	29	06.0	New Hebrides Islands. Depth about 33 km	16.9	S.	167.5	E.
25	15	52	29.9	Panama. Felt at Balboa Heights, C.Z. Depth about 51 km. Mag. 5¼–5½ (Pal).	8.4	N.	82.6	W.
25	20	06	10.0	About 700 km southwest of Macquarie Islands. Depth about 33 km.	61.4	S.	154.9	E.
25	21	49	34.4	Iraq-Iran border. Depth about 20 km	33.4	N.	46.0	E.
26	07	20	25.8	New Hebrides Islands. Felt at Port Vila. Depth about 33 km	17.7	S.	167.5	E.
26	11	26	12.4	Eastern Mediterranean Sea. Depth about 33 km	33.7	N.	27.9	E.
26	15	58	35.1	Sandwich Islands. Depth about 33 km	55.6	S.	26.6	W
26	20	22	58.6	Celebes region. Depth about 112 km	0.1	N.	124.1	E.
26	22	09	05.0	Sandwich Islands. Depth about 33 km	55.7	S.	26.5	W.
27	08	10	23.4	Guatemala-El Salvador border. Felt in western El Salvador. Depth about 93 km.	14.0	N.	90.6	W.
27	13	33	03.6	New Hebrides Islands. Felt at Port Vila. Depth about 33 km	18.0	S.	167.4	E.
27	13	52	51.2	Near west coast of Nicaragua. Depth about 80 km	11.5	N.	86.4	W.
27	16	01	57.6	Tadzhik S.S.R. Depth about 57 km	38.8	N.	70.6	E.
27	16	19	30.7	Fox Islands, Aleutian Islands. Depth about 60 km	52.1	N.	171.1	W.
27	22	28	58.7	Solomon Islands. Depth about 45 km	8.1	S.	156.6	E.

See footnote at end of table.

TABLE 2.—*Summary of instrumental epicenters for 1962*—Continued

1962	Origin Time G.M.T.			Region, focal depth, and remarks	Coordinates of provisional epicenter			
					Latitude		Longitude	
	h	*m*	*s*		° ′		° ′	
Oct. 28	12	06	17.8	Off coast of Luzon, Philippine Islands. Felt. Depth about 56 km	15.2	N.	119.9	E.
28	14	01	11.2	Kermadec Islands region. Depth about 33 km	32.3	S.	178.8	W.
28	15	00	30.0	Celebes region. Depth about 181 km	0.1	N.	123.7	E.
28	17	49	31.4	Near east coast of Honshu, Japan. Depth about 33 km	37.3	N.	142.0	E.
28	22	52	59.7	Chiapas, Mexico. Depth about 97 km	15.8	N.	93.8	W.
29	00	19	41.9	Off south coast of Panama. Depth about 42 km	6.9	N.	82.7	W.
29	02	42	54*	Near Big Bear, Calif. Slight damage in Riverside and San Bernardino counties. Mag. 4.8.	34 20	N.	116 52	W.
29	03	01	40*	Near Big Bear, Calif. Slight damage in Riverside and San Bernardino counties. Mag. 3.2.	34 17	N.	116 52	W.
29	05	35	05*	Near Big Bear, Calif. Slight damage in Riverside and San Bernardino counties. Mag. 3.7.	34 19	N.	116 52	W.
29	09	30	48.2	Central Chile. Felt at Santiago. Depth about 33 km	33.9	S.	70.7	W.
29	10	53	29.9	Near coast of El Salvador. Felt. Depth about 43 km	13.0	N.	88.4	W.
29	13	20	52.4	Solomon Islands. Depth about 64 km	6.5	S.	156.3	E.
29	21	01	28.5	Easter Island region. Depth about 33 km	23.3	S.	111.5	W.
30	01	46	33.1	Bouvet Island region. Depth about 33 km	53.8	S.	9.2	E.
30	08	31	51.8	Near coast of El Salvador. Felt. Depth about 80 km	12.5	N.	88.0	W.
30	16	13	25.6	Eastern India. Depth about 33 km	26.6	N.	93.3	E.
31	05	22	54.7	New Britain region. Depth about 31 km	5.3	S.	150.4	E.
31	11	32	28.2	South of Panama. Depth about 33 km. Mag. 6½	5.4	N.	82.5	W.
31	13	27	25.0	Rat Islands, Aleutian Islands. Depth about 83 km	51.6	N.	177.3	E.
Nov. 1	03	59	49.9	Off south coast of Hokkaido, Japan. Depth about 91 km	41.8	N.	144.8	E.
1	09	16	44.7	Ryukyu Islands. Depth about 164 km	29.0	N.	128.7	E.
1	09	47	15.6	Fiji Islands region. Depth about 525 km	23.7	S.	179.6	W.
1	11	31	48.7	Ecuador. Depth about 181 km	1.5	S.	77.8	W.
1	13	22	47.1	New Hebrides Islands. Felt at Port Vila. Depth about 33 km	17.5	S.	168.5	E.
1	13	46	43.4	Hindu Kush. Depth about 132 km	37.2	N.	70.0	E.
1	13	51	37.0	New Hebrides Islands. Felt at Port Vila. Depth about 21 km	17.6	S.	168.5	E.
1	14	06	40.5	New Hebrides Islands. Depth about 204 km	14.5	S.	167.6	E.
1	15	26	56.1	Hindu Kush. Depth about 124 km	37.4	N.	70.0	E.
1	15	33	22.6	North of western New Guinea. Depth about 56 km	1.9	N.	133.0	E.
1	15	52	42.4	North of western New Guinea. Depth about 54 km	1.8	N.	132.9	E.
1	17	52	20.2	North of western New Guinea. Depth about 36 km	1.9	N.	132.8	E.
1	23	20	59.6	Kurile Islands. Depth about 131 km	43.9	N.	145.2	E.
2	02	48	08*	Near Borrego, Calif. Felt at Descanso. Mag. 3.8	33 15	N.	116 17	W.
2	06	54	19.4	New Hebrides Islands. Depth about 33 km	17.6	S.	167.6	E.
2	13	23	03.9	Hindu Kush. Depth about 68 km	36.3	N.	71.2	E.
2	14	46	39.2	South of Sumbawa. Depth about 33 km	10.0	S.	117.8	E.
2	15	00	24.5	Near east coast of Honshu, Japan. Depth about 67 km	36.8	N.	141.2	E.
2	15	12	37.2	South of Sumbawa. Depth about 33 km	10.2	S.	117.6	E.
2	19	06	51.5	Fox Islands, Aleutian Islands. Depth about 60 km	52.5	N.	170.7	W.
3	01	00	24.9	Solomon Islands. Depth about 86 km	7.9	S.	158.3	E.
3	01	35	10.5	1500 km southwest of Galapagos Islands. Depth about 33 km	6.7	S.	105.2	W.
3	03	12	37.8	South of Sumbawa. Depth about 33 km	10.3	S.	117.8	E.
3	04	34	09.6	Admiralty Islands. Depth about 33 km	2.7	S.	147.4	E.
3	05	00	29.7	South of Sumbawa. Depth about 33 km	10.3	S.	117.8	E.
3	14	22	14.9	Jan Mayen Island region. Depth about 37 km	72.1	N.	2.4	E.
3	14	28	14.1	New Hebrides Islands. Felt on Santo. Depth about 124 km	14.9	S.	167.4	E.
3	15	01	39.6	Tsinghai Province, China. Depth about 33 km	37.1	N.	95.5	E.
3	15	38	08.5	Near north coast of New Guinea. Depth about 80 km	2.5	S.	139.5	E.
3	18	05	06.2	Near east coast of North Island, New Zealand. Depth about 33 km	37.6	S.	179.5	E.
3	19	04	30.7	Southern Sumatra. Depth about 108 km	4.1	S.	103.8	E.
3	20	26	07.0	Ceram. Depth about 42 km	2.8	S.	129.2	E.
4	06	18	31.5	Yellowstone National Park, Wyo. Depth about 33 km	44.3	N.	110.3	W.
4	10	57	03.7	Sinkiang Province, China. Depth about 33 km	40.3	N.	77.6	E.
4	21	07	34.4	Tonga Islands. Depth about 33 km	23.1	S.	176.5	W.
4	22	53	34.4	Off coast of southern Chile. Depth about 33 km. Mag. 5¾-6	43.2	S.	75.6	W.
5	11	46	13.7	Off coast of Norway. Depth about 32 km	66.7	N.	7.0	E.
5	20	54	41.1	South Pacific Ocean. Depth about 33 km	49.8	S.	114.9	W.
6	00	09	47.7	Southern Iran. Felt on Hormoz Islands. Depth about 30 km	28.0	N.	55.6	E.
6	03	36	43.5	Near Vancouver, Wash. Felt in Washington and Oregon. Minor damage. Mag. 4¾ (Brk).	45 38	N.	122 40	W.

See footnote at end of table.

TABLE 2.—*Summary of instrumental epicenters for 1962*—Continued

1962	Origin Time G.M.T.	Region, focal depth, and remarks	Coordinates of provisional epicenter	
			Latitude	Longitude
	h m s		° ′	° ′
Nov. 6	11 57 15.6	Northwest of Bishop, Calif. Felt in east-central California. Mag. 4.3 (Brk).	37 30 N.	118 37 W.
6	12 23 22.7	Southern Ecuador. Depth about 84 km	4.0 S.	79.8 W.
6	15 07 35.8	Near west coast of Samar, Philippine Islands. Depth about 200 km	12.1 N.	124.1 E.
6	15 08 04.2	Mona Passage. Depth about 33 km	16.9 N.	68.5 W.
6	20 48 44.3	Near west coast of Panay, Philippine Islands. Depth about 51 km	10.5 N.	122.0 E.
6	21 26 50.3	Near south coast of New Ireland. Felt at Doilene, Karlai, and Rabaul. Depth about 89 km.	4.8 S.	152.2 E.
7	03 56 38.4	Mariana Islands region. Felt. Depth about 121 km	13.3 N.	144.8 E.
7	05 12 17.3	Fiji Islands. Depth about 600 km	19.9 S.	178.5 W.
7	06 22 16.7	Fiji Islands region. Depth about 542 km	23.1 S.	179.9 W.
7	11 44 37.3	Loyalty Islands region. Depth about 91 km	20.0 S.	169.5 E.
7	12 57 45.7	Azores region. Depth about 33 km	40.5 N.	29.4 W.
7	16 03 07.4	Flores Sea. Depth about 182 km	7.8 S.	119.8 E.
7	20 02 12.8	Batan Islands. Depth about 57 km	20.4 N.	122.1 E.
7	21 57 17.5	Near west coast of Luzon, Philippine Islands. Depth about 95 km	15.5 N.	120.3 E.
7	22 26 33.8	Rat Islands, Aleutian Islands. Depth about 43 km	51.5 N.	176.1 E.
8	00 02 10.0	Near coast of southern Peru. Depth about 44 km	15.1 S.	75.4 W.
8	00 33 13.8	1700 km southwest of Galapagos Islands. Depth about 33 km	4.4 S.	105.5 W.
8	07 48 44.7	Loyalty Islands region. Depth about 33 km	20.1 S.	168.6 E.
8	10 03 22.8	New Hebrides Islands. Depth about 86 km	14.7 S.	167.1 E.
8	15 13 42.7	Santa Cruz Islands. Depth about 234 km	12.0 S.	166.8 E.
8	16 29 32.5	Fiji Islands region. Depth about 408 km	15.0 S.	179.2 W.
8	17 17 54.3	Kermadec Islands region. Depth about 71 km	31.5 S.	180.0
8	18 43 42.4	Tonga Islands region. Depth about 33 km	17.9 S.	167.9 E.
8	18 48 14.3	Kurile Islands. Depth about 186 km	45.8 N.	147.5 E.
8	21 15 55.7	Near Islands, Aleutian Islands. Depth about 33 km	51.9 N.	175.0 E.
9	01 11 03.4	Iraq-Iran border. Felt at Pol-E-Dokhtar. Depth about 44 km	33.5 N.	47.2 E.
9	02 14 47.4	Central Rumania. Depth about 129 km	45.7 N.	26.7 E.
9	04 47 20.4	Off east coast of Leyte, Philippine Islands. Depth about 33 km	10.4 N.	126.2 E.
9	08 26 10.0	Fiji Islands. Depth about 522 km	20.5 S.	178.8 W.
9	09 21 30.8	Near east coast of Honshu, Japan. Depth about 33 km	35.8 N.	140.3 E.
9	13 51 38.5	Bonin Islands region. Depth about 452 km	27.5 N.	140.1 E.
9	18 02 27.9	Banda Sea. Depth about 33 km	5.4 S.	132.5 E.
9	18 08 47.9	Azores region. Depth about 33 km	40.3 N.	29.3 W.
9	21 15 16.9	Gulf of California. Depth about 33 km	24.3 N.	109.3 W.
10	01 32 03.7	Southern Iran. Slight damage at Bandar-Abbas. Felt at Bandar-Lengeh, Minab, and on Queshm, Hormoz. Depth about 33 km.	27.9 N.	55.7 E.
10	01 33 15.9	Kurile Islands. Depth about 33 km. Mag. 6½–6¾	43.8 N.	147.3 E.
10	02 26 19.1	Mariana Islands region. Depth about 37 km	12.8 N.	143.6 E.
10	07 17 13.0	New Hebrides Islands. Depth about 70 km	18.1 S.	169.0 E.
10	11 03 36.8	Near north coast of Luzon, Philippine Islands. Depth about 32 km.	19.3 N.	121.1 E.
10	19 32 05.4	Near east coast of Honshu, Japan. Depth about 100 km	38.3 N.	141.8 E.
10	21 13 25.5	Near north coast of Timor Island. Depth about 33 km	9.8 S.	123.8 E.
10	22 13 48.9	Kermadec Islands region. Depth about 215 km	30.1 S.	179.1 W.
11	01 51 57*	Near Big Bear, Calif. Felt. Mag. 3.4	34 22 N.	116 52 W.
11	03 52 19.4	Ecuador. Depth about 59 km	1.2 S	78.8 W.
11	06 24 48.6	Mariana Islands. Depth about 107 km	18.5 N.	145.6 E.
11	07 39 15.4	1200 km southeast of Mascarene Islands. Depth about 33 km	23.9 S.	69.5 E.
11	10 31 48.3	----do	23.8 S.	69.4 E.
11	11 31 44.5	Lake Baikal region, U.S.S.R. Depth about 33 km. Mag. 6¼	55.8 N.	113.1 E.
11	11 57 47.9	Fiji Islands. Depth about 547 km	19.3 S.	177.6 W.
11	14 30 44.8	New Hebrides Islands. Depth about 154 km	15.8 S.	167.8 E.
11	15 15 33.6	Red Sea. Depth about 34 km	17.2 N.	40.7 E.
11	16 09 57.6	Santa Cruz Islands. Felt at Port Vila. Depth about 77 km. Mag. 6¼.	12.9 S.	166.5 E.
11	21 45 20.5	Vancouver Island region. Depth about 33 km	48.9 N.	128.8 W.
11	22 14 18.7	Off coast of southern Chile. Depth about 33 km. Mag. 6½–6¾	43.2 S.	76.0 W.
12	12 49 10.8	Ryukyu Islands. Depth about 40 km	26.0 N.	128.4 E.
12	16 16 56.1	Southern Honshu. Depth about 33 km	35.5 N.	135.8 E.
12	19 32 38.0	Andreanof Islands, Aleutian Islands. Depth about 57 km	51.5 N.	178.4 W
12	20 55 38.6	South Atlantic Ocean. Depth about 33 km	17.8 S.	13.5 W.

See footnote at end of table.

TABLE 2.—*Summary of instrumental epicenters for 1962*—Continued

1962	Origin Time G.M.T.			Region, focal depth, and remarks	Coordinates of provisional epicenter			
					Latitude		Longitude	
	h	*m*	*s*		° ′		° ′	
Nov. 13	08	54	39.1	Near south coast of Hokkaido, Japan. Depth about 61 km	42.0	N.	141.9	E.
13	09	58	13.4	Fox Islands, Aleutian Islands. Depth about 69 km	52.9	N.	166.7	W.
13	21	47	46.6	Sandwich Islands. Depth about 33 km	56.1	S.	27.2	W.
14	04	38	09.7	300 km northeast of Swan Islands. Depth about 33 km	18.7	N.	81.1	W.
14	05	15	42.1	New Hebrides Islands. Depth about 40 km	15.2	S.	167.9	E.
14	07	23	50.3	Kermadec Islands region. Depth about 33 km	26.5	S.	176.2	W.
14	07	48	05.5	Central Honshu, Japan. Depth about 61 km	35.7	N.	140.8	E.
14	07	56	29.2	Central Honshu, Japan. Depth about 60 km	35.6	N.	140.8	E.
14	16	11	08.4	North Atlantic Ocean. Depth about 33 km	20.3	N.	45.9	W.
14	21	59	16.1	Celebes. Depth about 92 km	0.3	S.	123.0	E.
15	11	30	38.6	Fiji Islands. Depth about 590 km	21.0	S.	178.4	W.
15	13	48	40.1	Central Honshu, Japan. Depth about 90 km	36.0	N.	140.3	E.
15	14	55	26.9	New Herbrides Islands. Depth about 33 km	14.5	S.	166.9	E.
15	15	51	57.6	Central Chile. Depth about 33 km	38.3	S.	73.2	W.
15	16	09	26.9	----do	38.4	S.	73.6	W.
15	16	25	09.4	Near coast of North-East New Guinea. Depth about 40 km	6.9	S.	146.7	E.
15	23	25	15.7	Near coast of northern Peru. Depth about 45 km. Mag. 6	8.7	S.	79.8	W.
16	02	19	48.7	Fiji Islands. Depth about 612 km	18.0	S.	178.4	W.
16	06	39	08.2	Ecuador. Slight damage at Ambato. Depth about 33 km	1.0	S.	78.6	W.
16	07	18	36.1	Easter Island. Depth about 33 km Mag. 6½–6¾	32.3	S.	111.1	W.
16	09	52	25.1	Mariana Islands. Depth about 207 km	19.0	N.	145.3	E.
16	21	10	01.8	Andaman Isands. Depth about 33 km. Mag. 6-6¼ (Pal)	13.5	N.	93.2	E.
16	22	45	41.9	Andaman Islands. Depth about 33 km	13.8	N.	92.9	E.
17	00	00	07.2	Bolivia. Depth about 144 km	21.0	S.	68.6	W.
17	01	13	23.7	Molucca Sea. Depth about 39 km	2.6	N.	126.9	E.
17	11	07	15.4	Near coast of Oaxaca, Mexico. Depth about 12 km	16.3	N.	98.2	W.
17	14	21	30.6	Celebes Sea. Depth about 609 km	2.8	N.	121.7	E.
17	22	28	27.1	South-central Alaska. Depth about 121 km	63.3	N.	150.7	W.
18	06	43	08.3	Molucca Sea. Depth about 56 km	0.2	S.	125.1	E.
18	07	38	27.4	North Atlantic Ocean. Depth about 30 km	16.0	N.	46.7	W.
18	12	00	26.7	Tonga Islands region. Depth about 129 km	16.4	S.	174.1	W.
19	04	15	36.1	Near east coast of Taiwan. Depth about 53 km	24.3	N.	122.6	E.
19	10	14	29.4	South Pacific Ocean. Depth about 33 km	50.0	S.	114.3	W.
19	13	58	57.6	700 km southwest of Macquarie Island. Depth about 33 km	60.7	S.	152.9	E.
19	14	30	32.2	Colombia. Depth about 160 km	6.8	N.	73.0	W.
19	16	49	29.3	New Britain region. Depth about 62 km	5.2	S.	152.6	E.
19	21	44	50.3	Unimak Island region. Depth about 33 km	53.8	N.	163.5	W.
20	06	54	07.1	Kamchatka. Depth about 32 km	56.1	N.	159.1	E.
20	07	32	41.0	Kamchatka. Depth about 23 km	56.2	N.	159.1	E.
20	10	11	11.2	Solomon Islands. Felt at Karoola and Rabaul. Depth about 69 km.	6.1	S.	154.5	E.
20	12	59	53.1	Celebes. Depth about 37 km	1.7	N.	126.4	E.
20	16	02	14.5	Hokkaido, Japan. Depth about 40 km	42.6	N.	143.4	E.
20	17	55	50.1	Near coast of Northeast New Guinea. Depth about 33 km	2.7	S.	141.7	E.
20	20	45	46.9	Southern Iran. Depth about 34 km	27.9	N.	54.9	E.
21	07	07	42.3	South Pacific Ocean. Depth about 33 km	49.8	S.	114.8	W.
21	15	04	15.4	Ryukyu Islands. Depth about 33 km	26.0	N.	128.2	E.
21	19	40	25.7	Fiji Islands. Depth about 626 km	21.1	S.	179.2	W.
22	01	30	03.1	Near coast of Chiapas, Mexico. Depth about 33 km	14.3	N.	92.8	W.
22	03	09	48.3	Near east coast of Hokkaido, Japan. Depth about 53 km	42.8	N.	143.0	E.
22	06	53	35.8	Peru-Ecuador border. Depth about 166 km	1.7	S.	76.9	W.
22	07	37	25.8	New Hebrides Islands. Depth about 33 km	18.2	S.	167.6	E.
22	08	37	12.6	Fiji Islands. Depth about 605 km	20.6	S.	178.5	W.
22	13	53	08.5	Vancouver Island region. Depth about 33 km	50.7	N.	129.1	W.
22	14	20	14.6	Kurile Islands. Depth about 60 km	45.1	N.	150.0	E.
22	20	33	25.6	Kermadec Islands. Depth about 298 km	30.2	S.	178.6	W.
22	23	55	28.3	Tonga Islands region. Depth about 391 km	24.1	S.	176.8	W.
23	00	30	05.3	Near coast of southern Peru. Depth about 33 km	15.1	S.	75.6	W.
23	00	44	49.3	Near south coast of Peru. Depth about 33 km	15.4	S.	76.0	W.
23	07	16	37.7	New Hebrides Islands. Depth about 33 km	17.7	S.	167.9	E.
23	10	41	57.6	Near coast of northeast New Guinea. Depth about 100 km	4.0	S.	142.3	E.
23	23	05	47.4	Fiji Islands. Depth about 69 km	21.5	S.	179.3	W.
24	07	31	49.1	Near north coast of Venezuela. Depth about 33 km	10.9	N.	62.9	W.

See footnote at end of table.

TABLE 2.—*Summary of instrumental epicenters for 1962*—Continued

1962	Origin Time G.M.T.			Region, focal depth, and remarks	Coordinates of provisional epicenter				
					Latitude			Longitude	
	h	*m*	*s*		° ′			° ′	
Nov. 24	08	10	11.1	Tonga Islands. Depth about 36 km	18.6	S.		175.3	W.
24	10	34	07.7	Fiji Islands region. Depth about 500 km	24.8	S.		180.0	
24	14	21	39.4	Near east coast of Kamchatka. Depth about 29 km	54.9	N.		161.6	E.
24	15	52	15.6	Kurile Islands region. Depth about 35 km	49.6	N.		155.9	E.
24	16	19	44.9	Mid-Atlantic Ocean. Depth about 33 km	9.8	N.		40.7	W.
24	17	22	59.5	Admiralty Islands region. Depth about 32 km	2.5	S.		148.9	E.
25	09	51	22.8	Near east coast of Leyte, Philippine Islands. Depth about 47 km	10.6	N.		125.2	E.
25	12	48	44.3	Near coast of central Peru. Depth about 33 km	11.9	S.		77.3	W.
25	14	55	59.6	New Britain. Depth about 33 km	5.9	S.		148.4	E.
25	17	34	48.5	Near coast of Chiapas, Mexico. Depth about 125 km	16.7	N.		94.0	W.
25	22	58	10.2	Svalbard region. Depth about 33 km	74.8	N.		14.1	E.
26	01	41	05.8	Hindu Kush. Depth about 121 km	36.2	N.		70.1	E.
26	05	29	30.2	Sinkiang Province, China. Depth about 14 km	39.8	N.		77.2	E.
26	13	28	33.7	Off southeast coast of Hokkaido, Japan. Depth about 33 km	42.2	N.		144.4	E.
26	15	58	46.2	Tonga Islands. Depth about 19 km	23.8	S.		175.8	W.
26	16	58	18*	Near Oakland, Calif. Felt at Berkeley and Oakland. Mag. 2.5 (Brk).	37	50	N.	122 13	W.
27	04	07	17.5	Andreanof Islands, Aleutian Islands. Depth about 33 km	51.6	N.		177.6	W.
27	06	52	57.8	Ryukyu Islands. Depth about 148 km	25.1	N.		122.9	E.
27	12	07	12.7	Near west coast of Luzon, Philippine Islands. Depth about 35 km	14.9	N.		119.9	E.
27	16	50	27.7	Mariana Islands. Depth about 33 km	12.2	N.		143.8	E.
28	02	35	48.8	----do----	12.1	N.		143.7	E.
28	05	02	36.1	South Atlantic Ocean. Depth about 33 km	22.4	S.		10.5	W.
28	05	09	15.0	----do----	22.5	S.		10.7	W.
28	05	53	13.0	Volcano Islands. Depth about 82 km	24.3	N.		141.3	E.
28	15	25	58.7	Andaman Islands region. Depth about 53 km	9.9	N.		93.4	E.
28	21	06	49.9	Off south coast of Hokkaido, Japan. Depth about 33 km	42.5	N.		142.3	E.
29	02	20	27.8	200 km north of Socotra. Depth about 33 km	14.0	N.		55.1	E.
29	03	58	32.1	Kermadec Islands. Depth about 140 km	29.4	S.		177.9	W.
29	09	03	51.4	Tonga Islands. Depth about 33 km	22.2	S.		175.9	W.
29	12	44	32.8	Mariana Islands. Depth about 100 km	13.9	N.		145.4	E.
29	19	06	37.6	New Hebrides Islands. Felt at Port Vila and Tongoa. Depth about 33 km. Mag. 5¾–6 (Pal).	17.3	S.		168.5	E.
29	22	51	55.2	Tadzhik S.S.R. Depth about 49 km	39.0	N.		70.7	E.
30	16	02	05.9	Burma. Depth about 98 km	24.3	N.		94.8	E.
30	16	53	24.6	Molucca Passage. Depth about 58 km	3.2	N.		127.1	E.
30	21	11	30.0	Leyte, Philippine Islands. Depth about 64 km	10.8	N.		124.7	E.
30	21	51	25.1	Guerrero, Mexico. 1 killed, slight damage at Acapulco. Felt at Toluca and Cuernavaca. Depth about 57 km. Mag. 5-5¼ (Pal).	17.6	N.		99.7	W.
30	23	07	51.6	Near coast of North-East New Guinea. Depth about 79 km	5.5	S.		145.9	E.
30	23	51	05*	San Bernardino County, Calif. Felt at Big Bear. Mag. 4.3	34	19	N.	116 55	W.
Dec. 1	00	35	49*	San Bernardino County, Calif. Slight damage at Big Bear City. Mag. 4.3.	34	19	N.	116 53	W.
1	00	57	30.4	San Bernardino County, Calif. Depth about 33 km. Mag. 2½–2¾.	34.3	N.		117.0	W.
1	01	50	20.4	Fox Islands, Aleutian Islands. Depth about 38 km. Mag. 5¼–5½ (Pal).	52.4	N.		170.1	W.
1	04	16	59.6	Kermadec Islands. Depth about 52 km	29.7	S.		177.7	W.
1	13	32	24.8	Central Chile. Depth about 68 km	30.8	S.		71.3	W.
1	14	06	02.8	San Bernardino County, Calif. Depth about 33 km. Mag. 3	34.3	N.		116.9	W.
1	21	02	51.8	Fiji Islands region. Depth about 620 km	17.7	S.		178.7	W.
2	00	41	39.7	San Bernardino County, Calif. Depth about 33 km. Mag. 4¼–4½.	34.3	N.		117.0	W.
2	05	30	53.8	Solomon Islands. Felt at Honiara. Depth about 34 km	9.9	S.		159.9	E.
2	09	49	48.4	Mariana Islands. Depth about 67 km	13.5	N.		146.0	E.
2	16	12	53.4	New Hebrides Islands. Felt at Port Vila. Depth about 33 km	18.9	S.		168.5	E.
2	18	19	55.5	Hindu Kush. Depth about 201 km	36.5	N.		70.8	E.
2	22	21	29.5	Iran. Felt at Tehran. Depth about 36 km	35.8	N.		50.1	E.
2	22	38	23.6	Java. Depth about 153 km	7.9	S.		111.9	E.
2	23	36	23.7	Iran. Felt at Tehran. Depth about 33 km	35.5	N.		50.1	E.
3	12	50	36.9	Santa Cruz Islands region. Depth about 632 km	12.9	S.		169.2	E.
4	01	31	43.9	New Guinea. Depth about 91 km	8.0	S.		147.7	E.

See footnote at end of table.

TABLE 2.—*Summary of instrumental epicenters for 1962*—Continued

1962	Origin Time G.M.T.	Region, focal depth, and remarks	Coordinates of provisional epicenter	
			Latitude	Longitude
	h *m* *s*		° ′	° ′
Dec. 4	03 29 40.8	Off coast of Guerrero, Mexico. Depth about 33 km	10.1 N.	103.6 W.
4	06 15 35.6	Near east coast of Honshu, Japan. Felt in central and northeast Honshu. Depth about 77 km.	36.9 N.	141.0 E.
4	07 23 04.2	Southern Bolivia. Depth about 300 km	21.8 S.	65.6 W.
4	08 16 18.8	Yellow Sea. Depth about 33 km	36.1 N.	123.5 E.
4	10 34 27.8	New Britain. Felt at Kandrian. Depth about 83 km	6.1 S.	149.9 E.
4	16 40 06.0	Samoa Islands region. Depth about 33 km. Mag. 5–5¼	16.5 S.	172.8 W.
4	17 49 59.4	Colorado. Slight damage in the Denver area. Depth about 33 km.	39.8 N.	104.7 W.
4	17 53 27.5	Ceram Island region. Depth about 33 km	3.8 S.	131.4 E.
4	18 46 01.6	Kurile Islands. Depth about 171 km	44.6 N.	147.9 E.
4	19 31 29.8	Celebes Sea. Depth about 586 km	4.6 N.	122.5 E.
5	00 19 40.9	Tsinghai Province, China. Depth about 74 km	32.7 N.	97.3 E.
5	01 16 06.3	Solomon Islands. Depth about 33 km	10.9 S.	161.6 E.
5	05 11 11.2	Fiji Islands region. Depth 565 km	17.7 S.	178.6 W.
5	11 38 10.6	Near coast of Peru. Depth about 50 km	10.3 S.	77.9 W.
5	12 24 32.6	Fiji Islands region. Depth about 591 km	20.8 S.	178.9 W.
5	13 48 00.4	Colorado. Slight damage in the Derby-Dupont area. Depth about 33 km.	39.9 N.	104.6 W.
6	02 13 25.1	South of Honshu, Japan. Depth about 33 km	30.7 N.	142.0 E.
6	03 45 20.5	Northern Chile. Depth about 123 km	23.3 S.	68.1 W.
6	04 04 09.9	Kurile Islands. Depth about 85 km	49.0 N.	154.4 E.
6	06 44 17.0	Near coast of southern Chile. Felt. Depth about 33 km	45.6 S.	73.4 W.
6	08 52 48.6	Sea of Okhotsk. Depth about 506 km	53.4 N.	153.5 E.
6	10 08 08.0	Fox Islands, Aleutian Islands. Depth about 33 km	53.1 N.	169.3 W.
6	11 28 11.9	Easter Island region. Depth about 33 km	22.0 S.	113.7 W.
6	16 05 37.0	Northeastern Utah. Depth about 33 km	40.2 N.	110.6 W.
6	17 16 08.5	Near east coast of Kamchatka. Depth about 33 km	55.0 N.	161.7 E.
6	17 43 35*	Southeast of Redding, Calif. Mag. 3.0 (Brk)	40.5 N.	122.2 W.
6	17 55 18.5	Ceram Island region. Depth about 33 km	3.7 S.	131.4 E.
6	22 36 45.8	Central Chile. Depth about 88 km	34.0 S.	71.1 W.
7	00 06 23.9	Solomon Islands region. Depth about 100 km	10.8 S.	164.0 E.
7	07 27 45.4	Windward Islands. Depth about 149 km	15.3 N.	61.2 W.
7	09 36 01.5	Inner Mongolia. Depth about 33 km	38.0 N.	106.3 E.
7	12 55 37.2	Kermadec Islands. Depth about 364 km	30.2 S.	179.4 W.
7	14 03 37.0	South of Honshu, Japan. Felt in the Tokyo area. Depth about 411 km. Mag. 6¾.	29.2 N.	139.2 E.
7	23 55 03.0	Near west coast of Luzon, Philippine Islands. Depth about 178 km.	13.9 N.	120.6 E.
8	01 43 43.8	Southern Alaska. Depth about 33 km	62.6 N.	151.6 W.
8	09 02 54.4	Northern Iran. Felt at Shahrud. Depth about 33 km	36.5 N.	55.0 E.
8	11 28 23.3	New Ireland region. Depth about 100 km	4.9 S.	154.0 E.
8	14 19 00.1	Tsinghai Province, China. Depth about 33 km	37.1 N.	95.5 E.
8	18 00 39.1	Northern Chile. Depth about 84 km	23.7 S.	69.1 W.
8	18 18 28.7	Tonga Islands region. Felt at Apia. Depth about 33 km. Mag. 6¾.	15.4 S.	173.4 W.
8	21 27 22.2	Santiago del Estero Province, Argentina. Felt at Buenos Aires. Depth about 620 km. Mag. 6¾–7.	25.8 S.	63.4 W.
8	22 55 01.2	Andreanof Islands, Aleutian Islands. Depth about 33 km	50.5 N.	176.8 W.
9	07 30 12.2	Near north coast of New Guinea. Depth about 173 km	5.4 S.	147.9 E.
9	10 17 39.5	Kurile Islands region. Depth about 34 km	43.5 N.	147.3 E.
9	14 15 56.3	Fiji Islands region. Depth about 117 km	22.3 S.	177.0 W.
9	14 27 04.1	New Britain region. Felt at Rabaul. Depth about 117 km	4.7 S.	153.7 E.
9	17 37 46.9	Banda Sea. Depth about 194 km	7.1 S.	129.1 E.
9	20 54 13.7	Tonga Islands region. Depth about 60 km	17.7 S.	173.6 W.
9	21 17 02.0	Northern Honshu, Japan. Depth about 33 km	39.9 N.	140.5 E.
10	04 56 20.0	Indian Ocean. Depth about 33 km	28.1 S.	62.7 E.
10	06 11 56.2	Solomon Islands. Depth about 39 km	8.4 S.	157.4 E.
10	16 09 58.3	Kurile Islands region. Depth about 45 km	49.7 N.	155.8 E.
10	16 56 04.5	Kermadec Islands region. Depth about 88 km	27.2 S.	176.8 W.
10	23 04 36.3	Near south coast of Java. Depth about 141 km	7.9 S.	108.5 E.
11	02 34 09.5	About 2000 km south of Australia. Depth about 33 km	48.9 S.	124.6 E.
11	10 28 17.5	Central Utah. Depth about 33 km	39.4 N.	110.3 W.

See footnote at end of table.

TABLE 2.—*Summary of instrumental epicenters for 1962*—Continued

1962	Origin Time G.M.T.			Region, focal depth, and remarks	Coordinates of provisional epicenter			
					Latitude		Longitude	
	h	*m*	*s*		° ′		° ′	
Dec. 11	13	54	36.3	Fiji Islands. Depth about 630 km	19.7	S.	178.4	W.
11	16	14	47.1	Off east coast of Honshu, Japan. Depth about 44 km	39.1	N.	144.3	E.
11	17	51	58.9	Tonga Islands region. Depth about 98 km	24.8	S.	177.6	W.
11	18	09	57.9	New Guinea. Depth about 51 km	4.6	S.	144.0	E.
11	18	23	30.8	Bismarck Sea. Depth about 58 km	5.3	S.	150.6	E.
11	23	32	57.0	Molucca Passage. Depth about 63 km	3.5	N.	126.9	E.
12	00	02	58.4	Near south coast of Honshu, Japan. Depth about 407 km	33.0	N.	136.0	E.
12	10	08	48.5	New Britain region. Felt at Rabaul, Karlai, and Dollene. Depth about 94 km. Mag. 6-6¼ (Pal).	4.8	S.	153.8	E.
12	11	29	39.5	Northern Honshu, Japan. Depth about 66 km	39.6	N.	140.5	E.
12	13	56	32.4	Sandwich Islands region. Depth about 33 km	60.3	S.	25.9	W.
12	15	50	08.0	New Hebrides Islands. Depth about 102 km	18.6	S.	168.6	E.
12	22	56	45.8	Sumatra. Depth about 138 km	4.6	N.	96.5	E.
13	00	25	24.5	Nicobar Islands. Depth about 224 km	7.9	N.	93.8	E.
13	04	21	21.2	Central Alaska. Depth about 47 km	63.3	N.	149.7	W.
13	08	10	44.5	Off coast of northern California. Depth about 33 km	40.2	N.	125.2	W.
13	08	13	34.4	New Ireland region. Depth about 112 km	4.7	S.	153.8	E.
13	14	57	27.9	Kenai Peninsula, Alaska. Felt at Anchorage. Depth about 69 km.	61.4	N.	147.2	W.
13	16	45	59.1	Halmahera region. Depth about 33 km	2.8	N.	127.9	E.
13	22	45	27.1	Dodecanese Islands region. Depth about 45 km	34.9	N.	27.8	E.
13	23	20	42.6	Batan Islands, Philippine Islands. Depth about 147 km	20.4	N.	122.0	E.
14	08	53	48.7	Solomon Islands region. Depth about 109 km	4.7	S.	153.8	E.
14	13	06	52.3	Northern Honshu, Japan. Depth about 97 km	41.8	N.	141.1	E.
14	16	52	49.7	Outer Mongolia-U.S.S.R. border. Depth about 30 km	50.4	N.	90.6	E.
14	18	01	30.8	Kurile Islands region. Depth about 125 km	43.8	N.	148.3	E.
15	02	37	56.4	Fiji Islands. Depth about 509 km	17.3	S.	178.9	W.
15	03	48	38.0	Near coast of central Norway. Depth about 33 km	67.2	N.	13.7	E.
15	06	34	59.8	Nevada. Depth about 33 km. Mag. 4½-4¾	40.7	N.	117.5	W.
15	14	22	35.2	New Britain. Felt at Rabaul. Depth about 53 km	4.6	S.	152.1	E.
15	15	28	12.1	Fiji Islands. Depth about 602 km	18.9	S.	177.3	W.
16	05	25	26.6	Near north coast of western New Guinea. Depth about 43 km	3.1	S.	139.5	E.
16	06	34	15.6	Hindu Kush. Depth about 145 km	36.2	N.	71.3	E.
16	11	06	45.7	Nevada. Depth about 33 km	38.7	N.	117.5	W.
16	22	21	27.1	Chiapas, Mexico. Depth about 187 km	15.6	N.	92.1	W.
17	02	15	49.7	Ceram region. Depth about 33 km	4.2	S.	127.6	E.
17	11	00	16.0	Celebes Sea. Depth about 393 km	2.1	N.	122.9	E.
17	12	29	52.2	Celebes. Depth about 126 km	0.2	N.	124.3	E.
17	17	25	40.8	Inner Mongolia. Depth about 33 km	38.0	N.	106.1	E.
17	22	02	45.2	Flores region. Depth about 151 km	8.2	S.	120.5	E.
18	02	06	09.2	Kirghiz S.S.R. Depth about 77 km	39.8	N.	71.4	E.
18	02	54	47.1	Mariana Islands region. Depth about 306 km	21.6	N.	143.1	E.
18	03	51	00.2	India-Burma border. Depth about 124 km	23.8	N.	93.9	E.
18	07	21	02.9	Dodecanese Islands region. Depth about 37 km	35.0	N.	28.0	E.
18	07	48	36.6	Easter Island region. Depth about 33 km	35.2	S.	104.8	W.
18	10	33	58.4	Kermadec Islands. Depth about 214 km	28.3	S.	178.2	W.
18	11	30	07.3	Fiji Islands. Depth about 486 km	24.7	S.	180.0	
18	12	37	16.1	Halmahera region. Depth about 96 km	2.7	N.	129.1	E.
18	20	47	41.5	Kurile Islands region. Depth about 80 km	43.7	N.	147.0	E.
18	20	56	32.3	Fiji Islands region. Depth about 308 km	18.4	S.	176.9	W.
18	22	47	18.1	Near Islands, Aleutian Islands, Depth about 33 km	54.1	N.	170.8	E.
19	05	17	18.1	Fox Islands, Aleutian Islands. Depth about 33 km	51.5	N.	170.8	W.
19	11	01	39.8	Kermadec Islands. Depth about 28 km	31.2	S.	178.1	W.
19	12	56	19.7	Solomon Islands. Felt at Rabaul and Metlik. Depth about 98 km. Mag. 5-5¼ (Pal).	4.7	S.	154.0	E.
19	20	15	56.8	Fiji Islands region. Depth about 422 km	24.0	S.	179.4	W.
20	02	00	51.1	Banda Sea. Depth about 189 km	6.8	S.	129.3	E.
20	08	32	37.3	Tonga Islands region. Depth about 33 km	20.0	S.	174.1	W.
20	08	47	23.3	Fiji Islands region. Depth about 512 km	23.4	S.	179.3	E.
20	18	20	55.8	Balleny Islands region. Depth about 29 km	61.8	S.	161.2	E.
20	19	32	27.4	Mariana Islands. Depth about 33 km	17.8	N.	144.6	E.
20	20	57	19.7	New Hebrides Islands. Depth about 155 km	13.8	S.	167.0	E.
21	00	44	19.7	Near south coast of Java. Depth about 64 km	9.0	S.	112.4	E.

See footnote at end of table.

TABLE 2.—*Summary of instrumental epicenters for 1962*—Continued

1962	Origin Time G.M.T.			Region, focal depth, and remarks	Coordinates of provisional epicenter			
					Latitude		Longitude	
	h	*m*	*s*		° ′		° ′	
Dec. 21	01	26	31.5	New Britain region. Felt at Rabaul. Depth about 150 km	4.2	S.	152.9	E.
21	02	11	20.7	Rat Islands, Aleutian Islands. Depth about 60 km	51.2	N.	179.8	E.
21	03	28	35.3	Central Luzon, Philippine Islands. Felt at Manila. Depth about 46 km.	15.4	N.	121.8	E.
21	06	27	49.1	Fox Islands, Aleutian Islands. Depth about 33 km	52.5	N.	168.7	W.
21	06	31	42.4	Fox Islands, Aleutian Islands. Depth about 39 km	52.6	N.	168.6	W.
21	06	45	26.5	Tonga Islands. Depth about 53 km	17.0	S.	173.4	W.
21	07	07	05.9	Fox Islands, Aleutian Islands. Depth about 33 km	52.8	N.	168.8	W.
21	08	36	53.9	----do	52.8	N.	168.6	W.
21	08	42	48.3	Fox Islands, Aleutian Islands. Depth about 33 km. Mag. 6½	52.4	N.	168.5	W.
21	08	50	08.2	Fox Islands, Aleutian Islands. Depth about 33 km	52.8	N.	168.1	W.
21	09	00	41.4	----do	52.4	N.	168.5	W.
21	09	10	01.6	----do	52.5	N.	168.5	W.
21	09	33	15.5	Near south coast of Hokkaido, Japan. Felt on Hokkaido and northeast Honshu. Depth about 27 km.	42.4	N.	142.3	E.
21	09	42	46.0	Jujuy Province, Argentina. Depth about 200 km	22.8	S.	66.5	W.
21	14	40	40.3	Fox Islands, Aleutian Islands. Depth about 16 km	52.6	N.	168.3	W.
21	15	10	22.9	Fox Islands, Aleutian Islands. Depth about 33 km	52.5	N.	168.7	W.
21	15	28	17.6	Fox Islands, Aleutian Islands. Depth about 49 km	52.7	N.	168.8	W.
21	17	35	56.1	New Ireland region. Depth about 95 km	4.6	S.	153.8	E.
21	17	47	29.7	Gulf of Aden. Depth about 33 km	13.9	N.	51.6	E.
21	18	20	44.7	Central Luzon, Philippine Islands. Felt at Manila. Depth about 55 km.	15.3	N.	121.7	E.
21	20	27	13.3	Fox Islands, Aleutian Islands. Depth about 40 km	52.4	N.	168.5	W.
21	21	27	51.6	Near coast of Ecuador. Felt at Guayaquil and Quito. Depth about 33 km.	0.9	S.	80.9	W.
22	00	52	23.4	Loyalty Islands region. Depth about 33 km. Mag. 6½–6¾	22.0	S.	160.1	E.
22	01	13	03.5	Loyalty Islands region. Depth about about 33 km	21.8	S.	170.0	E.
22	01	28	48.9	----do	21.9	S.	170.1	E.
22	01	59	50.3	Near south coast of Java. Depth about 69 km	9.2	S.	112.4	E.
22	06	35	57.1	Near coast of Ecuador. Depth about 33 km	1.1	S.	81.0	W.
22	09	24	41.5	Molucca Sea. Depth about 33 km	0.9	N.	125.8	E.
22	11	28	03.4	Samoa Islands region. Depth about 55 km	15.1	S.	173.0	W.
22	14	09	29.7	Near south coast of Mindanao, Philippine Islands. Depth about 18 km.	4.7	N.	125.7	E.
22	15	20	31.0	Fox Islands, Aleutian Islands. Depth about 47 km. Mag. 6¼	52.5	N.	168.8	W.
22	23	27	59.5	New Britain. Felt at Rabaul. Depth about 105 km	5.1	S.	151.2	E.
23	00	43	56.3	Albania-Yugoslavia border region. Depth about 33 km	41.3	N.	20.4	E.
23	03	46	03.6	Loyalty Islands region. Depth about 33 km	22.1	S.	169.9	E.
23	06	28	00.8	Hindu Kush region. Depth about 118 km	38.4	N.	73.3	E.
23	08	19	13.7	Near west coast of central Luzon, Philippine Islands. Felt at Manila. Depth about 54 km.	15.2	N.	119.8	E.
23	10	21	55.3	Near east coast of central Luzon, Philippine Islands. Felt at Manila. Depth about 52 km.	15.3	N.	121.7	E.
23	10	48	14.1	Fox Islands, Aleutian Islands. Depth about 53 km	52.5	N.	168.9	W.
23	15	04	37.6	Fox Islands, Aleutian Islands. Depth about 33 km	52.5	N.	168.3	W.
23	15	34	30.5	Off east coast of North Island, New Zealand. Depth about 31 km	38.1	S.	179.4	W.
23	18	52	38.8	Fox Islands, Aleutian Islands. Depth about 33 km	52.5	N.	169.0	W.
23	20	15	13.3	New Ireland region. Depth about 205 km	1.4	S.	152.5	E.
24	00	16	23*	Monterey County, Calif. Felt at Aromas and Watsonville. Mag. 3.8 (Brk).	36 56	N.	121 38	W.
24	00	23	53.1	Sandwich Islands region. Depth about 33 km	59.1	S.	26.0	W.
24	03	42	42.1	Near west coast of northern Honshu, Japan. Depth about 33 km	39.1	N.	139.0	E.
24	10	44	21.9	Novaya Zemlya. Depth about 0 km	74.2	N.	52.3	E.
24	11	11	42.0	----do	73.6	N.	57.5	E.
24	11	40	46.8	Loyalty Islands region. Depth about 33 km	21.9	S.	170.2	E.
24	17	43	05.3	Near coast of Peru. Depth about 80 km	8.4	S.	78.7	W.
25	12	09	45.3	Easter Island region. Depth about 33 km	36.2	S.	100.5	W.

See footnote at end of table.

TABLE 2.—*Summary of instrumental epicenters for 1962*—Continued

1962	Origin Time G.M.T.			Region, focal depth, and remarks	Coordinates of provisional epicenter			
					Latitude		Longitude	
	h	*m*	*s*		° ′		° ′	
Dec. 25	12	43	58.9	Santiago del Estero Province, Argentina. Depth about 589 km	28.2	S.	63.2	W.
25	13	30	32.1	Rat Islands, Aleutian Islands. Depth about 33 km	51.3	N.	178.8	E.
25	13	35	57.2	Novaya Zemlya. Depth about 0 km	73.4	N.	56.5	E.
25	18	57	45.4	Near east coast of Honshu, Japan. Depth about 80 km	36.7	N.	141.0	E.
26	01	19	15.2	Near coast of Guerrero, Mexico. Depth about 35 km	16.9	N.	99.9	W.
26	05	28	36.7	Fox Islands, Aleutian Islands. Depth about 33 km	52.5	N.	168.4	W.
26	06	12	54.5	Windward Islands. Depth about 150 km	15.1	N.	61.4	W.
26	08	58	11.1	Off coast of Portugal. Slight damage at Lisbon. Depth about 19 km.	39.3	N.	10.6	W.
26	14	58	56.4	Tadzhik S.S.R. Depth about 188 km	38.6	N.	72.8	E.
26	22	25	15.5	Komandorskie Islands region. Depth about 33 km. Mag. 6½	53.9	N.	168.7	E.
26	23	25	16.7	Arabian Sea. Depth about 34 km	23.9	N.	65.4	E.
26	23	46	14.7	Komandorskie Islands region. Depth about 33 km	54.0	N.	168.8	E.
27	01	28	47.6	——do	53.9	N.	168.7	E.
27	01	37	57.1	Jujuy Province, Argentina. Depth about 227 km	23.7	S.	65.4	W.
27	04	13	54.7	Samoa Islands region. Depth about 54 km	14.8	S.	173.2	W.
27	06	45	35.3	New Britain. Depth about 66 km	5.1	S.	152.2	E.
27	08	24	48.1	Mindoro, Philippine Islands. Depth about 33 km	12.5	N.	120.9	E.
27	11	13	45.9	La Rioja Province, Argentina. Depth about 88 km	28.8	S.	68.1	W.
27	12	48	17.9	Off south coast of Java. Depth about 40 km	9.1	S.	113.1	E.
27	14	02	02.1	Near north coast of New Guinea. Depth about 35 km	4.9	S.	145.1	E.
27	18	18	42.0	Near east coast of northern Honshu, Japan. Depth about 36 km	39.9	N.	142.0	E.
28	10	10	23.6	Montana. Felt at Big Fork, Mont., and Linfor, Idaho. Depth about 33 km.	48.4	N.	113.9	W.
28	14	47	08.1	Fox Islands, Aleutian Islands. Depth about 33 km	53.7	N.	163.7	W.
28	19	50	10.7	Near east coast of Hokkaido, Japan. Depth about 41 km	42.9	N.	145.4	E.
28	21	39	08.0	South Atlantic Ocean. Depth about 33 km	17.1	S.	14.1	W.
28	23	29	40.6	Near north coast of Crete. Felt. Depth about 82 km	35.6	N.	24.2	E.
29	04	12	12.7	Halmahera region. Depth about 64 km	2.3	N.	127.2	E.
29	08	04	24.8	Arabian Sea. Depth about 33 km	23.7	N.	65.4	E.
29	10	41	04.6	Near coast of northern Chile. Felt at Arequipa, Peru. Depth about 49 km. Mag. 6¾.	20.2	S.	70.3	W.
29	14	47	41.4	Kermadec Islands region. Depth about 43 km. Mag. 6¼-6½	31.2	S.	177.9	W.
29	15	20	42.3	Kermadec Islands region. Depth about 41 km	31.4	S.	177.6	W.
29	18	13	59.3	Kermadec Islands region. Depth about 33 km	31.6	S.	177.8	W.
29	18	19	40.7	——do	31.5	S.	177.6	W.
30	01	57	43.7	New Hebrides Islands. Depth about 49 km	14.9	S.	166.6	E.
30	07	07	10.5	Near west coast of central Luzon, Philippine Islands. Felt at Manila. Depth about 33 km.	15.4	N.	119.7	E.
30	13	23	09.3	Kermadec Islands region. Depth about 39 km	28.2	S.	175.7	W.
30	15	25	25.1	Hindu Kush region. Depth about 35 km	37.5	N.	72.9	E.
30	17	47	15.4	Loyalty Islands. Depth about 71 km	21.1	S.	169.3	E.
30	18	16	21.4	New Britain region. Felt at Rabaul. Depth about 116 km	4.7	S.	153.7	E.
30	21	16	42.5	Near south coast of Mindanao, Philippine Islands. Depth about 33 km.	5.0	N.	125.8	E.
30	22	08	38.3	Near south coast of Hokkaido, Japan. Depth about 86 km	42.6	N.	144.3	E.
30	22	50	25.9	Kermadec Islands region. Depth about 49 km	27.1	S.	176.5	W.
31	02	48	35.5	Flores Sea. Depth about 33 km	8.1	S.	120.9	E.
31	08	00	25.3	Off east coast of Kamchatka. Depth about 53 km	52.8	N.	160.7	E.
31	11	01	04.4	Sumatra. Depth about 67 km	0.5	N.	99.9	E.
31	15	42	23.0	Central Alaska. Depth about 113 km	62.5	N.	149.5	W.
31	17	19	15.3	New Britain region. Felt at Rabaul. Depth about 122 km	4.7	S.	153.6	E.
31	18	28	24.6	Luzon, Philippine Islands. Depth about 67 km	15.3	N.	121.5	E.
31	19	40	10.5	Loyalty Islands region. Depth about 39 km	22.7	S.	171.4	E.
31	20	49	36.0	Pierce County, Wash. Slight damage	47 00	N.	122 02	W.
31	21	45	04.8	Kermadec Islands region. Depth about 243 km	28.4	S.	178.4	W.
31	23	37	18.9	Tonga Islands region. Depth about 33 km	21.6	S.	176.8	W.

*Indicates probable error of 1/10 minute.

TABLE 3.—*Principal earthquakes of the world from January through December 1962*

NOTE.—This table lists (1) the strongest shocks of the period as revealed by seismographic records, particularly those of the Western Hemisphere stations; (2) important destructive and near destructive earthquakes; (3) earthquakes of unusual interest outside the two preceding categories; and (4) magnitude as determined by Pasadena.

1962	Origin time G.M.T.	Region	Coordinates of provisional epicenter		Remarks
			Latitude	Longitude	
	h m s		° ′	° ′	
Jan. 7	10 03 14.3	Yugoslavia	43.3 N.	17.1 E.	2 killed, 19 injured. Moderate damage at Makarska. Depth about 33 km.
8	01 00 22.7	Dominican Republic	18.4 N.	70.4 W.	1 killed, 6 injured. Damage at San Jose de Ocoa and Azua. Depth about 32 km. Mag. 6½.
11	05 05 04.1	Yugoslavia	43.3 N.	17.1 E.	1 killed, 20 injured. Moderate damage at Podgora, Ploce and Makarska. Depth about 33 km. Mag. 5¾.
Feb. 14	06 36 04.6	Near coast of Chile	37.8 S.	72.5 W.	Moderate property damage in central Chile. Depth about 45 km. Mag. 7¼.
Mar. 7	11 01 04.6	Mariana Islands	19.2 N.	145.1 E.	Depth about 685 km. Mag. 7.
12	11 40 12.2	Near south coast of Panama and Costa Rica.	8.1 N.	82.9 W.	Less than 1 ft. tsunami recorded at Puerto Armuelles, Panama and San Cristobal, Galapogas Islands. Depth about 30 km. Mag. 6¾.
17	20 47 32.3	North Atlantic Ocean	10.9 N.	43.2 W.	Depth about 33 km. Mag. 7.
18	15 30 35.5	Near coast of southern Albania.	40.9 N.	19.5 E.	15 killed, 154 injured. Moderate damage in Tepolene region. Felt in Italy, Yugoslavia, and Greece. Depth about 33 km.
18	20 18 54.6	Kwangtung Province, China.	23.8 N.	114.6 E.	1 killed, 2 injured in Canton. Felt in Hong Kong and Macao with minor damage. Depth about 25 km.
Apr. 1	00 45 14.6	Eastern Iran	33.6 N.	59.0 E.	2 killed, 3 injured. Minor damage at Tajkough and Mousavieh. Depth about 33 km.
11	23 21 26.3	Galapagos Islands	0.2 S.	91.5 W.	Depth about 25 km. Mag. 7–7¼.
12	00 52 44.8	Near east coast of Honshu, Japan.	38.1 N.	142.3 E.	Felt at Sendai and Tokyo. Depth about 48 km. Mag. 7–7¼.
18	19 14 35.6	Near coast of Peru	9.9 S.	78.9 W.	9 killed, moderate damage in Casma area. Depth about 23 km.
23	05 58 04.9	Hokkaido, Japan	42.9 N.	143.4 E.	Felt. Depth about 25 km. Mag. 7–7¼.
30	02 26 30.0	Honshu, Japan	38.8 N.	140.9 E.	1 killed, many injured. Moderate property damage in Sendai area. Depth about 104 km. Mag. 6½–6¾.
May 6	19 00 13.5	Sandwich Islands region	60.2 S.	33.5 W.	Depth about 33 km. Mag. 7.
11	14 11 54.1	Near coast of Mexico	17.0 N.	99.6 W.	4 dead, many injured. Extensive property damage in south-central Mexico. Seismic sea wave with maximum amplitude about 2.8 ft. reported at Acapulco. Depth about 40 km. Mag. 7.
15	05 23 46.4	Banda Sea	7.3 S.	128.3 E.	Depth about 34 km. Mag. 7–7¼.
19	14 58 15.0	Near coast of Mexico	17.2 N.	99.5 W.	3 dead, 16 injured. Extensive property damage in south-central Mexico. Depth about 33 km. Mag. 7–7¼.
21	12 02 50.6	Tsinghai Province, China	37.3 N.	96.0 E.	Depth about 25 km. Mag. 7–7¼.
21	21 15 30.0	Fiji Islands region	19.8 S.	177.4 W.	Depth about 342 km. Mag. 6¾–7.
July 30	17 16 47.4	Near north coast of New Guinea.	3.4 S.	143.7 E.	Felt. Depth about 33 km. Mag. 6¾–7.
30	20 18 52.3	Western Colombia	5.2 N.	76.4 W.	47 killed, 300 injured in Caldas Province; property damage over 400,000 square mile area. Felt at Balboa Heights, C.Z. Depth about 69 km. Mag. 6¾.

TABLE 3.—*Principal earthquakes of the world from January through December 1962*—Con.

1962	Origin time G.M.T.	Region	Coordinates of provisional epicenter		Remarks
			Latitude	Longitude	
	h m s		° ′	° ′	
Aug. 3	08 56 17.1	Northern Chile-Argentina border.	23.3 S.	68.1 W.	Felt. Depth about 107 km. Mag. 7–7¼.
17	05 04 31.5	Panay region, Philippine Islands.	10.6 N.	121.6 E.	1 killed on Panay Island. Depth about 33 km.
21	18 19 33.3	Italy	41.4 N.	15.5 E.	20 dead, 200 injured. Major property damage at Naples. Depth about 34 km. Mag. 6.
28	10 59 56.3	Southern Greece	37.8 N.	22.9 E.	1 killed, 25 injured. Moderate property damage. Felt in southern Italy, Sicily, Crete, Malta, southern Yugoslavia, and Egypt. Depth about 100 km. Mag. 6¾.
Sept. 1	19 20 38.7	Northwestern Iran	35.6 N.	49.9 E.	Over 10,000 killed, many injured, and 294 villages wrecked or damaged Depth about 20 km. Mag. 7¼.
18	00 29 05.5	Near south coast of Panama	7.4 N.	82.3 W.	Slight damage in Chiriqui Province. Felt at Balboa Heights, C.Z., and by three ships, *MS STOVE TRANSPORT, JAHI, and MGE.* Depth about 33 km. Mag. 7.
Oct. 5	20 02 27.6	Northeastern Iran	35.2 N.	58.8 E.	5 killed, many injured. Risteh destroyed; damage at Ahmadabad. Depth about 33 km.
Nov. 30	21 51 25.1	Guerrero, Mexico	17.6 N.	99.7 W.	1 killed, slight damage at Acapulco. Felt at Toluca and Cuernavaca. Depth about 57 km. Mag. 5–5¼ (Pal).
Dec. 8	21 27 22.2	Santiago del Estero Province, Argentina.	25.8 S.	63.4 W.	Felt in Buenos Aires. Depth about 620 km. Mag. 6¾–7.

STRONG-MOTION SEISMOGRAPH RESULTS

INTRODUCTION

During 1932, the Coast and Geodetic Survey inaugurated a program of recording strong ground movements in the seismically active regions of the country to obtain basic data needed in the design of earthquake-resistant structures. Notes pertinent to this program will be found in the preceding issues of the *United States Earthquake* series and in S.P. 201 *Earthquake Investigations in California, 1934–35*. (Out of print.) The latter is much broader in scope than the former, and contains data on structural and ground vibrations with detailed descriptions of the various activities which comprise the seismological program as a whole.

Interpretation of records.—The analyses appearing in tables 6 and 7 are based on the assumption of simple harmonic motion. This refers especially to the computation of displacement from accelerograph records. As most accelerograph records are of irregular character, and the character of the longer period waves is often obscured by the superposition of shorter period waves of relatively large amplitude, the estimates of displacement must be considered only rough approximations. These analyses are essentially condensations of material appearing in the *Quarterly Engineering Seismology Bulletin* available through mailing list CGS–5 from the Director, Coast and Geodetic Survey, Washington, D.C., 20230.

Units amd instrumental constants.—Quantitative results are expressed in c.g.s. units; centimeters or millimeters for displacement; and centimeters per second per second for acceleration. It is sometimes desirable to express acceleration in terms of the acceleration of gravity, indicated by "g" which is equal to 980 cm/sec.^{2} For practical purposes it is only necessary to point off three decimal places to convert cm/sec.^{2} to "g".

Most of the instruments have been adjusted so that each will register the maximum acceleration to be expected on the particular type of geological formation beneath the instrument. The following expectable earthquake accelerations were used in determining the accelerograph sensitivities: (a) rock foundation, 25 percent of gravity; (b) residual clay and shale, 40 percent of gravity; (c) alluvium, 70 percent of gravity; and (d) top floors of tall buildings, 100 to 200 percent of gravity. The four sensitivities may be roughly listed as 26, 19.5, 13, and 6.5 mm. per 0.1 g., respectively.

Sensitivity of the seismographs is expressed as the deflection of the trace, or light spot, in centimeters, for a constant acceleration of 0.1 g.

Damping ratio of the pendulum is the ratio between successive amplitudes when the pendulum oscillates.

Seismogram illustrations.—Reproductions of records in this publication are tracings of the original records and must not be accepted as genuine copies. The tabulated instrumental constants refer to the original records. The tracings are intended to show the nature of the data rather than furnish a means through which the reader can make his own measurements. Those who desire true copies for critical study should make request to the Director, Coast and Geodetic Survey, Washington, D.C., 20230.

Acceleration and displacement scales representing the equivalent of 0.1 g. and 1 inch are indicated on the tracings of the acceleration and displacement curves. The scales provide the investigator with a quick means for making rough measurements on the published curves. The measurements of period on records of this nature are dependent largely on the judgment of the person reading them and considerable latitude must be allowed in appraising their accuracy. The aim of such analyses is primarily to give a fair

picture of the magnitudes of the various elements involved, and the figures tabulated should therefore not be used for important studies without first referring to the illustrations for some idea of the nature of the original records.

TABLE 4.—*Coast and Geodetic Survey strong-motion stations in operation as of Dec. 31, 1962*

NORTHERN CALIFORNIA

Station	Accelero-graph	Displace-ment meter	Weed
Berkeley, University of California	1	1	
Eureka, Federal Building	1		
Ferndale, City Hall	1	1	
Hollister, Library	1	1	
Monterey, City Hall			1
Oakland, City Hall, basement	1	1	
Oakland, City Hall, 16th floor	1		
Oakland, Chabot Observatory			1
Pleasant Hill, Diablo Valley College	1	1	
Sacramento, Federal Building			1
San Francisco, Alexander Building, basement	1	1	
San Francisco, Alexander Building, 11th floor	1		
San Francisco, Alexander Building, 16th floor	1		
San Francisco, Bethlehem Pacific Building, basement	1	1	
San Francisco, Bethlehem Pacific Building, 12th floor	1	1	
San Francisco, 450 Sutter St., basement			1
San Francisco, 450 Sutter St., 29th floor			1
San Francisco, New Mint Building	1	1	
San Francisco, Shell Building, subbasement			1
San Francisco, Shell Building, 21st floor			1
San Francisco, Shell Building, 29th floor			1
San Francisco, Southern Pacific Building, basement	1	1	
San Francisco, Southern Pacific Building, 14th floor	1		
San Francisco, State Building, basement	1	2	
San Jose, Bank of America, basement	1	1	
San Jose, Bank of America, 13th floor	1		
San Pablo, Contra Costa Junior College	1	1	
Suisun Bay Bridge	1		
Tracy, Pumping Plant, basement	1	1	

TABLE 4.—*Coast and Geodetic Survey strong-motion stations in operation as of Dec. 31, 1962*—Continued

SOUTHERN CALIFORNIA

Station	Accelero-graph	Displace-ment meter	Weed
Bakersfield	1	1	
Bishop	1		
Cachuma Dam, Crest	1	1	
Cachuma Dam, Valve House	1	1	
Colton	1	1	
El Centro	1	2	
Long Beach, Public Utilities Building	1	1	
Long Beach, Terminal Island	1		
Los Angeles, Edison Building, basement	1		
Los Angeles, Hollywood Storage Co., basement	1		
Los Angeles, Hollywood Storage Co., penthouse	1		
Los Angeles, Hollywood Storage Co., adjoining P. E. Lot	1		
Los Angeles, Occidental Life Building, basement	1		
Los Angeles, Occidental Life Building, 11th floor	1		
Los Angeles, Subway Terminal, subbasement	1	1	
Los Angeles, Subway Terminal, 13th floor	1		
Los Angeles, Vernon, C.M.D	1		
Los Angeles, Westwood Engineering Building, University of California	1	1	
Pasadena, California Institute of Technology	1		1
Port Hueneme	1	1	
San Bernardino			1
San Diego	1		
San Luis Obispo	1		
Santa Ana	1	1	
Santa Barbara	1		
Taft	1		
Wheeler Ridge, General Store	1	1	

OUTSIDE CALIFORNIA

Bozeman, Mont., Montana State College	1		
Butte, Mont., Montana School of Mines	1		
Columbia Falls, Mont., Hungary Horse Dam, Bureau of Reclamation	1		
Flaming Gorge, Utah	1	1	
Glen Canyon, Ariz	1	1	
Hawthorne, Nev., U.S. Naval Ammunition Depot	1		
Helena, Mont., Carroll College	1		
Hoover Dam, Nev., 1215 Gallery	1	1	
Hoover Dam, Nev., intake tower	1	1	
Hoover Dam, Nev., oilhouse	1	1	
Logan, Utah, Utah State University	1		
Olympia, Wash., Highway Test Laboratory	1		
Portland, Oreg., State Office Building	1		
Ross Dam, Wash., Block 16	1		
Ross Dam, Wash., Right Bank	1		
Seattle, Wash., Federal Office Building	1	1	
Tacoma, Wash., County-City Building	1	1	

OUTSIDE UNITED STATES

Balboa Heights, C.Z	1		
Bogota, Colombia, South America	1		
Guatemala City, Guatemala, Central America	1		
Lima, Peru, South America	1		
Quito, Ecuador, South America	1		
San Jose, Costa Rica, Central America	1		
Santiago, Chile, South America	1		
Total	71	34	10

TABLE 5.—*List of shocks recorded and records obtained on strong-motion seismographs in 1962*

Date	Region and Recording Station	Records			
		Accelerograph	Survey displacement meter	Carder displacement meter	Weed
July 14	Northern California, Ferndale	1	1		
July 20	do	1	1		
Aug. 23	do	1	1		
	Eureka	1			
Aug. 30	Utah, Logan	1			
Sept. 4	Northern California, Ferndale	1	1		
	Eureka	1			
Nov. 5	Oregon, Portland	1			
	Total	8	4	0	0

TABLE 6.—*Summary of outstanding instrumental and noninstrumental data for 1962*

NORTHERN CALIFORNIA EARTHQUAKE OF JULY 14

Epicenter	Recording Station and Distance	Location of Instrument	Intensity[1]	Acceleration	Displacement[2]
				cm/sec.[2]	*cm.*
40°17′ N., 124°41′ W., off coast of northern California, V*. Mag. 5.0.	Ferndale, 55 miles	1st floor	IV	15	0.16

NORTHERN CALIFORNIA EARTHQUAKE OF JULY 20

40°15′ N., 124°25′ W., off coast of northern California, V*. Mag. 4.1.	Ferndale, 51 miles	1st floor	V	15	0.11

UTAH EARTHQUAKE OF AUGUST 30

41.8°N., 112.8° W., northern Utah, VII*. Mag. 5.7.	Logan, 46 miles	Basement	VII	113	0.37

NORTHERN CALIFORNIA EARTHQUAKE OF SEPTEMBER 4

40°58′ N., 124°12′ W., near coast of northern California, VI*. Mag. 5.0.	Eureka, 49 miles	Basement	V	52	0.16

OREGON-WASHINGTON BORDER EARTHQUAKE OF NOVEMBER 5

45°38′ N., 122°40′ W., Oregon-Washington border, VI*.	Portland, 48 miles	Basement	VI	97	0.05

[1] Reported intensity of earthquake at recording station.

[2] Displacement is the maximum recorded at the station reporting the maximum acceleration of the earthquake. If displacement is much greater at another location it is given along with the maximum acceleration at the same location.

*Following intensity designation in epicenter column, indicates maximum reported intensity of earthquake.

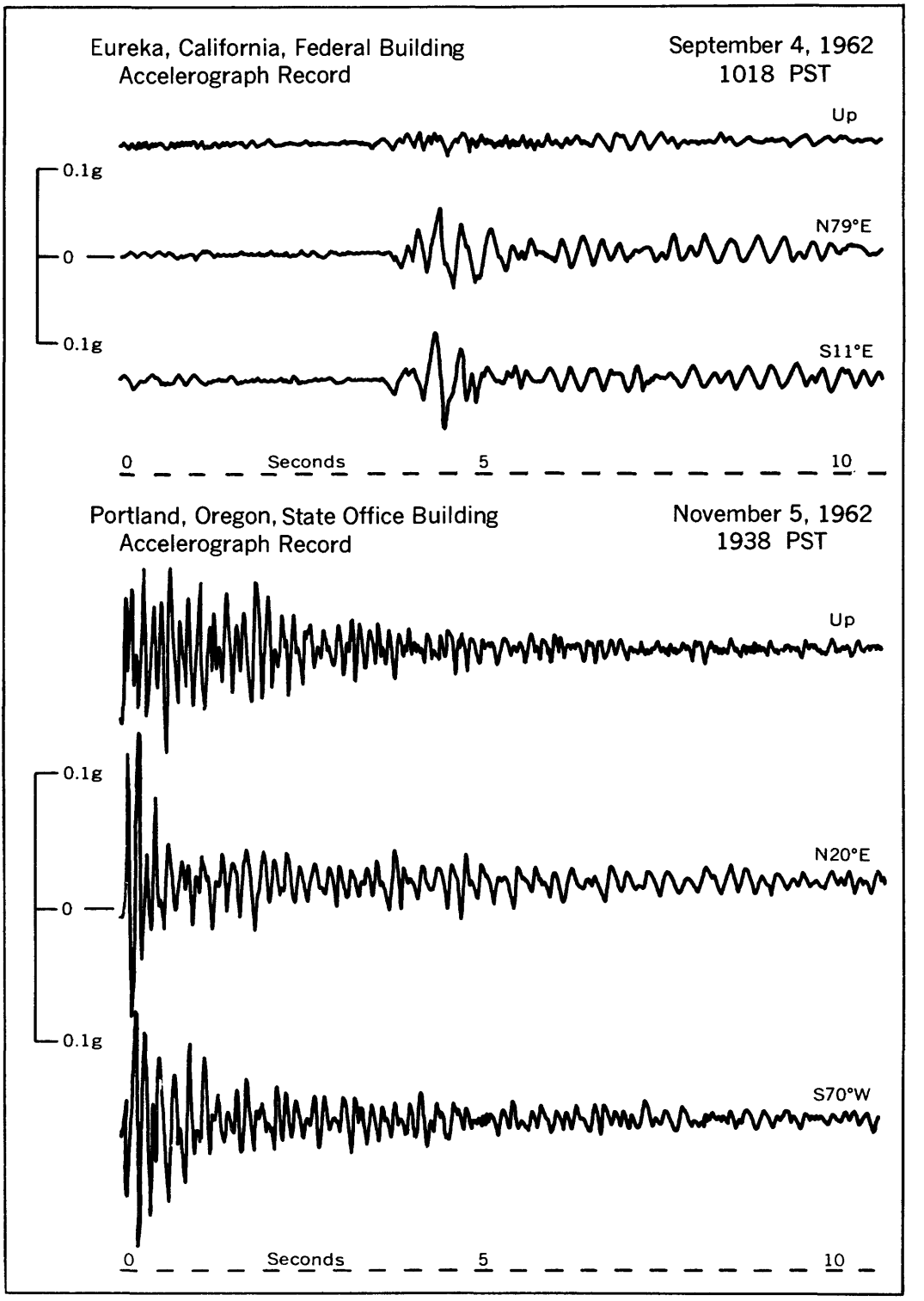

FIGURE 11.—*Tracings of accelerograph records obtained at Eureka, Calif., on September 4 and Portland, Oreg., on November 5.*

TABLE 7.—*Composite of strong-motion instrumental data for 1962*

NORTHERN CALIFORNIA EARTHQUAKE OF JULY 14

Station and component	Instrument No.	T_0	V	Sensitivity	ϵ	Acceleration		Displacement		Remarks
						Period	Amplitude	Period	Amplitude*	
		sec.		*cm./g*		*sec.*	*cm./sec.²*	*sec.*	*cm.*	
Ferndale:										
Vertical	247	0.0660	124	13.5	10	0.19	7			
S. 44° W	248	.0668	125	13.9	10	.17	12			
N. 46° W	249	.0646	123	12.8	18	.16	15			
S. 44° W	SDM-13	10.80	1.0		12			0.9	0.14	
S. 46° E	SDM-13	9.64	1.0		10			.7	.16	

NORTHERN CALIFORNIA EARTHQUAKE OF JULY 20

Ferndale:										
Vertical	247	0.0660	124	13.5	10	0.30	8			
S. 44° W	248	.0668	125	13.9	10	.10	14			
N. 46° W	249	.0646	123	12.8	18	.26	15			
S. 44° W	SDM-13	10.80	1.0		12			0.7	0.11	
S. 46° E	SDM-13	9.64	1.0		10			.9	.10	

UTAH EARTHQUAKE OF AUGUST 30

Logan:										
Vertical	319	0.0786	125	19.4	9	0.15	41		0.023	0.07 and 0.49 period waves present.
West	320	.0796	125	19.9	13	.36	113		.37	Irregular train of 0.8 sec. waves present.
North	321	.0793	125	19.7	9	.19	84		.077	

NORTHERN CALIFORNIA EARTHQUAKE OF SEPTEMBER 4

Eureka:										
Vertical	250	0.0658	117	12.6	9	0.30	9		0.02	
N. 79° E	251	.0655	121	13.0	10	.29	45		.10	
S. 11° E	252	.0665	121	13.3	12	.35	52		.16	
Ferndale:										
Vertical	247	.0658	124	13.4	10	.48	4			
S. 44° W	248	.0660	125	13.6	7	.56	8			
N. 46° E	249	.0639	123	12.5	17	.41	8			
S. 44° W	SDM-13	10.05	1.0		12			0.92	.09	
S. 46° E	SDM-13	9.90	1.0		10			.92	.11	

OREGON EARTHQUAKE OF NOVEMBER 5

Portland:										
Vertical	229	0.0835	121	21.0	10	0.12	63		0.023	
N. 20° E	230	.0843	124	21.8	8	.13	97		.041	
S. 70° E	231	.0813	123	20.2	9	.15	87		.049	

*Estimated from acceleration if no entry in displacement column.

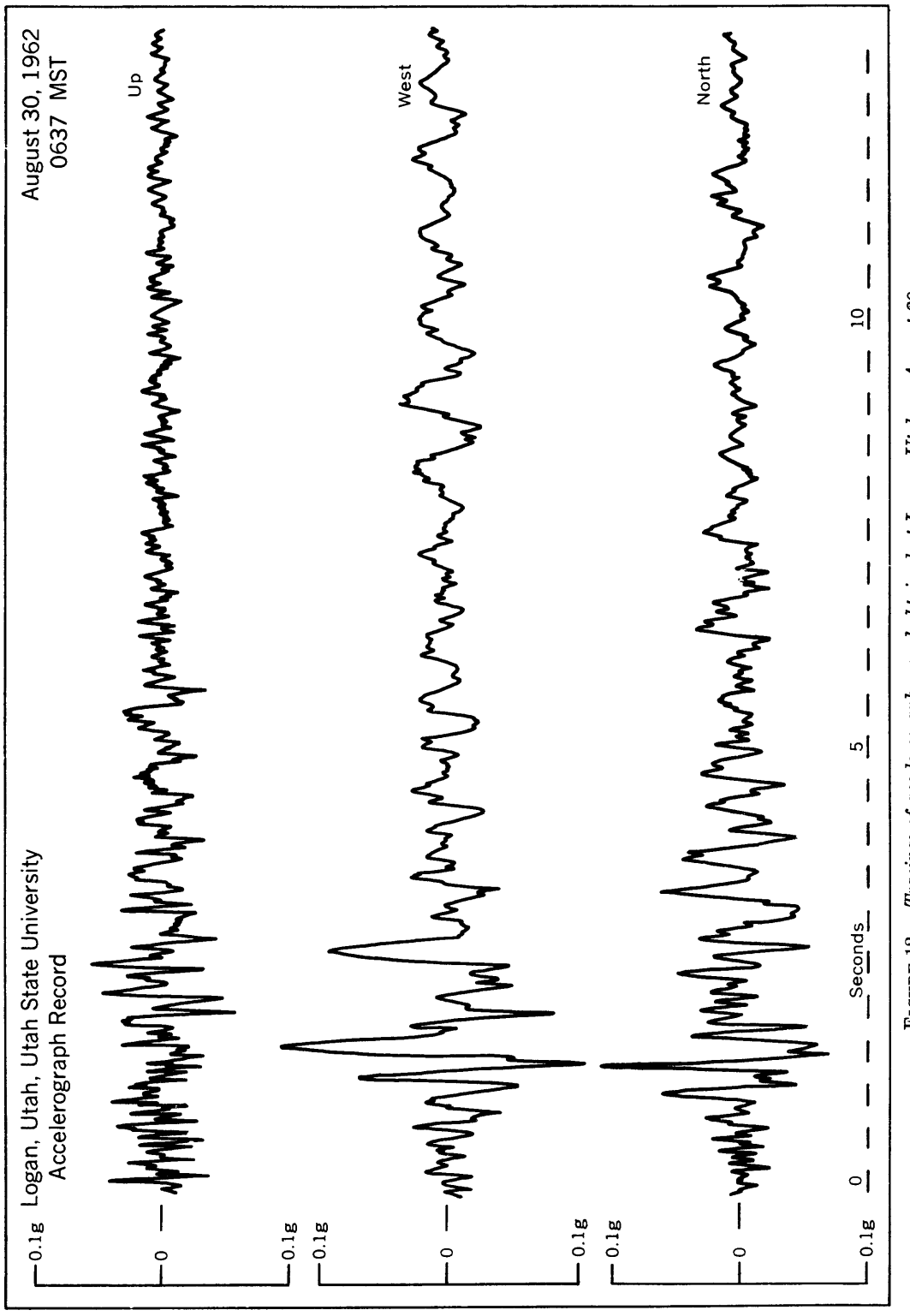

FIGURE 12.—*Tracings of accelerograph record obtained at Logan, Utah on August 30.*

TILT OBSERVATIONS

Two Merritt tiltmeter stations, Table Mountain and Santiago Peak continued in routine operation.

PUBLICATION NOTICES

The Coast and Geodetic Survey maintains mailing lists for notices of issuance of its publications. Should you desire to receive notices of seismological publications, address your request to the Director, Coast and Geodetic Survey, Washington, D.C., 20230.

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