DEPARTMENT OF THE INTERIOR

U.S. GEOLOGICAL SURVEY

United States Earthquakes, 1955

By

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and

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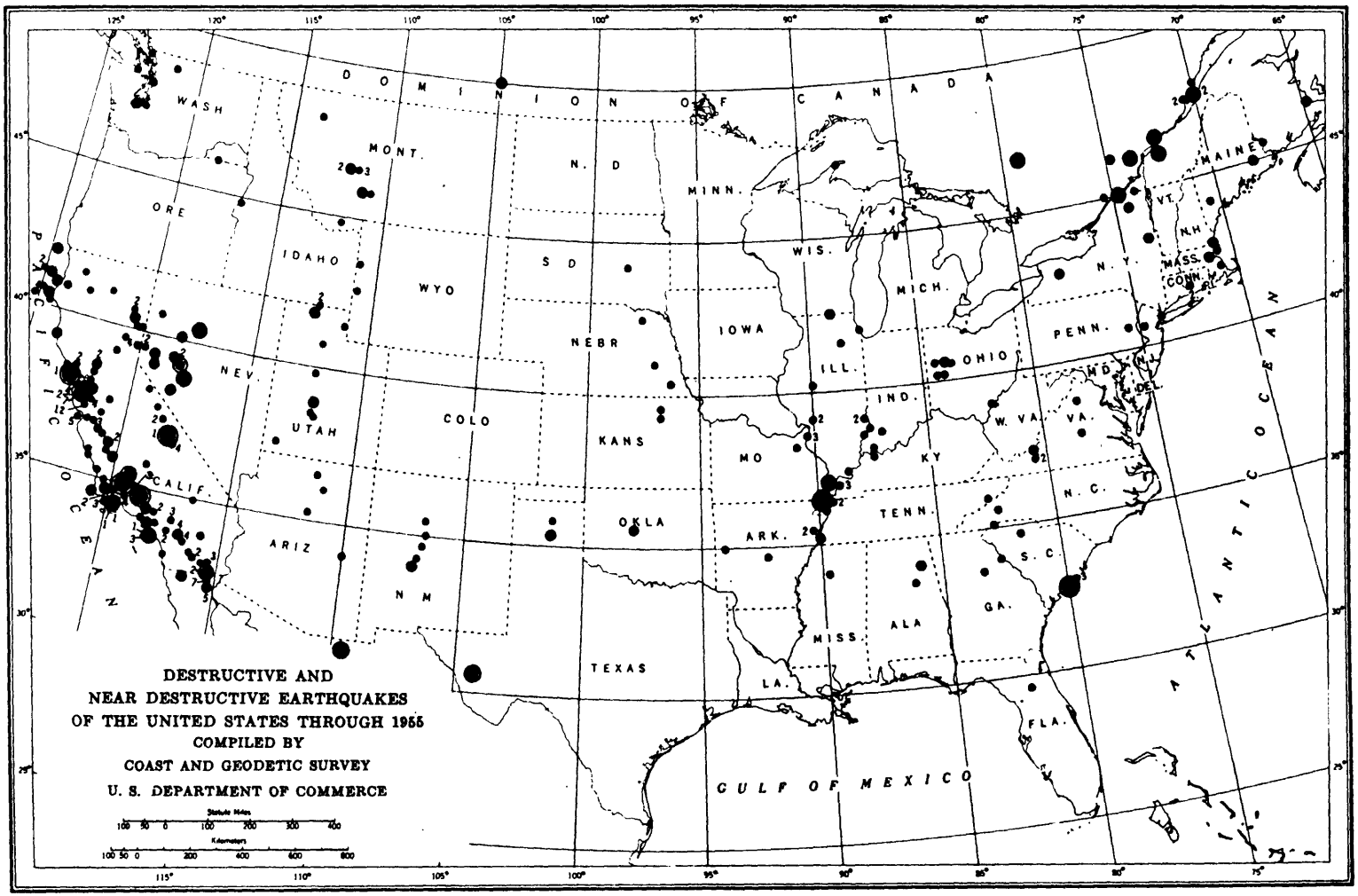

FIGURE 1.—Destructive and near destructive earthquakes in the United States through 1955

UNITED STATES EARTHQUAKES, 1955

INTRODUCTION

This publication is a summary of earthquake activity in the United States and regions under its jurisdiction for the calendar year 1955. 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 Letter;* 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 48 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 adequately map the seismic areas of the country 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 25, D. C. 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. Beno Gutenberg, 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 1955:

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

Colorado.—Dr. C. A. Heiland, Heiland Division, Minneapolis-Honeywell, 130 East Fifth Avenue, Denver.

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 Agricultural College, 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. James B. Macelwane, 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.

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.

MODIFIED MERCALLI INTENSITY SCALE OF 1931

(ABRIDGED)

I. Not felt except by a very few under especially 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 buildings, 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. Disturbance 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 1955. The smallest dot indicates

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

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 dot 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 1955. 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 figures 1 and 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 48 is a list of Survey and cooperating teleseismic stations for which the Survey publishes results. During the year the locations of 1130 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 25, D. C. During the year 1956, MSI-145–c for the monthly bulletin for March 1951, and MSI–181 through 192 for the monthly bulletins of 1956.

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 the 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.*

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 25, D. C. The revised analyses are given in table 7.

Earthquake history.—A history of the more important shocks of the country appears in Serial 609, *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 1947 and the latter in 1951.

A history of minor activity is covered largely in a series of references listed in Serial 609, 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 1953. 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 25, D. C., for 20 cents.

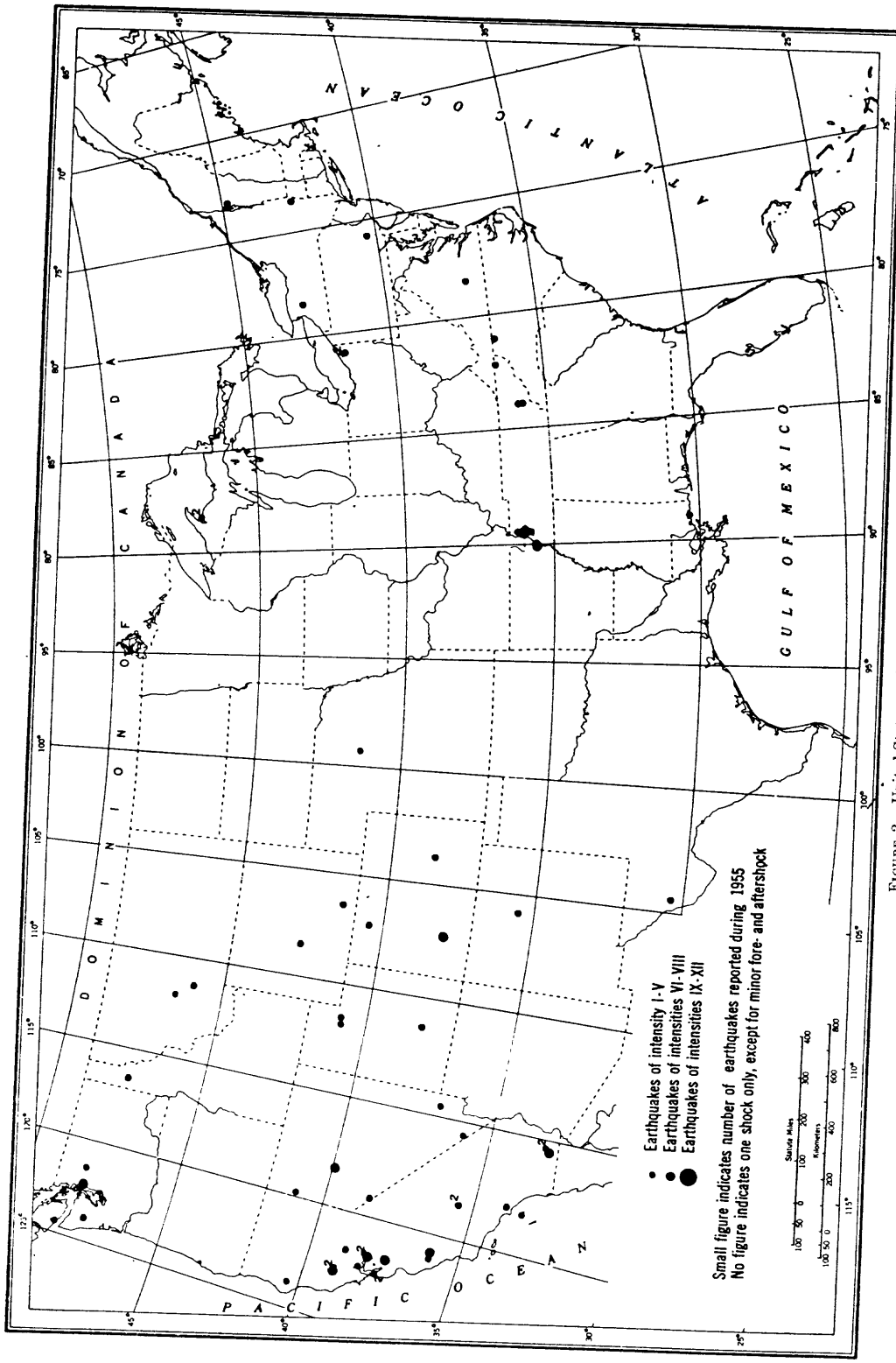

FIGURE 2.—United States earthquake epicenters, 1955.

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; BC, reported by the Boulder City office of the Coast and Geodetic Survey; NESA, reported by the Northeastern Seismological Association, Weston, Mass.; JSA, reported by the Jesuit Seismological Association, St. Louis, Mo.; S, reported by the Seismograph Station, University of Washington, Seattle, Wash.; and W, reported by the Washington Office, 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 motions.

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 the Western Mountain Region, MSA series, issued on mailing list CGS–3 by the Coast and Geodetic Survey, Washington 25, D. C.

EARTHQUAKE ACTIVITY IN THE VARIOUS STATES

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

Alabama: January 25, III.

Arizona: April 25, III; December 16, V.

Arkansas: January 25, IV; March 29, III.

California: (Intensity V and above) February 11, V; 21, V; March 1, V; 2, VI; April 25, V; 29, VI; May 7, VI; 28, V; June 7, V; 8, V; 13, V; 30, V; August 7, V; 8, V; 11, V; 29, V; September 4, VII; October 21, V; 23, VII; 25, V; 27, V; November 1, V; 2, VI; 7, V; 9, V; 14, V; 21, V; 22, V; 26, V; December 16, V, VII.

Colorado: February 10, V; August 2, VI; November 27, IV.

Idaho: January 24, III; 26, III; May 31, IV.

Illinois: January 25, III; April 9, VI; 11, II; May 29, IV.

Kentucky: January 25, III; April 9, III.

Michigan: January 5, IV; 6, V.

Mississippi: January 25, III; February 1, V.

Missouri: January 25, V; March 29, V; April 9, VI.

Montana: May 31, V; September 23, III; 24, IV; November 5, IV.

Nebraska: February 24, IV.

Nevada: January 10, V, VI; 18, IV; 27, V; 28, III; 31, IV; March 16, IV; July 4, 6; August 8, V; September 20, IV; 21; 28, V; November 20, IV; 21.

New Mexico: August 12, V.

New York: January 21, V; August 16, V.

North Carolina: September 28, V.

Ohio: May 26, V; June 28, V.

Pennsylvania: January 19, IV.

Tennessee: January 6, IV; 12, IV; 25, VI, IV; March 29, VI; September 5, V, IV; 24, IV; December 13, V (2).

Texas: January 26, IV.

Utah: January 10, IV; February 2, V; March 27, IV; May 12, V; June 24, IV.

Vermont: February 2, V.

Virginia: January 6, IV; 17, IV; September 28, V.

Washington: January 11, V; February 6, IV; 24; 25, VI; January–March (swarm of 200 shocks); July 15, 18, 19; September 10, V; November 2, V.

Wyoming: May 22, IV; December 13, IV.

EARTHQUAKE ACTIVITY OUTSIDE THE UNITED STATES

Alaska: January 12, 21; February 12, 27 (2), 28; March 30; April 11, 18, 28; May 14 (3), 20, 24, 29; July 8–15 (date indefinite), 10, 16, 17, 19 (2), 23, 31; August 5, 8, 9, 11, 15, 16, 31; September 15, 17; October 7 (2), 27; November 13; December 9, 18, 21, 29.

Hawaii: January 5, 6, 8 (2), 11, 22, 25; February 21, 23, 24 (3), 25 (6), 26 (6), 27 (8); March 1 (2), 5 (11), 6 (3), 7 (4), 8, 9 (2), 19, 20, 22 (2), 23 (3), 24 (6), 25, 27 (2); April 1, 12 (2), 23, 24 (2); May 8, 9 (2);

June 12, 29; July 23 (2), 27; August 7, 14, 19, 29 (2); September 26; October 12, 24 (3), 26, 29; November 2, 3–4 (date indefinite), 13, 21, 29; December 7, 26, 28 (2).

Panama Canal Zone: March 20; May 26.

Puerto Rico: March 9, 25; May 13.

NORTHEASTERN REGION

(75TH MERIDIAN OR EASTERN STANDARD TIME)

January 21: 03:40 and 07:20. Malta (Hall's Corners), N. Y. V. Felt by and frightened several at Hall's Corners. Buildings creaked; loose objects rattled. Trees and bushes shook. A small child was "jounced" out of bed. A ground crack was observed on both sides of a house, but no damage was noticed to the foundation. Rumbling subterranean sounds heard before shock. Felt by and awakened few at Schaghticoke. A slight tremor was reported in the northern outskirts of Schenectady in the direction of Saratoga.

February 2: (between 21:30 and 21:45). Burlington, Vt. V. Felt by many and frightened few at Burlington. A large ground crack was seen in the North Burlington area. Two or three distinct thumps and jolts were felt by many. Houses shook; windows and dishes rattled; and many thought their oil burners had blown up. Other tremors reported at 23:06, 23:08, and 23:28.

August 16: 02:35. Attica, N. Y. V. Felt by and awakened many at Attica. Few alarmed. Bumping subterranean sounds occurred at the beginning of the shock. Some reactions to the shock were: "thought one of the children had fallen out of bed," and "like a heavy object falling in the cellar." At the Attica Prison, a guard on duty at the time of the shock, said all the guard towers, which are 33 feet high, swayed perceptibly. Also felt by and awakened several in Alexander, where loose objects rattled. A mile southeast of Attica a farmer was awakened by the bellowing of the cattle.

EASTERN REGION

(75TH MERIDIAN OR EASTERN STANDARD TIME)

January 6: 15:30. Bristol, Tennessee-Virginia. IV. Felt by many. Houses shook. Felt by few on upper floors of tall buildings in Knoxville, Tenn. (may be two separate shocks).

January 12: 12:25. Blount and Knox Counties, Tenn. IV. Felt by many at Maryville and Bluegrass. "I first thought it was my furnace backfiring."

January 17: 07:37. Farmville, Va. IV. Felt in Prince Edward, Buckingham, Cumberland, and Nottaway Counties. Felt by many at Farmville, Cumberland, Crew (few alarmed), Hampden-Sydney, and Rice, where reports were received of buildings and windows shaking, earth rumbling, and sounds like explosion. Shook tray from washing machine at Burkeville. Also felt by several at Guinea Mills and Nottaway.

January 19: (about 22:00). Berks County, Pa. IV. Felt by many in western Berks County. The affected area was from West Reading west to Wernersville, and from West Leesport south to Gouglersville. In Wernersville, houses vibrated, windows and dishes rattled, and a lamp tumbled to the floor. Fire Chief was besieged by telephone calls. Some compared the shock to exploding oil and gas burners, and one woman said it sounded as though a truck crashed into the front of her home. Also felt with varying degrees of intensity at Angelica, Cedar Top, Gouglersville, Grill, Lincoln Park, Shillington, Sinking Spring, West Lawn, West Leesport, West Reading, Wyomissing, and Wyomissing Hills.

January 25: 14:34. Knoxville, Tenn. IV. Felt by many in Knoxville. Houses vibrated; windows and dishes rattled. Faint to moderate rumbling sounds heard by many. Newspaper and radio stations were flooded with calls. Reports include: "I thought the windows were going to fall out. Our TV set went off for a few minutes," and "It seemed like the vibration was coming from under the house. I thought maybe something was wrong with the furnace." At Washington Heights (northwest of Knoxville) the shock was strongly felt. One observer reported, "It almost shook my chair from under me, and my building is on a concrete foundation." Also felt by many at Maryville, and at Alcoa, Fountain City, Inskip, John Sevier, and Rockford.

September 28: 02:01:42*. Virginia-North Carolina border. V. Felt over approximately 1700 square miles including most of Allegheny and the northern portion of Ashe Counties in North Carolina, all of Grayson and parts of Smyth and Wythe Counties in Virginia. Awakened and frightened nearly all at Elk Creek. Rumbling noise like an explosion. Windows and dishes rattled. Felt by, awakened, and frightened many in Piney Creek, N. C. Reports were received of houses shaking, windows and dishes rattling, and roaring noises. Two plate glass windows were reported cracked. Felt by and awakened many at Independence, Mouth of Wilson, Rugby, and Volney (many alarmed), Va., where houses shook,

windows and dishes rattled, and roaring sounds were heard. Also felt and heard by several at Baywood, Camp, Crockett, Flatride, Galax, Nebo, Speedwell (sounded like dynamite blast), and Trout Dale, Va., and Ennice, Glade Valley, Grassy Creek (few alarmed), Helton, Lansing, North Wilkesboro, Sparta, and Whitehead, N. C. Reported felt at Fries and Wytheville, Va. (See EARTHQUAKE NOTES, Vol. XXVII, No. 1, March 1956, The Southern Appalachian Earthquake of September 28, 1955, by Gerald R. MacCarthy).

CENTRAL REGION

(90TH MERIDIAN OR CENTRAL STANDARD TIME)

January 5: (between 14:00 and 15:00). Calumet, Mich. IV. Felt by and awakened many at Calumet. Windows and dishes rattled. Recorded by seismographs at Marquette University and at the Nunn Bush Shoe Co., Milwaukee, Wis.

January 6: (between 23:00 and 24:00). Hancock, Mich. V. Felt by and awakened many in the Portage Lake area of Hancock. Press reported four sharp tremors. Dishes knocked from shelves. Also felt at Dodgeville and Atlantic. Recorded by seismographs at Marquette University and at the Nunn Bush Shoe Co., Milwaukee, Wis.

January 25: 01:24. Epicenter 35.6° north, 90.3° west, Tennessee-Arkansas-Missouri border (near Finley, Tenn.), JSA. VI. The earthquake was felt from Lepanto, Ark., northward to Paducah, Ky., and eastward to Birmingham, Ala. In southeast Missouri and western Tennessee, several reported shattered windows and damaged plaster walls. Along the New Madrid Fault line, thousands of people were awakened. Police stations and telephone exchange were deluged with calls. (The earthquake was recorded on the seismographs at St. Louis University and the University of Arkansas.)

INTENSITY VI IN TENNESSEE:

Barr.—Felt by and awakened all. Roaring sounds heard.

Dyersburg.—Felt by nearly all. Many awakened. Furniture shifted several inches. A brick pillar supporting a porch was shaken down. Shock preceded by noise described as like a tornado approaching.

Finley.—Felt by all. Several houses cracked; plaster walls and ceilings cracked. Canned goods shaken from shelves in a grocery store on Highway 78. An observer reported that her bed left the floor. Rumbling noise heard during the earthquake.

INTENSITY V IN MISSOURI:

Hayti.—Felt by many. Windows cracked in telephone exchange.

INTENSITY V IN TENNESSEE:

Halls.—Felt by nearly all. Many awakened. Windows and doors rattled. Rumbling noise heard before and after earthquake. Duration about 15 to 30 seconds.

Ripley.—Felt by and awakened nearly all. Rumbling noise like heavy distant explosion heard during earthquake.

INTENSITY IV IN ARKANSAS: Armorel, Blytheville, Bono, Brickeys, Caraway, Corning, Earle, Jonesboro, Madison, Manila, Marion, Marked Tree, Monette, Osceola, Parkin, Piggott, Stonewall, Tulot, Turrell, Vanndale, and Whitmore.

INTENSITY IV IN MISSOURI: Commerce, Illmo, Jaywye, Neelyville, Old Appleton, Point Pleasant, Poplar Bluff, and Sikeston.

INTENSITY IV IN TENNESSEE: Bemis, Bogota, Bradford, Brighton, Brownsville, Burlison, Covington, Crockett Mills, Drummonds, Fort Pillow, Fowlkes, Gadsen, Gates, Humboldt, Jackson, Lenox, Maury, Memphis, Milan, Munford, Oakfield, Paris, and Woodland Mills.

INTENSITY I TO III IN ALABAMA: Florence and Muscle Shoals.

INTENSITY I TO III IN ARKANSAS: Bassett, Caldwell, Cherry Valley, Dell, Etowah, Gilmore, Haynes, Hughes, Imboden, Leachville, Lepanto, Luxora, Paragould, Rector, Round Pound, Sedgewick, Tomato, Twist, Weona, Widener, and Wynne.

INTENSITY I TO III IN ILLINOIS: Brookport.

INTENSITY I TO III IN KENTUCKY: Fulton, Mayfield, and Paducah.

INTENSITY I TO III IN MISSISSIPPI: Corinth and Hernando.

INTENSITY I TO III IN MISSOURI: Caruthersville, Catron, Kinder, Malden, Qulin, and Risco.

INTENSITY I TO III IN TENNESSEE: Atoka, Bartlett, Beech Bluff, Bells, Boothspoint, Cordova, Friendship, Fruitland, Fruitvale, Fulton, Germantown, Henning, Lexington, Mason, Medina, Mercer, Millington, Nashville, Raleigh, Stanton, Tipton, and Yorkville.

January 26: 18:37. Valentine, Texas. IV. Felt by many. Houses shook.

February 1: 08:45 (about). Gulfport, Miss. V. Felt by and frightened many. Felt strongly by many along a 12-mile strip of the Mississippi Gulf Coast. In Gulfport, occupants of the building housing the highway patrol substation rushed outside. Houses shook; windows and dishes rattled; deep

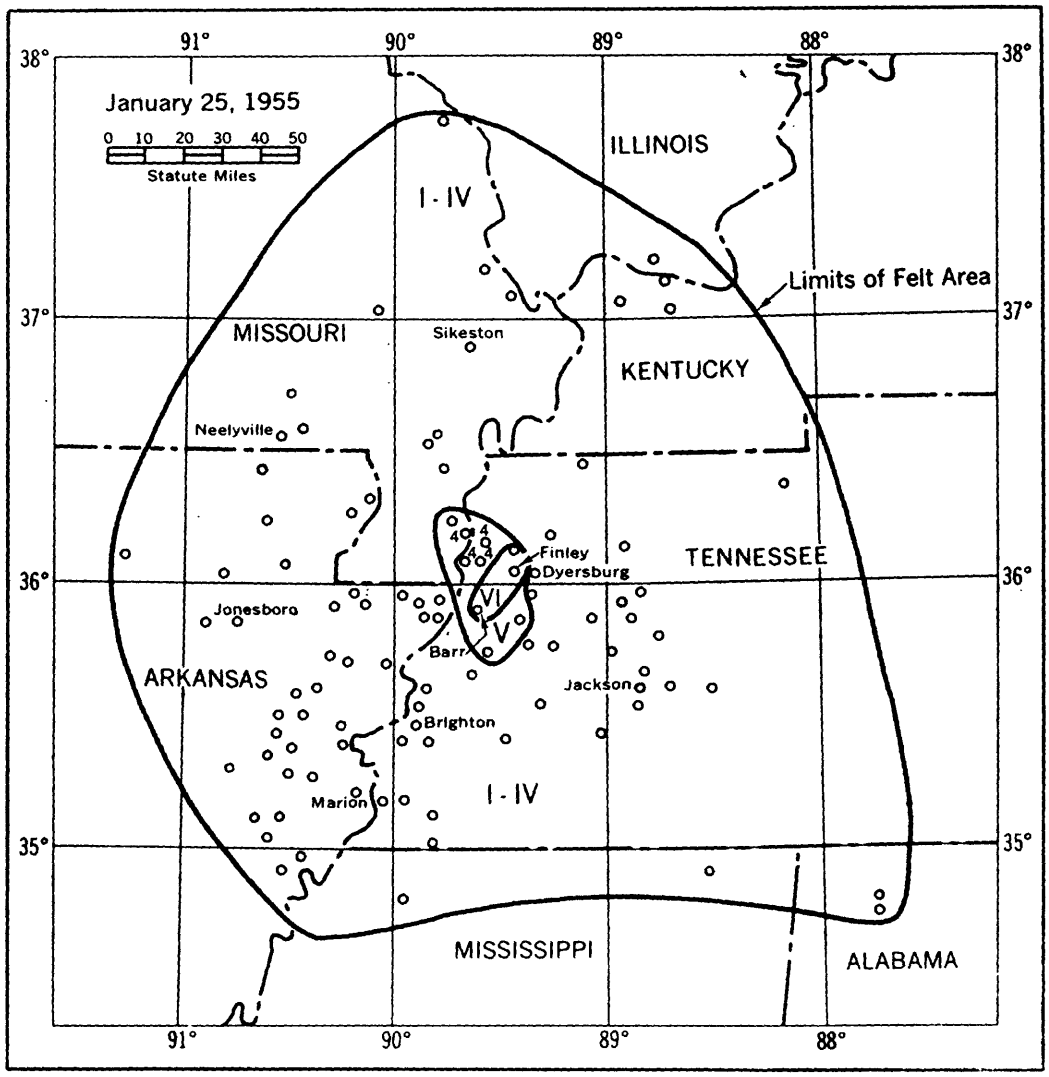

FIGURE 3.—Area affected by earthquake of January 25.

rumbling sounds heard by many. Several feared their houses would fall in. At one of the public schools, teachers reported lighting fixtures vibrated and several expressed the belief that someone was on the roof. At Biloxi several alarmed. Windows and doors rattled; and rumbling noise "which sounded like thunder" was heard. Felt by many at Mississippi City and Pass Christian, where windows rattled, and deep rumbling sounds like thunder were heard. At Bay St. Louis felt by many, where buildings creaked, and loose objects and windows rattled.

February 24: 19:45 (about). Cotesfield, Nebr. IV. Startled many residents. Windows and dishes rattled, houses creaked, and furniture trembled. Also felt at Dannebrog, Elba, Farwell, Ord, Scotia, and St. Paul.

March 29: 03:02:40*. Finley, Tenn. VI. Felt by all. Plaster cracked in one home. A roaring noise and violent shaking was reported. Felt by and awakened many in Caruthersville, Mo. Also felt at Dell, Ark.; Braggadocia, Gobler, and Hayti, Mo.; and Elbridge, Hornbeak, Miston, and Woodland Mills, Tenn.

April 9: 07:01:24*. Epicenter 38°07′ north, 89°48′ west, west of Sparta, Ill., JSA. VI. Minor damage occurred at Evansville, Ill., and Lemay, University City, and Webster Groves, Mo., when concrete foundations and plaster cracked. At Desloge, Mo., crack in concrete porch roof deck increased. Church

building moved as a unit; steam radiators actually swayed. Noise like a diesel freight train heard before and after earthquake. Police departments, newspapers, and radio stations in an area of at least 100 miles were besieged by telephone calls from alarmed residents.

INTENSITY V IN ILLINOIS:

Alton.—Felt by and frightened many.

Brussels.—Felt by all. One observer reported chair and table shook and "gave me a dizzy feeling."

Caseyville.—Felt by few. Storm window loosened from fastening. One observer reported house seemed to shake and twist. Loud rumble heard during the earthquake.

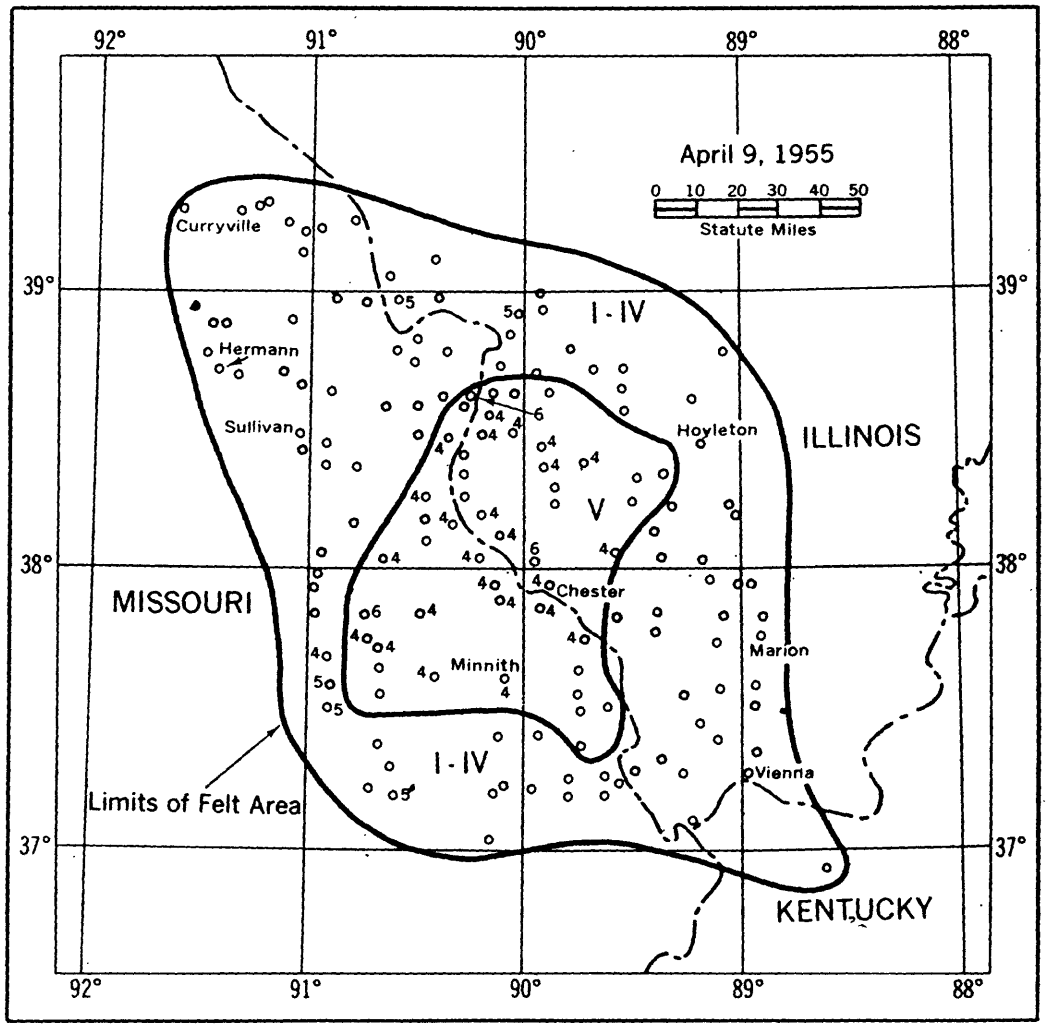

FIGURE 4.—Area affected by earthquake of April 9.

Columbia.—Felt by all. Bottles on glass top of dresser shook. Rumbling noise heard at beginning of the earthquake.

Ellis Grove.—Felt by all. Dishes and pans rattled in cabinets. Rumbling noise heard during earthquake.

Granite City.—Felt by few. About 1/32 to 1/16-inch drop in back door frame or jamb—required a small amount of work with plane. Windows rattled; house vibrated.

Lenzburg.—Felt by all. House trembled.

Maeystown.—Felt by all. House shook. Rumbling noise heard during earthquake.

Marissa.—Felt by nearly all. "Dishes and other loose utensils rattled; windows shook." Sound of popping wood in one wall reported.

Nashville.—Felt by nearly all. Dishes and metal cabinets rattled.

Oakdale.—Felt by all. Windows and dishes rattled. House shook.

Red Bud.—Felt by many. Bottle fell from bar but did not break. Rumbling sound similar to heavy truck heard during the earthquake.

Summerfield.—Felt by few. A 5-gal. empty bucket rolled from cistern platform to ground. House shook.

Tilden.—Felt by few and frightened one. "Everything shook, I ran outside." Dishes shaken from cupboards.

Waterloo.—Felt by all. Observer reported one cracked foundation. Sounds like a terrific explosion preceeded the earthquake.

INTENSITY V IN MISSOURI:

Annapolis.—Felt by nearly everyone. Windows shook. Muffled explosivelike noises heard during earthquake.

Brazeau.—Felt by nearly all. Windows rattled; walls creaked. Rumbling noise heard during earthquake.

Caledonia.—Felt by all. "Rumbling noise heard during earthquake, but thought it was a tractor or truck at the time."

Elvins.—Felt by nearly all. Furniture shook.

Farrar (2 miles from).—Windowpanes broke in farm home.

Frohna.—Felt by all. Sudden jar. Rumbling noise heard during earthquake.

Hematite.—Felt by all. Windows rattled; houses shook.

Iron Mountain.—Felt by nearly all. Windows and objects on shelves rattled.

LaDue.—Felt by nearly all. Radio dispatcher at police station was drenched with hot coffee when the earthquake jarred the cup from desk.

Manchester.—Felt by and awakened nearly all. Windows and dishes rattled.

New Wells.—Felt by nearly all. Dishes rattled. Vibration like that due to passing of truck ¼ mile away.

Rivermines.—Felt by nearly all. The postmaster reported his first impression was that the front door had come open, like a puff of wind. Then the lock boxes started to rattle and continued for three minutes to vibrate. "It was the most violent I have ever noticed."

St. Louis.—Felt by and frightened many. Awakened few. Sounded as if truck had crashed into foundation of house. Many thought there had been an explosion. Windows and dishes rattled, furniture vibrated.

Valles Mines.—Felt by nearly all. Rumbling noise heard during earthquake.

Wittenberg.—Felt by nearly all. Building shook. Felt like dynamite blast as in nearby stone quarries.

INTENSITY IV IN ILLINOIS: Albers, Ashley, Aviston, Baldwin, Bartelso, Batchtown, Beckemeyer, Belleville, Campbell Hill, Carbondale, Carlyle, Centerville Station, Chester, Collinsville, Coulterville, Creal Springs, Dowell, DuQuoin, East Carondelet, East Saint Louis, Elkville, Elsah, Energy, Fults, Goreville, Grafton, Hecker, Highland, Houston, Hoyleton, Keyesport, Jerseyville, Lebanon, Makanda, Marine, Maryville, Mascoutah, Menard, Millstadt, Modoc, Moro, Murphysboro, New Baden, New Minden, Okawville, Oraville, Percy, Pinckneyville, Pomona, Posey, Preston, Renault, Royalton, Saint Jacob, Saint Libory, Smithton, Sparta, Steeleville, Swanwick, Tamaroa, Troy, Venice, Vienna, Welge, Wood River, and Valmeyer.

INTENSITY IV IN MISSOURI: Affton, Altenburg, Belgrode, Belleview, Bessville, Biehle, Bismarck, Blackwell, Bloomsdale, Bonne Terre, Cantwell, Chesterfield, Cottleville, Crescent, Crystal City, Curryville, Danby, Doe Run, Edgewood, Ellisville, Ethlyn, Farmington, Farrar, Fenton, Festus, Fletcher, Fredericktown, French Village, Fruitland, Glencoes, Gray Summit, Grover, Hawk Point, Herculaneum, Ironton, Jackson, Kinsey, Koch, Leadington, Leadwood, Longtown, McBride, McKittrick, Maryland Heights, Matson, Menfro, Minnith, New Haven, New Offenburg, Oak Ridge, Patton, Pocahontas, Richwoods, Saco, Saint Charles, Saint Marys, Sedgwickville, Ste. Genevieve, Sullivan, Sulphur Spring, Treloar, Valley Park, Villa Ridge, Washington, Whitewater, and Winfield.

INTENSITY I TO III IN ILLINOIS: Alto Pass, Beaucoup, Belknap, Boulder, Conant, Cora, Cutler, Dongola, Dorsey, DuBois, Dupo, East Alton, Edwardsville, Freeburg, Germantown, Glen Carbon, Golden Eagle, Gorham, Jacob, Mill Creek, New Athens, New Douglas, New Memphis, O'Fallon, Orient, Prairie du Rocher, Radom, Rockwood, Sesser, Shattuc, Trenton, Venedy, Walsh, West Frankfort, Willisville and Zeigler.

INTENSITY I TO III IN KENTUCKY: Mayfield.

INTENSITY I TO III IN MISSOURI: Allenton, Arab, Arcadia, Ballwin, Barnhart, Belgique, Berger, Bowling Green, Briscoe, Buckhorn, Burfordville, Cadet, Cape Girardeau, Catawissa, Cedar Hill, Clarksville, Clearwater, Cornwall, Creve Coeur, Defiance, De Sota, Dutzow, Elsberry, Esther, Eureka, Flat River, Frankclay, Graniteville, Hillsboro, Irondale, Lithium, Luebbering, Lutesville, Marthasville, Mexico, Middlebrook, Millcreek, Millersville, Mineral Point, Neelys Landing, O'Fallon, Old Appleton, Pacific, Perryville, Pevely, Portage des Sioux, Potosi, River Aux Vases, St. Albans, St. Clair, St. Paul, St. Peters, Scopus, Tiff, Union, Uniontown, Warrenton, Wentzville, Whiteside, Wortham, and Wright City.

April 11: 04:50. Harrisburg, Ill. II. Mild tremor lasting only a few seconds.

May 26: 12:09:23*. Southeastern suburbs of Cleveland, Ohio. V. Recorded on the seismograph at John Carroll University. Newspaper and police stations flooded with calls. Felt indoors by many; alarmed few at Bedford. Buildings creaked; doors, windows, and dishes rattled. Some reported subdued rumbling sounds. Motion trembling.

INTENSITY IV:

Chagrin Falls.—Felt indoors by many. Windows, doors and dishes rattled; buildings creaked; pictures knocked askew. Many thought an explosion had occurred at a fireworks or powder factory. Motion trembling.

Solon.—Felt indoors by many. Windows, doors, and dishes shook; buildings creaked; loose objects rattled. Moderately loud sounds heard. Motion trembling.

Geauga Lake.—Felt indoors by many. Walls creaked; loose objects rattled. Some compared the sound to a blast.

Richmond Heights.—Felt like a truck had hit building.

INTENSITY III: AURORA.

May 29: (no time given). Ewing, Ill. IV. Houses shook. Duration a few seconds.

June 28: 19:15:33*. Southeastern suburbs of Cleveland, Ohio. V. Felt by and alarmed many. Houses vibrated. Rumbling sounds heard by many. At Geauga Lake felt by many indoors. Frightened few. Some compared the sound to a blast. Field investigation at Roundup Lake Park in Portage County by the John Carroll University revealed disturbance of lake bottom level, increased water volume in lake, and sanding of well.

INTENSITY IV:

Aurora.—Felt indoors by many. Doors, windows, and dishes rattled.

Bedford.—Felt indoors by many.

Chagrin Falls.—Felt indoors by many. Doors, windows, and dishes rattled.

Macedonia.—Felt indoors by many.

Maple Heights.—Felt indoors by many. Doors, windows, and dishes rattled.

Solon.—Doors, windows, and dishes rattled. Vibration like that due to passing of heavy train.

INTENSITY I TO III: Beachwood, Bedford Heights, Bentleyville, Cleveland Heights, Hunting Valley, Moreland Hills, Orange Village, Pepper Pike, Shaker Heights, and Willoughby.

September 5: 19:45. Finley and Dyersburg, Tenn. V. Felt by and frightened many. At Finley houses shook, and windows and dishes rattled. There was a "rumble that sounded like a freight train." Children watching a television program were frightened and ran out of the room. One observer said the tremor felt as if it were "lifting my house from its foundation." At Dyersburg the local radio station was flooded with calls. Many people rushed out of their homes to find out the cause of the disturbance. One observer said her house shook for several seconds, "starting out weakly, reaching a peak, and then gradually subsiding." Dishes rattled by vibrations. A table lamp "danced a jig."

September 5: 20:00. Finley, Tenn. IV. Felt by many.

September 24: 12:45. Tiptonville, Tenn. IV. Felt by many. Hard jolt as if truck had hit building. Houses shook; dishes moved on table; loose objects rattled. Dishes and windows rattling were reported in a home 1 mile northeast of Tiptonville.

December 13: 01:43 and 01:56. Dyer County, Tenn. V. Felt by and awakened many in western Dyer County. The first shock was the strongest of the two. Both shocks were felt by many at Finley.

WESTERN MOUNTAIN REGION

(105TH MERIDIAN OR MOUNTAIN STANDARD TIME)

January 10: 03:07:28*. Epicenter 37° north, 114½° west, southeastern Nevada, W. Caliente. V. ". . . minor damage in Caliente where street relays were jarred loose." (*BSSA, April 1955.*) At Gunlock, Utah, felt by several and frightened few in community. Rumbling earth noises heard.

January 24: 15:30. Boise, Idaho. III. Slight shock felt by two persons. One reported heater rattled and the other, "whole room started to shake."

January 26: 07:00. Boise, Idaho. III. Slight shock felt by one person. No motion felt but pull chain on floor lamp hit bulb and lamp base swayed slightly.

February 2: 12:23. Salt Lake City, Utah region. V. Sharp shock. Felt as far west as Arthur, north to Centerville, and south beyond Kearns. Small cracks opened in building at Arthur. Generally felt in Salt Lake City area where small cracks opened in building in southwestern part of the city; in the northwestern part (Rose Park area) few soap-chip boxes fell from shelf in grocery store; magazine racks in drugstore rocked together; large plate glass window in barber shop creaked. Many reported that furniture moved, dishes rattled, and houses shook. Noise was likened to a snowslide roaring down the roof. Felt by and alarmed many at the Weather Bureau Airport Station (3 miles west of Salt Lake City) where tower attendants reported a distinct jolt.

February 10: 10:30. Northwestern Colorado. V. At Steamboat general alarm; plaster cracked and few old cracks reopened; cement garage floor cracked; few dishes shaken from tables. People thought the shaking was due to furnace trouble or blasting. Buildings and houses rattled at Hayden, Kremmling and Oak Creek. At Rabbit Ears Pass people thought there had been a huge explosion in the Steamboat vicinity. At Yampa (1 mile southeast and 1 mile west) two persons reported feeling a single bump or jolt.

March 16: 20:30:46*. Las Vegas, Nev. IV. Slight shock, described as two rapid jolts. Felt by many. One woman was jolted out of chair. Faint rumble heard. Reported felt only within a few mile radius of Las Vegas.

March 27: 05:13. South-central Utah. IV. Sharp vertical jolt felt by all at Fruita (Capitol Reef National Monument). Loud rumbling earth noises like a very heavy rock fall heard by all after being awakened. Windows and dishes rattled. Also felt at Torrey (12 miles west of Fruita) with somewhat stronger intensity. Some small faulting is shown between Fruita and Torrey, and a minor movement in that area may have been the cause.

May 12: 15:57 (about). Davis and Salt Lake counties, Utah. V. Epicenter believed to be along the Wasatch Fault as most calls came from the east sides of Davis and Salt Lake counties. Shook areas from Farmington to Murray and beyond and was mainly felt east of the line formed by Redwood Road to above Mountain Dell Reservoir in Parley's Canyon. At Centerville felt by most people and few ran from houses in the eastern part of town near the mountain front; few cans toppled from high stack; felt like truck hit building. At Bountiful felt by some in drugstore; girl thought fern pot would topple; woman sitting on sofa thought it moved. Felt distinctly in stone courthouse at Farmington; chandelier swung in house. Felt by several at Mountain Dell Reservoir (northeast of Salt Lake City) where buildings creaked and loose objects rattled. Cracking, rattling, and thunderous earth noises heard at time of shock. Motion trembling and bumping. At Murray it seemed as if big picture window buckled in and out. Felt by many at Salt Lake City where paperweight and box of Kleenex vibrated off tables; windows rattled.

May 22: (between 05:30 and 05:45). Medicine Bow, Wyo. IV. Felt by vacationers in the Medicine Bow Range near the Colorado-Wyoming border. People in cabins awakened by loud rumbling noises and shaking. Fishermen sleeping on ground said they were rolled around in their tents.

May 31: 16:35. Coeur de'Alene, Idaho. IV. Heavy jar, believed to be an earthquake, felt by many. Federal building shook enough to interrupt briefly a court trial.

May 31: 21:56. Southwestern Montana. V. Sharp at Trident, causing most people to leave homes. Dishes, etc., rattled. Felt by and awakened many in community at Logan where windows, doors, and dishes rattled. Motion rapid. Felt distinctly at Three Forks (7 miles southwest of Trident).

June 24: 22:00. Morgan, Utah. IV. Felt by many; awakened few. Windows, doors, and dishes rattled. People sitting in automobiles felt them rock. Motion slow.

August 2: 23:39:42*. Southwestern Colorado. VI. Felt over an area of approximately 2,000 square miles. Awakened all in home and frightened few in community at Lake City. Ground and chimneys reported cracked; one chimney fell; small objects shifted; trees, bushes shaken moderately. Damage slight. Loud earth noises heard by many. At the U. S. Fisheries Station (about 12 miles southwest of Creede) felt by many in home and community (some outdoors); awakened and frightened few; few small objects and furnishings shifted. Felt like heavy gusts of wind buffeting house. Lighter shock reported felt at 23:35. Felt by, awakened, and alarmed many 20 miles southwest of Creede; pictures on walls askew; rattling and bumping earth noises heard during shock; motion trembling. Three shocks reported: 23:35, 23:37, 23:39. Awakened many and frightened few in community at Silverton where windows rattled and walls creaked. Single sharp jar reported felt throughout Ouray. Felt by many and awakened few in community at Telluride; observer awakened by shaking of bed.

August 12: 09:20 (about). Santa Fe, New Mexico area. V. Plaster cracked on wall of building at the Turquoise Trading Post (on U. S. Highway 85 about 15 miles southwest of Santa Fe). Buildings shook and windows rattled at Santa Fe. House shaken noticeably and objects rattled at north edge of city. Desk rattled at police station. A distinct rolling motion felt by two in downtown buildings. Felt

by two in home at Bandelier National Monument (19 miles west-northwest of Santa Fe) where windows, doors, and dishes rattled; cement floor trembled. Motion slow.

September 23: 10:30. Helena, Mont. III. Felt by several. Distant rumbling earth noises heard.

September 24: 05:21. Helena Valley and vicinity, Mont. IV. Felt by several and awakened few. Motion rapid. Rapid vibration felt by several about 4 miles north of Helena.

November 5: 07:21. Helena, Mont. IV. Felt by several. Buildings creaked; loose objects rattled.

November 20: 03:57.9*. Epicenter 37.1° north, 113.9° west, southwestern Utah, P. Boulder City, Nev. IV. "Two rumbling earthquakes rattled windows in Boulder City at 02:55 and 04:00, PST. No damage was reported."—(*BSSA, January 1956.*) Press reported people were awakened about 04:00. Windows rattled and buildings and homes rolled gently. Not felt in nearby Las Vegas.

November 27: 22:25:13*. Southeastern Colorado. IV. Press reported five southeastern Colorado communities were jarred by earthquake which shook furniture and rattled windows. Reports of duration varied from a few seconds to one minute. Felt by several at Fowler where buildings creaked and loose objects rattled; house vibrated as if struck by some object; explosivelike earth noises heard. At Sugar City explosivelike shock felt by many; buildings creaked; loose objects rattled; cover displaced on wall clock (east-west wall). Felt by several at the Colorado Experiment Station (2 miles east of Rocky Ford). "Mostly surprise and curiosity." Also felt at Nepesta, Ordway, and Rocky Ford.

December 13: 08:17:17*. West-central Wyoming. IV. Houses shook, dishes rattled, and trees swayed in the Lander area. Loud roar accompanied the shaking in an area at the foot of the Wind River Mountains. At Sinks and Red canyons people frightened and went outside to find cause of the disturbance; thunderous noise like landslide or explosion heard.

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: 18:49:21*. Epicenter 40°57′ north, 124°00′ west, northeast of Arcata, B. Aftershock of December 21, 1954. IV. Sharp, circular jolt at Arcata. At Blue Lake floor lamps shook and ornaments on Christmas tree swung south-north. "Have felt many aftershocks." Frightened all in restaurant (old building) at Eureka where chair moved east-west. Some plaster cracked (probably weakened by previous shocks).

January 1: 23:14:36*. Epicenter 41°11′ north, 124°11′ west, southwest of Orick, B. Light shock 5/10 mile north of Dows Prairie School and Grange. Light shock also felt on January 2 at 07:00.

January 3: 20:47:54*. Epicenter 36°10′ north, 117°55′ west, near Haiwee, P. South Haiwee Reservoir (Coso Junction). IV. Felt by several in community. Windows, doors, and dishes rattled. Motion rapid.

January 10: 02:44. Yosemite Valley (Yosemite National Park). IV. Felt by several in home; awakened few in home and community. Windows rattled. Motion slow.

January 10: 03:23. East San Francisco Bay region. IV. Reported felt in Albany, Orinda, and Richmond. Strong enough to cause some alarmed calls to authorities.

January 10: 05:15:54*. Epicenter 39.9° north, 118.4° west, southeast of Lovelock, Nev., B. Battle Mountain, Nev. VI. Ground crack about 1 inch wide and a mile long.

January 10: 18:15:18*. Epicenter 38°02′ north, 121°48′ west, near Antioch, B. "An earthquake jarred southern Alameda County. . . No damage reported."—(*BSSA, April 1955.*)

January 18: 05:30. Not recorded at Mount Hamilton, B. Big Sur. IV. Two distinct jolts felt by several and awakened few in community; house creaked slightly.

January 18: 18:10:10*. Epicenter 39°21′ north, 118°15′ west, near Frenchman's Station, Nev., B. Aftershock of December 16, 1954. IV. Lights swayed noticeably at Gabbs, Nev.

January 19: 14:02:33*. Epicenter 33°38′ north, 117°50′ west, near Huntington Beach, P. Very light at Huntington Beach.

January 21: 03:57:44*, 04:20:59*. Epicenter 37°09′ north, 118°20′ west, near Big Pine, P. Tinemaha Reservoir (Independence). IV. Both shocks felt by and awakened observer. Windows and doors rattled and house creaked during second shock. Motion rapid.

January 22: 21:28. Not recorded at Mount Hamilton, B. Hollister. "A sharp earthquake . . . but no damage was reported."—(*BSSA, April 1955.*)

January 25: 04:23. Epicenter 33°46′ north, 118°13′ west, P. Terminal Island area. Moderately perceptible at surface (IV) and felt over a limited area. Damage, estimated by engineers to exceed 3 million dollars, occurred at 1500-foot level below the surface where approximately 43 oil wells were damaged on Terminal Island and the adjacent mainland. It was reported the area in which the wells are located has subsided more than 20 feet in some places, forming a large depression. Fluctuation occurred in water level of fresh water well at the Long Beach Steam Plant No. 3 on Terminal Island. No change was noted in a similar well approximately 800 feet southwest. Felt by many at Long Beach where objects were disturbed; light chandeliers swayed; walls of apartment house creaked; loud rumbling earth noises heard during shock. At Wilmington felt by many; venetian blinds rattled. Awakened few at Walnut where windows, doors, and dishes rattled slightly. "Just slight quiver." Brief shock awakened observer at Lomita. Felt by several at Los Alamitos.

January 27: 01:00. Gabbs, Nev. V. One sharp jolt. Felt by all; awakened many; frightened few. Faint earth noises heard.

January 28: 04:10:20*. Epicenter 33°49′ north, 115°28′ west, north of Niland, P. IV. Felt by five families at the Hayfield Pumping Plant, near Desert Center, where buildings creaked and loose objects rattled. Motion rocking.

January 28: 09:30. Aftershock of December 16, 1954 Nevada earthquake. Frenchman's Station, Nev. III. Shock lasting 2 seconds felt by several.

January 30: 11:20. Not recorded at Arcata, B. Eureka. IV. Felt by many, according to press.

January 31: 21:02. Epicenter about 15 miles from Arcata, B. IV. Light jolt felt by several and alarmed few at the Eureka Weather Bureau Office where building creaked and loose objects rattled.

January 31: 22:35. Aftershock of December 16, 1954 Nevada earthquake. Frenchman's Station, Nev. IV. Rapid motion felt by observer; windows, doors, and dishes rattled.

February 3: 13:29:26*. Epicenter 35°37′ north, 118°30′ west, near Bodfish, P. Felt at Isabella seismograph station.

February 4: 05:23:29*. Epicenter 37°58′ north, 122°01′ west, near Concord, B. San Francisco East Bay region. IV. "A sharp earthquake which rattled dishes but caused no apparent damage awakened residents of Concord, Martinez, and Orinda . . . "—(*BSSA, April 1955.*) Rapid jolting motion awakened two of three persons at Canyon where house creaked. Felt like boulder rolled down hill onto house.

February 4: 11:55:02*. Epicenter 37°58′ north, 122°01′ west, near Concord, B. Felt in the Oakland Dimond district with somewhat sharper intensity than shock at 05:23:29*.

February 7: 05:49:00*. Epicenter 40°17′ north, 124°32′ west, off Punta Gorda, B. Garberville (9 miles north of). IV. Felt by two in home; house creaked slightly. Felt like someone gave the bed a hard push.

February 11: 11:44:30*. Epicenter 35°24′ north, 118°31′ west, northeast of Caliente, P. Tehachapi. V. Felt by all and frightened few in community. Creaking of buildings and rattling of loose objects heard by all; equipment in post office rattled. Rumbling earth noises heard by nearly all.

February 12: 05:52:48*. Epicenter 35°08′ north, 118°37′ west, west of Tehachapi, P. Tehachapi. IV. Felt by most persons, who heard creaking of buildings and rattling of loose objects. Explosivelike earth noises heard by many just before shock. One heavy vertical jar.

February 14: 06:23:06*. Epicenter 37°28′ north, 121°56′ west, northeast of Mount Hamilton, B. Minor earthquake rattled parts of the San Francisco Bay area and the Santa Clara Valley.

February 18: 07:27:28*. Epicenter 31°58′ north, 116°13′ west, Baja California, P. Reported felt at Calexico and El Centro in the Imperial Valley. Felt by several at Descanso and Mount Helix in San Diego County. No damage reported.

February 18: 21:53 (about). Brief shock felt by few at Norden.

February 18: 22:11:33*. Epicenter 39°28′ north, 120°16′ west, northwest of Truckee, B. Brief shock felt by few at Norden and by two at Donner Summit. Few felt a shock about 22:20.

February 21: 02:06:56*. Epicenter 34°00′ north, 118°20′ west, near Culver City, P. Los Angeles County. V. Fairly sharp jolt awakened many in the west and southwest sections of Los Angeles. About 15 calls received by police at Inglewood where some thought it was an explosion. Felt by many and awakened few at Huntington Park; windows and doors rattled; frame creaked. Also felt at Baldwin Park, Hawthorne, Leimert Park, and Santa Monica.

February 26: 19:17:51*. Epicenter 36°15′ north, 120°50′ west, near Lonoak, B. Priest Valley, southwest section (Monterey County). IV. Slight swaying motion felt by several; buildings creaked and loose objects rattled.

March 1: 22:04:43*. Epicenter 36°52′ north, 121°39′ west, near Chittenden Pass, B. Gilroy. V. Moderately strong tremor. Awakened and frightened many in community. Windows and doors rattled; hanging objects swung west-east. Motion rapid, rolling.

March 2: Between 03:00 and 04:00. Indian Valley (12 miles northeast of San Miguel). IV. Felt by several; dishes rattled; doors slammed.

March 2: 07:59:01*. Epicenter 36°00′ north, 120°56′ west, near San Ardo, B. Moderately strong shock felt over an area of approximately 7,000 square miles of west-central California. (See map, page 17.) Maximum intensity VI. Magnitude 5.1. Slight damage reported from several localities.

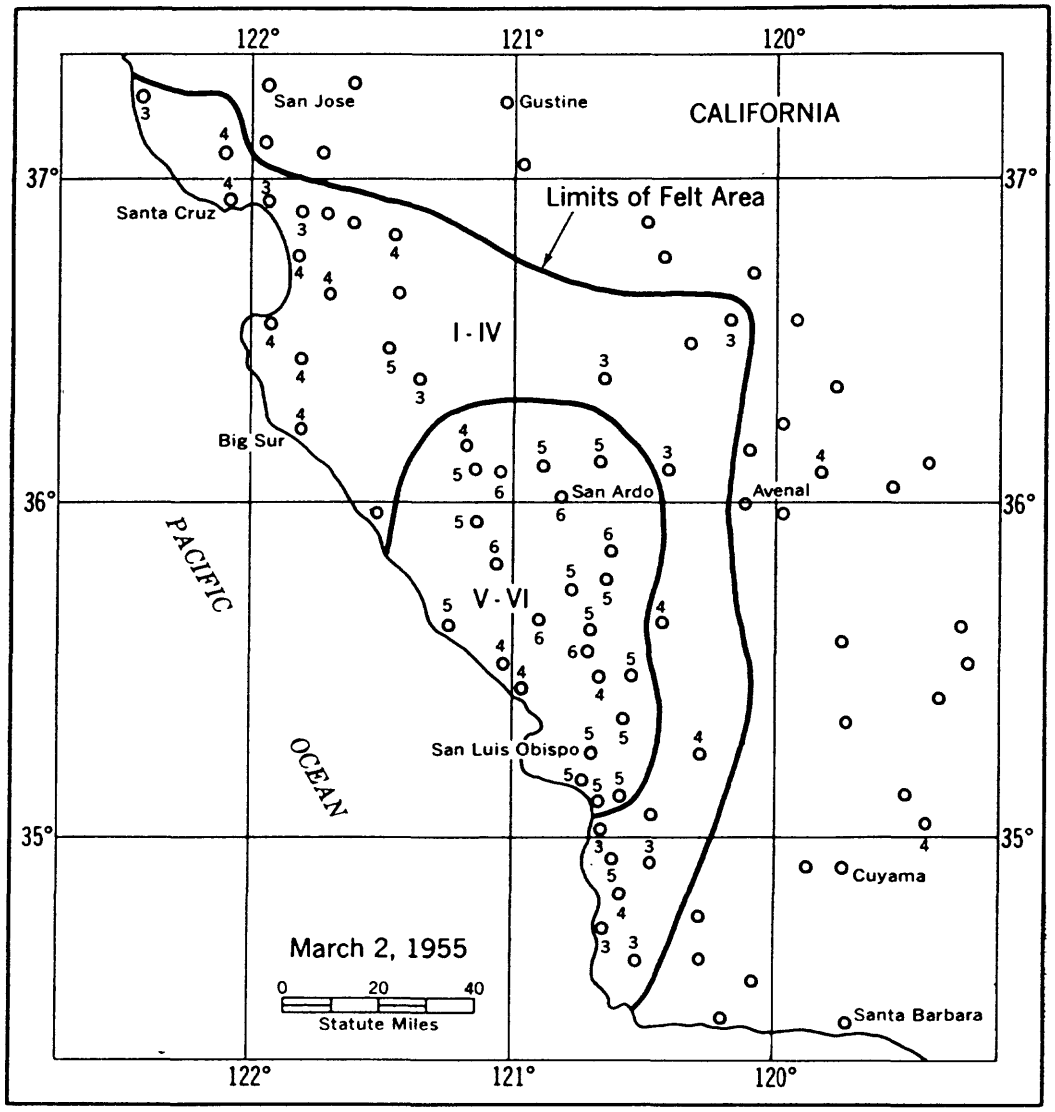

FIGURE 5.—Area affected by earthquake of March 2.

INTENSITY VI:

Adelaida.—Felt by all. Plaster cracked. Power drop wires swung for several seconds after shock. Baby table shifted. Trees, bushes shaken moderately. Loud earth noises heard 3–5 seconds before shock. Motion slow, ending with sharp jolt.

Bryson (Ernest Weferling Ranch).—Felt by many or all, some outdoors (active); awakened many; frightened few. Small objects and furnishings shifted; knickknacks fell. Trees, bushes shaken moderately. Loud earth noises from south heard by many before shock.

Indian Valley (12 miles northeast of San Miguel).—Felt by and frightened all at ranch (some outdoors). Plaster cracked. Small objects and furnishings shifted. "Felt like house would drop in the basement. Longest shock ever felt."

San Ardo.—Felt by all and frightened many in community. Small objects and furnishings shifted; vases overturned; knickknacks fell. Trees, bushes shaken moderately. Loud earth noises heard by many just before shock.

San Lucas.—Felt by all and frightened many in community. Small objects shifted. "I was working in post office when shock occurred. Ran outside and saw trees shaking and cars rolling back and forth." About 1 mile west of San Lucas a brick house chimney collapsed. Damage slight to brick. Loud earth noises from northeast heard by many.

Templeton.—Felt by all and frightened few in community. Plaster cracked. Damage slight. Small objects shifted. Trees, bushes shaken moderately. Moderately loud earth noises from northeast heard by few 2 seconds before shock.

INTENSITY V: Arroyo Grande, Avila, Bradley (9 miles west of, Buttle Ranch), Creston, Gonzales, Guadalupe, Jolon, King City, Lonoak Road (intersection of Highway 198 and Lonoak Road, Mee Ranch), Paso Robles, Pismo Beach, Pleyto School (Bryson), Priest Valley, San Luis Obispo, San Miguel, San Simeon, Santa Margarita, and Walti Ranch (Slack Canyon, about 15 miles northeast of San Miguel).

INTENSITY IV: Atascadero, Big Sur, Boulder Creek, Buttonwillow, Carmel Valley, Casmalia, Cayucos, Greenfield, Harmony, Hausna (about 7 miles southeast of Arroyo Grande), Hollister (7 miles south of), Maricopa, Monterey, Moss Landing, Mount Hermon, Pozo Guard Station (Pozo), Salinas, Santa Cruz, Shandon, and Stratford.

INTENSITY I TO III: Aptos, Bitterwater Pumping Station, Circle M Ranch (on coast about 24 miles south of Big Sur), Coalinga, Idria, Lompoc, Oceano, Pescadero, San Joaquin, Santa Maria, Soledad (Sec. 6, T19S, R5E), Surf, and Watsonville.

March 2: 20:00. Bakersfield. III. Very light shock felt by observer in theater. Motion slow, lasted 10 seconds. Direction northwest.

March 5: 00:05:27*. Epicenter 41.0° north, 124.0° west, north of Arcata, B. Press reported Eureka and other Humboldt County communities were jarred by a light earthquake. No damage reported.

March 14: 17:23. Not recorded at Mount Hamilton, B. Hollister. III. Trees, bushes shaken slightly. Motion slow, lasted 5 seconds.

March 15: 15:56, 16:37. Not recorded at Arcata, B. Two slight shocks reported felt in Eureka.

March 26: 06:45:12*. Epicenter 33°38′ north, 117°58′ west, near Huntington Beach, P. Huntington Beach. IV. Felt by many in community; windows and doors rattled. Motion rapid. Very light.

April 15: 03:33:28*. Epicenter 37°43′ north, 122°04′ west, near Hayward, B. Sharp shock jolted the Hayward area. Felt by nurses at Fairmount Hospital and by personnel at radio station on the hospital grounds. Also felt at Berkeley, Livermore, Oakland, Pleasanton, and Contra Costa County communities.

April 24: 18:55:15*. Epicenter 33°27′ north, 116°41′ west, east of Aguanga, P. Hemet (7 miles west of). IV. People awakened. Reported as slight in East San Diego.

April 25: 02:43:08*. Epicenter 32°20′ north, 115°00′ west, vicinity of Volcano Lake, Baja California, P. El Centro. V. Awakened many in community where windows rattled; house creaked; hanging objects swung. Motion slow. Felt by several in San Diego and by several in Yuma, Ariz.

April 25: (early a.m.) Not recorded on seismographs at Berkeley, B. Vallejo. IV. People awakened by light shock.

April 29: 07:14:38*. Epicenter 38°57′ north, 122°46′ west, near Kelseyville, B. Sharp shock. Felt over an area of approximately 900 square miles, principally in Lake County. Maximum intensity VI. Damage slight. Shocks reported by press at 07:45 and 10:45 not recorded by Berkeley.

INTENSITY VI:

Clearlake Highlands.—Felt by all. Dresser rolled across room; clothes dryer slid 4–5 feet; window broke; dishes fell from cupboard at Roberts Poultry Ranch. "First shock heavy; second, mild; third, very mild. To my knowledge, this was the first hard shock felt in 30 years. Considerable gas released from bottom of lake and lake bubbled strongly in many places." Loud earth noises from northeast heard by many.

Lower Lake.—Frightened all in community. Several cracks in walls of service station; plaster cracked; chimneys and windows broke; dishes broke; stock fell in stores. Trees, bushes shaken strongly. Loud earth noises from southeast heard by many about 1 second before shock.

INTENSITY V: Clearlake Oaks and Clearlake Park.

INTENSITY IV: Finley, Kelseyville, Lakeport, Morgan Valley (southeast Lake County), and Seigler Springs.

INTENSITY I TO III: Middletown.

May 7: 00:48:07*, 03:50:39* (principal shock), 06:56:15*. Epicenter 38°56′ north, 122°52′ west, near Kelseyville, B. Sharp shocks. Principal shock was felt over an area of approximately 2,000 square miles. Maximum intensity VI. Magnitude 5.0. Moderate damage to some older type buildings and some loss of merchandise in stores.

INTENSITY VI:

Anderson Ranch (about 5 miles east of Kelseyville).—Felt by all except a few very sound sleepers; frightened few. Small objects shifted; vases, etc., overturned; trees, bushes shaken moderately.

Clearlake Highlands.—Awakened all in community; frightened few. Cracks opened in ceiling, floor, marquee, and walls of laundry. Practically every pillar was damaged and light fixtures cracked. Outside chimney damaged and stovepipe jarred loose in bar. One house had plaster shaken down in every room but the bath. Damage to fallen stocks in grocery stores was estimated at $1500. Many felt two shocks about 5 minutes apart at 00:48:07 and slight shocks until 03:50:09. About 14 shocks were reported felt until 06:56:15.

Clearlake Oaks.—Felt by and awakened all in community; frightened many. Merchandise fell from shelves in grocery stores; small objects shifted and overturned. Damage slight. Pendulum clock stopped; trees, bushes shaken strongly. Loud earth noises heard by many 10 seconds before shock.

Clearlake Park.—Awakened and frightened all in home. Damage slight. Ground cracked. Small objects shifted; pictures fell. Loud earth noises heard by many.

Lower Lake.—Felt by, awakened, and frightened many in community. Few weak chimneys on older type houses fell. Plaster cracked and fell. Vent flue disconnected from ceiling thimble of hanging heater. Damage considerable to fallen merchandise in stores. Knickknacks, books, and pictures fell; dishes broke. Moderate earth noises from northwest heard by many.

INTENSITY V: Brooks, Calistoga, Cobb Valley (Binkley Ranch), Finley, Glenhaven, Hobergs, Kelseyville, Lakeport, Long Valley, Lucerne, and Middletown.

INTENSITY IV: Guinda, Saint Helena, Upper Lake, and Witter Springs.

INTENSITY I TO III: Kenwood.

May 9: (in p.m.). Sharp shock reported felt throughout the Escondido and Mount Helix areas.

May 11: 11:49. Reported felt at El Centro.

May 12: 17:09:26*. Epicenter 39°50′ north, 123°37′ west, north of Branscomb, B. Branscomb and 3 miles east of. IV. Felt by several in community (some outdoors; quiet). Windows rattled; house creaked. "Those in cars said it felt like a car had bumped them."

May 13: 13:35. Not recorded at Berkeley, B. Branscomb (post office). Shock felt similar to one at 17:09:26 on the 12th.

May 14: 12:00:00*. Epicenter 29° north, 126½° west, W. Big Sur. IV. Felt by many in community; frightened few. Windows and dishes rattled. "One person spoke of seeing gravel rise from the ground." Started with an abrupt, hard jolt, southeast-northwest, followed by much weaker tremors, lasted about 10 seconds.

May 14: (early in p.m.). Santa Cruz. IV. Sharp jolt; houses shook. (May be related to the preceding shock).

May 15: 09:03:26*. Epicenter 34°05′ north, 117°28′ west, near Fontana, P. IV. In San Bernardino, numerous calls received by police. Pasadena residents reported a jolt with sounds like explosion. Windows rattled in scattered Southland areas. Also reported felt in Colton, Corona, Fontana, Glendale, and Rialto.

May 25: 14:00:28*. Epicenter 36°08′ north, 117°52′ west, east of Haiwee, P. Coso Junction. IV. Felt by many; by observer outdoors (quiet). Windows, doors, and dishes rattled; house creaked. "Seemed to be a local shock." Motion rapid, vertical.

May 28: 11:44:20*. Epicenter 35½° north, 118° west, southeast of Weldon, W. Tehachapi. V. Felt by most everyone. Some articles fell from shelves; building creaked; loose objects rattled. Gradual onset, followed by abrupt, jarring bump, lasting 3 seconds. Brief shock felt by several at Kern Canyon Powerhouse (10 miles east of Bakersfield), where windows rattled. "Not felt at other stations as close as 15 miles." Felt sharply at Little Lake. Cabin creaked at Sageland.

May 29: 08:43:35*. Epicenter 34°01′ north, 119°05′ west, off Point Mugu, P. Press reported mild shock was felt in scattered areas from East Los Angeles to Santa Barbara. Observer at Agoura reported no motion was felt but loose objects rattled very noisily. Also felt at Manhattan Beach.

June 2: 01:19:27*. Epicenter 35°04′ north, 118°34′ west, west of Tehachapi, P. Tehachapi. IV. Felt by most everyone. Buildings creaked; loose objects rattled. Motion trembling, then abrupt, jarring, west-east bump.

June 7: 03:40:13*. Epicenter 40°58′ north, 121°52′ west, southeast of Big Bend, B. Pit River Powerhouse No. 1 (Fall River Mills). IV. Felt by several at powerhouse; awakened few in community. Equipment at powerhouse rattled; hanging objects swung. Motion rapid.

June 7: 22:02:59*. Epicenter 36°47′ north, 121°26′ west, near Hollister, B. Watsonville. V. Some plaster fell from a church wall. At Hollister (7 miles south of) felt by several in home; awakened few. Windows and doors rattled; house creaked. At Gilroy sounded like heavily loaded freight train.

June 8: 08:26:56*. Epicenter 37°40′ north, 122°32′ west, southwest of San Francisco. San Francisco area. V. Felt strongly in Daly City and South San Francisco. Objects dislodged from shelves in some areas. Houses rattled and shook in the Bernal Heights, Crocker-Amazon, Inglewood, St. Francis Wood, and Sunset districts of San Francisco. Many reported hearing a boomlike sound and several said it felt like a truck hit the house.

June 10: 10:26:37*. Epicenter 37°30′ north, 118° 41′ west, west of Bishop, P. Laws. IV. Very rapid, abrupt, blastlike shock felt by many. House creaked; doors swung. Also felt at Bishop.

June 12: 20:50. Not recorded at Pasadena. Laws. IV. Awakened few; house creaked; motion rolling.

June 13: 23:47:09*. Epicenter 32°58′ north, 115°32′ west, near Brawley, P. El Centro. V. Felt by and awakened many in community; frightened few. Windows, doors, and dishes rattled; house creaked. Sounded like an explosion. House seemed to rise and settle with sharp jerk. Also felt at Brawley and Calexico. Calexico reported feeling a shock late on the evening of June 14 (probably the following shock).

June 15: 01:30:02*. Epicenter 32°27′ north, 115°28′ west, Baja California, P. Reported felt at El Centro.

June 27: 14:42:51*. Epicenter 38°45′ north, 122°09′ west, east of San Leandro, B. San Francisco East Bay region. Rolling motion accompanied by a faint rumbling sound was felt in the Danville area and at the Oakland Airport.

June 30: 03:11:51*, 05:16:55*. Epicenter of first shock 37°42′ north, 122°29′ west; second shock, 37°41′ north, 122°30′ west, near Daly City, B. San Francisco area. V. Awakened all in home at Brisbane where windows and doors rattled; hanging objects swung. Faint earth noises heard. Awakened and frightened many in Daly City where windows, doors, and dishes rattled. In San Bruno, small soil testing apparatus shifted slightly at the Naval Testing Laboratory; awakened few in home. In San Francisco, scores awakened in the Crocker-Amazon, Inglewood, and Sunset districts by the first shock. Sounds like "low rushing wind" heard by some. Felt slightly in the downtown district where loose objects rattled very slightly. Windows, doors, and dishes rattled at Sharp Park. Second shock at 05:16:55 described as slightly weaker; some awakened.

July 2: 08:29:39*. Epicenter 34°25′ north, 116°38′ west, near Old Woman Springs, P. Fawnskin. IV. Rapid, brief shock felt by several in home; windows rattled.

July 4: 23:07:03*. Epicenter 39.3° north, 118.5° west, east of Fallon, Nev., B. Salt Wells, Nev. Light shock felt.

July 6: 02:15. Salt Wells, Nev. Reported felt.

July: Hemet, near (4 miles west of the San Jacinto Tunnel). V. Press reported an earthquake caused a leakage in one of the joints at the Casa Loma Siphon. (Press report dated July 14 with date of occurrence given as "last week." Pasadena reported nothing in their files suggested a date for this.)

July 12: 11:12:38*. Epicenter 34°36′ north, 118°57′ west, near Fillmore, P. Santa Paula. Slight, brief shock. No reports of it being felt elsewhere.

July 16: 03:39:48*. Epicenter 34°02′ north, 116°43′ west, north of White Water, P. Fawnskin. III. Rapid, brief shock felt by several in home (lying down). Also felt at Hemet.

July 18: 18:04:26*. Epicenter 35°22′ north, 118°30′ west, northeast of Caliente, P. Mount Breckenridge (Kern County). IV. One slight bump, accompanied by bumping earth noises, felt by observer. Building creaked; loose objects rattled.

July 26: 17:35:02*. Epicenter 33°52′ north, 117°11′ west, northwest of Lakeview, P. Felt at Riverside.

July 27: 14:42. Not recorded on seismographs at Berkeley, B. San Francisco East Bay region. "A light earthquake was felt in the East Bay. . . The shock was reported felt at the Oakland Airport and in San Leandro . . ."—(*BSSA, October 1955.*)

August 3: 08:49:05*. Epicenter 33°57′ north, 116°56′ west, northeast of Beaumont, P. Reported felt at Yucaipa.

August 7: 19:21:51*. Epicenter 35°24′ north, 118°38′ west, north of Caliente, P. V. Felt over an area of approximately 6,000 square miles, principally in Kern County. Alarmed all three persons on Mount Breckenridge (about 10 miles northeast of Caliente) where KERO TV tower reportedly swayed 2 feet at top; ash trays and tubes in spare rack displaced; loud rattling and thunderous earth noises heard at

time of shock. Shock felt at 19:31 and a slight bump felt at 19:37. Intensity IV at Arvin, Bakersfield, Borel Powerhouse (Bodfish), Caliente, Delano, Glenville, Isabella, Kernville, Maricopa, Oildale, Shafter, Taft, and Tehachapi. Also felt at Buttonwillow, Claraville, Ducor, Johnsondale, Lost Hills, Oak Flat Lookout, and lookouts east of Fresno, and Woody.

August 8: 02:35:38*. Epicenter 38.5° north, 118.8° west, near Hawthorne, Nev., W. V. Felt over an area of approximately 9,000 square miles of Nevada and California. No damage reported.

INTENSITY V IN NEVADA:

Gabbs.—Awakened many or all in community. Windows and doors rattled. Moderate earth noises heard. Motion rapid. Shock reported felt at 20:20.

Hawthorne.—Felt by and awakened many in community; frightened few. Frame creaked. Moderate earth noises heard by many. Motion rapid.

Mason.—Felt by several in home; awakened few. Pendulum clock stopped. Hanging objects swung. One movement. Very slight. Motion rapid.

Mina.—Felt by and awakened all in home. Windows rattled; walls creaked. Faint earth noises from east heard by few 5 seconds before shock. Motion rapid.

Schurz.—Felt by and awakened few in community. Pendulum clock stopped. Hanging objects swung slightly. Faint earth noises heard by few.

Yerington.—Felt by, awakened, and frightened all in home. Walls creaked.

INTENSITY V:

Benton.—Felt by several in home; awakened few. One glass cracked. Faint earth noises heard.

Bridgeport.—Felt by and awakened all in home. Walls creaked. Hanging objects swung. Faint earth noises from north heard by few. Slight but noticeable. Motion slow.

Tioga Pass (entrance station).—Awakened all the rangers.

Yosemite National Park (central section Yosemite Valley).—Felt by, awakened many, and frightened few in community; felt by some outdoors (active). Windows, doors, and dishes rattled; house creaked. Hanging objects swung east-west. Trees, bushes shaken slightly. Motion rapid.

INTENSITY IV IN NEVADA: Luning, Nevada Scheelite Mine (Rawhide), and Wabuska.

INTENSITY IV: Coleville, El Portal, Leevining, and Tuolumne Meadows.

INTENSITY I TO III IN NEVADA: Minden and Smith.

INTENSITY I TO III: Sonora and Wawona.

August 11: 19:55:52. Epicenter 37°53′ north, 122°14′ west, near Berkeley, B. V. Felt over an area of approximately 400 square miles, principally in Alameda and Contra Costa counties. Felt by and frightened all at Temescal; books fell in the Library building; windows rattled; loud earth noises heard. Motion rapid. Intensity IV at Albany, Berkeley, Canyon, Lafayette, Moraga, Oakland, and Orinda. Also felt at Alameda, Rodeo, and San Francisco.

August 13: 23:05:37*. Epicenter 37°51′ north, 122°13′ west, near Berkeley, B. Berkeley. IV. Felt by all in home; awakened few; windows, dishes, and bottles in cupboard rattled. Motion rapid. Also felt in East Oakland, the Montclair district, and downtown Oakland.

August 17: 12:18:08*, 12:37:51*, 16:01:09*. Epicenter 37°56′ north, 122°16′ west, east of El Cerrito, B. San Francisco East Bay region. "Three slight earthquakes, one accompanied by a sound like that of a muffled explosion, jarred the Berkeley and Oakland areas. . . The last one was the strongest. . ."—(*BSSA, October 1955.*) Rapid motion felt by several on third floor at the University of California, Berkeley.

August 19: 14:06:22*. Epicenter 37°46′ north, 122°10′ west, northeast of San Leandro, B. Oakland. Reported felt by one person on Mountain Boulevard.

August 22: 09:17:39*. Epicenter 37°41′ north, 122°29′ west, near Colma, B. San Francisco. IV. Blastlike shock, accompanied by earth noises, felt by many in the area west of Twin Peaks.

August 24: 13:30. Not recorded at Pasadena or elsewhere, P. Palos Verdes and Redondo Beach. Press reported police departments received calls reporting a slight shock.

August 25: 21:23:22*. Epicenter 33°03′ north, 116°01′ west, southeast of Borego Valley, P. San Diego. III. Rapid motion felt by several in Suncrest district. Direction northeast.

August 26: 23:00:26*. Epicenter 40°23′ north, 124°30′ west, off Cape Mendocino, B. Eureka. III. "A minor earthquake was felt in Eureka. . . Light fixtures swayed, but there were no reports of damage."—(*BSSA, October 1955.*)

August 29: 17:57:15*, 18:08, 18:14, 18:15. Epicenter 40°25′ north, 124°11′ west, south of Ferndale, B. Felt over an area of approximately 2,000 square miles of Humboldt County. Maximum intensity V. No damage reported.

INTENSITY V:

Alton.—Felt by all. Motion slow.

Carlotta.—Felt by all. Lamps and plants swung southeast. Dishes rattled; house creaked. Moderate earth noises heard by many 2 seconds before shock. Motion slow. Four shocks felt; first and fourth strongest.

Eureka.—Felt by many. Creaking of buildings and rattling of loose objects heard by many; disturbed objects observed by many; floor lamps swayed east-west. In the east section northeast corner of frame building (on concrete piers) seemed to settle 2–3 inches, then shake for 6–7 seconds. Direction northeast-southwest. Felt like suddenly putting on brakes while driving about 30 mph. Fairly loud rumbling earth noises heard by several immediately after the shock. Three or four tremors felt. Steady north-south shaking at 18:15, lasting 3–4 seconds.

Ferndale.—Felt by all and frightened many in community. Small objects shifted and overturned. Dishes rattled; walls creaked. Motion rapid.

Fortuna.—Felt by all; frightened few. Trees, bushes shaken moderately. Windows, doors, and dishes rattled; house creaked. Hanging objects swung north. Motion slow.

Kneeland.—Felt by all. Motion rapid.

Loleta.—Felt by all. Dishes rattled. Faint earth noises from northeast heard. Motion slow.

INTENSITY IV: Arcata, Briceland, Fields Landing, Rio Dell, and Scotia.

INTENSITY I TO III: South Fork.

August 31: 00:00. Backus Ranch (NW¼, Sec. 20, T. 10 N, R. 12 W, SBBM), Mojave area, at base of Soledad Mountain. III. Long, rolling, gentle rocking motion felt by observer in bed. Doors rattled slightly. Not felt by many.

September 4: 18:01:18*. Epicenter 37°22′ north, 121°47′ west, east of San Jose, B. Felt over an area of approximately 12,000 square miles of west-central California. (See map, page 23.) Magnitude 5.8. Maximum intensity VII. Extensive minor damage, estimated at $100,000 consisting mainly of toppled chimneys and broken plate glass windows, occurred in the San Jose area.

INTENSITY VII:

Alum Rock Park.—Boulders up to 2 feet in diameter fell, damaging a half-dozen automobiles.

Mount Hamilton Road (east section of San Jose).—Moved full 3,000-gallon water tank off its foundation. Furniture in bedroom moved to center of floor. Light fixture in kitchen fell and broke; considerable glass and dish breakage. Front and back doors of house opened; all doors of kitchen cabinets opened and contents spilled to floor. All pictures turned on side. Loud roaring earth noises heard before and during shock. One 6-inch water line laid in Mount Hamilton Road (about 2300 feet south of Alum Rock Avenue) cracked in the bell.

San Jose—Principal damage was to chimneys in the Willow Glen District where many fell and numerous required repair. One chimney reinforced with steel rods was sufficiently damaged to require partial demolition. Minor cracking occurred in several large downtown buildings, and the County Hospital (southwest San Jose), had minor cracking. At least one house moved on its foundation. Plaster cracked. Replacement of plate glass will cost about $18,000. Large amount of merchandise fell in grocery and liquor stores, with considerable breakage.

INTENSITY VI:

Alameda Creek (on top of mountain about 5 miles north of Mount Hamilton).—Many rocks fell. Trees moved north-south. Shock accompanied by loud explosivelike sound.

Alviso.—Felt by many in community (some outdoors; active); frightened few. Trees, bushes shaken strongly.

Agnew.—Felt by all and frightened many in community. Small objects shifted. Trees, bushes shaken moderately.

Boulder Creek.—Felt by all and frightened few in community. Small objects shifted and overturned; knickknacks and pictures fell.

Coyote.—Felt by all and frightened many or all in community. Furniture moved from walls; stovepipe fell; small objects and furnishings shifted; knickknacks fell. Trees, bushes shaken strongly. Field-workers reported ground waves and that trees and trucks weaved.

Cupertino.—Felt by and frightened all. Damage slight. Small objects and furnishings shifted. Trees, bushes shaken strongly.

Davenport.—Felt by all in community; frightened few. Cement walk cracked.

Freedom.—Felt by and frightened all in community. Windows, doors, and dishes rattled. Hanging objects swung.

Gilroy.—Felt by all and frightened few in community. Small objects shifted. Trees, bushes shaken strongly.

Hollister.—Felt by all. Plaster cracked in many places. Light fixtures swung about 1 foot. Visible swaying of houses, trees, and telephone poles. People in large group left theatre.

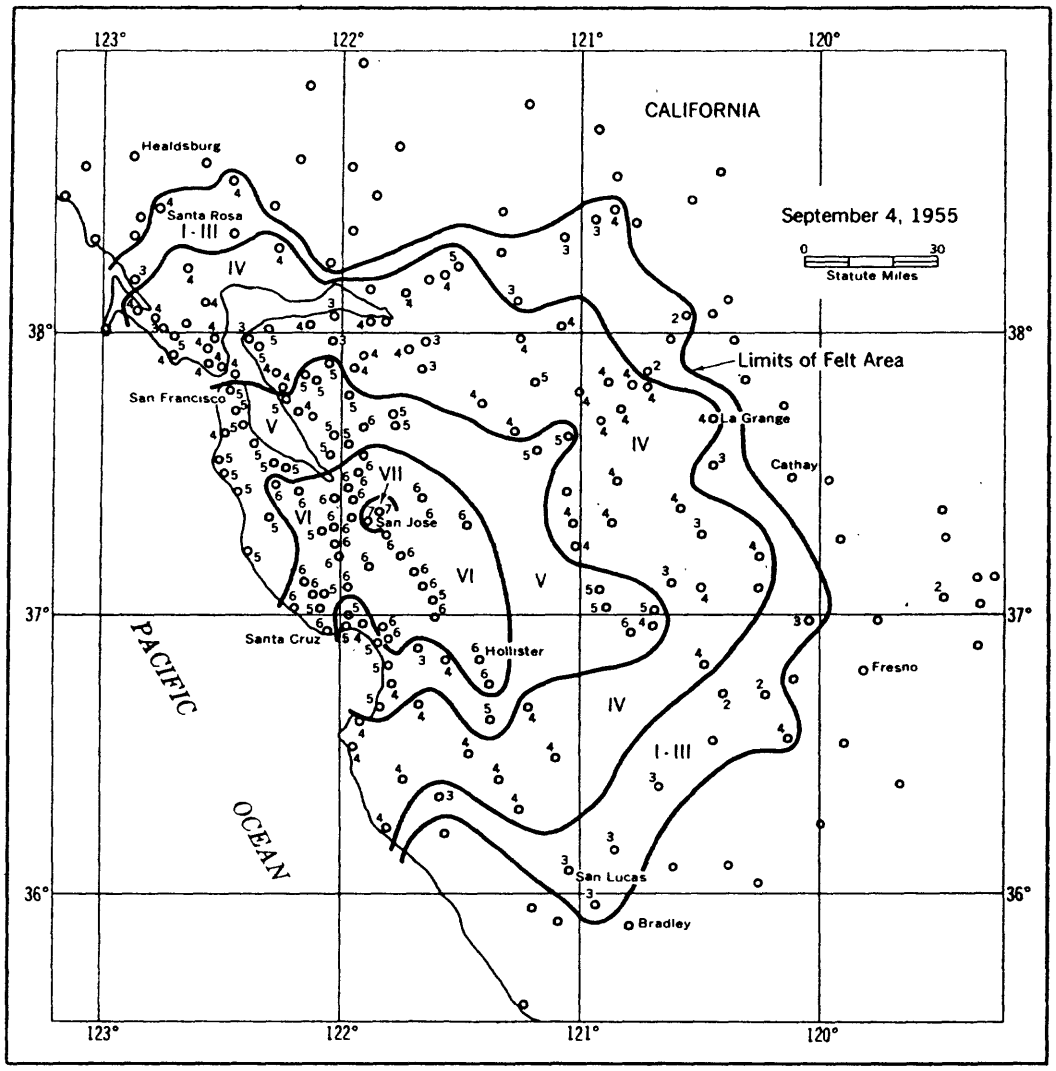

FIGURE 6.—Area affected by earthquake of September 4.

Hollister (7½ miles south of).—Felt by many in community; frightened few. Small objects shifted. Trees, bushes shaken moderately. Cattle frightened. Parked car shaken very noticeably and at first seemed to move in circles. Sounded like a heavy wind as it really started.

Holy City.—Felt by and frightened all in community. Trees, bushes shaken strongly. Windows, doors, and dishes rattled.

Los Banos (6 miles southeast of).—New cracks reported in cement areas around home at the Anthony Mattos ranch near the Charleston School.

Los Gatos.—Felt by and frightened all in community. Visible swaying of buildings; trees, bushes shaken strongly; large waves in swimming pool. Small objects shifted. Door jamb shifted slightly. Motion slow, rocking, rolling. Several shocks in brief period.

Madrone.—Felt by and frightened many in community. Damage slight. Small objects shifted and overturned; knickknacks fell. Trees, bushes shaken moderately.

Menlo Park.—Felt by all. One resident in the Lindfield Oaks area reported cracks in house. Water seeped from cracked water main.

Mission San Jose.—Small objects shifted. Trees, bushes shaken strongly.

Morgan Hill.—Felt by all and frightened many or all in community. Pendulum clock stopped. Hanging objects swung.

Mount Hamilton.—Felt by all. One pendulum clock facing east stopped. Small objects shifted and overturned; knickknacks fell. Objects that fell were more or less precariously situated; most objects on open shelves remained.

New Almaden.—Felt by and frightened many in community. Small objects shifted; vases and small objects overturned. Trees, bushes shaken strongly.

Pleasanton.—Felt by all in community; frightened few. Small objects shifted; vases and small objects overturned; books fell. Trees, bushes shaken moderately.

San Antonio Valley (southeast of Mount Hamilton near Santa Clara-Stanislaus county line).—Observer reported effects in this area were similar to those given for the Madrone area (VI), possibly slightly milder.

Santa Clara.—Felt by all and frightened many in community; some left homes. Damage slight. Few objects fell from store shelves. Windows cracked in drug store. Damage slight in private homes, with few cracks in porches and patios. Water pipe broke at the University of Santa Clara, flooding kitchen. Plaster, windows, walls, and chimneys cracked. Knickknacks and books fell. Dishes broke.

Santa Cruz.—Felt by all and frightened many in community. Visible swaying of buildings and trees. Bed on rollers displaced in south-north direction. Displaced objects observed by several. Pendulum clock (pendulum swinging east-west) stopped. In the Seabright District (south Santa Cruz beach area) people ran to the streets. Plaster cracked. Small objects shifted and overturned; knickknacks fell.

Saratoga.—Felt by all in community. Small objects overturned. Trees, bushes shaken moderately.

Stevens Creek Road (west San Jose area).—Front store windows broke. Over 150 items fell from one row of stock in store, while another row was hardly disturbed; 30 jars fell and broke in another store.

Sunnyvale.—Frightened few in home. Separated wood beams ¼ inch over a column. Plaster cracked. Telephone wires swayed moderately.

Warm Springs.—Felt by all outside; frightened many. Knickknacks fell. Trees, bushes shaken strongly.

Watsonville.—Felt by all and frightened many in community. Damage slight. Chimneys cracked. Small objects shifted and overturned; knickknacks fell. Trees, bushes shaken moderately.

Woodside (about 4½ miles southeast of Redwood City).—Felt by eight persons in home. Trees, bushes shaken strongly. Hanging objects swung north.

INTENSITY V: Alameda, Alvarado, Arroyo Sanatorium (Livermore), Belmont, Ben Lomond, Brisbane, Brookdale, Burlingame, Campbell, Capitola, Chualar Canyon, Daly City, Decoto, Dos Palos, El Granada, Felton, Half Moon Bay, Lafayette, La Honda (5 miles west of), La Selva Beach (Watsonville), Livermore, Locke, Los Banos, Manteca, Marina, Millbrae, Milpitas, Modesto, Moffett Field, Montara, Monta Vista, Moss Landing, Mountain View, Mount Hermon, Newark, Niles, Pinole, Redwood City, Redwood Estates, Richmond, Saint Mary's College (Moraga), San Carlos, San Francisco, San Lorenzo, San Martin, San Mateo County, San Ramon, Seaside, Soquel, Volta, Walnut Creek, Westley, and Woodacre.

INTENSITY IV: Alamo, Alcatraz, Amador City, Aptos, Atwater, Berkeley, Big Sur, Bolinas, Brentwood, Canyon, Carmel, Carmel Valley, Castroville, Centerville, Clayton, El Nido, Emeryville, Escalon, Firebaugh, Gonzales, Greenfield, Gustine, Hayward, Helm, Inverness, Irvington, Kentfield, Knights Ferry, La Grange, Le Grand, Linden, Lomita Park (near San Bruno), Los Altos, Martinez, Mill Valley, Monterey, Moss Beach, Napa, Newman, Novato, Oakdale, Oakland, Orinda, Pacific Grove, Paicines, Palo Alto, Pedro Valley, Permanente, Pescadero, Petaluma, Pittsburgh, Point Reyes Station, Rio Vista, Riverbank, Ryde, Saint Helena, Salinas, San Benito, San Bruno, San Juan Bautista, San Leandro, San Rafael, Santa Rosa, Sausalito, Sharp Park, Soledad (Sec. 6, T. 19 S, R. 5 E), South Dos Palos, Stevinson, Stinson Beach, Stockton, Sunol, Tiburon, Tracy, Turlock, Valley Home, Vernalis, and Waterford.

INTENSITY I TO III: Angels Camp, Aromas, Auberry, Byron, Concord, Courtland, Danville, Diablo, Fort Baker, Idria, Knightsen, Lodi, Madera, Marshall, Mee Ranch (intersection of State Highway 198 and Lonoak-Hollister Road), Mendota, Merced, Olema, Paloma area, Port Chicago, Rodeo, San Anselmo, San Ardo, San Gregorio, San Lucas, San Quentin, Santa Rita Park, Snelling, Tranquillity, Turlock State Park (25 miles east of Modesto), and Waterman.

September 6: 03:10. Not recorded on seismographs at Berkeley, B. San Francisco. III. Brief, rapid motion felt by observer in home (lying down).

September 7: 06:22:53. Epicenter 37°43′ north, 122°30′ west, southwest San Francisco, B. San Francisco area. IV. Mild earthquake shook parts of San Francisco and the surrounding area. Telephone calls to police and press indicated it was felt most severely in Daly City and Colma. Windows, doors, and dishes rattled; frame creaked. Motion vertical, jolting, explosivelike.

September 12: 03:35. San Jose. "A very light earthquake was felt in the eastern foothill area of San Jose . . . No damage was reported."—(*BSSA, January 1956.*)

September 13: 23:05. Not recorded at Pasadena or elsewhere, P. May relate to the following shock. Wildomar. III. Slow, gentle motion felt by and awakened one. Direction northwest-southeast. Lasted 10 seconds.

September 14: 02:19:54*. Epicenter 33°45′ north, 118°19′ west, near San Pedro, P. IV. Los Angeles area. Minor shock reported felt in Bell, Compton, Gardena, Huntington Park, Inglewood, Los Angeles (southern parts), Maywood, South Gate, and Torrance. Desk officer at the Compton police station reported a slight temor then a fairly sharp shock. Awakened few at Maywood where windows, doors, and dishes rattled. Motion slow. Felt by many at Torrance; creaking of buildings and rattling of loose objects heard by many. Motion bumping.

September 20: 21:30. Not recorded on seismographs at Reno, Nev., B. Pyramid, Nev. IV. Felt by several. Walls creaked. Faint earth noises heard. Motion rapid. "I have felt shocks the past three evenings."

September 21: 23:37. Not recorded on seismographs at Reno, Nev., B. Nixon, Nev. "No one seems to have felt it here but me."

September 28: 01:52.6*. Epicenter 38.5° north, 118.3° west, region of Hawthorne, Nev., P. Mono County. V. "Northern Mono County was jolted by a sharp earthquake . . . Merchants of the area reported that considerable amounts of goods tumbled from shelves. No extensive damage was reported." —(*BSSA, January 1956.*)

September 29: 10:24. Not recorded on seismographs at Arcata, B. Petrolia. IV. Felt by several indoors only. Windows and doors rattled; building creaked.

September 30: 07:00:10*. Epicenter 33°44′ north, 117°58′ west, near Westminster, P. Reported felt at Garden Grove and Huntington Beach.

October 11: 18:44. Not recorded on seismographs at either Arcata or Ferndale, B. Eureka (south section). III. Felt by two in home. Several slight rattles of doors, dishes, and refrigerator.

October 12: 21:25:30*. Epicenter 34°03′ north, 117°12′ west, near Redlands, P. IV. Felt by many in community at Redlands. House creaked. Two distinct shocks, 1–3 seconds apart. Motion rapid, brief. Felt sharply at Riverside. Also felt at White Water.

October 18: 03:50:18*. Epicenter 33°44′ north, 117°58′ west, near Westminster, P. Felt by few at Huntington Beach.

October 21: 13:35:42*. Epicenter 35°39′ north, 118°29′ west, very near Isabella, P. Kernville. IV. Felt by many in community (some outdoors; quiet). Windows and doors rattled. Motion rapid.

October 21: 23:04:13*. Epicenter 36°13′ north, 120°20′ west, north of Coalinga, B. V. Felt by and awakened many at Coalinga where windows, doors, and dishes rattled. Motion rapid. Fourteen miles northwest of Coalinga bed moved about 6 inches from north wall; others in bed said beds moved. Felt by people in 10-mile radius, who thought it was the sharpest shock ever felt in the district. Motion bumping.

October 23: 20:10:44*. Epicenter 37°58′ north, 122°03′ west, between Walnut Creek and Concord, B. Felt over an area of approximately 12,000 square miles of west-central California. (See map, page 26.) Magnitude 5.4. Maximum intensity VII. Moderate damage, estimated at $1,000,000, consisting mainly of cracked walls and plaster, broken windows, and loss from damaged merchandise, occurred over a considerable area.

INTENSITY VII:

Berkeley.—Felt by all and frightened many in community. Fourteen-inch water main broke, flooding a 4-block area. Two chimneys fell. Plaster cracked. Knickknacks, books, and pictures fell. Loud earth noises from northeast heard about 20 seconds before shock.

Canyon.—Felt by and frightened all in community. Plaster, windows, walls, and chimneys cracked; walls twisted. Damage considerable to wood. Small objects and furnishings shifted; knickknacks fell; dishes broke. Pendulum clock stopped. Outside bird bath partly emptied. Hanging pots swung for 10 minutes (actual timing) after shock. Loud explosivelike earth noises heard by many 2 seconds before shock. "During hard part of shock I had to brace myself to keep balance. Like standing in a swaying bus."

Concord.—Felt by all in area; frightened many. Several water mains broke. Stores had moderate damage from broken windows and bottled goods. Plaster cracked and bulged in four rooms; one room replastered. Low brick wall in yard cracked through in three places. Crack across sidewalk. Concrete slab foundation, 18 x 25 feet, raised ¾ inch in middle; floors distorted. Chimney pulled away from side of house ¼ inch at 8 feet from ground and ½ inch at 28 feet (top); chimneys cracked. Dishes and mirror broke. Lamps and vases knocked off tables; canned goods fell. Lights swayed back and forth. Slight tremors felt at 20:25 and 22:00. There have been at least three fairly strong shocks, all adding cracks in the plaster.

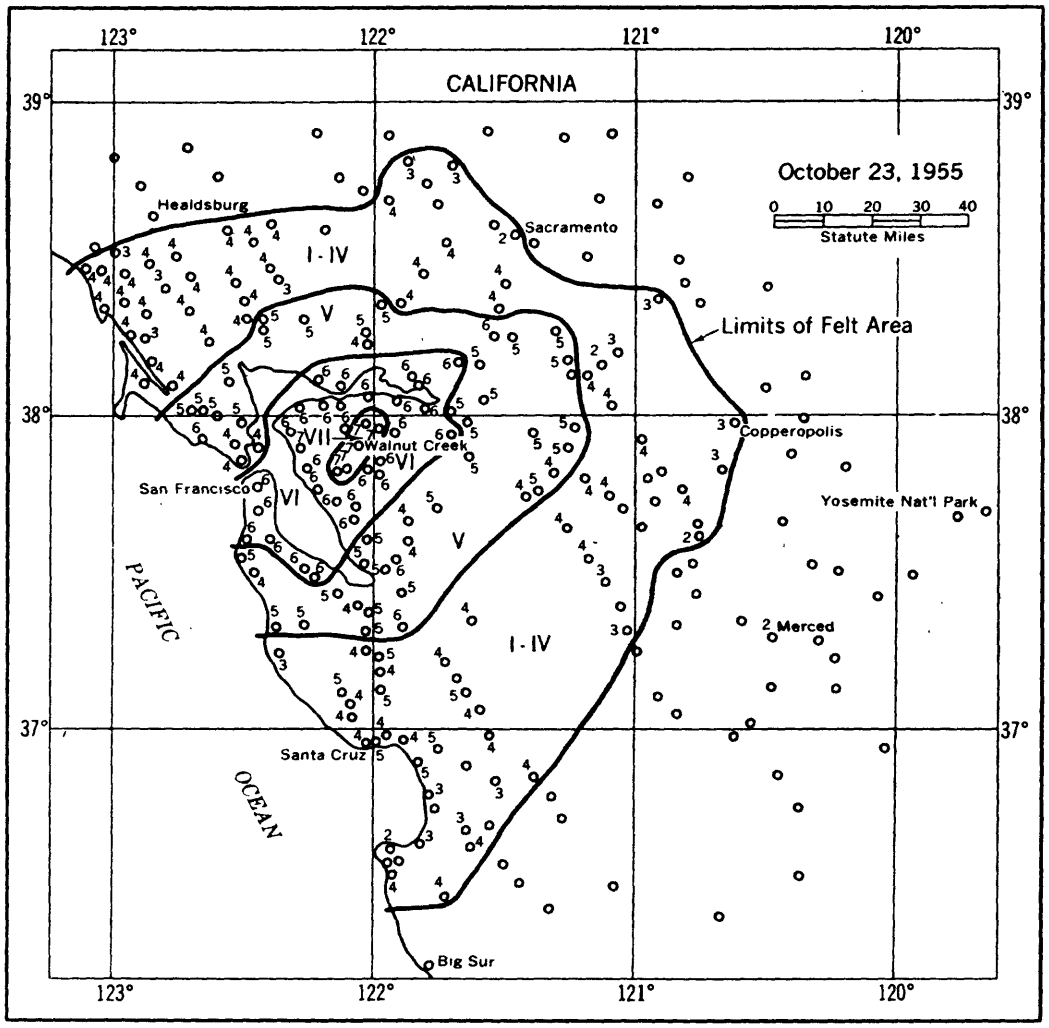

FIGURE 7.—Area affected by earthquake of October 23.

Cowell.—Felt by and frightened all in community. Chimneys twisted and fell. Damage to brick and masonry. Considerable damage to brick building inside and outside. Great cracks in walls and ceilings. Perhaps condemn building. Little damage to frame houses other than cracks in walls and ceilings. No broken windows or water mains. Small objects and furnishings shifted and overturned; knickknacks and pictures fell.

Moraga.—Felt by and frightened all. State Department of Public Works reported that all dams in the immediate vicinity were inspected but damage was found only at Saint Mary's Dam where two systems of cracks occurred in the fill of the main dam. Most notable was a single crack, 1–2 inches wide, at the surface which was continuous from the spillway to the right abutment and located directly above the concrete core wall. The concrete core wall near the center of the dam shifted ½ inch in a downstream direction. At Saint Mary's College large pieces of electronic equipment were knocked to floor. All chandeliers swung, even those over 25 feet in length. Walls swayed visibly. Equipment damaged in main kitchen. Two statues fell 25 feet and broke. Loud rumbling earth noises from hills east of building heard by many during shock and for 30 seconds after.

Pacheco (Country Club Acres, 1158 Temple Drive).—New house (one year old) frame, sheetrock inside, stucco outside. Wall cracked from floor to ceiling on southeast corner and wall pulled away ¼ inch from redwood siding, 1 inch from moulding at top. One beam facing east-west pulled out ½ inch from sup-

porting beam. Many hairline cracks in outside stucco wall. Brick wall and brick planter outside, facing south, had mortar cracked between brick from top to bottom in every seam in the planter. Some windows and hot water heater connections broke in this tract.

Walnut Creek.—Felt by and frightened all in community. About 80 large plate glass windows broke and walls of four buildings cracked; chimneys cracked. Liquor and grocery stores had large amount of stock breakage. Electricity in some sections temporarily out. Considerable cracking of inside sheetrock and outside stucco, particularly at door and window corners and around fireplace. Moved bed about 1 foot; heavy bureau shifted 9 inches; grand piano moved 8 inches. Hot water heater piping pulled out of solder joint at top of heater, flooding three rooms. Water sloshed out of toilet reservoirs onto floor. At the Parkmead School some existing settlement cracks were enlarged and five or six egg-crate-type light fixture reflectors fell to floor. It was apparent that only a violent, twisting motion could account for this as other reflectors in the same room are clamped securely to the fixtures.

INTENSITY VI:

Alameda.—Felt by and frightened all in community. Small objects shifted and overturned. Pendulum clock facing southeast stopped. Doors swung. Loud earth noises from northeast heard by many 10 seconds before shock.

Alamo.—Felt by all and frightened many in community. Damage considerable. Windows and dishes broke. Small objects shifted and overturned; knickknacks, books, and pictures fell.

Albany.—Felt by all or most in community; frightened all in home. Plaster cracked slightly. Windows, doors, and dishes rattled; walls creaked. Hanging objects swung.

Antioch.—Felt by all and frightened many in community. Damage slight. Plaster and walls cracked. Small objects and furnishings shifted; vases, etc., small objects overturned; books and pictures fell. "This was the strongest shock since 1906. Noise sounded like a clap of thunder over my house. Heavy marble-base lamps were saved only by quick action." Loud earth noises from west-east heard by many 3 seconds before shock.

Belmont.—Felt by all in community; frightened many. Plaster cracked. Trees, bushes shaken moderately.

Benicia.—Felt by and frightened all in community. Damage slight. Plaster and chimneys cracked; dishes broke. Small objects shifted; vases, etc., small objects overturned.

Birds Landing.—Felt by and frightened all. Pendulum clock stopped.

Bolinas.—Felt by all and frightened many in community. Small objects shifted. Trees, bushes shaken moderately. Loud earth noises heard by all.

Brentwood.—Felt by all and frightened many in community. Small objects and furnishings shifted; vases, etc., overturned. Trees, bushes shaken strongly.

Brisbane.—Felt by many in homes, by others outdoors (active); frightened few in community. Damage slight. Small objects and furnishings shifted and overturned; knickknacks and books fell. Windows broke.

Castro Valley.—Felt by all in home; frightened all. Damage slight. Small objects shifted; vases overturned. Loud earth noises heard. "First shakes not too hard but last part was quite strong."

Clayton.—Felt by and frightened all in community. Dishes broke. Trees, bushes shaken strongly. Small objects shifted; vases and small objects overturned; knickknacks fell.

Collinsville.—Felt by all and frightened many in community. Dishes broke. Small objects and furnishings shifted; vases, etc., small objects overturned. Loud earth noises heard.

Crockett.—Felt quite strongly. Damage slight to at least three known places. Plaster and chimneys cracked.

Daly City and Colma.—Felt by and frightened many in community. Damage slight to masonry. Windows and dishes broke; walls cracked. Knickknacks and pictures fell. In the Westlake district door to shower out of plumb and one crack at juncture of wall and ceiling in two rooms. Moderate earth noises heard by many.

Danville.—Felt by all and frightened many in community. Damage considerable. Chimneys twisted; plaster fell; windows broke. Furnishings shifted; knickknacks fell. Pendulum clock stopped.

Diablo.—Felt by and frightened all in community. No real damage. Plaster and books fell. Loud earth noises from northwest heard by all 30 seconds before shock.

El Cerrito.—Large crack (width and depth of a finger) over arched door of living room from ceiling around the arch and to the floor.

Hayward.—Felt by and frightened all in community. Windows, doors, and dishes rattled; house creaked. Hanging objects swung northwest. Trees, bushes shaken moderately.

Lafayette.—Felt by and frightened all in community. Damage considerable. Plaster cracked; windows broke. Knickknacks, books, and pictures fell. Loss from fallen cans and bottles in stores. Loud earth noises heard by many.

Martinez.—Felt by and frightened all in community. Damage considerable to brick. Considerable damage to the girls' gymnasium in the Alhambra Union High School; a number of heavy 12 x 8 ceiling beams cracked. Building declared unsafe. Fireplace and chimney cracked; plaster cracked. Small objects overturned; knickknacks fell. Old clock started.

Mount Diablo School District.—State Department of Public Works reported that all schools in the district were surveyed for damage. Slight damage was reported at three schools: Pleasant Hills Elementary—Six windows cracked; few minor cracks observed (questionable if earthquake-caused); Ambrose Elementary—Slight plaster cracks; one exterior wall crack; many old stucco and plaster cracks reopened; Oak Park—Several plaster cracks; two windows cracked.

Mission San Jose.—Felt by all and frightened many in community. Knickknacks fell.

Oakland.—Felt by and frightened all in community. Lowell Junior High School closed as a "collapse hazard" following earthquake. Gas line cracked, causing fire. Plaster cracked. Knickknacks fell; dishes broke. Water splashed from fish tank. Loud earth noises heard.

Palo Alto.—Felt by and frightened many in community. Plaster cracked. Small objects shifted; knickknacks fell. "Felt like truck hit house and sounded like diesel locomotive."

Pinole.—Felt by all in community; frightened few. Small objects shifted and overturned; pictures fell. Trees, bushes shaken strongly. Moderate earth noises heard by many.

Pittsburg.—Felt by all and frightened many in community. Plaster fell; walls and chimneys cracked; windows and dishes broke. Knickknacks, books, and pictures fell. Loud earth noises heard by many.

Pleasant Hill (Fair Oaks Tract).—Observer at 139 Hookston Road reported some nearby houses damaged.

Port Chicago.—Frightened many in community. Damage slight to concrete. Plaster and windows cracked. Knickknacks fell.

Port Costa.—Felt by and frightened all in community. Small objects and furnishings shifted; picture fell. Loud explosivelike sounds heard by many. "First motion gave a sickening feeling then felt like a blast. We went outside and everything was still shaking and continued to shake for a while."

Redwood City.—Felt by all and frightened many in community. People left theater. Several reported they were thrown from chairs. Merchandise fell from shelves in store. Two large plate glass windows cracked. Lights momentarily dimmed.

Richmond.—Frightened all in community. Small objects shifted.

Rio Vista.—Felt by many and frightened few in community. Water mains damaged. Plaster cracked. Trees, bushes shaken moderately.

Rockaway Beach.—Felt by all in community. Plaster cracked.

Rodeo.—Plaster, walls and windows cracked. Damage slight. Moderate earth noises heard by many 5 seconds before shock.

Ryde.—Felt by and frightened all in community; not felt by people riding in automobiles. Small objects shifted; knickknacks fell. Slight tremors felt for 30–40 minutes after shock, causing slight dizziness.

San Bruno (Lomita Park).—Felt by and frightened all in community. Small objects shifted.

San Francisco.—Felt by and frightened many. Plaster cracked; few plate glass windows broke. Small objects and furnishings shifted. Shock quite severe. Apparently two shocks, second one more severe and of longer duration, but at no time during the shocks did vibrations cease completely.

San Jose.—Felt by all and frightened many in community. Damage slight. Plaster cracked. Small objects shifted. Trees, bushes shaken moderately. Moderate earth noises heard.

San Leandro.—Felt by and frightened all in community. Damage slight. Dishes rattled. Hanging objects swung.

Selby.—Felt by and frightened all in community. Hanging objects swung. Loud earth noises heard. Strongest shock ever felt in this area.

Vallejo.—Felt by all in community. Plaster cracked. Small objects shifted and overturned. Loud earth noises from north-south heard by many. Hanging objects swung with circular motion.

INTENSITY V: Acampo, Arroyo Sanitorium (Livermore), Atherton, Banta, Bethel Island (Contra Costa County), Boulder Creek, Brookdale, Burlingame, Byron, Centerville, Decoto, El Sobrante, Fairfax, Fairfield, Freedom, French Camp, Galt, Hillsborough, Holt, Holy City, Irvington, Isleton, Knightsen, La Honda, La Selva Beach (Watsonville), Locke, Lodi, Los Gatos, Menlo Park, Milpitas, Montara, Monta Vista, Morgan Hill, Napa, Newark, Novato, Oakley, Piedmont, San Carlos, San Geronimo, San Gregorio, San Lorenzo, San Mateo, San Rafael, Seabright, Sonoma, South San Francisco, Stinson Beach, Stockton, Sunnyvale, Thornton, Vacaville, Villa Grande, Vineburg, Walnut Grove, and Woodacre.

INTENSITY IV: Angwin, Aptos, Ben Lomond, Bodega, Bodega Bay, Boyes Hot Springs, Calistoga, Cambrian Park, Capitola, Carmel, Carmel Valley, Clarksburg, Cotati, Courtland, Coyote, Cupertino, Davis, Dillon Beach, Dixon, Duncan Mills, Eldridge, El Granda, Elmira, El Verano, Esparto, Fallon, Farmington,

Felton, Fetters Hot Springs, Forest Knolls, Forestville, Fulton, Gilroy, Glen Ellen, Half Moon Bay, Hollister, Hood, Inverness, Jenner, Kentfield, Kenwood, Lathrop, Liberty Farms, Linden, Livermore (Veterans Hospital), Los Altos, Manteca, Marshall, Millbrae, Mill Valley, Monte Rio, Moss Beach, Mountain View, Mount Hamilton, Mount Hermon, Niles, Oakdale, Penngrove, Petaluma, Pleasanton, Point Reyes Station, Redwood Estates, Ripon, Ross, Rutherford, Saint Helena, Sanitarium, San Anselmo, San Martin, Santa Cruz, Santa Rosa, Saratoga, Sausalito, Soquel, Spreckels, Suisun City, Sunol, Tiburon, Tracy, Vernalis, Victor, Waterman (near Ione), Westley, Woodbridge, and Yosemite National Park (central section).

INTENSITY I TO III: Belvedere, Bloomfield, Broderick, Campbell, Camp Meeker, Clements, Copperopolis, El Nido, Graton (¾ mile west of), Guerneville, Hickman, Ione, Knights Ferry, Knights Landing, Laguinitas, Larkspur, Lockeford, Merced, Moss Landing, Newman, Oakville, Pacific Grove, Patterson, Pescadero, Sacramento, Salinas, San Juan Bautista, San Quentin, Seaside, Sebastopol, Tomales, Valley Ford, Veterans Home, Windsor, Yountville, and Zamora (3 miles north of).

October 23: 20:37:40*. Epicenter 34°20′ north, 117°06′ west, northwest of Big Bear, P. Felt at Twin Peaks.

October 25: 09:49:42*. Epicenter 33°00′ north, 115°32′ west, near Brawley, P. V. Felt by many (some outdoors; active) and frightened few in community at Brawley where some damage occurred to fallen merchandise. Loud earth noises heard by many. Slight shock reported felt earlier at 09:15 and a barely perceptible tremor felt at 11:08. At Calipatria many frightened. Motion slow. Felt by all and frightened few in community at El Centro where windows, doors, and dishes rattled; walls creaked; hanging objects swung. Gentle, rolling, lasting about 10 seconds. At Imperial felt by all and frightened few in community; windows, doors, and dishes rattled; house creaked. Moderate earth noises heard by many 1 second before shock. Motion rapid. Intensity IV at Campo, Jacumba, and Westmorland. Also felt at Calexico and Heber.

October 25: 18:47:06*. Epicenter 38°02′ north, 121°58′ west, north of Cowell, B. Aftershock of October 23. Canyon. IV. Felt by all in home. Windows and doors rattled; house creaked. Motion rapid, jolting, lasting 3 seconds. Also reported felt at Lafayette, Martinez, Orinda, and Walnut Creek.

October 26: 00:02:10*. Epicenter 38°02′ north, 121°57′ west, north of Cowell, B. Aftershock of October 23. East Bay region. Press reported the area from Martinez to Oakland was shaken by a mild shock. Reported as sharp, short jolt at Canyon.

October 27: 11:33:32*. Epicenter 38°01′ north, 121°58′ west, north of Cowell, B. Aftershock of October 23. East Bay region. V. Only damage reported was at Martinez where window cracked and canned goods display in store toppled. City Hall rocked at Walnut Creek. People in building at Mare Island said it seemed "almost as severe" as the main shock on October 23. Also felt at Oakland, Pittsburg, and in many sections of San Francisco. Reported felt as far east as Tracy.

November 1: 00:50:54*. Epicenter 37°59′ north, 122°02′ west, north of Concord, B. Aftershock of October 23. East Bay region. V. Some windows reported cracked at Concord where many were awakened. No reports of serious damage in any community. Reported felt at Berkeley, Danville, Lafayette, Martinez, Oakland, and Walnut Creek.

November 2: 11:40:06*. Epicenter 36°00′ north, 120°55′ west, near San Ardo, B. Felt over an area of approximately 7,000 square miles of the coastal region of west-central California. (See map, page 30.) Magnitude 5.2. Slight damage. Maximum intensity VI.

INTENSITY VI:

Adelaida Road (14 miles west of Paso Robles).—Felt by all in area; frightened few. Books fell; dutch oven on stove shifted. Trees, bushes shaken slightly. Earth noises like jet planes heard by all 30 seconds before shock.

Bryson.—Felt in home and outdoors. Plaster cracked slightly. Trees, bushes shaken slightly. Felt by all and frightened few at Pleyto School (rural). Moderate earth noises heard.

King City.—Frightened many in community. Damage slight. Plaster cracked. Loud earth noises heard.

Paso Robles.—Felt by all in community. Canned goods fell from grocery store shelves. Trees, bushes shaken slightly.

San Ardo.—Felt by all in home; frightened all. Dishes broke; knickknacks fell. Loud earth noises heard by many.

San Lucas.—Felt by all; frightened few. Knickknacks and pictures fell. Trees, bushes shaken moderately.

San Miguel.—Plaster cracked. Small objects and furnishings shifted. Seemed quite heavy. Very noticeable in post office (thick concrete walls). Those outside didn't notice it except in few cases reported. Moderate earth noises heard.

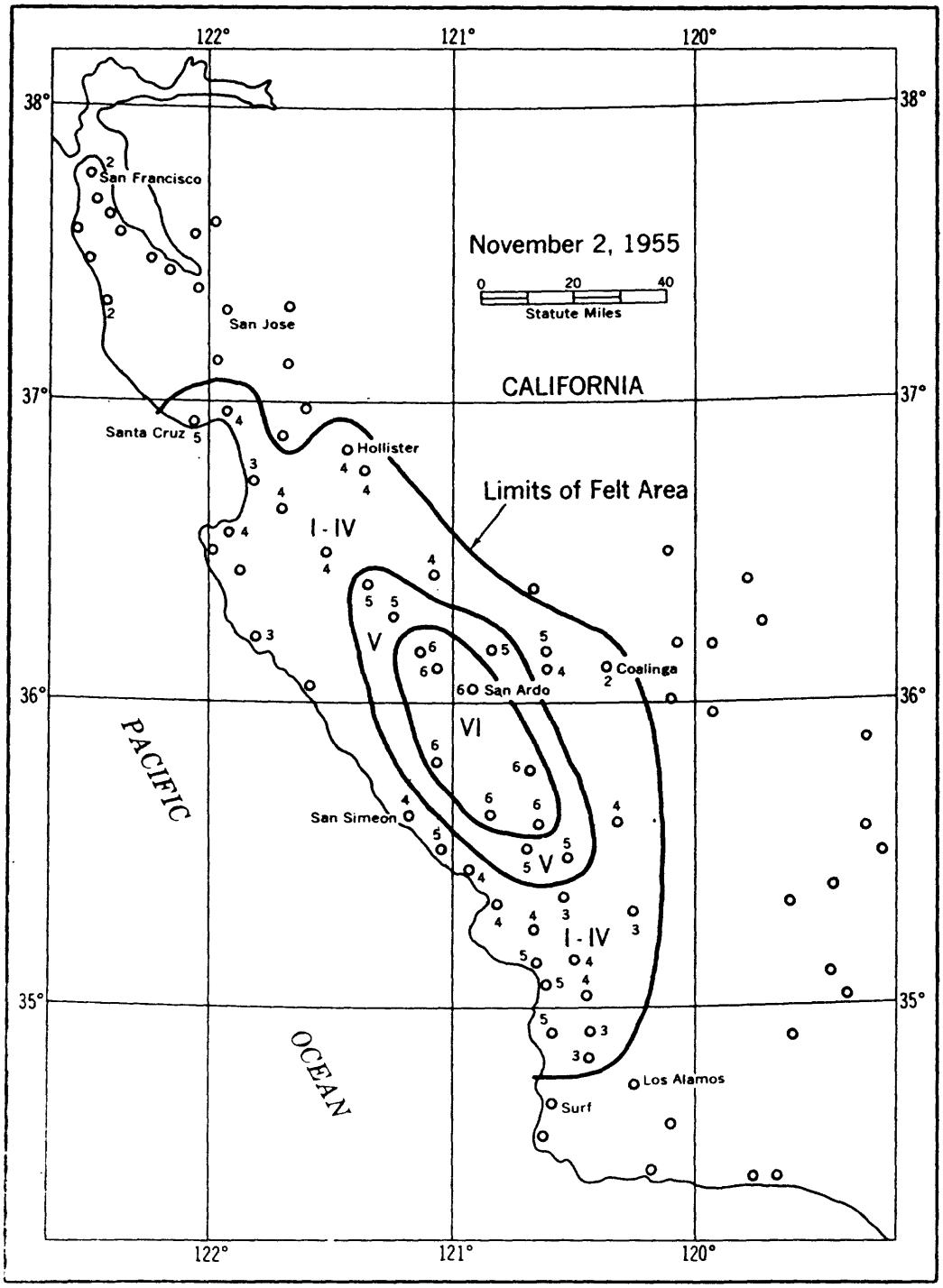

FIGURE 8.—Area affected by earthquake of November 2.

INTENSITY V: Avila Beach, Creston, Greenfield, Guadalupe, Harmony, Mee Ranch (intersection of State Highway 198 and Lonoak-Hollister Road), Pismo Beach, Priest Valley, Santa Cruz, Soledad, and Templeton.

INTENSITY IV: Aptos, Arroyo Grande, Atascadero, Bitterwater Pumping Station (20 miles west of Cholame), Cayucos, Chualar, Hollister, Lone Pine Inn (about 20 miles east of San Lucas), Monterey peninsula area, Morro Bay, Nipomo, Salinas, San Benito, San Luis Obispo, San Simeon, Shandon, and Tres Pinos.

INTENSITY I TO III: Big Sur, Casmalia, Coalinga, Moss Landing, Orcutt, Paloma, Pozo Guard Station (about 14 miles southeast of Santa Margarita), San Francisco. San Gregorio, Santa Margarita, and Santa Maria.

November 3: 14:04:45*. Epicenter 37°58′ north, 122°02′ west, near Concord, B. Aftershock of October 23. East Bay region. Slight shock reported felt at Berkeley, Concord, Martinez, Oakland, and Walnut Creek.

November 4: 20:49:35*. Epicenter 40.8° north, 124.3° west, west of Eureka, B. Eureka. IV. Felt by all in home; frightened few. "Sitting in chair facing southwest. A sharp settling shock on east side of house, then west, with east side more noticeable." Felt by all in home (lying down) ½ mile south of Eureka where hanging objects swung.

November 7: 18:40:52*. Epicenter 37°30′ north, 118°48′ west, west of Bishop, P. Long Valley Dam (Bishop). V. Felt by all in community. House creaked. Hanging objects swung east-west. Felt by many (some outdoors; active) in central section of Yosemite National Park. Curtains, pictures, and plants swung east-west. Buildings creaked; loose objects rattled. Sharp jar, with explosivelike earth noises heard 1 second before and after shock.

November 9: 14:41:35*. Epicenter 34°02′ north, 116°50′ west, north of Banning, P. Yucaipa. V. Ceramic figures standing in window shifted. Lamp swung back and forth over dining area. Motion sharp. Felt by many and frightened few at Banning where windows rattled. Motion rapid.

November 10: 10:02:16*. Epicenter 37°50′ north, 122°03′ west, near Danville, B. IV. Felt by several in community at Canyon where windows rattled; house creaked. Motion rapid. Rapid, jolting motion felt by two out of three in home at Moraga; windows rattled. Also reported felt at Benicia, Berkeley, Concord, Lafayette, Martinez, Orinda, Pleasant Hills, Pittsburg, San Francisco, and Walnut Creek area.

November 13: 23:15:59*. Epicenter 40°29′ north, 121°35′ west, near Lassen Peak, B. Manzanita Lake (Mineral). IV. Felt by several; awakened few; walls creaked. Motion rapid.

November 14: 05:12:58*. Epicenter 40°28′ north, 121°36′ west, near Lassen Peak, B. Manzanita Lake. V. Felt by, awakened, and frightened all in home; windows, doors, and dishes rattled; walls creaked.

November 15: 13:54:52*. Epicenter 40.7° north, 123.6° west, east of Eureka, B. Eureka (½ mile east of). IV. Felt by all in home. Motion rapid, brief; first a sharp crack like blasting, then considerable motion of floor.

November 16: 20:41:38*. Epicenter 33°42′ north, 116°52′ west, southeast of Hemet, P. IV. Felt sharply at Hemet. Felt by several 4½ miles south of Fallbrook where buildings creaked and loose objects rattled; lamp swung slightly. Distinct rumbling earth noises heard. Also felt at Palm Springs and White Water.

November 18: 01:38:43*. Epicenter 40°25′ north, 124°05′ west, southeast of Ferndale, B. Rio Del. IV. "Residents of Rio Dell and immediate vicinity were awakened . . . by an earthquake which was followed a few seconds later by a second tremor. No damage was reported."—(*BSSA, January 1956.*)

November 18: 23:20. Santa Barbara. "A slight earthquake was reported felt in the Santa Barbara area."—(*BSSA, January 1956.*)

November 20: 09:59:05*. Epicenter 37°55′ north, 122°01′ west, near Concord, B. San Francisco East Bay region. Reported felt at Concord, Martinez, and Walnut Creek.

November 21: 12:25:34*, 12:40* (aftershock). Epicenter 39.4° north, 118.0° west, Stillwater Mountains, Nev., W. Magnitude 5.5. Austin, Nev. Shock reported felt in the Austin area about 13:00.

November 21: 12:55:27*. Epicenter 35°24′ north, 118°44′ west, north of Bena, P. Felt over an area of approximately 4,000 square miles, principally in Kern County. V. Felt by several in community (some outdoors) at Arvin where furnishings shifted; windows and doors rattled; frame creaked; trees, bushes shaken slightly. Motion rapid, brief. At Miracle Hot Springs felt by all in community; frightened few; windows and doors rattled; loud earth noises heard by many. Motion rapid. Frightened few in community at Tehachapi; small objects shifted; windows rattled; buildings creaked. Motion swaying. Felt with intensity IV at Bakersfield, Balch Powerhouse (about 10 miles north of Springville), Bodfish (2 miles west of), Caliente, Claraville, Kern Canyon Powerhouse (about 10 miles east of Bakersfield), Lamont, Magunden Powerhouse (about 10 miles southeast of Bakersfield), Onyx, Posey, Pumpkin Center (south of Bakersfield), and Springville. Also felt at Corcoran, Isabella, Johnsondale, Kernville, and Weldon.

November 22: 04:31:47*. Epicenter 37°36′ north, 122°26′ west, south of San Francisco, B. Reported felt in San Francisco.

November 22: 06:22:22*. Epicenter 34°48′ north, 118°54′ west, west of Gorman, P. Wheeler Ridge. V. Felt by and awakened all in community; frightened few; windows, doors, and dishes rattled; house creaked; trees, bushes shaken moderately. One hard, quick shock. Felt sharply in the Lebec-Frazier Park area where windows and doors rattled.

November 22: 13:38:57*. Epicenter 35°24′ north, 118°44′ west, north of Bena, P. Heavy jar felt at Claraville. Also felt at Bena.

November 26: 09:30 (about). Bakersfield. IV. Shock reported felt in the eastern part of the city where windows rattled and dishes shook. (No trace of this could be found on records at the Seismological Laboratory at Pasadena, but it was reported that it may have been overshadowed by the Mexican shock at 09:36.0*.)

November 26: 09:36.0*. Epicenter 31.6° north, 116.1° west, Baja California, P. V. Magnitude 5.4. At Imperial windows, doors, and dishes rattled; trees, bushes shaken slightly. Motion slow. Felt with intensity IV at Campo, El Centro, Heber, Jacumba, La Jolla, Miramar, and San Diego, where principal effects were the rattling of windows and doors and creaking of walls. Reported as light in San Diego, though felt over a wide area. Also felt at Brawley, Calexico, Coronado, Del Mar, Hipass, Holtville, Mountain Center, Pine Valley, Santa Ysabel, and Warner Springs. People at El Alamo, Baja California, stated to a field party from the Seismological Laboratory at Pasadena that most of their houses were damaged.

November 28: 05:55:59*. Epicenter 34°05′ north, 117°49′ west, near Laverne, P. Felt at Pomona.

November 30: 20:46:12*. Epicenter 37°37′ north, 122°31′ west, near Rockaway Beach, B. Felt in San Mateo.

November 30: 22:01:38*, 22:03:38*, 22:26:54*. Epicenter 40°28′ north, 121°33′ west, near Lassen Peak, B. Mineral. IV. All three shocks felt. Felt by several in homes (lying down and active); windows and doors rattled; loud earth noises from east heard by many 2–3 seconds before shock. Motion rapid.

December 2: 11:35. Not recorded at Barrett or elsewhere, P. Jamul. IV. Felt by several in community; windows and doors rattled.

December 4: 22:50. Not recorded on Mineral seismographs, B. Mineral. IV. Felt by many in home; lamp shade rattled. Motion slow.

December 9: 20:16:30*. Epicenter 36°48′ north, 121°28′ west, southwest of Hollister, B. Hollister (7 miles south of). IV. Felt by all in home; awakened and frightened few; windows and doors rattled; house creaked. Motion rapid.

December 16: 06:32. Balboa. IV. Observer awakened by very gentle motion. Windows rattled.

December 16: 06:43:11*. Epicenter 36°02′ north, 120°52′ west, near San Ardo, B. Paso Robles. V. Press reported a rolling earthquake shook the community for 30 seconds, cracking plaster in some homes and swaying street lamp posts. Also reported felt at Atascadero and San Miguel.

December 16: 22:07:29*. Principal shock of a numerous swarm. Epicenter 33°00′ north, 115°30′ west, near Brawley, P. The principal shock was felt over an area of approximately 9,000 square miles of California and Arizona. (See map, page 33.) Magnitude 5.4. Maximum intensity VII was limited to the town of Brawley where visible damage was estimated at about $15,000, consisting mainly of few cracked walls (mostly old cracks enlarged), cracked plaster, broken plate glass windows, and loss from broken merchandise. One break occurred in an old section of the city's water lines undergoing repair and there were about 15 breaks in private lines believed to be partially corroded. It was reported that approximately 81 earthquakes were felt in Brawley between 17:59:20* (first of the swarm) on the 16th and 03:51* on the 19th; 32 of magnitude 3.0 and over were recorded.

INTENSITY VI:

El Centro.—Slight damage reported.

Holtville.—Felt by all; awakened and frightened many in community. Slight damage. Small objects shifted and overturned; knickknacks fell. Moderate earth noises heard by many.

Imperial.—Slight damage reported.

Winterhaven.—Felt by many; awakened few. Damage slight. Plaster and windows cracked.

INTENSITY V: Blythe, Boulevard, Calipatria, Campo, Heber, Hipass, Niland, Palo Verde, and Westmorland.

INTENSITY V IN ARIZONA: Somerton.

INTENSITY IV: Bard, Chula Vista, Jacumba, Lakeview, La Quinta, Mecca, and Rancho Santa Fe.

INTENSITY IV IN ARIZONA: Yuma.

INTENSITY I TO III: Alpine, Guatay, Midland, Moreno, Palm City, Solana Beach, and Winchester.

December 23: 00:43:44*. Epicenter 34°07′ north, 117°22′ west, near Bloomington, P. IV. Felt by many and awakened many in home at Fontana where windows rattled and walls creaked. Motion rapid. Loud earth noises heard by many before shock. Slight shock awakened some persons at Riverside.

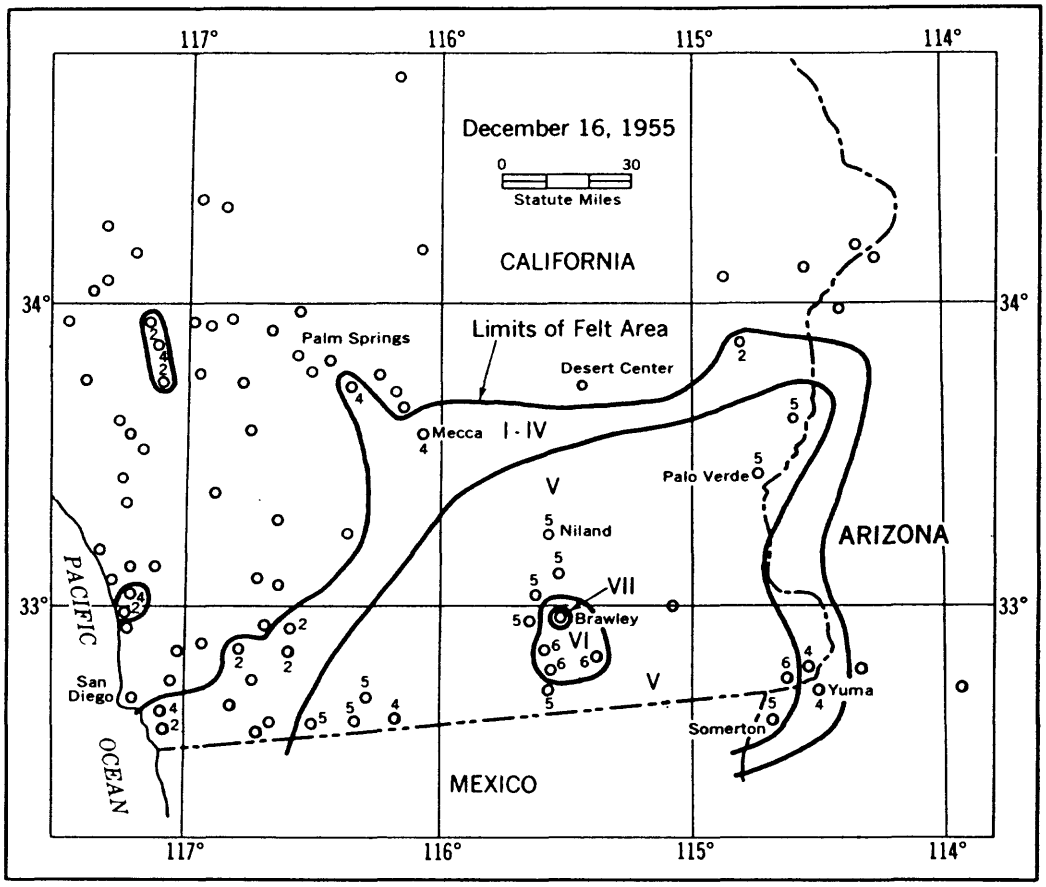

FIGURE 9.—Area affected by earthquake of December 16.

December 23: 04:40:33*. Epicenter 37°37′ north, 122°27′ west, west of San Bruno. Reported felt at Pedro Valley (near Rockaway Beach).

December 25: 01:30:04*. Epicenter 34°01′ north, 116°32′ west, north of Desert Hot Springs, P. Felt sharply at and near Garnet.

WASHINGTON AND OREGON

(120TH MERIDIAN OR PACIFIC STANDARD TIME)

January 11: 02:20:08*. Epicenter 47°49′ north, 124°01′ west, western Olympic Mountains, Wash., S. Northwest Washington. V. At Port Angeles felt by and awakened many in community; walls creaked; hanging objects swung. Two quick jolts felt by several in home and awakened four out of six at the Hoh Ranger Station (Hoh River, 47°52′ north, 123°55′ west). "Must have been two shocks about 30 seconds apart. Felt like two dynamite blasts about ¼ mile away or like a big tree falling on the roof." Also felt in Quinault and 4 miles east of Raymond. Reported felt in two areas of Victoria, B. C., and southwest of Victoria along the Strait of Juan de Fuca.

February 6: 01:00. Grand Coulee, Wash. IV. Felt by those awake. Felt like house settled. Loud earth noises heard. Fifteen miles north of Grand Coulee a farmer reported one crashlike shock. He rushed outside and then felt another. Disturbed a flock of birds near his home.

February 24: 02:00:50*. Epicenter 47°59′ north, 123°11′ west, northern Olympic Peninsula, southwest of Sequim, Wash., S. Reported felt by few in Victoria, B. C.

March 25: 22:55:50*. Epicenter 48°03′ north, 122°02′ west, near Hartford, Wash., S. Felt over an area of approximately 8,500 square miles of western Washington. (See map, page 34.) Maximum intensity VI.

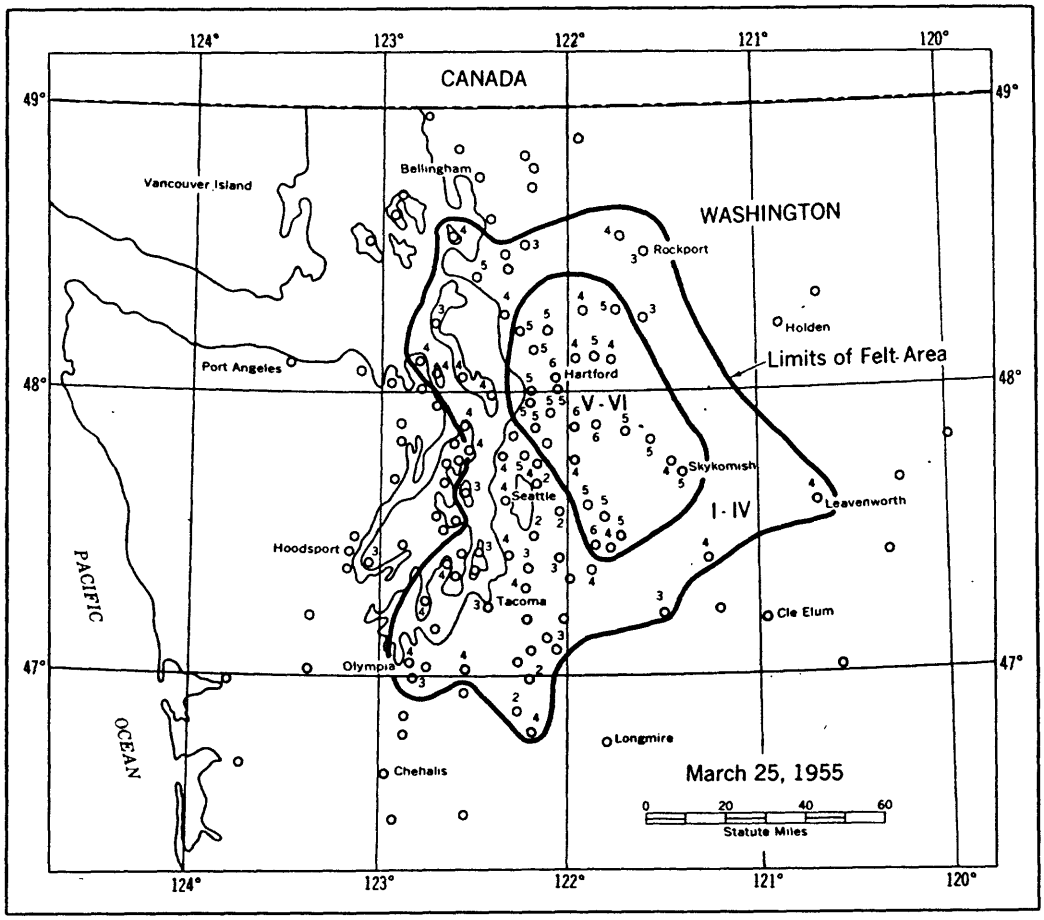

FIGURE 10.—Area affected by earthquake of March 25.

INTENSITY VI:

Everett (south of).—House foundation reported cracked.

Hartford (3 miles northeast of).—Felt by and awakened all in area; children in home frightened. Windows, doors, and dishes rattled; house creaked. Earth noises heard by many before shock. Motion bumping, like hammer blows.

Monroe.—Felt by and awakened all. Windows and doors rattled. Moderate earth noises heard before shock.

Preston.—Felt by and awakened all in community; frightened few. Windows, doors, and dishes rattled; house creaked. Started with barely perceptible motion followed by sudden jolt from south-north.

Sultan.—Felt by all; awakened and frightened few. Small objects and furnishings shifted and fell. Moderate earth noises heard before shock.

INTENSITY V: Arlington, Bellevue, Clearview, Everett, Fall City, Fortson, Gold Bar, Index, Kenmore, La Conner, Lake Stevens, Lakewood, North Bend, Pinehurst, Robe, Silvana, Skykomish, Snohomish, and Snoqualmie Falls.

INTENSITY IV: Algona, Anacortes, Cedar Falls, Clinton, Concrete, Des Moines, Duvall, East Stanwood, Edmonds, Elbe, Freeland, Granite Falls, Grotto, Hansville, Hyak, Kingston, Lakebay, Leavenworth, Lowell, Marysville, Mercer Island, Mukilteo, Nordland, Olympia, Oso, Port Townsend, Roy, Seattle, Seattle-Tacoma Airport (about 15 miles south of Seattle), Selleck, Snoqualmie, Verlot Ranger Station (Verlot), Wauna, and Woodinville.

INTENSITY I TO III: Bothell, Coupeville, Cove, Darrington, East Olympia, Eatonville, Issaquah, Kanaskat, Kapowsin, Kennydale, Kent, Kirkland, Lester, Maple Valley, Ravensdale, Renton, Rockport, Seabold, Sedro Woolley, Stanwood, Startup, Tacoma, Tahuya, and Wilkeson.

January, February, March. Eastern Washington. Othello. A 10–12 square mile farmland area was shaken by nearly 200 shocks during this period, causing farm towers to sway, cracking walls, and shifting pictures on walls. Geologists reported the disturbances were caused by shifting subterranean rock due to the weight of irrigation water. The ground water volume has been rising steadily since this vast area, formerly an arid desert region, was opened to farming by giant irrigation projects.

July 15, 18, 19: 06:00, 22:23, 01:55, respectively; other shocks also reported. Series of sharp shocks, similar to those reported from Othello during January, February, and March, felt at Soap Lake, Wash. (Grant County).

September 10: 08:52:45*. Epicenter 48°24′ north, 124°36′ west, Neah Bay, Wash., S. V. Felt by many and frightened few in community at Neah Bay; merchandise fell from shelves and broke; small objects shifted; concrete buildings shook. Lighter shock felt about 15 seconds later. Felt by many and frightened few in home at Sekiu where everything shook, wires, etc.; windows rattled. Moderate earth noises heard. On Tatoosh Island at the Weather Bureau Office felt by all personnel and few alarmed; disturbed objects observed by all; barometers swung; dishes rattled. Moderately loud earth noises heard by all during shock. Felt by many at Clallam Bay where water tanks, windows, and mirrors vibrated; merchandise rattled on store shelves; trees, bushes shaken moderately. Thump-like blasting heard.

November 2: 17:40:28*. Epicenter 48°06′ north, 121°45′ west, northeast of Robe, Wash., S. V. Felt by all at Gold Bar where dishes rattled; faint earth noises heard by few 10 seconds before shock; motion rapid. Intensity IV at Everett, Granite Falls, Lake Stevens, Marysville, and southeast of, Oso, Snohomish, and Verlot Ranger Station, where principal effects were rattling of windows and dishes. At Everett police switchboard flooded with calls and cement floor jarred enough to set off a furnace thermostat. Some persons reported the shock was accompanied by a sharp explosivelike noise; one person reported a rolling motion preceded the noise. Also felt at Bellevue (3 miles northeast of) on east side of Lake Washington.

ALASKA

(150TH MERIDIAN OR ALASKA STANDARD TIME)

January 12: 16:03:43 and 16:35:45*. Epicenter 53° north, 167½° west, Fox Islands, Aleutian Islands, W. Magnitudes 6.9 and 6½ respectively. Felt on Unalaska.

January 21: 04:18:33*. Epicenter 53° north, 168° west, Fox Islands, Aleutian Islands, W. Felt on Unalaska and Adak.

February 12: 16:37. Whittier. Slight shock.

February 27: 10:50. Caswell. Slight shock.

February 27: 15:16. Wales. Slight shock. Duration 2 seconds.

February 28: 18:42:59*. Epicenter 65° north, 133° west, Yukon, Canada, W. Magnitude 6½–6¾. Felt at Mayo and Keno City, Yukon, and Aklavik, Good Hope, and Fort McPherson, Northwest Territories, Canada. Felt by several at Northway, Alaska, where light fixtures swayed gently. Duration 2 seconds.

March 30: 02:15. Moose Valley. Slight shock.

April 11: 01:26. Manley Hot Springs. Slight shock.

April 18: 06:34. Whittier. Two slight shocks.

April 28: 09:04:59*. Epicenter 51° north, 178½° west, Andreanof Islands, Aleutian Islands, W. Magnitude 6½. Felt by many on Adak. Duration approximately 30 seconds.

May 14: 02:38:08*. Epicenter 59½° north, 151½° west, Kenai Peninsula, W. Depth about 100 km. Slight shocks felt at Homer (5 miles northwest of).

May 14: 11:29:01*. Epicenter 61° north, 148° west, Kenai Peninsula, W. Felt slightly at Valdez (duration 2 seconds), and Whittier.

May 14: 15:52. Whittier. Slight shock.

May 20: 17:06. Anchorage. Felt by few. Short sharp tremor.

May 24: 17:58:36*. Epicenter 54° north, 165½° west, Fox Islands, Aleutian Islands, W. IV. Felt by many on Unalaska. An aftershock occurred at 18:03:18.

May 29: 08:43. Whittier. Slight shock.

July 8, 15: (no time given). Cold Bay. Several employees of Northwest Airlines felt slight earthquakes during this period.

July 10: 19:15. Moose Valley. Slight shock.

July 16: 08:00. Moose Valley. Slight shock. Duration 6 seconds.

July 17: 11:58:25*. Epicenter 54° north, 168° west, Fox Islands, Aleutian Islands, W. Mag. 5¾–6. Felt by several on Unalaska.

July 19: 06:21:05*. Epicenter 60½° north, 145½° west, Southern Alaska, W. Felt by many at Cordova. Buildings creaked; blinds rattled; light fixtures swayed; and disturbed objects were observed by several. Moderately loud bumping sounds heard. Also felt at Valdez.

July 19: 06:44:24*. Epicenter 60½° north, 146° west, Southern Alaska aftershock, W. Felt at Cordova and Valdez.

July 23: 14:13. Moose Valley. Slight shock. Duration 3 seconds.

July 31: 03:22:44*. Southwestern Yukon, Canada. Felt slightly at Seward and Kasilof, Alaska.

August 5: 10:49 and 10:52. Kenai. Slight shocks.

August 8: 11:57. Whittier. Slight shock.

August 9: 03:45. Kasilof. Slight shock.

August 11: 07:30 and 09:43. Whittier. Slight shocks.

August 15: 04:55. Caswell. Slight shock.

August 16: 04:54 (a.m. or p.m.). Anchorage (5 miles southwest of). Felt by several. Motion bumping. Abrupt onset.

August 31: 02:23:36*. Epicenter 63½° north, 147° west, Alaska, W. Felt by several at Fairbanks. Motion swaying in east-west direction. Beginning gradual.

September 15: 18:00. Karluk River. Slight shock.

September 17: 06:58. Fairbanks. Felt by many. Houses shook. Many mistook the quake for the vibrations of jet planes. Motion swaying and beginning gradual. Felt at College.

October 7: 20:40. Sterling. Slight shock.

October 7: 20:50. Kasilof. Slight shock.

October 27: 23:17:12*. Epicenter 58½° north, 138° west, near coast of southeastern Alaska, W. Felt by few at Sitka.

November 13: 21:30. Valdez. Slight shock. Duration 1 second.

December 9: 16:50. Caswell. Slight shock.

December 18: 12:58. Valdez. Slight shock. Duration 5 seconds.

December 21: 02:56. Matanuska Agriculture Experiment Station. Sharp vibration east to west.

December 29: 06:04:45*. Epicenter 59½° north, 154° west, Southern Alaska, W. Depth about 100 km. Felt at Anchorage, where windows and dishes rattled. Slight shock felt at Caswell, Girdwood, Homer (5 miles northwest of), Kasilof, and Seward.

HAWAIIAN ISLANDS

(150TH MERIDIAN OR HAWAIIAN STANDARD TIME)

NOTE.—Data on the following local disturbances were determined from seismograph stations operated on the islands of Hawaii and Maui by the Hawaiian Volcano Observatory of the Geological Survey. "Felt locally" appearing in the summary means in the vicinity of the observatory. For additional information, see the Volcano Letter, Nos. 527–530.

January 5: 00:16:43. Slight. Felt at Pahoa. Origin east rift of Kilauea near Pahoa.

January 6: 18:33:55. Slight. Felt on Pahoa. Origin east rift of Kilauea near Heiheiahulu.

January 8: 17:33:33 and 18:20:03. Slight. Felt at Pahoa. Origin east rift of Kilauea southeast of Pahoa.

January 11: 11:03:27. Slight. Felt on Pahoa. Origin east rift of Kilauea southeast of Pahoa.

January 22: 09:01:02. Moderate. Felt at Pahoa. Origin east rift of Kilauea southeast of Pahoa.

January 25: 05:08:10. Slight. Felt at Pahoa. Origin east rift of Kilauea near Pahoa.

February 21: 19:17:45. Slight. Felt in the Volcano area. Origin east of Puu Kapukapu.

February 23: 13:58:49. Slight. Felt in Hawaii National Park, the Volcano area, and Pepeekeo. Origin east rift of Kilauea near Makaopuhi Crater.

February 24: 15:06:17. Slight. Felt at Pahoa. Origin east rift of Kilauea southeast of Pahoa.

February 24: 18:46:22. Moderate. Felt at Pahoa. Origin east rift of Kilauea near Puu Honuaula.

February 24: 21:23:28. Slight. Felt at Pahoa. Origin east rift of Kilauea southeast of Pahoa.

February 25: 01:34:43 and 05:50:34. Slight. Felt at Pahoa. Origin east rift of Kilauea southeast of Pahoa.

February 25: 06:11:25. Moderate. Felt at Pahoa. Origin east rift of Kilauea southeast of Pahoa.

February 25: 13:19:21 and 15:19:56. Slight. Felt at Pahoa. Origin east rift of Kilauea near Pahoa.

February 25: 22:01:50. Moderate. Felt at Pahoa. Origin east rift of Kilauea near Pahoa.

February 26: 07:30:43 and 08:47. Slight. Felt at Pahoa. Origin east rift of Kilauea near Pahoa.

February 26: 10:37:13. Moderate. Felt at Pahoa. Origin east rift of Kilauea near Puu Kepaka.

February 26: 12:22:05, 15:40:18, and 18:56:33. Slight. Felt at Pahoa. Origin east rift of Kilauea near Pahoa.

February 27: 00:37:24, 13:42:23, 17:00:30, and 17:22:06. Slight. Felt at Pahoa. Origin east rift of Kilauea near Pahoa.

February 27: 17:56:53. Moderate. Felt at Pahoa. Origin east rift of Kilauea near Pahoa.

February 27: 18:07:29, 20:15:03, and 23:12:02. Slight. Felt at Pahoa. Origin east rift of Kilauea near Pahoa.

March 1: 09:06:43. Slight. Felt at Pahoa. Origin east rift of Kilauea near Pahoa.

March 1: 14:21:30. Strong. Felt at Pahoa and in the Volcano area. Origin east rift of Kilauea near Kalalua Crater.

March 5: 12:39:08. Strong. Felt at Pahoa and Hilo. Origin 4 km. east of Napau Crater.

March 5: 12:46:53 and 12:48:37. Moderate. Felt at Pahoa. Origin near Kalalua Crater.

March 5: 12:53:21. Slight. Felt at Pahoa. Origin near Kalalua Crater.

March 5: 12:53:44. Strong. Felt at Pahoa. Origin near Kalalua Crater.

March 5: 12:54:43. Moderate. Felt at Pahoa. Origin near Kalalua Crater.

March 5: 12:58:26. Strong. Felt at Pahoa. Origin 4 km. west of Kalalua Crater. Largest earthquake of series.

March 5: 14:13:51. Moderate. Felt at Pahoa. Origin near Kalalua Crater.

March 5: 14:22:08. Strong. Felt at Pahoa. Origin near Kalalua Crater.

March 5: 16:11:23 and 17:59:08. Felt at Pahoa. Origin near Kalalua Crater.

March 6: 05:24:47. Moderate. Felt at Pahoa. Origin near Kalalua Crater.

March 6: 09:58:37. Slight. Felt at Pahoa. Origin near Kalalua Crater.

March 6: 11:45:06. Strong. Felt at Pahoa. Origin near Kalalua Crater.

March 7: 22:21:31. Strong. Felt over the entire southern half of the island of Hawaii. Origin near Heiheiahulu.

March 7: 22:43:50. Moderate. Felt at Pahoa, Hilo, and in Hawaii National Park. Origin near Heiheiahulu.

March 7: 22:57:38. Strong. Felt at Pahoa, Hilo, Hawaii National Park, and Captain Cook. Origin near Heiheiahulu.

March 7: 23:32:41. Strong. Felt at Pahoa, Hilo, and in Hawaii National Park. Origin near Heiheiahulu.

March 8: 20:03:36. Slight. Felt at Pahoa. Origin east rift of Kilauea near Pahoa.

March 9: 09:16:55. Slight. Felt at Pahoa. Origin south coast of Kilauea near Kalapana.

March 9-18: (83 earthquakes). Slight. Felt at Pahoa. Origin east rift of Kilauea near Pahoa.

March 19: 12:09:40. Slight. Felt at Pahoa. Origin east rift of Kilauea near Pahoa.

March 20: 18:10:42. Slight. Felt at Pahoa. Origin east rift of Kilauea near Pahoa.

March 22: 00:42:54 and 20:46:27. Slight. Felt at Pahoa. Origin east rift of Kilauea near Pahoa.

March 23: 02:06:30, 03:42:12 and 12:08:52. Slight. Felt at Pahoa. Origin east rift of Kilauea near Pahoa.

March 24: 05:23:46. Slight. Felt at Pahoa. Origin east rift of Kilauea near Pahoa.

March 24: 06:56:11, 06:59:27, 07:05:32 and 10:27:38. Slight. Felt in Hawaii National Park. Origin Kilauea caldera.

March 24: 11:02:26. Slight. Felt at Pahoa. Origin east rift of Kilauea near Pahoa.

March 25: 06:26:10. Slight. Felt at Pahoa. Origin east rift of Kilauea near Pahoa.

March 27: 09:23:43. Strong. Felt in Hawaii National Park. Origin Kilauea caldera.

March 27: 16:02:20. Strong. Felt strongly in Hawaii National Park, where water lines were broken and houses cracked in the residential area. Cracks were opened across the Mamalahoa Highway about 1,000 feet east of Park Headquarters. Origin Kilauea caldera.

April 1: 04:24:23*. Epicenter 19½° north, 155° west, Island of Hawaii, W. A strong earthquake occurred under the Kilauea caldera region and was generally felt over the entire island of Hawaii and by a few observers on the islands of Maui and Oahu. No damage reported.

April 12: 08:25:44 and 12:49:56. Moderate. Felt in Hawaii National Park. Origin east rim of Kilauea caldera.

April 23: 07:33:51. Moderate. Felt at Hilo, Hawaii National Park, and Naalehu. Origin 10 km. north of Halfway House.

April 24: 13:19:08. Moderate. Felt in Hawaii National Park. Origin Kilauea caldera.

April 24: 09:06:19. Slight. Felt at Hilo, Pahoa, and the Volcano area. Origin 5 km. north of Halfway House.

May 8: 16:01:57. Moderate. Felt at Pahoa and Pepeekeo. Origin near Puu Kapukapu.

May 9: 05:44:51 and 09:35:38. Slight. Felt in Hawaii National Park. Origin east rim of Kilauea caldera.

June 12: 21:15:56. Slight. Felt at Pahala, Naalehu, and Hawaii National Park. Origin near the Mauna Loa seismograph station.

June 29: 07:11. Slight. Windows rattled in the Waimea area.

July 23: 11:27:16. Moderate. Felt in Hilo. Origin south of Makaopuhi Crater.

July 23: 22:23. Strong. Felt strongly on the rift zone at the Pahoa-Kalapana road, and weakly in Pahoa and Kaueleau. Origin near Iilewa Crater.

July 27: 02:58. Slight. Felt over the northwest 1/3 of the island of Hawaii. Origin near Keahole Point.

August 7: 07:17:32*. Epicenter 20½° north, 155½° west, near north coast of the island of Hawaii, W. Felt over the entire island of Hawaii, on Maui, and on Oahu. Origin 5 km. northeast of Kamuela.

August 14: 02:27:58*. Epicenter 19½° north, 155½° west, island of Hawaii, W. V. Felt over the entire island of Hawaii, on Maui, and on Oahu, and by a few persons on Kauai. Dishes were knocked from shelves, and walls were cracked at a farm 40 miles southwest of Hilo. Origin Hilina fault south of the Volcano Observatory.

August 19: 05:27. Slight. Felt in the volcano area. Origin Kilauea volcano.

August 29: 02:41 and 02:44. Slight. Felt at Nanawale Ranch 3 miles east of Pahoa. Origin east rift zone of Kilauea.

September 26: 02:16:00. Strong. Felt strongly at the Kapapala Ranch, and weakly all over the southern part of the island from Kalapana to south Kona. No damage was reported. Origin southwest rift of Mauna Loa near Puu Keokeo.

October 12: 00:41:42. Slight. Felt in Hawaii National Park. Origin Kilauea caldera.

October 24: 16:33. Slight. Felt in the Volcano district and at Pahala. Origin probably Kaoiki fault zone near the mouth of Wood Valley.

October 24: 17:17 and 23:45. Slight. Felt at Kamuela and Umikoa. Origin Waimea region.

October 26: 16:55:40*. Epicenter 20° north, 155½° west, Island of Hawaii, W. Strong. Felt in Hawaii National Park. Origin near the northeast end of Mokuaweoweo.

October 29: 22:07. Slight. Felt at Hilo. Origin probably Kilauea caldera.

November 2: 10:36:44. Slight. Felt at Hilo and Pahoa, and in the Volcano district. Origin east rift of Kilauea near Kilauea caldera.

November 3 and 4: (no time given). Slight. Felt in Naalehu. Origin near Naalehu.

November 13: 08:16:24. Strong. Felt in central Kona. Origin near Kealakekua.

November 21: 14:59:54. Slight. Felt strongly at Hawaii National Park Headquarters. Origin northeast rim of Kilauea caldera.

November 29: 20:15:20. Feeble. Felt at Pahoa. Origin east rift of Kilauea southeast of Pahoa.

December 7: 15:15. Slight. Felt at Honokohau. Origin probably Hualalai volcano area.

December 26: 14:23:34. Feeble. Felt on Oahu. Origin near the north coast of Molokai.

December 28: 14:14. Slight. Felt at the Kapapala ranch. Origin southwest rift of Kilauea.

December 28: 18:02:25. Moderate. Felt at Kilauea Military Camp. Origin near the north rim of Kilauea caldera.

PANAMA CANAL ZONE

(60TH MERIDIAN TIME)

March 20: 19:19:20. Intensity II at Balboa Heights.

May 26: 02:11:18*. Epicenter 10° north, 79½° west, near north coast of Panama. Intensity IV at Balboa Heights. Also felt at Colon and Panama, Panama. (Two sharp tremors.)

PUERTO RICO

(60TH MERIDIAN TIME)

March 9: 06:01. Felt at San Juan.

March 25: 01:58:02*. Epicenter 19½° north, 65° west, Virgin Islands region, W. Felt at San Juan.

May 12: 23:29:49*. Epicenter 19° north, 63½° west, Virgin Islands region, W. Felt at San Juan.

MISCELLANEOUS ACTIVITIES

GEODETIC WORK OF SEISMOLOGICAL INTEREST

The program of repeating geodetic control surveys for the purpose of detecting horizontal and vertical movement in the earth's crust was continued in 1955.

After the earthquake of December 16, 1954, centered near Dixie Valley, Nevada, plans were made to reobserve the triangulation and to relevel the existing level lines in that area. These surveys were completed in 1955, and the results adjusted. The triangulation disclosed a northward movement of the area on the west side of the fault of an amount of about four feet, and for the points immediately east of the fault zone a southward movement of about four feet. The magnitude of these horizontal displacements decreases rapidly as the distance from the fault zone is increased east or west.

The releveling across Dixie Valley indicated a sharp vertical drop of almost five feet on the east side of the fault line. Further east, there was a drop of about two feet. This gives a tilting effect to the Valley floor which had dropped. In the releveling of a USGS line north of this Valley there was a vertical drop of more than 7 feet.

The program for reobserving the triangulation in Southern California in the Imperial Valley which had been started in 1954 was completed in 1955. The results of these surveys were also adjusted.

Releveling was accomplished in the Palmdale, California area for a line crossing the San Andreas Fault. There were no significant vertical changes noted.

TIDAL DISTURBANCES OF SEISMIC ORIGIN

There were no seismic sea waves recorded at tide gages of the Coast and Geodetic Survey during the calendar year 1955.

There was a newspaper report on a seismic sea wave in the central part of the coast of Chile confirmed by a letter from the Chile Navy, reporting a wave at Coquimbo and Tongoy. The wave reportedly reached a maximum level of one meter above normal high water.

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 United States 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 sesimographic stations nearest the locality.

Similar data for 1943 were published by the Coast and Geodetic Survey in Serial 672, United States Earthquakes, 1943, and those for subsequent years through 1949 appeared in Serial 748, United States Earthquakes, 1949, and Serial 755, 762, 773, 785, and 793, United States Earthquakes, 1950, 1951, 1952, 1953, and 1954, respectively. Descriptions of wells given here include only those that have not appeared in previous editions.

WELL DESCRIPTIONS

CALIFORNIA

Well No. 1S/2—20B1, semi-confined, northeast of Redlands, NW¼NE¼, Sec. 20, T. 1 S., R. 2 W., SBBM. Owner, City of Redlands. Depth, 177 feet; diameter, 26 inches; finish, perforated with Mills Knife. Aquifer, older alluvium of Pleistocene age.

IDAHO

Well No. 11S—19E—20ccl, non-artesian, 42°26′ N., 114°16′ W., Twin Falls County. Owner, Ove Anderson. Depth, 214 feet; diameter, 16 inches; finish, open hole. Aquifer, Snake River basalt, and alluvium, Quaternary.

TABLE 1.—*Fluctuations in well-water levels, January 1 through December 31, 1955*

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 registers of seismographic stations nearest the locality.

CALIFORNIA

Well No.	Date	Time G. C. T.	Depth to water				Amplitude of fluctuation
			Before disturbance	After disturbance	At highest point	At lowest point	
			ft.	*ft.*	*ft.*	*ft.*	*ft.*
13/13–15R1	1–4–55	15:00	233.12	233.13	233.11	233.18	0.07
2/7–2C1	1–5–55	17:48	30.16	30.16	30.15	30.17	.02
2/7–2C1	1–9–55	04:00	30.25	30.25	30.24	30.27	.03
18/18–31P1	1–19–55	09:00	175.34	175.32	175.30	175.37	.07
18/18–31P1	2–8–55	02:00	170.88	170.88	170.86	170.89	.03
18/18–31P1	2–8–55	04:00	170.88	170.88	170.86	170.88	.02
2/7–2C1	2–8–55	19:36	30.02	30.02	30.01	30.03	.02
18/18–31P1	2–24–55	08:00	169.64	169.64	169.62	169.67	.05
18/18–31P1	2–27–55	09:00	170.53	170.53	170.51	170.55	.04
2/7–2C1	2–27–55	23:00	30.03	30.03	29.99	30.05	.06
3/8–29C1	2–27–55	23:00	88.01	88.01	88.00	88.01	.01
27/40–10B1	2–27–55	23:00	104.91	104.96	104.88	105.38	.50
15/16–20R1	2–27–55	24:00	49.82	49.83	49.76	49.87	.11
18/18–31P1	3–4–55	11:00	172.84	172.84	172.80	172.87	.07
18/18–31P1	3–4–55	13:00	172.83	172.83	172.82	172.84	.02
18/18–31P1	3–9–55	04:00	173.43	173.43	173.40	173.48	.08
18/18–31P1	3–9–55	08:00	173.46	173.46	173.46	173.49	.03
2/7–2C1	3–13–55	23:31	30.13	30.12	30.12	30.13	.01
2/7–2C1	3–18–55	22:00	30.24	30.23	30.22	30.24	.02
2/7–2C1	3–20–55	08:00	30.14	30.14	30.13	30.14	.01
3/8–29C1	3–20–55	08:00	87.95	87.95	87.95	87.95	.00
2/7–2C1	3–22–55	22:00	30.08	30.08	30.07	30.08	.01
18/18–31P1	3–23–55	03:00	175.34	175.34	175.32	175.37	.05
18/18–31P1	3–23–55	05:00	175.35	175.35	175.33	175.36	.03
1S/2W–20B1	3–24–55	04:00	155.43	155.42	155.34	155.47	.13
2/7–2C1	4–5–55	15:09	30.33	30.33	30.32	30.34	.02
15/16–20R1	4–5–55	16:30	80.73	80.73	80.71	80.75	.04
20/15–32A1	4–9–55	21:00	183.30	183.30	183.28	183.32	.04
18/18–31P1	4–17–55	05:00	177.22	177.22	177.22	177.25	.03
18/18–31P1	4–17–55	09:00	177.23	177.24	177.22	177.24	.02
2/7–2C1	4–19–55	20:24	30.41	30.41	30.40	30.42	.02
18/18–31P1	5–7–55	11:00	180.07	180.07	180.05	180.08	.03
20/15–32A1	5–10–55	18:00	183.72	183.72	183.72	183.74	.02
20/15–32A1	5–12–55	17:00	183.74	183.74	183.74	183.76	.02
18/18–31P1	5–13–55	08:00	178.89	178.85	178.84	178.91	.07
20/15–32A1	5–20–55	01:00	183.77	183.77	183.74	183.78	.04
20/15–32A1	5–20–55	17:00	183.82	183.82	183.80	183.84	.04
20/15–32A1	5–21–55	19:00	183.85	----------	----------	----------	----------
18/18–31P1	6–6–55	23:00	174.40	174.40	174.39	174.41	.02
20/15–32A1	6–14–55	23:00	184.07	184.08	183.94	184.34	.40
20/15–32A1	6–16–55	18:00	184.11	184.03	----------	----------	----------
20/15–32A1	6–20–55	17:00	184.10	184.03	183.85	184.27	.42
20/15–32A1	6–25–55	20:00	184.14	184.09	184.00	184.32	.32
20/15–32A1	6–26–55	18:00	184.10	184.34	----------	----------	----------
20/15–32A1	6–28–55	18:00	184.40	184.40	184.39	184.42	.03
20/15–32A1	7–5–55	15:00	184.52	184.52	184.46	184.52	.06
20/15–32A1	7–6–55	21:00	184.52	184.75	----------	----------	----------
20/15–32A1	7–9–55	14:00	184.80	184.61	184.54	185.05	.51
20/15–32A1	7–15–55	10:00	184.70	184.71	184.50	184.92	.42
20/15–32A1	7–18–55	23:00	184.79	184.79	184.77	184.82	.05
20/15–32A1	7–24–55	16:00	184.96	184.88	----------	----------	----------
15/16–34E1	7–25–55	15:00	160.96	160.96	160.96	161.02	.06
20/15–32A1	8–2–55	01:00	184.98	184.98	184.97	185.01	.04
18/18–31P1	8–5–55	05:00	184.75	184.70	184.64	185.85	1.21
18/18–31P1	8–6–55	20:00	184.16	184.11	184.08	184.16	.08
18/18–31P1	8–13–55	23:00	183.98	184.00	183.98	184.01	.03
18/18–31P1	8–25–55	16:00	184.45	184.37	184.37	184.46	.09
15/16–34E1	8–25–55	22:00	163.23	163.12	163.09	163.23	.14
18/18–31P1	9–5–55	02:00	184.00	184.00	183.98	184.00	.02
15/16–20R1	9–5–55	03:00	80.81	80.81	80.78	80.82	.04

Footnotes at end of table.

TABLE 1.—*Fluctuations in well-water levels, January 1 through December 31, 1955*—Continued

CALIFORNIA—Continued

Well No.	Date	Time G. C. T.	Depth to water				Amplitude of fluctuation
			Before disturbance	After disturbance	At highest point	At lowest point	
			ft.	*ft.*	*ft.*	*ft.*	*ft.*
18/18-31P1	9-15-55	14:00	184.52	184.53	184.52	184.55	0.03
15/16-34E1	9-27-55	03:00	164.70	164.70	164.60	164.77	.17
15/16-20R1	9-27-55	19:00	83.10	83.10	83.10	83.13	.03
18/18-31P1	10-8-55	09:00	186.30	186.22	186.22	186.36	.14
15/16-34E1	10-16-55	18:00	163.13	163.13	163.13	163.15	.02
18/18-31P1	10-26-55	13:00	184.03	183.88	183.88	184.40	.52
NORTHERN FLORIDA							
D206	1-13-55	02:15	10.42	10.42	10.41	10.43	0.02
D206	2-4-55	20:00	10.55	10.54	10.53	10.55	.02
D206	2-27-55	21:25	10.61	10.61	10.59	10.73	.14
M92	2-27-55	21:35	43.07	43.08	43.07	43.09	.02
O47	2-27-55	21:50	6.44	6.45	6.43	6.46	.03
P45	2-27-55	21:35	69.98	70.00	69.96	70.04	.08
D206	3-18-55	01:10	11.70	11.71	11.69	11.73	.04
H30	3-18-55	01:10	+4.33	+4.35	+4.33	+4.36	.03
M46	3-18-55	01:10	+9.35	+9.35	+9.37	+9.33	.04
M92	3-18-55	01:00	44.17	44.18	44.17	44.19	.02
M450	3-18-55	00:30	4.08	4.06	4.03	4.11	.08
P45	3-18-55	00:50	72.59	72.60	72.58	72.62	.04
D206	8-28-55	21:10	13.36	13.34	13.31	13.37	.06
H30	8-28-55	21:10	9.12	9.13	9.14	9.12	.02
M92	8-28-55	21:10	40.73	40.71	40.67	40.76	.09
M450	8-28-55	21:10	1.19	1.17	1.08	1.23	.15
P16	8-28-55	21:10	69.07	69.06	69.05	69.07	.02
P246	8-28-55	21:10	26.20	26.22	26.69	26.75	.06
P45	8-28-55	21:10	63.58	63.57	63.52	63.60	.08
L7	8-28-55	21:30	168.52	168.51	168.41	168.60	.19
P45	11-23-55	06:50	69.30	69.30	69.28	69.32	.04
SOUTHERN FLORIDA							
F210	2-27-55	21:00	0.79	0.79	0.81	0.78	0.03
S19	2-27-55	21:00	.61	.61	.63	.60	.03
S68	2-27-55	21:00	−.34	−.34	−.32	−.35	.03
S19	3-1-55	04:55	.58	.58	.60	.56	.04
S68	3-1-55	04:55	−.66	−.66	.65	.67	.02
F210	8-28-55	20:30	1.63	1.63	1.66	1.60	.06
S19	8-28-55	20:30	1.11	1.11	1.14	1.08	.06
S68	8-28-55	20:30	.14	.14	.15	.11	.04
F210	9-3-55	12:45	1.72	1.72	1 73	1.71	.02
F291	9-3-55	12:45	2.02	2.02	2.03	2.00	.03
G553	9-3-55	12:45	5.42	5.42	5.43	5.42	.01
S19	9-3-55	12:45	1.31	1.31	1.33	1.30	.03
S68	9-3-55	12:45	.62	.62	.63	.60	.03
F291	9-26-55	07:50	1.97	1.97	1.98	1.95	.03
S19	9-26-55	07:50	1.72	1.72	1.73	1.70	.03
S68	9-26-55	07:50	.93	.93	.95	.92	.03
IDAHO							
9S-20E-1da1	1-7-55	03:00 04:00	346.17	346.17	346.06	346.30	0.24
2S-20E-1db1	1-26-55	21:00 23:00	150.63	150.63	150.57	150.74	.17
6N-31E-27ba1	2-27-55	20:00 21:00	210.16	210.16	210.08	210.25	.17

Footnotes at end of table.

TABLE 1.—*Fluctuations in well-water levels, January 1 through December 31, 1955*—Continued

IDAHO—Continued

Well No.	Date	Time G. C. T.	Depth to water				Amplitude of fluctuation
			Before disturbance	After disturbance	At highest point	At lowest point	
			ft.	*ft.*	*ft.*	*ft.*	*ft.*
8S-27E-13dd1	2-27-55	20:00 21:00	21.63	21.64	21.54	21.72	0.18
8S-26E-33bc1	2-27-55	21:00	100.88	100.88	100.85	100.92	.07
4N-30E-7ad1	2-27-55	21:00 22:00	323.89	323.89	323.79	323.98	.19
6N-31E-27ba1	3-1-55	03:00 04:00	210.23	210.23	210.20	210.26	.06
4N-30E-7ad1	3-1-55	03:00 04:00	323.93	323.93	323.84	323.98	.14
8S-27E-31dd1	3-1-55	04:00 05:00	21.74	21.74	21.59	21.88	.29
8S-26E-33bc1	3-1-55	05:00	100.95	100.95	100.93	100.98	.05
9S-19E-22cc1	3-17-55	19:30	134.81	134.82	134.76	134.87	.11
8S-27E-31dd1	3-17-55	20:00 22:00	21.84	21.84	21.83	21.86	.03
4N-30E-7ad1	3-17-55	21:00 23:00	324.20	324.20	324.15	324.24	.09
6N-31E-27ba1	3-17-55	22:00 24:00	210.46	210.46	210.43	210.48	.05
11S-19E-20cc1	3-28-55	24:00	122.27	122.27	122.22	122.37	.15
9S-25E-23ca1	4-3-55	19:30	126.14	126.14	126.14	126.17	.03
4N-30E-7ad1	4-4-55	17:00 19:00	324.38	324.38	324.29	324.46	.17
6N-31E-27ba1	4-5-55	14:00 16:00	210.49	210.49	210.46	210.54	.08
3N-29E-14ad1	4-5-55	14:00 16:00	452.90	452.90	452.88	452.95	.07
8S-27E-31dd1	4-5-55	14:00 16:00	21.63	21.64	21.52	21.75	.23
8S-26E-33bc1	4-5-55	16:00	101.61	101.61	101.58	101.64	.06
4S-32E-12dd1	4-8-55	18:00 20:00	21.06	21.06	20.89	21.92	1.03
9S-25E-23ca1	4-12-55	20:30	126.50	126.51	126.45	126.53	.08
8S-26E-27ab1	4-23-55	18:00 20:00	129.12	129.12	129.09	129.19	.10
9S-22E-33ab1	4-25-55	09:30	224.05	224.05	224.02	224.10	.08
8S-25E-24bd1	4-27-55	19:00	135.74	135.73	135.66	135.78	.12
8S-26E-27ab1	4-28-55	17:00 19:00	129.04	129.04	129.02	129.10	.08
8S-26E-27ab1	4-30-55	19:00 21:00	128.98	128.98	128.96	129.03	.07
8S-25E-36da1	5-5-55	19:30	101.49	101.49	101.47	101.50	.03
9S-26E-10dd1	5-8-55	11:00 13:00	76.92	76.92	76.88	76.93	.05
9S-25E-23ca1	5-10-55	08:00	126.52	126.52	126.34	126.66	.32
8S-25E-24bd1	5-12-55	21:00	135.74	135.75	135.72	135.76	.04
1S-19E-5ad1	5-19-55	22:30	32.78	32.78	32.46	33.42	.96
8S-26E-33bc1	5-20-55	23:30	101.37	101.37	101.26	101.41	.15
9S-26E-10dd1	5-21-55	20:00 22:00	76.75	76.73	76.59	76.88	.29
8S-26E-27ab1	5-27-55	21:00 23:00	129.35	129.35	129.29	129.43	.14
8S-26E-27ab1	5-30-55	16:00 18:00	128.94	128.94	128.90	129.05	.15
8S-26E-27ab1	6-3-55	19:00 21:00	129.27	129.27	129.22	129.36	.14
8S-26E-33bc1	6-4-55	22:30	101.23	101.23	101.22	101.25	.03
8S-25E-36da1	6-6-55	19:30	100.89	100.89	100.83	100.92	.09
8S-26E-27ab1	6-6-55 6-7-55	24:00 02:00	129.25	129.25	129.22	129.31	.09
8S-26E-27ab1	6-12-55	22:00 24:00	129.26	129.26	129.24	129.30	.06
8S-27E-31dd1	6-14-55	02:00 04:00	20.73	20.72	20.66	20.80	.14

Footnotes at end of table.

TABLE 1.—*Fluctuations in well-water levels, January 1 through December 31, 1955*—Continued

IDAHO—Continued

Well No.	Date	Time G. C. T.	Depth to water				Amplitude of fluctuation
			Before disturbance	After disturbance	At highest point	At lowest point	
			ft.	*ft.*	*ft.*	*ft.*	*ft.*
4N-30E-7ad1	6-14-55	04:00 05:00	324.63	324.62	324.59	324.67	0.08
9S-25E-23ca1	6-17-55	16:00	124.90	124.90	124.86	124.92	.06
8S-27E-31dd1	6-21-55	06:00 08:00	20.79	20.80	20.72	20.95	.23
8S-26E-27ab1	6-22-55	14:00 16:00	129.52	129.52	129.49	129.59	.10
3N-30E-31aa1	6-26-55	09:00 11:00	456.30	456.32	456.29	456.35	.06
8S-26E-27ab1	6-30-55	17:00 19:00	129.42	129.41	129.39	129.49	.10
8S-26E-27ab1	7-25-55	21:00 23:00	129.20	129.20	129.19	129.22	.03
4S-32E-12dd1	7-26-55	20:00 22:00	16.17	16.18	16.14	16.20	.06
8S-27E-31dd1	7-27-55	15:00 17:00	20.76	20.75	20.72	20.79	.07
5N-34E-9bd1	7-29-55	22:00 24:00	257.87	257.87	257.83	257.91	.08
5N-29E-23cd1	7-31-55	20:00 22:00	273.31	273.31	273.26	273.36	.10
5N-34E-9bd1	8-2-55	21:00 23:00	257.97	257.96	257.90	258.01	.11
4N-30E-7ad1	8-23-55	09:00 11:00	325.09	325.09	325.06	325.11	.05
8S-27E-31dd1	8-23-55	15:00 17:00	20.62	20.62	20.56	20.65	.09
8S-23E-2ba1	8-26-55	15:00 17:00	203.06	203.08	202.90	203.32	.42
8S-25E-36da1	8-31-55	21:00	99.16	99.16	99.14	99.24	.10
8S-26E-33bc1	8-31-55	21:30	99.44	99.43	99.39	99.52	.13
8S-27E-31dd1	9-4-55 9-5-55	23:00 01:00	20.74	20.74	20.72	20.75	.03
4S-32E-12dd1	9-6-55 9-7-55	24:00 02:00	16.51	16.53	16.48	16.56	.08
4N-30E-7ad1	9-8-55	12:00 14:00	325.12	325.12	325.10	325.15	.05
8S-25E-36da1	9-19-55	21:30	98.92	98.92	98.89	98.93	.04
8S-27E-31dd1	9-22-55	15:00 17:00	20.72	20.81	20.72	20.82	.10
6N-31E-27ba1	10-9-55	22:00 24:00	212.05	212.04	212.01	212.07	.06
11S-19E-20cc1	10-12-55	13:00	100.38	100.39	100.38	100.41	.03
11S-19E-20cc1	10-12-55	16:00	100.41	100.41	100.39	100.51	.12
9S-25E-23db1†	12-4-55	10:00	122.48	122.48	122.45	122.49	.04
ILLINOIS							
ANL-9	2-27-55	21:00	91.54	91.54	91.51	91.56	0.05
ANL-10	2-27-55	21:30	72.04	72.04	72.00	72.05	.05
ANL-9	3-1-55	05:00	91.21	91.21	91.19	91.24	.05
ANL-10	3-1-55	05:00	71.40	71.40	71.37	71.46	.09
ANL-9	4-5-55	16:00	(?)91.14	91.14	91.10	91.17	.07
ANL-10	4-5-55	16:00	70.80	70.80	70.78	70.85	.07
ANL-11	12-15-55	21:00	78.29	78.30	78.27	78.33	.06
MICHIGAN							
GeFL491	1-13-55	02:45	29.41	29.41	29.39	29.44	0.05
GeFL491	1-15-55	17:30	29.45	29.45	29.43	29.48	.05

Footnotes at end of table.

TABLE 1.—*Fluctuations in well-water levels, January 1 through December 31, 1955*—Continued

MICHIGAN—Continued

Well No.	Date	Time G. C. T.	Depth to water				Amplitude of fluctuation
			Before disturbance	After disturbance	At highest point	At lowest point	
			ft.	*ft.*	*ft.*	*ft.*	*ft.*
GeFL491	2-27-55	19:30	29.07	29.08	28.98	29.12	0.14
GeFL491	3-1-55	04:15	28.89	28.89	28.84	28.92	.08
GeFL491	3-1-55	16:30	28.93	28.94	28.92	28.95	.03
GeFL491	3-7-55	19:30	29.17	29.17	29.16	29.18	.02
GeFL491	3-18-55	00:30	29.16	29.16	29.12	29.19	.07
GeFL491	3-27-55	20:00	29.16	29.16	29.14	29.18	.04
GeFL491	4-5-55	16:20	28.92	28.92	28.89	28.95	.06
GeFL491	4-13-55	22:00	28.98	28.98	28.96	29.00	.04
GeFL491	4-15-55	04:00	29.02	29.02	29.01	29.03	.02
GeFL491	4-15-55	04:30	29.02	29.02	29.01	29.03	.02
GeFL491	4-17-55	18:30	29.16	29.16	29.15	29.17	.02
GeFL491	4-19-55	15:20	28.79	28.79	28.78	28.80	.02
GeFL491	5-28-55	15:00	31.45	31.45	31.44	31.46	.02
GeFL491	5-29-55	14:00	31.52	31.52	31.50	31.54	.04
GeFL491	6-2-55	01:00	31.26	31.26	31.24	31.27	.03
GeFL491	6-14-55	01:45	32.36	32.36	32.35	32.37	.02
GeFL491	6-20-55	07:30	32.48	32.48	32.46	32.50	.04
GeFL491	8-3-55	17:45	37.69	37.69	37.68	37.70	.02
GeFL491	8-28-55	21:15	37.62	37.62	37.61	37.64	.03
GeFL491	8-30-55	09:45	37.94	37.94	37.92	37.95	.03
GeFL491	9-7-55	18:30	36.07	36.07	36.06	36.08	.02
GeFL491	9-20-55	16:30	35.40	35.40	35.38	35.42	.04
GeFL491	9-23-55	16:15	35.49	35.49	35.48	35.49	.01
GeFL491	10-10-55	09:00	33.61	33.61	33.60	33.63	.03
GeFL491	10-24-55	05:15	33.18	33.18	33.17	33.19	.02
GeFL491	11-17-55	03:30	30.94	30.94	30.91	30.96	.05
NEVADA							
S20/61-35ddc2	1-11-55	00:40	+32.8	+32.8	+34.7	+29.9	4.80
S19/60-9bcc1	1-12-55	01:30	82.17	82.17	82.14	82.21	.07
S19/60-27bdc1	2-10-55	18:00	+10.9	+10.4	+11.7	+9.1	2.60
S20/61-35ddc2	2-10-55	18:00	+35.4	+35.4	+37.8	+33.5	4.30
S19/60-9bcc1	2-14-55	07:45	79.72	79.72	79.69	79.77	.08
S22/61-4bcc1	2-24-55	05:50	87.21	87.21	87.19	87.26	.07
S19/60-33bca1	2-27-55	21:00	10.48	10.48	10.46	10.50	.04
S20/60-25abd1	2-28-55	01:10	44.81	44.81	44.75	44.86	.11
S19/60-9bcc1	2-28-55	06:40	80.59	80.59	80.51	80.62	.11
S19/60-9bcc1	2-28-55	16:45	80.73	80.73	80.65	80.81	.16
S19/60-9bcc1	2-29-55	04:10	80.89	80.89	80.81	80.96	.15
S19/60-9bcc1	3-18-55	01:40	78.81	78.81	78.75	78.87	.12
S20/60-25abd1	3-18-55	04:10	47.61	47.61	47.58	47.64	.06
S19/60-9bcc1	3-22-55	12:50	79.90	79.90	79.87	79.92	.05
S20/61-35ddc2	3-31-55	17:15	+35.0	+35.0	+37.8	+32.1	5.70
S20/61-35ddc2	3-31-55	17:25	+35.0	+35.0	+36.3	+34.2	2.10
S19/60-9bcc1	4-5-55	13:40	86.73	86.73	86.67	86.80	.13
S19/60-9bcc1	4-16-55	22:10	86.59	86.59	86.56	86.61	.05
S20/61-35ddc2	4-17-55	18:50	+34.8	+34.8	+37.6	+31.8	5.80
S20/61-35ddc2	4-17-55	19:25	+34.8	+34.8	+37.6	+29.4	8.20
S20/61-35ddc2	4-17-55	19:40	+34.8	+34.8	(?)	+28.7	(?)
S20/61-35ddc2	4-17-55	19:50	+34.7	+34.7	+38.0	+31.2	6.80
S19/60-9bcc1	4-26-55	11:50	85.29	85.29	85.25	85.31	.06
S19/60-9bcc1	5-14-55	18:30	86.81	86.81	86.79	86.84	.05
S19/60-9bcc1	5-17-55	18:40	87.39	87.39	87.33	87.45	.12
S19/60-9bcc1	5-26-55	20:00	86.20	86.20	(?)86.16	86.29	.13
11/24-22dc1	5-30-55	13:45	57.54	57.54	57.50	57.64	.14
S20/61-35ddc2	6-8-55	15:40	+27.7	+27.7	+30.6	+25.2	5.40
11/24-22dc1	6-8-55	19:00	57.79	57.79	57.73	57.87	.14
S19/60-9bcc1	6-8-55	24:00	87.50	87.50	87.47	87.55	.08
S19/60-9bcc1	6-11-55	07:00	87.97	87.97	87.96	88.01	.05
S19/60-9bcc1	6-18-55	11:15	87.87	87.87	(?)	87.98	(?)

Footnotes at end of table.

TABLE 1.—*Fluctuations in well-water levels, January 1 through December 31, 1955*—Continued

NEVADA—Continued

Well No.	Date	Time G. C. T.	Depth to water				Amplitude of fluctuation
			Before disturbance	After disturbance	At highest point	At lowest point	
			ft.	*ft.*	*ft.*	*ft.*	*ft.*
S20/61-35ddc2	6-23-55	17:35	+26.9	+26.9	+29.7	+24.6	5.10
S19/60-9bcc1	7-11-55	23:10	87.70	87.70	87.69	87.72	.03
S19/60-9bcc1	7-13-55	20:15	88.95	88.95	88.94	88.96	.02
S19/60-9bcc1	8-3-55	16:00	89.02	89.02	(?)89.00	89.09	(?).09
S20/61-35ddc2	8-7-55	14:50	+23.1	+23.1	+25.6	+19.8	5.80
11/24-22dc1	8-26-55	03:30	59.01	59.01	59.00	59.03	.03
S19/60-9bcc1	8-28-55	19:45	88.12	88.12	88.09	88.14	.05
S19/60-9bcc1	9-3-55	12:15	88.16	88.16	88.13	88.18	.05
S19/60-9bcc1	10-10-55	09:15	88.03	88.03	88.01	88.05	.04
S20/61-35ddc2	10-15-55	21:45	+22.6	+22.6	+27.2	+17.1	10.10
S19/60-9bcc1	11-21-55	21:15	85.58	85.58	85.56	85.61	.05
S20/61-35ddc2	11-24-55	17:00	+23.2	+23.2	+26.4	+20.7	5.70
S19/60-9bcc1	12-17-55	06:20	85.90	85.90	85.89	85.91	.02
11/24-22dc1	12-18-55	21:00	60.30	60.27	60.26	60.37	.11
NEW JERSEY							
26.22.4.4.4	2-27-55	20:45	+25.51	+25.51	+25.61	+25.42	0.19
26.22.4.4.4	3-31-55	19:45	+27.75	+27.75	+27.77	+27.72	.05
31.1.6.4.8	7-10-55	15:15	−10.37	−10.37	−10.35	−10.41	.06
31.1.6.4.8	8-28-55	20:25	−9.74	−9.74	−9.73	−9.75	.02
26.21.5.9.2	10-10-55	09:30	+50.24	+50.24	+50.25	+50.23	.02
26.22.4.4.4	10-10-55	09:40	+23.22	+23.20	+23.30	+23.14	.16
31.11.5.1.1	10-12-55	13:20	−1.15	−1.16	−1.15	−1.16	.01
31.1.6.4.8	10-12-55	13:40	−8.91	−8.91	−8.90	−8.92	.02
NEW YORK							
Sa529	1-13-55	02:30	47.32	47.32	47.31	47.33	0.02
Q64	1-13-55	03:00	1.52	1.52	1.57	1.46	.11
Sa529	2-27-55	20:30	45.82	45.81	45.80	45.83	.03
Q64	2-27-55	21:00	1.83	1.83	2.04	1.61	.43
Sa529	3-1-55	05:30	46.95	46.94	46.89	46.99	.10
Sa529	3-17-55	23:30	47.07	47.07	47.06	47.08	.02
Sa529	3-31-55	16:45	46.88	46.91	46.87	46.92	.05
Sa529	4-1-55	09:15	46.82	46.81	46.81	46.82	.01
Q64	4-1-55	22:00	2.60	2.60	2.63	2.57	.06
Sa529	4-5-55	15:30	46.80	46.80	46.78	46.81	.03
Sa529	4-6-55	10:45	46.60	46.60	46.60	46.60	.00
Sa529	4-14-55	02:30	47.16	47.15	47.14	47.16	.02
Q64	5-17-55	15:00	2.39	2.39	2.43	2.36	.07
Sa529	6-2-55	01:30	48.42	48.42	48.42	48.43	.01
Sa529	6-14-55	06:15	48.27	48.27	48.27	48.27	.00
Sa529	6-20-55	12:45	48.45	48.46	48.44	48.47	.03
Q64	6-20-55	13:00	1.45	1.45	1.51	1.39	.12
Q64	8-7-55	23:00	−4.73	−4.73	−4.70	−4.74	.04
Sa529	8-28-55	20:45	48.87	48.87	48.86	48.88	.02
Sa529	10-10-55	09:45	46.82	46.81	46.80	46.83	.03
Q64	12-1-55	10:30	1.27	1.27	1.29	1.25	.04
Q64	12-14-55	13:00	1.43	1.43	1.45	1.40	.05
TENNESSEE							
7:1-6	1-1-55	18:40	76.19	76.19	76.17	76.19	0.02
24:10-2	1-10-55	21:10	40.41	40.41	40.40	40.42	.02
7:1-6	1-22-55	21:10	77.64	77.64	77.62	77.64	.02
7:1-6	2-18-55	22:45	77.41	77.41	77.37	77.48	.11
7:1-6	2-27-55	21:30	76.94	76.94	76.91	77.04	.13
7:1-6	4-5-55	16:20	77.28	77.28	77.27	77.30	.03

Footnotes at end of table.

TABLE 1.—*Fluctuations in well-water levels, January 1 through December 31, 1955*—Continued

TENNESSEE—Continued

Well No.	Date	Time G. C. T.	Depth to water				Amplitude of fluctuation
			Before disturbance	After disturbance	At highest point	At lowest point	
			ft.	*ft.*	*ft.*	*ft.*	*ft.*
79:78–1	4–29–55	08:23	100.29	100.29	100.26	100.33	0.07
79:1–2	5–7–55	23:30	84.10	84.09	84.08	84.12	.04
79:78–1	5–21–55	01:30	102.80	102.81	102.79	102.81	.02
7:1–6	5–22–55	14:05	78.09	78.09	78.08	78.12	.04
79:78–1	5–31–55	17:57	103.62	103.62	103.60	103.65	.05
79:3–A	6–14–55	15:59	69.23	69.24	69.20	69.24	.04
79:1–2	6–14–55	19:30	85.42	85.40	85.40	85.42	.02
79:78–1	6–14–55	19:30	103.19	103.20	103.17	103.24	.07
79:3–A	7–3–55	14:01	72.22	72.21	72.21	72.24	.03
79:5–193	8–5–55	03:12	118.46	118.47	118.43	118.47	.04
7:1–6	8–28–55	21:05	79.44	79.43	79.43	79.44	.01
7:1–6	9–3–55	16:22	79.48	79.48	79.48	79.48	.00
79:78–1	9–30–55	13:47	109.78	109.77	109.72	109.88	.16
79:3–A	10–7–55	04:00	71.87	71.88	71.87	71.91	.04
79:3–A	10–16–55	17:16	70.83	70.82	70.81	70.84	.03
79:1–2	11–23–55	06:29	87.57	87.55	87.55	87.58	.03
79:11–1	12–5–55	20:14	89.65	89.59	89.52	90.51	.99
WISCONSIN							
Lf–57	1–13–55	02:00	87.98	87.99	87.93	88.03	0.10
Lf–57	2–27–55	21:30	90.13	90.14	90.01	90.26	.25
Lf–57	3–1–55	05:00	90.06	90.07	89.94	90.27	.33
Lf–57	3–18–55	00:00	(?)	90.14	90.05	90.23	.18
Lf–57	3–31–55	20:00	90.32	90.31	90.30	90.33	.03
Lf–57	4–5–55	15:00	+90.37	90.41	90.26	90.50	.24
Lf–57	4–14–55	02:00	90.42	90.43	90.39	90.47	.08
Lf–57	4–28–55	19:00	90.42	90.42	90.40	90.44	.04
Lf–57	5–17–55	16:00	89.14	89.14	89.12	89.16	.04
Lf–57	6–14–55	07:00	89.15	89.15	89.12	89.20	.08
Lf–57	7–27–55	19:00	+88.43	88.43	88.34	88.52	.18
Lf–57	8–28–55	20:00	88.30	88.29	88.24	88.35	.11
Lf–57	9–3–55	12:00	88.33	88.33	88.31	88.36	.05
Lf–57	10–10–55	09:00	88.24	88.24	88.20	88.27	.07
Ml–148	11–12–55	05:00	32.95	32.93	32.03	33.00	.03
HAWAIIAN ISLANDS							
36A	1–6–55	00:00	14.45	14.45	----------	----------	----------
132	1–6–55	00:00	16.24	16.25	16.21	16.26	0.05
132	1–13–55	02:00	16.18	16.19	16.13	16.25	.12
36A	1–13–55	02:50	14.37	14.38	14.30	14.43	.13
83	2–27–55	20:00	+2.33	+2.32	+2.35	+2.30	.05
132	2–27–55	20:15	15.00	14.90	14.80	15.00	.20
36A	2–27–55	20:40	13.07	13.07	13.01	13.14	.13
132	3–17–55	23:30	14.25	14.26	13.90	14.59	.69
83	3–18–55	00:00	+2.96	+2.97	+3.00	+2.96	.04
36A	3–18–55	00:40	12.36	12.36	12.07	12.64	.57
132	3–31–55	18:20	13.90	13.91	13.88	13.94	.06
83	3–31–55	18:40	+3.35	+3.35	----------	----------	----------
36A	3–31–55	19:00	12.01	12.01	----------	----------	----------
132	4–28–55	18:55	13.54	13.54	13.51	13.58	.07
36A	4–28–55	20:00	11.66	11.66	11.63	11.69	.06
36A	6–2–55	00:00	11.74	11.74	11.73	11.76	.03
132	6–2–55	00:10	13.59	13.58	13.55	13.60	.05
132	10–9–55	12:15	15.44	15.43	15.41	15.46	.05
83	10–9–55	13:00	+1.87	+1.87	+1.89	+1.85	.04
36A	10–9–55	13:45	13.55	13.55	13.54	13.56	.02

† Well No. 9S–25E–23dbl previously reported as 9S–25E–23cal.
+Water surface above mean sea level or land surface datum.
−Water surface below 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:

Balboa Heights
(The Panama Canal Co.)
Boulder City, Nev.
Bozeman, Mont.
(Montana State College)
Burlington, Vt.
(University of Vermont)
Butte, Mont.
(Montana School of Mines)
Chicago, Ill.
(University of Chicago and U. S. Weather Bureau)
College, Alaska
Columbia, S. C.
(University of South Carolina)
Eureka, Nev.
(Eureka Corporation Limited)
Honolulu, T. H.
Hungry Horse, Mont.
Lincoln, Nebr.
(Nebraska Wesleyan University)
Logan, Utah
(Utah State Agricultural College)
Montezuma, Chile
(Smithsonian Institution)
Nelson, Nev.
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
Tucson, Ariz.
Ukiah, Calif.
(International Latitude Observatory)
Washington, D. C.

College, Honolulu, Nelson, San Juan, Sitka, Tucson, Ukiah, and Washington are Coast and Geodetic Survey stations.

Boulder City and Hungry Horse are cooperating stations of the Bureau of Reclamation. Montezuma is operated by the Smithsonian Institution, and Eureka by personnel of the Eureka Corporation Limited.

Bozeman, Butte, Chicago, Columbia, Lincoln, Rapid City, and Salt Lake City are cooperating university stations.

Balboa Heights, Burlington, Logan, and Philadelphia are independent stations.

All readings were made or revised at the Washington Office except those for Balboa Heights. All seismograms are on file in the Coast and Geodetic Survey, except those for Balboa Heights, Burlington, and Logan, which may be obtained on loan by addressing the Seismograph Station Director: Meteorological and Hydrographic Office, Panama Canal Company, Balboa Heights, C. Z.; University of Vermont, Burlington, Vt.; Utah State Agricultural College, Logan, Utah.

For detailed instrumental data regarding these stations, including instrumentation, constants, and other information, see *Seismological Bulletin*, MSI–169, January 1955. 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 25, D. C.

SUMMARY OF INSTRUMENTAL EPICENTERS FOR 1951

The summary of instrumental epicenters for 1951 is not available for publication at this time. However, the summary will be published as soon as the data become available. The last Seismological Bulletin issued covers March 1951.

TABLE 2.—*Summary of instrumental epicenters for 1955*

1955	Origin Time G. C. T.			Region, focal depth, and remarks	Coordinates of provisional epicenter				
					Latitude		Longitude		
	h	*m*	*s*		°	′	°	′	
Jan. 1	10	34	41*	North Atlantic Ocean	28½	N.	44		W.
1	10	49	32*	----do	28½	N.	44		W.
1	12	13	54**	Fallon, Nevada aftershock. Mag. 5.1					
1	18	03	08*	Andreanof Islands, Aleutian Islands	51	N.	178½		W.
1	18	37	41*	Andreanof Islands, Aleutian Islands. Depth about 60 km	51½	N.	178½		W.
2	02	09	50**	Western New Guinea					
2	07	21	53**	Fiji Islands. Depth about 400 km					
3	01	07	02*	Central Greece. Slight damage at Kedhron	39	N.	22		E.
3	18	41	50**	Near coast of Peru. Depth about 60 km					
3	19	29	16**	Near west coast of Sumatra					
4	12	07	48**	Off south coast of Honshu, Japan					
5	00	50	12*	Off coast of South Island, New Zealand. Mag. 6.9	50	S.	162½		E.
5	12	44	44*	Near coast of Peru	15	S.	76		W.
5	15	28	20*	Near east coast of Kamchatka	54½	N.	161		E.
5	15	35	08*	Northern Ecuador	0		78		W.
5	17	48	35*	New Hebrides Islands. Felt on Ambrym. Mag. 6¾	16	S.	167½		E.
5	23	42	03*	New Hebrides Islands. Damage on Malekula. Mag. 6¾–7	16	S.	167½		E.
6	01	59	43**	New Hebrides aftershock					
6	02	22	35*	----do	16	S.	167½		E.
6	04	02	00**	Off coast of Guerrero, Mexico					
6	05	04	24*	Hokkaido, Japan. Felt at Kushiro and Urakawa. Depth about 60 km.	41½	N.	143½		E.
6	06	59	47**	New Hebrides aftershock					
6	09	48	19*	----do	16	S.	167½		E.
7	05	30	56*	Guatemala. Depth about 150 km	14½	N.	90½		W.
7	09	44	28*	Indian Ocean	16½	S.	78		E.
8	07	33	36*	Santa Cruz Islands. Felt on Banks Islands. Depth about 60 km. Mag. 6¾.	11½	S.	166½		E.
8	07	52	57*	Central Greece. Felt	39	N.	22½		E.
8	09	00	32*	Off south coast of Honshu, Japan. Depth about 100 km	31½	N.	141		E.
8	09	58	42*	West of Galapagos Islands	5	S.	106		W.
8	19	03	55*	Near south coast of Kamchatka	50½	N.	158		E.
9	00	27	48*	Near east coast of Kamchatka	54½	N.	162		E.
9	04	00	44*	Near east coast of Kamchatka. Depth about 60 km	55	N.	161½		E.
9	09	10	50*	Fallon, Nevada aftershock. Mag. 5.0	39	N.	118		W.
9	11	06	52**	Sandwich Islands					
10	04	25	48*	Hindu Kush. Depth about 150 km	37	N.	71		E.
10	09	38	43*	Near coast of Ecuador. Felt at Quito	½	S.	80		W.
10	10	07	28*	Southern Nevada. Mag. 4.4	37	N.	114½		W.
10	13	15	54*	Fallon aftershock. Mag. 4.0	39.9	N.	118.4		W.
10	19	31	50*	Mexico-Guatemala border. Depth about 100 km	15	N.	92½		W.
10	21	43	10*	Samoa Islands. Felt at Apia. Depth about 100 km	14½	S.	175		W.
11	00	35	58*	Northern Chile. Felt at Antofagasta	20	S.	69½		W.
11	07	35	36**	Near south coast of Honshu, Japan. Felt at Tokyo and Yokohama.					
11	09	21	12*	Western Crete	35	N.	23½		E.
11	10	20	08*	Northwest Washington. Felt at Quinault, Port Angeles, Wash., and Victoria, British Columbia.	47	49 N.	124	01	W.
11	12	48	10*	New Hebrides Islands	13	S.	167½		E.
11	13	48	11*	Ryukyu Islands	27	N.	127½		E.
11	15	41	27**	Near coast of Guatemala					
11	23	03	07*	Near coast of Nicaragua	11	N.	86½		W.
12	19	25	56*	Northern Chile. Felt at Antofagasta	21½	S.	69		W.
13	00	14	29**	About 600 miles northeast of Sandwich Islands					
13	02	03	43*	Fox Islands, Aleutian Islands. Felt at Unalaska. Mag. 6.9	53	N.	167½		W.
13	02	35	45*	Fox Islands aftershock. Felt at Unalaska. Mag. 6½	53	N.	167½		W.
13	02	44	47**	Fox Islands aftershock					
13	08	31	40*	Northern Chile aftershock. Felt at Antofagasta	20½	S.	70		W.
14	07	44	40**	Assam-Burma border region. Depth about 100 km					
15	19	55	14*	Near east coast of Honshu, Japan. Felt	35	N.	141		E.
16	13	30	15**	Near south coast of Sumatra					
16	23	21	45**	Indian Ocean, about 350 miles northeast of Prince Edward Islands.					
17	02	21	49*	Honshu, Japan. Felt at Tokyo and Yokohama. Depth about 60 km.	35½	N.	140½		E.

Footnotes at end of table.

TABLE 2.—*Summary of instrumental epicenters for 1955*—Continued

1955	Origin Time G. C. T.			Region, focal depth, and remarks	Coordinates of provisional epicenter				
					Latitude			Longitude	
	h	m	s		°	′		°	′
Jan. 17	02	40	17*	Tonga Islands. Depth about 200 km	20		S.	176½	W.
17	21	27	40**	Off coast of Jalisco, Mexico					
18	08	42	03*	Galapagos Islands region	5		N.	87½	W.
18	14	36	32*	Samoa Islands. Depth about 400 km	19		S.	179	W.
18	16	51	26*	Southeast of Easter Island	36½		S.	98½	W.
18	19	48	36**	Santa Cruz Islands region					
19	02	10	10*	Near Fallon, Nevada. Mag. 4.4	39	21	N.	118	15 W.
19	04	34	25*	Atlantic Ocean, south of Liberia	2		S.	13	W.
19	15	33	07*	Colombia-Ecuador border. Depth about 100 km	1		N.	78½	W.
19	19	02	40**	Kodiak Island region					
20	03	48	50*	Off coast of Mexico. Mag. 6¼	15½		N.	104½	W.
21	09	06	00**	Jujuy Province, Argentina					
21	14	18	33*	Fox Islands, Aleutian Islands. Felt on Adak and Unalaska	53		N.	168	W.
22	05	28	28*	Chagos Islands region	9½		S.	68	E.
22	21	11	00**	Fiji Islands. Depth about 650 km					
23	22	21	14**	Near southwest coast of Java					
24	00	49	20*	Southwest of Galapagos Islands	4		S.	104	W.
24	05	47	50**	Near coast of Guerrero, Mexico					
24	14	33	38*	Fiji Islands	18		S.	179½	W.
25	04	09	30**	Off south coast of Java					
25	07	24	30**	Tennessee-Arkansas-Missouri border. Slight property damage	35.6		N.	90.3	W.
25	14	19	29*	Revilla Gigedo Islands region	19½		N.	109½	W.
25	14	50	05*	Arctic Ocean, off west coast of Spitsbergen	80		N.	3	W.
25	23	07	10*	Jujuy Province, Argentina. Depth about 250 km	22½		S.	65½	W.
26	02	50	00**	About 500 miles south of Juan Fernandez Islands					
26	07	31	09**	Galapagos Islands region					
27	13	11	34**	Off coast of Oaxaca, Mexico. Depth about 60 km					
27	16	16	05*	Near west coast of Hokkaido, Japan	43		N.	140½	E.
27	18	38	20*	Fiji Islands region. Depth about 400 km	17½		S.	177	W.
28	07	42	00**	Off south coast of Crete					
28	17	02	33*	Tibet. Mag. 6¼–6½	33		N.	82½	E.
29	17	03	35*	Off southeast coast of Kamchatka	51½		N.	159½	E.
31	02	27	12**	Andreanof Islands, Aleutian Islands					
31	02	44	15*	Kurile Islands	46		N.	152½	E.
31	05	03	03*	Mato Grosso, Brazil. Mag. 6¾	12½		S.	57	W.
31	15	03	10*	Central Chile. Felt at Santiago	31½		S.	71½	W.
31	16	02	07*	Kurile Islands. Mag. 6½	46½		N.	153	E.
Feb. 1	19	16	10*	Off south coast of Hokkaido, Japan. Felt in southern Hokkaido and northeastern Honshu. Depth about 60 km.	42		N.	142½	E.
1	20	19	45*	Volcano Islands	25		N.	142	E.
2	07	22	32*	Tonga Islands. Felt at Nukualofa. Depth about 100 km	22		S.	176	W.
2	22	11	18*	Oregon foreshock	44		N.	128½	W.
3	03	10	16*	----do	44½		N.	128	W.
3	09	07	52**	----do					
3	12	22	41*	----do	44		N.	128½	W.
3	12	34	52**	----do					
3	12	41	24*	About 200 miles off coast of Oregon	44		N.	128½	W.
4	07	21	49*	Mascarene Islands region. Mag. 6¼–6½	17		S.	67	E.
4	09	04	39*	Jan Mayen Island region	70		N.	15	W.
5	05	42	14*	Kurile Islands	47		N.	154	E.
5	09	17	00**	----do					
5	14	08	15**	Off coast of Kamchatka					
5	20	41	51*	Kurile Islands	46½		N.	153	E.
5	21	46	32*	----do	47		N.	153	E.
6	00	55	32*	Jan Mayen Island foreshock	71		N.	13½	W.
6	02	27	51*	Jan Mayen Island region	71		N.	14½	W.
6	04	34	55**	Near south coast of Sumatra					
6	10	05	45**	Sandwich Islands region					
6	10	45	30**	South Pacific Ocean, about 750 miles off coast of Chile					
6	14	51	53*	Western Sinkiang Province, China	41		N.	78	E.
6	18	17	05*	Andreanof Islands, Aleutian Islands	50½		N.	180	
6	21	04	43*	Fiji Islands. Depth about 550 km	16½		S.	179	W.
6	22	35	48**	100 miles off southeast coast of Kamchatka					
7	00	10	58*	Southern Kurile Islands. Felt at Nemuro	44		N	146½	E.
7	13	49	00**	Punta Gorda, California	40	17	N.	124	32 W.

Footnotes at end of table.

TABLE 2.—*Summary of instrumental epicenters for 1955*—Continued

1955	Origin Time G. C. T.			Region, focal depth, and remarks	Coordinates of provisional epicenter			
					Latitude		Longitude	
	h	m	s		° ′		° ′	
Feb. 7	16	50	42*	Near coast of northern Peru	3½	S.	81	W.
7	17	46	15**	Sonora, Mexico				
7	19	56	40*	Near coast of Honshu, Japan	34½	N.	141	E.
8	04	12	10*	Southern Bolivia. Depth about 600 km. Mag. 5¾	20	S.	62½	W.
8	05	49	00*	Galapagos Islands	½	S.	92	W.
8	14	19	03**	About 250 miles west of Easter Island				
8	15	43	07*	Near south coast of Honshu, Japan. Felt. Depth slightly greater than normal.	33½	N.	140½	E.
8	19	36	32**	Off coast of Alaska Peninsula				
9	10	35	24*	Tibet	33	N.	83	E.
10	00	03	21*	Northern Kurile Islands. Depth about 60 km	50	N.	156	E.
10	04	06	12*	Near coast of Peru. Minor damage near Lima. Depth slightly greater than normal.	11½	S.	77½	W.
10	09	36	41**	Tonga Islands				
11	02	57	00*	Oaxaca, Mexico. Depth about 100 km	17	N.	95	W.
11	04	30	30**	Kermadec Islands region				
11	12	06	03**	Northern Chile. Depth about 100 km				
11	16	12	33*	Near Fallon, Nevada. Mag. 4.7	39½	N.	118	W.
12	00	59	45**	Pakistan foreshock. Felt at Quetta				
12	04	27	22**	About 350 miles south of Fiji Islands. Depth about 600 km				
12	19	03	08*	New Hebrides Islands region. Depth about 100 km	21	S.	171	E.
13	17	16	55*	Central Kamchatka. Depth about 200 km	56	N.	160½	E.
14	15	27	48*	Komandorski Islands region	54	N.	169	E.
14	16	53	09*	Molucca Passage. Mag. 6¼	2	N.	126½	E.
14	19	27	04*	Molucca Passage	3	N.	126½	E.
15	06	20	18*	New Hebrides Islands. Depth about 60 km	13½	S.	166½	E.
15	06	21	22*	——do——	14	S.	166½	E.
15	10	15	00**	Hindu Kush				
15	18	41	53**	New Hebrides Islands. Depth about 60 km				
16	11	29	54*	Banda Sea. Depth about 150 km	7	S.	130	E.
17	08	48	34*	Ecuador	4	S.	79	W.
17	19	31	31*	Near coast of southern Italy. Depth about 470 km. Mag. 5¼.	39½	N.	14	E.
17	19	57	00**	About 100 miles off south coast of Puerto Rico				
18	08	06	41*	Off northeast coast of Dominican Republic. · Depth about 100 km.	19	N.	68	W.
18	22	48	33*	Pakistan. 12 killed, many injured, and moderate property damage in the Quetta area.	30½	N.	67	E.
19	03	44	28*	Bolivia. Depth about 250 km	20½	S.	65	W.
19	10	33	00**	Central Ecuador				
19	15	21	40*	Samar, Philippine Islands. Felt at Masbate and Tacloban	12	N.	125	E.
20	00	52	20*	Luzon, Philippine Islands. Felt at Baguio, Iba, Manila, and Tagupan.	15½	N.	121	E.
20	12	17	21*	Rat Islands, Aleutian Islands. Depth about 100 km	52½	N.	178½	E.
20	20	14	46*	New Britain	5	S.	152	E.
21	18	43	48*	Kurile Islands	49	N.	153	E.
21	19	46	42*	Near east coast of Greece. Several casualties and moderate property damage at Volos.	39	N.	23	E.
21	23	14	45*	Azores Islands	40½	N.	29	W.
22	14	48	26*	Off northeast coast of Formosa	25½	N.	122½	E.
23	04	57	11*	Tonga Islands. Depth about 250 km	20	S.	175½	W.
23	08	36	22*	Fiji Islands region. Depth about 600 km	23	S.	179	E.
23	11	41	02*	Fiji Islands. Depth about 600 km	18	S.	178	W.
23	18	31	45*	Indian Ocean	34	S.	54½	E.
23	20	01	27*	South of Honshu, Japan. Depth about 60 km	30½	N.	142	E.
23	23	13	30*	Nepal	28	N.	85½	E.
24	09	15	06*	Kurile Islands. Depth about 60 km	44½	N.	149	E.
24	12	15	24**	Southern Kurile Islands				
24	15	15	19**	Nepal				
26	00	31	14*	Sumatra	0		102	E.
26	02	52	04*	Near south coast of Unimak Island	54	N.	163½	W.
27	10	32	08*	Northern Kurile Islands	48	N.	155½	E.
27	16	36	59*	Atlantic Ocean	7½	N.	42½	W.
27	19	20	38**	Off south coast of Honshu, Japan. Felt at Tokyo				

Footnotes at end of table.

TABLE 2.—*Summary of instrumental epicenters for 1955*—Continued

1955	Origin Time G. C. T.			Region, focal depth, and remarks	Coordinates of provisional epicenter			
					Latitude		Longitude	
	h	*m*	*s*		° ′		° ′	
Feb. 27	20	43	24*	Kermadec Islands region. Felt on Raoul Island, Tolaga Bay, and Wellington, New Zealand. Mag. 7.4.	27½	S.	176	W.
28	00	16	44*	Kermadec Islands aftershock	27½	S.	176	W.
28	00	58	39*	Andreanof Islands, Aleutian Islands	52	N.	174	W.
28	03	02	11**	Kermadec Islands region				
28	05	09	47**	Near southeast coast of Kamchatka				
28	20	42	31*	Indian Ocean	11	S.	66½	E.
Mar. 1	01	46	14*	Off coast of Brazil. Felt at Espirito Santos. Mag. 6½	21	S.	37	W
1	04	42	59*	Yukon, Canada. Felt at Aklavik and Good Hope, N.W.T. Mag. 6¾.	65	N.	133	W.
1	08	03	13**	Off coast of Guerrero, Mexico				
1	08	48	21*	Yukon aftershock	65½	N.	133	W.
1	14	02	25*	do	65	N.	133	W.
1	14	41	37*	South of Honshu, Japan. Felt	29½	N.	141½	E.
1	17	18	55**	Near Maldive Islands, Indian Ocean				
1	19	11	19**	Off north coast of Java				
2	01	18	53*	New Britain	4½	S.	152½	E.
2	01	35	45*	do	4	S.	152½	E.
2	15	59	01*	Near San Ardo, California. Felt at Paso Robles and Hollister. Mag. 5.1.	36 00	N.	120 56	W.
3	11	51	57**	Off south coast of Kamchatka				
3	20	47	22*	Jan Mayen Island	71½	N.	4½	W.
4	02	03	22*	Kermadec Islands region	26½	S.	176	W.
4	11	32	42*	Samoa Islands region. Depth about 250 km	15	S.	175½	W.
5	03	29	58*	Guatemala. Depth about 150 km	14	N.	90½	W.
5	05	29	58*	Molucca Passage. Depth about 100 km	3	N.	129	E.
5	07	43	20*	Hudson Strait	60½	N.	67	W.
5	10	22	50**	Hindu Kush				
5	19	28	31*	Atlantic Ocean	11	N.	44	W.
6	06	18	01*	Near south coast of Sumatra	2½	S.	100	E.
6	10	55	28*	Philippine Islands foreshock. Felt at Cuyo, Dipolog, and Iloilo.	9½	N.	122½	E.
6	13	33	31*	Negros Island, Philippine Islands. Felt at Cuyo, Dipolog, and Iloilo.	9½	N.	122½	E.
6	20	55	13*	Tadzhik S.S.R.	38½	N.	73½	E.
7	04	44	44*	New Hebrides Islands. Felt on Uvea, Loyalty Islands, and Tanna, New Hebrides Islands.	18½	S.	169	E.
7	06	30	11*	Kurile Islands	49½	N.	155	E.
7	14	47	07*	Kermadec Islands region	28	S.	175½	W.
7	19	32	50*	Nicaragua	13	N.	87	W.
8	23	30	20*	Off south coast of Kamchatka. Depth about 60 km	50½	N.	156	E.
9	00	29	26**	Near east coast of Mindanao, Philippine Islands				
9	02	26	25*	Tristan da Cunha region	30½	S.	13	W.
9	03	42	30**	Kermadec Islands region				
9	05	39	57*	Solomon Islands region	9½	S.	154½	E.
9	09	19	05*	Off northeast coast of Formosa. Felt at Taipei	24½	N.	123	E.
9	17	11	23*	Northern Peru	5	S.	79	W.
10	03	38	38*	Near coast of Nicaragua	12½	N.	87	W.
10	04	55	10*	Off coast of El Salvador	10	N.	90½	W.
10	21	10	11*	Samoa Islands. Felt at Apia	15	S.	174	W.
10	21	16	20*	Northern India	32½	N.	77	E.
11	07	02	13*	Near coast of Oaxaca, Mexico	16	N.	96½	W.
11	09	10	44*	do	16	N.	98	W.
11	21	43	40*	Kamchatka	52	N.	158	E.
11	23	32	46*	Near northwest coast of Mindanao, Philippine Islands. Several injured and minor damage at Ozamis City.	8	N.	124	E.
12	13	25	15*	Santa Cruz Islands	11½	S.	167½	E.
12	16	42	15*	India-Pakistan border	35	N.	73½	E.
13	04	03	53*	Kurile Islands. Depth about 60 km	49½	N.	155½	E.
13	05	23	24**	Negros Island region, Philippine Islands. Felt at Dumaguete and Mambajao. Depth about 200 km.				
13	08	40	23*	Northern Nevada. Mag. 4.3	40	N.	118	W.
13	16	58	00**	Southern Iran				
13	18	48	38**	Bonin Islands				
13	19	32	43**	Gulf of Tomini, Celebes. Depth about 200 km				

Footnotes at end of table.

TABLE 2.—*Summary of instrumental epicenters for 1955*—Continued

1955	Origin Time G. C. T.			Region, focal depth, and remarks	Coordinates of provisional epicenter			
					Latitude		Longitude	
	h	m	s		° ′		° ′	
Mar. 13	23	31	54*	Virgin Islands	19	N.	63½	W.
14	13	12	04*	Andreanof Islands, Aleutian Islands. Depth about 100 km. Mag. 6½.	52½	N.	173½	W.
14	17	13	45**	Solomon Islands				
14	18	23	46*	Northern Nevada. Mag. 4.7	39½	N.	118	W.
15	08	12	57**	Burma-India border				
15	11	16	12*	Samoa Islands	14½	S.	174	W.
16	02	07	43*	Fox Islands, Aleutian Islands	52	N.	167	W.
16	13	05	53*	Off coast of Liberia	3	S.	13	W.
16	20	12	22*	Off east coast of Formosa. Felt at Ilan, Hualien, and Taipei	24	N.	122	E.
16	20	39	20*	Hindu Kush. Depth about 200 km	36	N.	70	E.
16	21	45	14*	Easter Island region	26½	S.	115	W.
17	17	34	24**	New Britain				
18	00	06	42*	Near east coast of Kamchatka. Mag. 7.2	54½	N.	161	E.
18	03	21	37**	Near east coast of Kamchatka				
18	09	08	10*	Kamchatka. Depth about 100 km	55	N.	161½	E.
19	11	25	34**	Kermadec Islands region				
19	14	08	45**	Andreanof Islands, Aleutian Islands				
19	17	15	23*	Off coast of El Salvador	13	N.	90	W.
19	23	38	25**	Near east coast of Kamchatka				
20	00	35	13*	Off east coast of Kamchatka	53½	N.	161	E.
20	03	46	52*	Kamchatka	52	N.	158½	E.
20	20	13	42*	Guatemala. Depth about 150 km	15	N.	92	W.
21	00	52	00**	200 miles west of Chagos Island, Indian Ocean				
21	13	02	05*	China-Burma border. Depth about 100 km	26	N.	98½	E.
22	02	33	09*	North Atlantic Ocean	45	N.	28	W.
22	04	06	16*	Near Fallon, Nevada. Mag. 4.4	39½	N.	118½	W.
22	06	14	00*	Burma	26	N.	98½	E.
22	13	53	57**	Near coast of Guatemala				
22	13	55	38*	Yukon, Canada	65½	N.	133	W.
22	14	05	04*	Indian Ocean. Mag. 7.0	8½	S.	92	E.
23	04	54	31**	Indian Ocean aftershock				
23	05	04	36**	Macquarie Island foreshock				
23	17	16	17*	Southwest of Macquarie Island	56½	S.	147	E.
23	22	27	16*	Cebu Island, Philippine Islands. Felt at Iloilo and Mambajao	10½	N.	124	E.
24	00	31	36**	Northern Ryukyu Islands				
24	17	53	20**	Kurile Islands				
25	05	58	02*	Virgin Islands region. Felt at San Juan, Puerto Rico	19½	N.	65	W.
25	22	52	28*	Near west coast of Kamchatka. Depth about 100 km	52	N.	156	E.
26	06	55	50*	Near Hartford, Washington. Felt at Seattle and vicinity	48 03	N.	122 02	W.
27	09	33	18*	Near east coast of Kamchatka. Depth about 60 km	53½	N.	162	E.
27	13	59	40*	Near south coast of Formosa	22½	N.	120½	E.
27	14	38	44*	Eastern Tibet	30	N.	90	E.
27	21	37	38*	New Hebrides Islands region. Felt on Tanna	19	S.	169	E.
28	00	59	09*	North Atlantic Ocean	53	N.	35	W.
28	06	52	16**	Near coast of El Salvador. Felt. Depth about 100 km				
28	09	12	09*	Ryukyu Islands. Felt at Naze and Yaku-Shima. Mag. 6¼	29	N.	130	E.
28	14	45	46*	Near southwest coast of Greece. Damage at Pirgos	38	N.	21	E.
28	14	58	28*	Off east coast of Kamchatka	53	N.	160	E.
28	19	42	16*	Daghestan S.S.R	43	N.	46	E.
29	01	39	45**	Fiji Islands. Depth about 600 km				
29	04	37	40**	Yukon, Canada				
29	09	48	10**	Bonin Islands region				
29	17	46	30*	Leeward Islands	17½	N.	62½	W.
30	01	23	25*	South of Honshu, Japan. Depth about 400 km	32	N.	138	E.
30	04	51	43*	Near east coast of Kamchatka	55	N.	164	E.
30	12	07	24*	Off east coast of Kamchatka	52	N.	160½	E.
31	16	24	09*	New Hebrides Islands region. Felt on Anatom	19½	S.	169	E.
31	18	17	00*	Near northwest coast of Mindanao, Philippine Islands. About 432 killed and several million dollars damage to property and agriculture in Ilagan, Ozamis City, and Lake Lanao area. Mag. 7.3.	8	N.	124	E.
31	20	52	39*	Philippine Islands aftershock. Felt at Cagayan de Oro, Cebu City, Davao City, Malaybalay, and Mambajao.	8	N.	124½	E.
31	23	40	53*	Philippine Islands aftershock. Felt at Cagayan de Oro	8	N.	124½	E.

Footnotes at end of table.

TABLE 2.—*Summary of instrumental epicenters for 1955*—Continued

1955	Origin Time G. C. T.			Region, focal depth, and remarks	Coordinates of provisional epicenter			
					Latitude		Longitude	
	h	*m*	*s*		° ′		° ′	
April 1	14	24	23*	Hawaii, T. H. Felt at Hilo and Kona Coast	19½	N.	155	W.
1	18	41	27*	Iceland. Minor damage at Hveragerdi	64	N.	21	W.
2	23	53	42*	Off west coast of Kamchatka. Depth about 400 km	53½	N.	154½	E.
4	02	40	17*	Kermadec Islands region	26½	S.	175½	W.
4	11	11	21*	Near south coast of Formosa. Mag. 6¼	22	N.	121	E.
4	19	24	04*	Nicaragua. Mag. 6¼	13	N.	87	W.
5	03	08	00*	Mindanao, Philippine Islands. Felt at Cagayan de Oro, Cotabato, and Mambajao.	7	N.	124½	E.
5	07	33	27*	Fiji Islands region	15½	S.	178½	W.
5	11	23	17*	Mariana Islands region	13	N.	142½	E.
5	13	48	46*	Off south coast of Formosa	21½	N.	121	E.
5	14	02	46*	Formosa	23	N.	121	E.
5	15	09	15*	Gulf of California. Mag. 6¾	25	N.	110	W.
5	16	16	24*	Gulf of California aftershock. Mag. 6	24½	N.	110	W.
5	16	50	18**	800 miles south of Tasmania				
5	19	22	05*	Near coast of Mexico	26	N.	109	W.
6	12	50	50*	Mascarene Islands region	17½	S.	66½	E.
6	14	50	04**	Tonga Islands				
6	19	48	46*	Indian Ocean	33½	S.	87	E.
7	22	52	08**	Kurile Islands				
8	02	55	42*	New Hebrides Islands	18½	S.	167	E.
8	13	11	30*	Ecuador	2	S.	80	W.
9	01	27	24**	Near south coast of Alaska Peninsula				
9	04	54	18**	Solomon Islands				
9	13	01	24*	West of Sparta, Illinois. Felt in Illinois and Missouri	38	07 N.	89	48 W.
9	15	21	41*	Central Peru. Depth about 100 km	10	S.	75	W.
10	17	38	12*	Philippine Islands aftershock. Many injured, moderate property damage in Lanao Province. Mag. 6¼.	8	N.	125	E.
10	23	28	21*	Santa Cruz Islands	12	S.	167	E.
10	23	53	47*	Hokkaido, Japan. Felt. Depth about 150 km	43	N.	144	E.
11	00	01	04*	Fiji Islands. Depth about 550 km	17	S.	179	W.
11	00	50	21*	Near northeast coast of New Guinea	6	S.	147½	E.
11	20	21	16*	Nicaragua-Honduras border	13½	N.	87	W.
12	10	39	32**	Near coast of Guatemala				
12	18	02	03*	Fox Islands, Aleutian Islands	52	N.	170	W.
13	03	40	50**	Fiji Islands region				
13	11	33	00**	Near Fallon, Nevada. Mag. 4.2				
13	11	40	20*	Near east coast of Formosa	24	N.	120½	E.
13	20	45	45*	Southern Greece. Several injured and minor damage at Kalamai and Sparta.	37½	N.	22	E.
14	01	00	46**	Northern India				
14	01	28	58*	Sikang Province, China. 39 killed and 113 injured at Kangting City. Mag. 7.2.	30	N.	101½	E.
14	04	07	45**	Near south coast of Kamchatka				
14	08	24	50**	Guatemala. Depth about 150 km				
14	12	25	34*	Fox Islands, Aleutian Islands	52½	N.	170	W.
14	15	21	32**	Central Chile				
15	03	40	52*	Kirghiz S.S.R. Felt at Rawalpindi, Pakistan. Mag. 6.9	40	N.	74½	E.
15	04	13	23*	Kirghiz aftershock. Felt at Rawalpindi, Pakistan	40	N.	75	E.
15	16	07	11*	New Hebrides Islands	19	S.	168½	E.
16	01	07	42**	Samoa Islands				
16	21	40	30*	Near east coast of Kamchatka	53½	N.	162	E.
17	03	49	32*	India-Bhutan border	26½	N.	90	E.
17	12	48	55**	Near east coast of Kamchatka				
17	18	35	27*	Off south coast of Kamchatka. Depth about 60 km. Mag. 6¾.	52	N.	159½	E.
17	22	36	04*	Central Chile. Felt	29	S.	70	W.
17	23	20	33*	Bonin Islands region. Depth about 350 km	28	N.	140	E.
18	07	29	30*	Bolivia. Depth about 250 km	18	S.	67½	W.
18	08	47	58**	About 150 miles off north coast of Formosa				
18	19	16	07*	Southern Iran	28	N.	52½	E.
19	01	06	06*	Off coast of northern Chile	26	S.	74½	W.
19	07	28	04**	Celebes Sea				
19	09	57	50**	Fiji Islands. Depth about 600 km				

Footnotes at end of table.

TABLE 2.—*Summary of instrumental epicenters for 1955*—Continued

1955	Origin Time G. C. T.	Region, focal depth, and remarks	Coordinates of provisional epicenter	
			Latitude	Longitude
			° ′	° ′
April 19	14 27 11*	Kermadec Islands region. Felt on Raoul Island. Depth about 100 km.	28 S.	176½ W.
19	16 47 17*	Near east coast of Greece. One killed, many injured, and extensive property damage at Volos.	39½ N.	23 E.
19	20 24 05*	Near coast of central Chile. 1 killed and extensive damage from water waves at Tongoy and La Serena. Mag. 7.0.	30 S.	72 W.
20	00 23 00*	Central Chile aftershock. Felt	30 S.	71 W.
20	02 12 26*	Central Chile aftershock. Felt. Mag. 6½	30 S.	72½ W.
20	05 48 27*	----do	30½ S.	72½ W.
20	08 13 35*	Sinkiang Province, China	44½ N.	83½ E.
20	09 44 07*	Molucca Passage	1 N.	126 E.
21	07 18 17*	Near east coast of Greece. 7 killed, many injured, and extensive property damage at Volos.	39½ N.	23 E.
21	13 58 46**	Central Chile aftershock	----------	----------
22	01 03 56**	Sandwich Islands region	----------	----------
22	10 02 21*	Off south coast of Crete	34½ N.	24½ E.
22	11 03 35*	Near coast of Ecuador	0	81 W.
22	16 27 31*	Kurile Islands. Felt. Depth about 100 km	46 N.	150½ E.
23	03 58 03**	Central Chile aftershock	----------	----------
23	04 27 00**	Kermadec Islands region. Felt on Raoul Island. Depth about 300 km.	----------	----------
23	11 57 07**	Central Chile aftershock. Felt	----------	----------
23	16 39 04*	Bonin Islands region. Depth about 500 km	27½ N.	139½ E.
23	18 28 47*	Easter Island region. Mag. 6¾	24½ S.	113 W.
23	19 41 20**	Central Chile aftershock. Felt	----------	----------
24	12 45 25*	Windward Passage	19 N.	74 W.
24	12 59 00*	Sinkiang Province, China	45 N.	86 E.
24	14 11 42*	----do	44 N.	83½ E.
24	20 34 35*	Central Bolivia	17 S.	65 W.
24	21 07 55*	Columbia-Venezuela border	7 N.	71½ W.
25	00 23 45**	Northern Peru	----------	----------
25	08 49 50*	Kurile Islands	44½ N.	149½ E.
25	10 43 08*	Volcano Lake, Baja California. Felt at El Centro, California and Yuma, Arizona. Mag. 5.2.	32 20 N.	115 00 W.
26	03 03 34*	Near coast of El Salvador. Felt at San Salvador. Depth about 60 km. Mag. 6½.	13½ N.	89½ W.
26	04 45 20**	Southern Kurile Islands	----------	----------
27	22 42 00*	Sinkiang Province, China	44 N.	83½ E.
28	00 35 49*	Pacific Ocean. Mag. 6	8½ S.	108½ W.
28	19 04 59*	Andreanof Islands, Aleutian Islands. Felt at Adak. Mag. 6½.	51 N.	178½ W.
28	21 46 30*	New Hebrides Islands. Felt on Mare Island, Loyalty Islands; Tanna, New Hebrides; and Noumea, New Caledonia.	20 S.	169½ E.
29	08 23 03**	Northern Kurile Islands	----------	----------
29	23 25 25**	Tadzhik S.S.R.	----------	----------
30	01 32 25*	Near coast of Nicaragua. Felt	12½ N.	87 W.
30	01 43 50*	Nicaragua aftershock. Felt	12 N.	87 W.
30	06 22 05**	Northern Chile. Felt	----------	----------
30	09 15 00*	Nicaragua aftershock. Felt	12½ N.	86½ W.
30	09 19 59*	----do	13 N.	86½ W.
30	14 05 10*	Honshu foreshock. Felt	40½ N.	143 E.
May 1	09 55 16*	Off coast of northern Honshu, Japan. Felt. Mag. 6¾	39½ N.	143½ E.
1	13 58 44*	Honshu aftershock. Felt. Mag. 6	39½ N.	143½ E.
1	21 22 53*	East central Romania. Depth about 150 km	46 N.	26 E.
2	12 39 06*	Mariana Islands. Depth about 100 km	19 N.	145 E.
3	11 49 25**	Oaxaca, Mexico	----------	----------
3	12 50 05*	Off coast of Peru	8½ S.	79½ W.
3	15 15 07*	New Hebrides Islands	12½ S.	166½ E.
3	17 07 33*	Near coast of northern Honshu, Japan. Felt	39½ N.	143 E.
4	00 16 59*	Northern Assam	28 N.	96½ E.
5	05 48 30*	Kermadec Islands region	33 S.	179½ W.
5	08 44 12**	New Britain	----------	----------
6	00 04 31*	Near coast of northern Honshu, Japan. Felt	40 N.	143 E.
6	11 39 53*	North Atlantic Ocean	35½ N.	36 W.
6	16 35 57*	Andreanof Islands, Aleutian Islands. Depth about 100 km	51 N.	180

Footnotes at end of table.

TABLE 2.—*Summary of instrumental epicenters for 1955*—Continued

1955	Origin Time G. C. T.	Region, focal depth, and remarks	Coordinates of provisional epicenter	
			Latitude	Longitude
			° ′	° ′
May 7	01 34 16*	Kermadec Islands region. Depth about 300 km	28 S.	179 W.
7	11 50 39*	Near Kelseyville, California. Minor damage at Clearlake and Lower Lake. Mag. 5.0.	38 56 N.	122 52 W.
8	03 35 16*	Yukon, Canada	65½ N.	133½ W.
8	04 39 47**	Crete		
8	09 38 16	Idaho-Wyoming border	42¾ N.	110¾ W.
8	10 31 40*	Gulf of California	25½ N.	110 W.
8	10 38 33*	Near Fallon, Nevada. Mag. 4.9	39 N.	118 W.
8	21 39 01*	Near coast of Algeria. Felt at Francis Garnier, Boucheral, and Cavaignac.	36½ N.	1½ E.
9	20 15 10*	Near coast off northern Honshu, Japan. Felt	41 N.	145 E.
11	00 43 36*	Timor Island region	8 S.	128 E.
11	11 04 00*	Ecuador. Minor damage in Carchi and Imbabura Provinces. Mag. 6¾.	0	78 W.
11	15 48 57*	Near east coast of Honshu, Japan. Felt at Tokyo	36 N.	140½ E.
11	16 37 10*	Off north coast of Luzon, Philippine Islands. Felt at Aparri, Calayan, and Vigan. Mag. 6.	19½ N.	121½ E.
11	19 23 58*	Banda Sea. Depth about 700 km	7 S.	123½ E.
12	07 18 06*	Chile-Bolivia border. Felt. Depth about 100 km	22½ S.	68 W.
13	03 29 49*	Virgin Islands region. Felt at San Juan, Puerto Rico	19 N.	63½ W.
13	05 21 09*	Virgin Islands aftershock	19 N.	63½ W.
13	06 59 26*	----do	19 N.	63½ W.
13	21 55 51*	Colombia-Panama border	7½ N.	78 W.
14	06 04 14*	Bonin Islands region. Felt on Torishima. Depth about 500 km. Mag. 6¾.	28 N.	139½ E.
14	12 38 08*	Kenai Peninsula, Alaska. Depth about 100 km	59½ N.	151½ W.
14	13 35 38*	Hindu Kush. Felt at Risalpur, Rawalpindi, and Peshawar, Pakistan. Depth about 200 km.	37 N.	71½ E.
14	20 00 00*	Pacific Ocean. Off coast of Baja California	29 N.	126½ W.
14	21 29 01*	Kenai Peninsula, Alaska. Felt at Valdez and Whittier	61 N.	148 W.
15	10 07 34*	New Hebrides Islands. Felt on Anatom, Lifou, Tanna, and Uvea Islands.	18 S.	168½ E.
16	03 34 42*	South of Honshu, Japan	33 N.	141 E.
17	14 07 43*	Off south coast of Alaska Peninsula	56 N.	156½ W.
17	14 49 47*	Nicobar Islands. Mag. 7.1	7 N.	94½ E.
18	05 26 03*	Batan Islands. Felt at Basco	21 N.	122 E.
18	07 23 00**	Batan Islands aftershock. Felt at Basco		
18	15 46 04*	New Britain	5 S.	150 E.
19	03 11 20*	Near north coast of Iceland. Felt	66½ N.	17 W.
19	07 07 13*	Northern Chile. Felt at Arica. Depth about 100 km	19 S.	69 W.
21	01 30 15*	Bonin Islands foreshock	29 N.	140 E.
21	03 30 06*	Bonin Islands region. Mag. 6	29 N.	140½ E.
21	15 27 10**	Eastern Java		
21	15 39 24*	Samoa Islands. Minor damage at Apia. Depth about 100 km.	15½ S.	173 W.
21	22 24 36*	Tonga Islands region	23 S.	176½ W.
22	04 57 33**	Austria-Germany border. Minor damage at Innsbruck, Austria.		
22	14 05 35*	Mariana Islands	18 N.	147½ E.
22	23 45 17*	Central Peru. Depth about 100 km	11 S.	74 W.
23	16 32 38**	Near east coast of Formosa		
23	17 41 40*	New Hebrides Islands. Felt on Tanna	18 S.	169 E.
23	21 25 22**	Fiji Islands. Depth about 250 km		
24	01 12 11**	Kurile Islands region		
25	03 08 58*	Off coast of Guatemala. Felt at San Salvador, El Salvador	14 N.	92½ W.
25	03 58 36*	Fox Islands, Aleutian Islands. Felt on Unalaska	54 N.	165½ W.
25	12 25 25*	North Atlantic Ocean	46 N.	27 W.
25	12 28 42**	Western Sinkiang Province, China		
25	18 20 53*	Northern Kurile Islands	48 N.	157 E.
26	06 11 18*	Near north coast of Panama. Felt at Balboa Heights, Canal Zone, and Colon and Panama, Panama.	10 N.	79½ W.
26	06 59 13*	Near coast of Venezuela	10½ N.	65 W.
26	12 45 40**	Near east coast of Honshu, Japan. Felt at Tokyo		
26	13 15 12**	Nicobar Islands region		
26	16 23 10*	Solomon Islands. Mag. 6.9	10 S.	161 E.

Footnotes at end of table.

TABLE 2.—*Summary of instrumental epicenters for 1955*—Continued

1955	Origin Time G. C. T.	Region, focal depth, and remarks	Coordinates of provisional epicenter	
			Latitude	Longitude
			° ′	° ′
May 26	21 18 09**	Sinkiang Province, China		
26	21 20 57*	Solomon Islands aftershock	10 S.	160½ E.
27	07 08 01**	Solomon Islands region		
27	12 26 39*	Solomon Islands aftershock	10 S.	160½ E.
27	19 06 14**	Sumbawa Island		
28	06 20 40*	Cordoba Province, Argentina. Felt at Santiago and Valparaiso, Chile. Mag. 6¾–7.	30½ S.	65 W.
28	19 44 19*	Southern California. Felt at Sageland, Little Lake, and Tehachapi. Mag. 4.5.	35½ N.	118 W.
28	22 12 52*	Fiji Islands. Depth about 600 km	17½ S.	179 W.
29	01 15 07*	South of Fiji Islands. Depth about 600 km	24 S.	177½ E.
29	02 31 34*	Sea of Okhotsk. Depth about 400 km	50 N.	151 E.
29	03 59 05**	Bouvet Island region		
29	11 05 50*	Northern Kurile Islands	49 N.	157 E.
29	13 31 26*	Near south coast of Kodiak Island. Mag. 5¾	56 N.	155 W.
29	15 34 00*	Off south coast of Java. Mag. 6¾	10½ S.	110½ E.
29	21 03 07*	Kodiak Island aftershock. Mag. 5½	56 N.	155 W.
29	21 20 00**	Northern Chile. Depth about 100 km		
30	00 23 15*	Leeward Islands	19 N.	63 W.
30	07 55 50**	Volcano Islands region		
30	08 24 00**	Samoa Islands region		
30	09 32 10**	Off south coast of Alaska Peninsula		
30	12 31 41*	Volcano Islands. Felt at Tokyo, Japan. Depth about 570 km. Mag. 7.1.	24½ N.	142½ E.
30	16 54 57*	Fiji Islands. Depth about 550 km	17 S.	178½ W.
30	23 26 50*	Western New Guinea. Mag. 6½	3 S.	137 E.
31	07 22 30**	Near east coast of Honshu, Japan. Depth about 100 km		
31	09 30 44*	Kermadec Islands region. Felt on Raoul Island. Depth about 100 km. Mag. 6¼.	27 S.	177½ W.
31	14 44 10*	Near south coast of Hokkaido, Japan. Felt throughout Hokkaido and northern Honshu. Depth about 100 km.	42 N.	141 E.
31	16 30 18**	Bismarck Sea		
31	17 57 12*	Galapagos Islands	0	92 W.
31	20 29 12**	Western Colombia		
June 1	05 43 04**	Tonga Islands region		
1	15 25 32*	Near east coast of Formosa	24½ N.	122½ E.
1	16 10 32*	Halmahera. Depth about 100 km	1½ N.	128 E.
1	20 23 43**	Yukon-Alaska border		
2	00 18 56*	Andreanof Islands, Aleutian Islands. Mag. 6¾	51½ N.	180
2	00 34 33*	Andreanof Islands aftershock	52 N.	179½ W.
2	02 02 10*	——do	51½ N.	180
2	07 34 04**	——do		
2	11 25 56**	Bismarck Sea		
2	23 34 31*	Near west coast of Turkey. Felt at Canakkale, Ayvalik, and Sile, Turkey; the islands of Samothrace and Lemnos, and in eastern Macedonia and western Thrace, Greece.	40 N.	25½ E.
3	01 35 02*	Honshu, Japan. Felt	38½ N.	141 E.
3	05 16 56*	Andreanof Islands, Aleutian Islands. Depth about 100 km	51½ N.	179 W.
3	11 11 15*	Peru-Brazil border. Depth about 150 km	9 S.	74 W.
3	11 39 35*	Near west coast of Norway. Felt in southwestern Norway	62 N.	4 E.
4	14 39 30*	South of Honshu, Japan. Felt at Hachijo-Jima, Miyaki-jima, and Tokyo.	34 N.	140 E.
4	16 51 22*	Off coast of northern Honshu, Japan. Depth about 60 km	40 N.	142½ E.
4	17 22 31*	——do	40 N.	142½ E.
4	19 06 15*	Samoa Islands. Felt at Apia	16 S.	173 W.
5	01 53 16*	Andreanof Islands, Aleutian Islands. Mag. 6¼	51½ N.	180
5	02 13 42*	Andreanof Islands aftershock	51 N.	179½ E.
5	06 11 18*	Near northeast coast of Formosa. Felt at Taipei	24½ N.	122 E.
5	08 38 30*	Fiji Islands. Depth about 400 km	18 S.	178 W.
5	14 56 13*	Near north coast of Algeria. Slight damage at Beni-Rached and Carnot.	36½ N.	1½ E.
5	15 43 07*	Sinkiang Province, China	40 N.	75½ E.
5	22 45 17**	Mariana Islands		
6	01 17 09*	——do	12 N.	144 E.

Footnotes at end of table.

TABLE 2.—*Summary of instrumental epicenters for 1955*—Continued

1955	Origin Time G. C. T.			Region, focal depth, and remarks	Coordinates of provisional epicenter			
					Latitude		Longitude	
					° ′		° ′	
June 6	05	59	06*	Near north coast of Honshu, Japan. Felt at Kushiro and Urikawa.	40½	N.	142½	E.
6	14	18	15**	Tonga Islands region				
6	14	36	49*	Solomon Islands	11	S.	162	E.
6	21	08	32**	do				
7	00	48	56*	Sikang Province, China	27½	N.	101	E.
7	15	30	15*	do	27	N.	100½	E.
8	13	47	22*	Near Islands, Aleutian Islands	51½	N.	175	E.
8	17	08	13*	Near coast of Chiapas, Mexico. Depth about 100 km	16	N.	94	W.
8	22	16	03*	New Hebrides Islands. Depth about 200 km	13	S.	167	E.
9	04	05	20*	Fiji Islands	16	S.	179	W.
10	15	53	19**	350 miles south of Easter Island				
10	18	55	00**	500 miles south of Easter Island				
10	22	00	31*	Fiji Islands	15	S.	177½	W.
11	03	37	19**	Santa Cruz Islands				
11	21	12	27*	Fiji Islands. Depth about 650 km	16½	S.	179	W.
11	22	19	40*	Santiago del Estero Province, Argentina. Depth about 600 km.	27	S.	63	W.
11	23	06	18**	Off coast of Luzon, Philippine Islands				
12	00	12	00**	350 miles south of Easter Island				
12	01	15	25*	Kermadec Islands	29½	S.	178½	W.
12	05	14	58*	Kurile Islands	49	N.	156	E.
12	20	30	45*	do	49	N.	155	E.
13	05	05	28*	Ryukyu Islands. Felt at Naze	29½	N.	130	E.
13	13	52	59*	Kurile Islands	47	N.	151	E.
13	19	17	21*	Off coast of Formosa	24	N.	122½	E.
13	19	49	00**	Northern Celebes				
13	21	36	06*	Loyalty Islands region. Depth about 100 km	21½	S.	170½	E.
14	02	57	37**	Bonin Islands region				
14	03	42	50*	Off coast of Colombia	6	N.	78½	W.
14	06	11	18*	Off coast of Colima, Mexico. Mag. 6½–6¾	20	N.	107	W.
14	07	36	29**	Colima, Mexico aftershock. Mag. 5¾–6				
14	10	32	04*	New Ireland region	1	S.	150	E.
14	15	00	30*	Near coast of Ecuador	½	N.	80	W.
14	15	59	48*	Near Mindoro Island, Philippine Islands. Felt at Manila	13½	N.	120	E.
14	17	21	57*	Near east coast of Honshu, Japan. Felt	36½	N.	141½	E.
14	19	30	53*	Near west coast of Baja California	25	N.	113	W.
15	01	03	56*	Tadzhik S.S.R.	39½	N.	71	E.
15	03	01	05*	Loyalty Islands	21	S.	169	E.
15	10	06	16*	Near coast of Chiapas, Mexico. Felt at Chiapas	16	N.	93½	W.
15	12	28	36*	Mariana Islands	18½	N.	146	E.
15	15	36	27*	New Ireland. Depth about 100 km	3	S.	153	E.
16	06	04	36**	Mariana Islands region				
16	12	37	21*	Off coast of Baja California	25	N.	112½	W.
16	13	56	43**	New Hebrides Islands				
17	08	06	31*	Near east coast of Formosa. Felt at Hualien and Taitung	22	N.	122	E.
17	17	59	48*	Tonga Islands. Depth about 200 km	20½	S.	175	W.
18	00	31	45**	Kurile Islands				
18	04	43	26*	Kurile Islands region	46½	N.	155	E.
18	16	07	20*	Near east coast of Formosa. Felt at Taipei	24	N.	122	E.
19	19	21	05*	Near Fallon, Nevada. Mag. 4.9	39	N.	118½	W.
19	19	25	19**	Near Fallon, Nevada. Mag. 5.0				
19	19	36	14*	Fox Islands, Aleutian Islands	53	N.	166½	W.
19	21	25	21*	do	53½	N.	166	W.
20	12	07	25*	Andreanof Islands, Aleutian Islands. Mag. 6¾	51½	N.	180	
21	09	53	30*	Santiago del Estero Province, Argentina. Felt at Ponzo Hondo.	27½	S.	63	W.
21	10	51	00*	Off coast of Kamchatka	52	N.	161½	E.
21	12	40	28*	Bonin Islands region. Felt. Depth about 350 km	29	N.	139½	E.
21	15	58	55*	Mariana Islands	12	N.	144	E.
21	21	35	07*	Near coast of northern Peru	7	S.	80½	W.
22	11	11	25**	Fiji Islands region				
23	08	39	43*	Near east coast of Honshu, Japan. Felt. Depth about 60 km	37	N.	141	E.
23	11	19	18*	Kirgiz S.S.R.	42	N.	71	E.
23	22	13	31*	Kurile Islands. Felt at Nemuro and Kushiro	44½	N.	149	E.

Footnotes at end of table.

TABLE 2.—*Summary of instrumental epicenters for 1955*—Continued

1955	Origin Time G. C. T.	Region, focal depth, and remarks	Coordinates of provisional epicenter	
			Latitude	Longitude
			° ′	° ′
June 24	04 36 20**	Bangka Island, Netherlands Indies		
25	17 41 27*	Negros Island, Philippine Islands. Felt at Dumaguete and Iloilo.	9½ N.	122 E.
26	21 12 29**	North central Turkey		
27	01 58 30*	Off coast of Colima, Mexico	19½ N.	108 W.
27	10 14 06*	India-Tibet border	32 N.	78½ E.
27	13 46 10*	----do----	31½ N.	78½ E.
27	16 11 44*	Halmahera	1 N.	128½ E.
27	18 09 12*	Santa Cruz Islands	10½ S.	166 E.
28	04 28 07*	North Polar region. Mag. 6	86½ N.	70 E.
28	05 27 34**	100 miles off east coast of Mindanao, Philippine Islands		
28	06 18 53*	Tonga Islands region. Depth about 400 km	23 S.	176 W.
28	07 32 22**	Tonga Islands region		
29	03 23 58*	Off east coast of Mindanao, Philippine Islands	8½ N.	127 E.
29	03 34 22*	Off north coast of Mindanao, Philippine Islands. Felt at Mambajao and Surigao.	10 N.	126½ E.
29	04 48 40*	Near south coast of Java	8½ S.	110½ E.
29	04 54 52*	Ryukyu Islands. Felt	29 N.	131 E.
29	09 53 38*	New Guinea	6½ S.	148 E.
29	15 40 18*	Mindanao, Philippine Islands	8½ N.	125½ E.
30	04 07 16*	Kurile Islands	48½ N.	155½ E.
30	20 29 16**	150 miles off coast of Oregon		
30	22 02 04*	Mindanao aftershock	10 N.	126 E.
July 2	06 33 52**	Northern Kurile Islands		
3	08 00 53*	Rat Islands, Aleutian Islands	51 N.	177 E.
3	14 01 46*	Hindu Kush	37 N.	71 E.
3	14 26 32*	Rat Islands, Aleutian Islands. Mag. 6½	52 N.	178 E.
4	02 45 25**	Off coast of Guatemala		
4	14 19 44*	Rat Islands, Aleutian Islands. Mag. 6½–6¾	51 N.	177 E.
4	22 55 39**	Near east coast of Mindanao, Philippine Islands. Felt at Surigao.		
5	00 19 09**	Mindanao aftershock		
5	04 03 25**	Rat Islands, Aleutian Islands. Depth about 100 km		
5	10 41 11*	Tonga Islands region	16 S.	175 W.
5	11 38 40**	About 100 miles north of Montezuma, Chile. Felt		
5	15 15 00**	200 miles off coast of Oregon		
6	01 54 17*	Kamchatka. Mag. 6¾	51 N.	158 E.
6	10 29 40*	Near south coast of Alaska Peninsula	54½ N.	162½ W.
6	14 59 21*	Tonga Islands region. Depth about 100 km	24½ S.	177 W.
7	04 57 25*	Near coast of Nicaragua. Felt at San Salvador, El Salvador	12½ N.	88 W.
7	09 51 19*	China-Tibet border	31 N.	93 E.
7	18 10 02**	Rat Islands, Aleutian Islands		
8	14 12 52*	Sikang Province, China	29½ N.	97 E.
8	18 20 11*	Fiji Islands foreshock. Depth about 600 km	21 S.	179½ W.
8	18 39 11*	Fiji Islands. Felt at Nukualofa. Depth about 600 km	20½ S.	179½ W.
8	19 03 09*	Java Sea. Depth about 600 km	5 S.	110 E.
9	00 52 43**	Near Kenai Peninsula, Alaska		
9	18 24 00**	Mendoza Province, Argentina		
9	23 53 40*	Northern Greece. Felt	40½ N.	22 E.
10	06 51 58**	Mendoza Province, Argentina		
10	14 20 52*	Tonga Islands. Mag. 6¼	20 S.	175½ W.
11	03 13 56*	Southern Yukon-Alaska border	60 N.	135 W.
11	05 08 00**	Near south coast of Sumatra		
11	20 21 21*	Atlantic Ocean	1 S.	13½ W.
12	14 44 26*	----do----	12½ N.	35 W.
12	17 57 18*	Samoa Islands region	14½ S.	173 W.
13	01 56 52*	Northern Chile	20½ S.	70 W.
13	09 55 32*	Fiji Islands. Depth about 300 km	20 S.	178½ W.
13	18 40 34*	Solomon Islands	6 S.	154½ E.
13	20 16 28*	Sandwich Islands region	54½ S.	27 W.
14	03 54 02*	Solomon Islands	6 S.	154½ E.
14	09 51 37*	Nicobar Islands	8½ N.	94 E.
14	10 17 27*	Near east coast of Honshu, Japan. Felt. Depth about 60 km	36½ N.	141 E.
14	15 56 10*	Off east coast of Honshu, Japan. Felt. Depth about 60 km	39 N.	142½ E.
15	04 44 58**	About 200 miles off coast of Vancouver, British Columbia		

Footnotes at end of table.

TABLE 2.—*Summary of instrumental epicenters for 1955*—Continued

1955	Origin Time G. C. T.	Region, focal depth, and remarks	Coordinates of provisional epicenter	
			Latitude	Longitude
			° ′	° ′
July 16	07 07 08*	Dodecanese Islands. 4 killed, many injured, and extensive damage on Samos Island, and in western Turkey. Mag. 6¾.	37½ N.	27 E.
16	12 17 04**	Tonga Islands		
16	13 31 43*	Off coast of Peru	14 S.	78½ W.
17	07 06 00**	New Hebrides Islands		
17	07 54 02*	Kurile Islands	46½ N.	153 E.
17	08 19 41*	Northern Afghanistan	38 N.	71 E.
17	12 21 42*	Fox Islands, Aleutian Islands	53 N.	170 W.
17	21 58 25*	Fox Islands, Aleutian Islands. Felt on Unalaska. Mag. 5¾–6.	54 N.	168 W.
18	00 54 37*	New Hebrides Islands region	18 S.	170 E.
18	02 14 59*	Fox Islands, Aleutian Islands	52½ N.	169 W.
18	10 14 14*	Kurile Islands	44½ N.	149 E.
18	10 26 26*	----do	45 N.	149 E.
18	10 36 24*	----do	44½ N.	149 E.
18	10 40 55*	----do	44½ N.	149 E.
18	11 29 58*	New Hebrides Islands. Depth about 150 km	13½ S.	167 E.
18	13 33 08*	Samoa Islands region. Felt at Apia	16 S.	173 W.
19	00 36 52**	Kurile Islands		
19	08 47 36*	Uzbek S.S.R.	40 N.	68 E.
19	15 51 06*	Mariana Islands region	12 N.	143 E.
19	16 21 05*	Southern Alaska. Felt at Cordova and Valdez	60½ N.	145½ W.
19	16 44 24*	Southern Alaska aftershock. Felt at Cordova and Valdez	60½ N.	146 W.
19	19 52 15*	Rat Islands, Aleutian Islands. Depth about 60 km	51½ N.	178 E.
19	23 52 25*	Near south coast of Kodiak Island. Mag. 6	56½ N.	153 W.
20	00 14 20**	Kodiak Island aftershock		
20	04 07 53**	Andreanof Islands, Aleutian Islands		
20	06 44 30**	100 miles off coast of Colima, Mexico. Mag. 6		
20	07 31 45**	Fox Islands, Aleutian Islands		
20	21 00 43*	Northern Ecuador. Many injured and extensive damage at Cotacachi.	½ N.	78½ W.
21	11 45 40*	Southern Peru. Felt in northern Chile. Depth about 100 km. Mag. 6¾.	15 S.	74 W.
23	06 20 06**	Negros Island foreshock		
23	10 19 49**	Sandwich Islands region		
23	11 23 08**	Negros Island foreshock. Felt at Iloilo and Roxas City		
23	12 48 28*	Banda Sea	7 S.	128½ E.
23	13 57 04*	Negros Island, Philippine Islands. Felt at Dumaguete and Dipolog.	9½ N.	122½ E.
24	01 04 56*	Samoa Islands	14 S.	175 W.
24	11 02 14*	Southern Honshu, Japan. Felt. Depth about 100 km	36 N.	140 E.
24	16 20 03*	Near east coast of Formosa. Felt at Hualien and Shinko	24 N.	122 E.
24	19 04 20**	New Hebrides Islands		
25	05 56 45**	China-Tibet border		
25	11 22 31*	Northern Chile. Felt at Antofagasta and Mejillones. Depth about 60 km.	23½ S.	70½ W.
26	04 04 18*	Kodiak Island foreshock. Mag. 6	56½ N.	153 W.
26	05 15 50*	New Hebrides Islands	13 S.	166½ E.
27	01 20 50*	Shikoku, Japan. One killed and several injured at Tokushima	34 N.	134 E.
27	05 01 48*	Tonga Islands region	15 S.	175½ W.
27	18 19 08*	Near south coast of Kodiak Island. Mag. 6¼	56½ N.	153 W.
28	01 59 30*	Chile-Argentina border. Extensive damage in Valdivia, Cautin, and Osorno Provinces, Chile.	40½ S.	71½ W.
28	02 00 10**	Negros Island aftershock. Felt at Dumaguete and Iloilo		
28	03 06 00**	Central Afghanistan		
28	12 00 50*	Near south coast of Hokkaido, Japan. Felt at Urakawa	41½ N.	142½ E.
29	21 53 13*	Near south coast of Kamchatka	51½ N.	158 E.
31	13 22 44**	Southwestern Yukon. Felt at Kasilof and Seward, Alaska		
Aug. 1	03 15 40**	Sandwich Islands region		
1	21 44 59**	Off southeast coast of Mindanao, Philippine Islands. Felt at Dadiangas. Depth about 200 km.		
2	06 50 16**	Nicobar Islands region		
3	06 39 42**	Southwestern Colorado. Felt at Creede		
3	17 10 15**	Eastern Tibet		

Footnotes at end of table.

TABLE 2.—*Summary of instrumental epicenters for 1955*—Continued

1955	Origin Time G. C. T.	Region, focal depth, and remarks	Coordinates of provisional epicenter	
			Latitude	Longitude
			° ′	° ′
Aug. 3	19 45 20*	Andreanof Islands, Aleutian Islands	52 N.	179½ W.
3	20 16 54**	New Ireland region		
3	22 22 40**	Santiago del Estero Province, Argentina		
3	22 42 08**	Sikang Province, China		
4	00 00 00**	Bay of Bengal		
4	06 40 46*	Tibet	30½ N.	86½ E.
4	10 53 01*	Near east coast of New Britain	5 S.	152½ E.
4	14 18 20*	Ryukyu Islands	25½ N.	125 E.
5	03 12 06*	Off coast of Colima, Mexico	17½ N.	106 W.
5	10 20 50*	Dagestan A.S.S.R.	43 N.	47½ E.
5	11 11 15*	Andreanof Islands, Aleutian Islands	51 N.	179½ W.
5	16 46 01*	Fiji Islands region	16 S.	174 E.
6	08 31 25*	Tonga Islands region. Felt on Raoul Island. Depth about 360 km. Mag. 6.9.	21½ S.	177½ W.
7	12 34 41*	Off north coast of New Guinea	3½ S.	145 E.
7	17 17 32*	Near north coast of Hawaii, T. H. Felt on Hawaii, Oahu, and Maui Islands.	20½ N.	155½ W.
7	17 40 30**	About 200 miles off south coast of Honshu, Japan		
8	03 21 51*	Kern County, California. Felt at Bakersfield. Mag. 4.7	35 24 N.	118 38 W.
8	10 35 38	Mineral County, Nevada. Felt in Nevada and California	38.5 N.	118.8 W.
9	13 32 25**	New Hebrides Islands region		
9	18 14 25*	Santa Cruz Islands	11 S.	166½ E.
9	19 17 30*	Unimak Island, Aleutian Islands	54 N.	165 W.
10	05 01 43*	New Ireland region	2 S.	151 E.
10	07 45 49*	Peru-Ecuador border. Depth about 100 km	4 S.	80 W.
10	15 59 22*	Near north coast of Hokkaido, Japan. Felt at Kushiro. Depth about 100 km.	44½ N.	145 E.
11	19 26 20**	Sumbawa Island		
12	04 09 26*	Near east coast of Honshu, Japan. Felt	37 N.	141 E.
12	07 56 30**	Off coast of Mindoro Island, Philippine Islands		
14	07 11 12**	Ecuador		
14	12 27 58*	Hawaii, T. H. Slight damage south of Kilauea Crater	19½ N.	155½ W.
14	16 43 20*	Kermadec Islands region	33 S.	179 W.
15	00 27 00*	Atlantic Ocean	25½ N.	45 W.
15	14 58 27*	New Britain region	3½ S.	149½ E.
15	16 44 07*	Assam, India	27 N.	95 E.
16	04 18 47*	Off coast of El Salvador	12½ N.	88½ W.
16	07 15 45**	About 200 miles northeast of Jan Mayen Island		
16	11 46 58*	Solomon Islands. Depth about 210 km. Mag. 6.9	6 S.	155 E.
16	19 10 06*	Off coast of Nicaragua	11 N.	87 W.
17	10 42 37*	Central Peru. Depth about 150 km	8½ S.	76 W.
17	14 42 00**	Mariana Islands region		
17	17 29 52**	About 350 miles south of Honshu, Japan		
18	00 01 10*	Near east coast of Mindanao, Philippine Islands. Felt at Davao.	7 N.	127 E.
18	08 26 25**	New Hebrides Islands		
19	07 44 44*	Near coast of Peru. Felt at Trujillo. Depth about 60 km	8 S.	79½ W.
19	14 36 10**	Virgin Islands region		
19	16 28 50*	Acre, Brazil. Depth about 650 km	9 S.	71 W.
20	04 01 16**	Atlantic Ocean, about 800 miles north of Brazil		
20	06 11 38*	Samar Island, Philippine Islands. Felt at Borogan	12 N.	126 E.
20	18 57 28*	Tonga Islands. Depth about 200 km	20½ S.	176½ W.
21	00 42 50*	Tadzhik S.S.R.	38 N.	69½ E.
21	08 52 44**	Tonga Islands		
21	16 04 01*	Burma	24 N.	96½ E.
21	17 33 58*	New Guinea. Mag. 6¾–7	3 S.	137½ E.
23	09 53 20**	Mindanao, Philippine Islands		
23	14 09 17*	Central Pakistan. Felt at Leiah, Multan, Bahawalpur and Montgomery. Depth about 60 km.	31 N.	71½ E.
23	15 32 40*	About 170 miles off coast of Oregon. Mag. 6¼	43½ N.	128 W.
23	18 09 38**	Molucca Passage		
23	20 56 52*	Dagestan A.S.S.R.	43 N.	46 E.
23	22 42 36*	Off coast of Samar Island, Philippine Islands	12½ N.	126½ E.
24	04 36 22*	Fiji Islands. Depth about 600 km	18 S.	178 W.
24	06 56 20*	Off coast of Oregon	44½ N.	129½ W.

Footnotes at end of table.

TABLE 2.—*Summary of instrumental epicenters for 1955*—Continued

1955	Origin Time G. C. T.	Region, focal depth, and remarks	Coordinates of provisional epicenter	
			Latitude	Longitude
			° ′	° ′
Aug. 24	15 39 17**	Fiji Islands		
25	05 49 28*	Dagestan A.S.S.R	43½ N.	46 E.
25	22 12 43*	Rat Islands, Aleutian Islands. Depth about 60 km	52 N.	176 E.
26	06 23 29*	Yukon, Canada	65½ N.	133 W.
26	20 54 20*	Fiji Islands region. Depth about 600 km	16 S.	177½ E.
27	02 46 30*	Chile-Bolivia border. Felt at Arica, Chile	19 S.	69½ W.
27	06 48 45*	New Hebrides Islands. Depth about 150 km	15 S.	168 E.
28	13 39 17*	Near west coast of Turkey. Felt throughout the Dodecanese Islands; and Smyrna and Koucadachi, Turkey.	38 N.	27½ E.
28	20 13 30*	Near coast of Guatemala. Felt at Guatemala City, and in Chiapas, Mexico. Depth about 60 km. Mag. 6¾.	14 N.	91 W.
28	21 05 59*	Fiji Islands region. Depth about 600 km	24½ S.	179 E.
29	01 14 27**	Near coast of Guatemala. Depth about 60 km		
29	07 53 32*	Nicaragua	12 N.	87 W.
29	08 05 15**	Near coast of Peru. Depth about 100 km		
29	11 01 02**	New Hebrides Islands		
29	14 39 35**	Pacific Ocean, about 150 miles south of Panama		
29	15 33 56*	Andreanof Islands, Aleutian Islands	51 N.	178½ W.
29	16 04 54**	Pakistan-Assam border. Felt at Mymensingh, Shillong, and Sylhet, Pakistan.		
29	23 12 03*	Peru	11 S.	76½ W.
30	01 57 15*	South of Ferndale, California. Felt at Eureka	40 25 N.	124 11 W.
30	03 30 50**	Kermadec Islands		
30	17 35 20*	Bonin Islands region. Felt. Depth about 500 km	28 N.	139 E.
30	20 06 34*	Loyalty Islands. Felt at Noumea	19½ S.	169½ E.
31	12 23 36*	Alaska. Felt at Fairbanks	63½ N.	147 W.
Sept. 1	17 33 01*	Costa Rica. Ten killed and 500 homeless in Toro Amarillo	10 N.	84½ W.
1	22 40 15*	Sea of Okhotsk. Depth about 400 km	52½ N.	153 E.
2	13 17 07**	Santa Cruz Islands region		
2	21 11 56**	Western New Guinea		
3	03 45 27*	Tonga Islands. Depth about 300 km	21½ S.	175 W.
3	05 23 08*	Dominican Republic	19 N.	70 W.
3	12 36 20*	Guatemala. Felt at Guatemala City and El Salvador. Depth about 100 km. Mag. 6½–6¾.	14 N.	91 W.
3	16 22 52*	Celebes. Depth about 300 km	0	122 E.
4	11 29 40*	Northern Chile. Minor damage at Calama. Depth about 100 km.	22 S.	69 W.
4	19 09 30*	Hokkaido, Japan. Felt	43 N.	145 E.
4	22 12 45*	Belgian Congo-Uganda border	1½ N.	31 E.
5	02 01 18*	Santa Clara County, California. Minor damage at San Jose. Mag. 5.8.	37 22 N.	121 47 W.
5	07 00 35*	South of Fiji Islands. Depth about 550 km	24 S.	180
5	10 16 30**	Samoa Islands region. Felt at Apia		
5	11 45 40**	Near coast of southern Peru		
5	17 13 24*	Flores Sea. Depth about 600 km	7 S.	120½ E.
5	18 58 33**	Solomon Islands		
6	09 20 30*	Bonin Islands region. Depth about 550 km	28 N.	139 E.
6	20 58 47*	Fox Islands, Aleutian Islands	53½ N.	166 W.
7	03 19 21*	Chagos Islands region	2 S.	68 E.
8	02 03 15**	Sandwich Islands region. Mag. 6½–6¾		
8	03 27 14*	Solomon Islands. Mag. 6½	7 S.	155½ E.
8	03 31 25*	Colombia-Panama border	8 N.	77 W.
8	04 45 26*	Northern Burma. Depth about 150 km	25 N.	95 E.
8	10 59 15*	Near east coast of Kamchatka	53½ N.	160 E.
8	16 53 15*	Tonga Islands. Depth about 250 km	19 S.	176½ W.
9	09 41 57*	Near south coast of Sumatra. Mag. 6½	2 S.	100 E.
9	16 21 12*	Solomon Islands	7 S.	155 E.
10	05 54 08*	Komandorskie Islands	54½ N.	169 E.
10	09 29 15*	Andreanof Islands, Aleutian Islands	50½ N.	173½ W.
10	21 04 40*	Negros Island, Philippine Islands	10 N.	123 E.
11	00 52 45*	Near coast of Vancouver Island, British Columbia. Minor damage at Neah Bay, Washington.	48 24 N.	124 36 W.
11	01 49 57**	Peru-Ecuador border		
11	08 44 00**	Swan Island region, Carribean Sea. Slight damage on Swan Island.		

Footnotes at end of table.

TABLE 2.—*Summary of instrumental epicenters for 1955*—Continued

1955	Origin Time G. C. T.	Region, focal depth, and remarks	Coordinates of provisional epicenter	
			Latitude	Longitude
			° ′	° ′
Sept. 11	12 15 58*	Off south coast of Honshu, Japan. Felt	31½ N.	140 E.
11	17 54 28*	Solomon Islands. Mag. 6	7 S.	155 E.
11	18 04 16*	Solomon Islands aftershock	7 S.	155 E.
11	23 29 36*	Chinghi Province, China	34 N.	93½ E.
12	06 09 20*	Off coast of Egypt. Twenty killed, many injured and extensive damage in the Nile Delta area. Felt in Palestine, Cyprus, Crete, and the Dodecanese Islands. Mag. 6½.	32½ N.	30 E.
13	02 00 43*	Andreanof Islands, Aleutian Islands. Depth about 60 km. Mag. 6.	52 N.	176 W.
13	16 59 52*	South Indian Ocean	45 S.	96½ E.
13	17 36 41*	Near coast of Celebes	½ N.	125 E.
14	17 32 10**	Laptev Sea. 300 miles north of Taimyr Peninsula		
15	12 30 27*	Off coast of western New Guinea. Mag. 6¾	5 S.	134½ E.
15	18 11 44**	Samoa Islands. Felt at Apia		
16	04 30 00*	Fiji Islands region. Depth about 400 km	15 S.	177½ W.
16	04 42 30*	Kermadec Islands	30 S.	178½ W.
16	07 00 47**	Solomon Islands		
16	10 01 35*	Tonga Islands. Depth about 500 km	21 S.	176 W.
17	11 55 28*	New Hebrides Islands	17½ S.	168 E.
17	14 49 40*	----do	17½ S.	168 E.
17	18 16 35*	----do	17½ S.	168½ E.
17	19 56 46*	Kermadec Islands	32 S.	178 W.
18	01 15 46*	New Hebrides Islands	17½ S.	167½ E.
18	11 32 32*	Off east coast of Korea. Depth about 600 km	39 N.	129 E.
19	04 11 03*	Ryukyu Islands	26½ N.	129 E.
19	20 22 56**	Andreanof Islands, Aleutian Islands. Depth about 60 km		
20	13 20 19*	Kermadec Islands. Mag. 6½	32 S.	178 W.
20	20 21 13*	Bhutan	27½ N.	90 E.
21	05 00 55*	Near south coast of Navaya Zemlya Island	70½ N.	52½ E.
21	06 39 38*	New Hebrides Islands. Felt at Port Vila	17½ S.	169 E.
21	07 11 52*	Atlantic Ocean	14 S.	14½ W.
21	07 50 06*	Baja California	27 N.	112 W.
21	09 18 02**	Near coast of Oregon		
21	13 28 35*	Kermadec Islands	32 S.	178½ W.
21	22 42 55*	Bismarck Sea	6 S.	148 E.
22	03 25 03*	Off east coast of Formosa. Felt at Taipei. Mag. 6¾	24 N.	123 E.
22	05 24 26**	New Britain		
23	12 23 00*	New Hebrides Islands	15 S.	170 E.
23	15 06 19*	Yunnan Province, China. Mag. 6.9	27 N.	101½ E.
23	17 52 13**	Sikang Province, China		
23	19 17 29**	New Hebrides Islands		
24	02 00 45*	Kermadec Islands	32 S.	178 W.
24	10 21 29*	Off east coast of Formosa. Felt	22 N.	122 E.
24	16 50 45*	Northern Chile. Felt at Antofagasta and Calama. Depth about 100 km.	23 S.	68 W.
24	19 51 43**	Solomon Islands		
25	08 35 52*	Southern Russia	43 N.	46 E.
25	11 34 57**	Tonga Islands region		
25	18 48 13*	Vera Cruz, Mexico. Felt at San Juan Evangelista. Depth about 100 km.	17 N.	95½ W.
25	18 59 22*	Off east coast of Mindanao, Philippine Islands. Felt at Davao City and Hinatuan. Depth about 100 km. Mag. 6½–6¾.	6 N.	127½ E.
26	08 28 20*	Chiapas, Mexico. Felt in Chiapas and on the Isthmus of Tehuantepec. Depth about 200 km. Mag. 6¾–7.	15½ N.	92½ W.
27	20 37 12**	Kermadec Islands. Felt on Raoul Island		
28	01 46 36*	Yunnan Province, China	27 N.	101½ E.
28	04 21 43**	Celebes Sea		
28	18 09 40*	Near coast of Oaxaca, Mexico. Mag. 6	15 N.	97½ W.
28	19 47 47*	Mariana Islands	20 N.	146 E.
29	08 38 28**	Near east coast of Kamchatka		
29	11 30 33*	Andreanof Islands, Aleutian Islands	51½ N.	176 W.
29	12 58 29*	Sikang Province, China	28 N.	101 E.
29	19 58 27*	Northern Honshu, Japan. Felt. Depth about 150 km	40 N.	141 E.
30	03 08 46*	Mindanao foreshock. Felt at Davao City, Butuan, Hinatuan, and Mambajao.	8 N.	126½ E.

Footnotes at end of table.

TABLE 2.—*Summary of instrumental epicenters for 1955*—Continued

1955	Origin Time G. C. T.	Region, focal depth, and remarks	Coordinates of provisional epicenter	
			Latitude	Longitude
			° ′	° ′
Sept. 30	03 22 12**	Andreanof Islands, Aleutian Islands		
30	03 42 17**	Sikang Province, China		
30	07 01 22*	Near east coast of Mindanao, Philippine Islands. Felt at Butuan, Davao City, and Malaybalay.	7½ N.	126½ E.
30	13 47 37*	Andreanof Islands foreshock	51½ N.	176½ W.
30	19 14 24*	Andreanof Islands, Aleutian Islands	51½ N.	176½ W.
Oct. 1	00 12 29*	Komandorskie Islands region	53½ N.	170 E.
1	06 29 54*	Sikang Province, China	30 N.	101 E.
1	10 11 07**	Near coast of Guerrero, Mexico		
1	10 22 33*	Near north coast of Honshu, Japan. Felt	41 N.	141 E.
1	12 24 49*	Tonga Islands region	25 S.	177 W.
1	12 40 48**	Off south coast of Unimak Island		
1	18 49 10*	New Hebrides Islands	19 S.	169 E.
2	03 13 40**	Andreanof Islands, Aleutian Islands		
2	16 02 54*	Off coast of Panama	5½ N.	83 W.
2	19 35 43**	Tonga Islands region		
3	10 02 16**	Fiji Islands region. Depth about 600 km		
3	11 24 03**	Near south coast of Vancouver Island, British Columbia		
3	17 40 00*	Alaska Peninsula	56 N.	162 W.
4	07 26 57**	Tonga Islands region		
4	20 48 29**	Fiji Islands region		
5	00 46 42*	Tonga Islands region. Depth about 200 km	23½ S.	178 W.
5	08 57 55*	Near east coast of Kamchatka. Mag. 6–6¼	53½ N.	161 E.
6	10 55 38**	North Atlantic Ocean		
6	11 03 16*	Mendoza Province, Argentina. Felt at Constitucion, Santiago, and Talca, Chile. Depth about 150 km. Mag. 6½.	36 S.	70 W.
6	17 48 39*	New Hebrides Islands	19 S.	167 E.
7	04 00 37*	North Atlantic Ocean	30½ N.	41 W.
7	07 20 36*	Tonga Islands	19 S.	173½ W.
7	14 50 42**	Central Peru. Depth about 100 km		
8	21 05 32**	Fiji Islands		
9	12 50 30*	Mid-Atlantic Ocean	2 S.	12½ W.
9	17 40 09*	New Britain. Felt at Kokopo and Rabaul	5 S.	153 E.
9	23 13 32*	Near Islands, Aleutian Islands. Mag. 6	50½ N.	176 E.
10	01 17 26*	Near south coast of Hokkaido, Japan. Felt	41½ N.	143 E.
10	08 57 44*	New Britain. Felt at Kokopo and Rabaul. Mag. 7.1	5 S.	153 E.
10	11 52 32**	New Britain aftershock		
10	20 51 42*	Tonga Islands. Depth about 60 km	17½ S.	174 W.
10	23 03 41*	Northern Honshu, Japan. Felt. Depth about 100 km	39 N.	140½ E.
11	01 14 27**	Northern Celebes		
11	04 10 00**	Indian Ocean, 700 miles east of Mascarene Islands		
13	09 26 49*	Solomon Islands. Depth about 60 km. Mag. 7.1	10 S.	161 E.
13	11 59 22**	Samoa Islands region		
13	16 19 51*	Off coast of North Island, New Zealand. Depth about 200 km.	36 S.	177½ E.
13	17 50 16*	Formosa. Felt at Taipei	24 N.	121 E.
13	21 50 59*	Near coast of Nicaragua	12 N.	87 W.
14	00 55 55*	Tonga Islands	16½ S.	172 W.
14	08 43 00*	Pacific Ocean, west of Galapagos Islands. Mag. 6–6¼	3 S.	103½ W.
14	09 55 11*	Fiji Islands. Depth about 600 km	17½ S.	179 W.
14	14 43 41*	Tonga Islands region	24½ S.	176½ W.
15	04 31 15*	Near coast of Colombia	6 N.	77½ W.
16	04 41 23**	Farquhar Islands, 300 miles north of Madagascar		
16	17 16 38**	Near south coast of Kamchatka. Depth about 60 km		
17	01 08 07*	Solomon Islands	6 S.	154 E.
17	20 08 54*	Southern Saudi Arabia	17½ N.	43½ E.
18	15 32 47**	Eastern Tibet		
19	01 45 26*	Northern Honshu, Japan. One killed, 152 buildings destroyed and two bridges damaged in Akita Prefecture.	40 N.	139½ E.
19	09 54 43*	Northern Kurile Islands. Mag. 6½	49½ N.	155 E.
19	20 36 30**	Kurile Islands aftershock		
20	01 33 30**	Southern Atlantic Ocean, about 300 miles north of South Georgia Island.		
20	07 27 58*	Near east coast of Kamchatka	52½ N.	159 E.
21	04 32 03*	Near coast of Sumatra	4 N.	95 E.
21	19 02 40*	Fiji Islands. Depth about 650 km. Mag. 6¼	21 S.	179 W.

Footnotes at end of table.

TABLE 2.—*Summary of instrumental epicenters for 1955*—Continued

1955	Origin Time G. C. T.	Region, focal depth, and remarks	Coordinates of provisional epicenter	
			Latitude	Longitude
			° ′	° ′
Oct. 21	23 09 38*	Northern Celebes. Mag. 6¼–6½	½ S.	123½ E.
22	01 18 00*	Yukon, Canada	67 N.	136 W.
22	10 09 20*	Kurile Islands	46 N.	156 E.
22	11 18 22**	Celebes aftershock		
22	12 43 30*	----do	0	123 E.
22	22 06 56*	New Britain	6 S.	149 E.
22	22 33 10*	Fiji Islands region. Depth about 300 km	15 S.	176 W.
23	17 04 09*	Solomon Islands	11½ S.	163 E.
24	00 20 15*	Off coast of New Britain. Depth about 250 km	5 S.	150½ E.
24	04 10 44*	Contra Costa County, California. Moderate damage in Walnut Creek and Oakland. Mag. 5.4.	37 58 N.	122 03 W.
24	05 03 34**	Kermadec Islands		
25	03 08 28**	Near west coast of Greece		
25	16 34 23*	Oaxaca, Mexico. Felt on the Isthmus of Tehuantepec. Mag. 6–6½.	16½ N.	95½ W.
25	17 49 42*	Imperial County, California. Felt. Mag. 4.3	33 00 N.	115 32 W.
26	11 12 39*	Near east coast of Formosa. Felt	24½ N.	122½ E.
27	00 04 10*	Andreanof Islands, Aleutian Islands. Depth about 100 km	52 N.	179½ W.
27	01 36 58*	Fiji Islands. Depth about 600 km	17 S.	179 W.
27	02 55 40*	Island of Hawaii, T. H. Felt	20 N.	155½ W.
27	03 34 17*	Kurile Islands region	49 N.	157½ E.
27	11 06 32*	Santa Cruz Islands	10½ S.	166 E.
27	11 50 40*	Off east coast of Kamchatka	52½ N.	159½ E.
28	09 17 12*	Near coast of southeastern Alaska. Felt at Sitka	58½ N.	138 W.
28	12 01 06*	Fiji Islands. Depth about 600 km	20 S.	178 W.
29	03 14 40**	Off east coast of Kamchatka		
29	20 56 07*	Near east coast of Kamchatka	54½ N.	161½ E.
30	02 01 39*	Kermadec Islands	29½ S.	178½ W.
30	11 34 40*	Northern Celebes	½ S.	123½ E.
30	19 20 50*	Fiji Islands. Depth about 650 km	19 S.	180
31	01 05 53*	Andreanof Islands, Aleutian Islands. Mag. 5¾–6	52 N.	175½ W.
31	08 24 10*	Tonga Islands region. Depth about 650 km	23½ S.	178 W.
Nov. 1	10 12 09*	New Britain region	5 S.	153 E.
1	15 14 18**	Loyalty Islands		
1	23 46 10*	Off east coast of Honshu, Japan. Felt	39½ N.	144 E.
2	04 52 11**	Kermadec Islands		
2	07 37 54**	Near north coast of Honshu, Japan. Felt		
2	18 36 00*	Off south coast of Mindanao, Philippine Islands. Felt at General Santos.	5 N.	126 E.
2	19 40 06*	Monterey County, California. Felt from Monterey to San Luis Obispo. Mag. 4½.	36 00 N.	120 55 W.
3	12 39 56**	Bolivia-Chile border. Felt. Depth about 100 km		
4	22 43 50*	Mendoza Province, Argentina. Minor damage at Talca, Chile. Depth about 100 km. Mag. 6¾.	33½ S.	69½ W.
5	03 53 38*	New Hebrides Islands. Depth about 150 km	19½ S.	169 E.
5	07 19 23*	Southern Gulf of California	24½ N.	109 W.
5	08 09 51*	Gulf of California aftershock	24½ N.	109 W.
5	08 40 17**	Southwestern Bolivia		
5	12 23 15**	Off east coast of Mindanao, Philippine Islands. Felt at Davao City and Hinatuan.		
6	22 07 33*	Kermadec Islands region. Depth about 100 km	25½ S.	177½ W.
6	23 57 10*	Colombia-Venezuela border. Depth about 100 km	7 N.	71 W.
7	07 33 52*	Fiji Islands. Depth about 600 km	17 S.	179½ E.
9	21 58 45**	Near east coast of Madagascar. Minor damage at Alaotra, Andilamena, Imerimandroso, and Tananarive.		
10	01 24 20*	New Britain region	5 S.	152 E.
10	01 44 04*	Samoa Islands. Felt at Apia. Depth about 100 km. Mag. 6¾.	15 S.	174 W.
10	03 58 46*	Kurile Islands	47½ N.	152½ E.
10	05 10 20*	Kermadec Islands region	28½ S.	178½ W.
10	08 52 20*	Salta Province, Argentina. Felt at Antofagasta, Chile. Depth about 200 km.	24 S.	67 W.
11	08 31 11**	South Atlantic Ocean, about 400 miles north of Tristan da Cunha.		
11	10 37 03**	Tonga Islands region		

Footnotes at end of table.

TABLE 2.—*Summary of instrumental epicenters for 1955*—Continued

1955	Origin Time G. C. T.	Region, focal depth, and remarks	Coordinates of provisional epicenter	
			Latitude	Longitude
			° ′	° ′
Nov. 11	18 27 34**	Near west coast of Turkey. Felt on Samos Island		
12	05 32 14*	Northern Red Sea. Felt at Aswan, Cairo, and Kera, Egypt	25½ N.	34½ E.
12	10 07 47*	New Britain. Depth about 60 km	5 S.	152½ E.
12	11 12 15*	Near north coast of Mindanao, Philippine Islands. Felt at Hinatuan and Surigao.	10 N.	126 E.
12	12 19 44*	South of Fiji Islands. Depth about 600 km	22½ S.	179 E.
12	13 43 00**	New Britain region		
12	15 45 34*	New Hebrides Islands region	17½ S.	167½ E.
12	22 54 37*	South of Panama	7 N.	82½ W.
13	07 51 10**	Southern Gulf of California		
13	22 43 40**	Fiji Islands region		
13	23 07 08*	Kermadec Islands region. Depth about 100 km	33½ S.	179½ W.
14	01 15 56*	Mariana Islands. Depth about 100 km	17½ N.	146 E.
14	03 09 10*	New Hebrides Islands. Depth about 200 km	14 S.	167 E.
14	13 08 07*	Near coast of New Britain	5½ S.	152½ E.
14	13 23 09*	Mariana Islands. Depth about 150 km	17½ N.	145½ E.
15	03 16 32*	Solomon Islands region	5 S.	154 E.
15	10 06 49*	Off south coast of Alaska Peninsula. Mag. 6½	55½ N.	155 W.
15	22 10 53*	Sinkiang Province, China	43½ N.	87 E.
16	09 05 54**	Sandwich Islands		
16	14 33 57**	Andreanof Islands, Aleutian Islands		
16	23 54 04*	Arctic Ocean, northeast of Greenland	84 N.	2 E.
17	03 44 05*	Solomon Islands region	5 S.	154 E.
17	06 53 27*	Northern Chile. Felt at Copiapo. Depth about 60 km. Mag. 6¾.	26½ S.	69 W.
17	23 35 43**	Kenai Peninsula, Alaska		
18	03 26 53**	Off coast of Peru		
18	07 05 26*	Samoa Islands region. Felt at Apia	15 S.	173 W.
18	21 56 10*	Tonga Islands	21 S.	173 W.
19	05 39 08*	Fiji Islands region	14 S.	179 W.
19	08 25 32*	New Hebrides Islands	17½ S.	168 E.
19	23 03 01**	Solomon Islands		
21	20 25 34.5	Fallon, Nevada. Felt at Austin. Mag. 5.5	39.4 N.	118.0 W.
21	20 55 27*	Southern California. Felt at Arvin, Bakersfield, and Tehachapi. Mag. 4.3.	35 24 N.	118 44 W.
21	21 04 00*	Near east coast of North Island, New Zealand. Felt	38 S.	178 E.
22	03 24 00*	Eastern Tuamotu Archipelago. Mag. 6¾	24½ S.	123 W.
22	17 05 22**	New Britain		
23	00 04 40**	Southern Colombia. Felt		
23	02 33 47*	Bhutan-Pakistan border	26½ N.	90 E.
23	03 14 36*	Near coast of Guatemala. Depth about 150 km	14 N.	90 W.
23	06 29 29*	Near south coast of Kamchatka. Depth about 70 km. Mag. 7.0.	50½ N.	157 E.
24	04 51 20*	Near north coast of Luzon, Philippine Islands. Felt at Aparri, Calayan, and Laoag.	19 N.	120½ E.
24	11 10 32*	Near south coast of Kamchatka	51 N.	157 E.
25	08 33 13*	Hokkaido, Japan. Felt in Hokkaido and northern Honshu	43 N.	143 E.
25	14 24 26**	Alaska Peninsula		
25	16 49 30**	....do		
26	13 24 47**	Santa Cruz Islands		
26	17 36 00*	Northern Baja California. Felt in Imperial Valley and at San Diego. Mag. 5.4.	31.6 N.	116.1 W.
27	07 05 07*	Tonga Islands region. Depth about 100 km	24½ S.	177½ W.
27	13 06 50*	Alaska Peninsula	57½ N.	156½ W.
27	17 17 24*	Mariana Islands. Depth about 600 km	19 N.	145 E.
27	19 30 35*	Off east coast of Formosa	23 N.	124½ E
27	21 29 05**	Banda Sea. Depth about 500 km		
28	01 30 26**	Near east coast of Kamchatka		
28	04 24 43**	Andreanof Islands, Aleutian Islands		
28	18 21 39**	Samoa Islands region		
29	03 57 57*	Off north coast of Luzon, Philippine Islands. Felt at Aparri and Calayan.	19½ N.	121 E.
29	06 04 52*	Azores region	37½ N.	34 W.
29	09 31 12*	Solomon Islands	5 S	153½ E.
29	16 24 05*	Tonga Islands region. Depth about 200 km	18½ S.	175½ W.

Footnotes at end of table

TABLE 2.—*Summary of instrumental epicenters for 1955*—Continued

1955	Origin Time G. C. T.	Region, focal depth, and remarks	Coordinates of provisional epicenter	
			Latitude	Longitude
			° ′	° ′
Nov. 29	19 22 33**	Central Kamchatka		
30	00 09 51*	Fiji Islands region	21 S.	174½ E.
30	06 25 50**	----do		
30	08 46 50**	Southern Yukon, Canada		
30	17 14 36*	Santa Cruz Islands	11 S.	166 E.
Dec. 1	08 38 21**	Solomon Islands region. Depth about 100 km		
1	10 25 00*	Near Fallon, Nevada. Mag. 4.4	39½ N.	118 W.
3	14 27 54*	Southern Honshu, Japan. Felt	35½ N.	135 E.
4	02 01 28*	Kermadec Islands region	35 S.	179½ W.
4	14 02 08*	Central Iran	34 N.	49 E.
5	07 27 24*	Tibet	30 N.	89½ E.
5	12 06 55**	Southern Tibet		
5	13 30 56*	Southern Honshu, Japan. Felt at Kure	35 N.	133 E.
5	14 26 46*	Jujuy Province, Argentina. Depth about 150 km	23½ S.	67 W.
5	20 14 18*	Off east coast of Formosa	24 N.	122½ E.
6	04 31 00*	Northern Chile. Felt at Iquique. Mag. 6¾	20 S.	70 W.
7	05 49 40**	Central Yukon, Canada		
7	14 26 26*	Samoa Islands region. Felt at Moto'otua and Apia	15 S.	173½ W.
7	15 03 11*	Bonin Islands. Mag. 6¾–7	26½ N.	142½ E.
7	16 09 45**	Tonga Islands region. Depth about 200 km		
7	22 53 27*	Ryukyu Islands	26 N.	128½ E.
8	02 08 03**	Near south coast of Sumatra		
8	17 36 00*	New Britain region. Depth about 500 km	4 S.	152 E.
8	21 58 03*	Outer Mongolia	45 N.	99½ E.
9	08 58 06*	Kermadec Islands region	31 S.	176½ W.
10	20 24 14*	Northeastern Siberia	64½ N.	154 E.
11	03 27 08**	Kermadec Islands		
11	05 42 35*	Hindu Kush. Depth about 100 km	27½ N.	71½ E.
11	07 22 30**	Central Kamchatka		
11	08 33 19*	Near north coast of Honshu, Japan. Felt. Depth about 60 km.	40½ N.	143 E.
11	11 12 11**	Kermadec Islands region		
11	12 23 49**	Fiji Islands region		
12	02 33 00**	Northern Chile. Felt		
12	08 58 53*	Near south coast of Mindanao, Philippine Islands. Felt at General Santos and Davao City. Depth about 60 km.	4½ N.	126 E.
12	09 29 03*	Near east coast of Honshu, Japan. Felt at Tokyo. Depth about 100 km.	36 N.	140½ E.
12	19 41 20*	Off coast of Oregon	43½ N.	127½ W.
13	08 26 00**	Kermadec Islands		
13	13 37 24*	Northern Celebes	0	123½ E.
14	10 51 44*	Pakistan-Burma border. Felt at Chittagong and Comilla, East Pakistan.	22 N.	92½ E.
14	12 22 15*	Rat Islands, Aleutian Islands	51½ N.	178 E.
14	12 52 03**	Near coast of Colombia		
14	13 04 20**	Mariana Islands region		
14	20 01 05*	Mendoza Province, Argentina	30 S.	69 W.
15	01 19 00**	Easter Island region		
15	13 58 32**	Bonin Islands region		
15	19 02 43*	Bismarck Sea	3½ S.	149 E.
17	00 37 53**	About 100 miles northwest of Sitka, Alaska		
17	05 17 19**	Imperial County foreshock. Felt at Brawley. Mag. 4.3		
17	06 07 29	Imperial County, California. Minor damage at Brawley and El Centro. Mag. 5.4.	33 00 N.	115 30 W.
17	06 52 03**	Imperial County aftershock. Felt at Brawley. Mag. 4.6		
17	08 06 42*	Western Iran	33½ N.	49 E.
17	08 16 37*	Hindu Kush. Depth about 200 km	37 N.	70½ E.
18	05 33 10*	Central Honshu, Japan Felt at Tokyo. Depth about 60 km	36½ N.	139½ E.
18	06 27 45*	Southern Honshu, Japan. Felt	35 N.	134½ E.
18	10 07 04**	Near northeast coast of New Guinea. Depth about 200 km		
18	21 57 30*	Eastern Tibet	30 N.	90½ E.
18	22 37 45*	----do	30 N.	90 E.
19	03 13 46*	Near east coast of Mindanao, Philippine Islands	8½ N.	127 E.
19	13 55 12**	Central Kamchatka		
20	13 41 47**	Ecuador Depth about 200 km		

Footnotes at end of table.

TABLE 2.—*Summary of instrumental epicenters for 1955*—Continued

1955	Origin Time G. C. T.			Region, focal depth, and remarks	Coordinates of provisional epicenter			
					Latitude		Longitude	
					° ′		° ′	
Dec. 20	13	50	46*	New Hebrides Islands. Depth about 100 km	14½	S.	167	E.
21	03	03	32**	Central Kamchatka				
21	11	58	30**	Mona Passage				
21	19	54	54*	Southern Russia	44	N.	40	E.
22	06	20	48**	Fiji Islands. Depth about 600 km				
22	08	30	43*	Off east coast of Honshu, Japan	40	N.	145	E.
22	10	09	10**	Galapagos Islands				
22	10	09	37*	Tonga Islands region. Depth about 150 km	18	S.	176	W.
22	12	05	10*	Near Fallon, Nevada. Mag. 4.7	39	N.	118½	W.
22	20	29	43*	Volcano Islands	23½	N.	141½	E.
23	23	09	45**	Fiji Islands				
23	23	24	10**	Northern Kurile Islands				
24	03	34	40*	Off south coast of Costa Rica	8½	N.	85	W.
24	08	21	03**	Tonga Islands region. Depth about 100 km				
25	10	38	49**	Near southeast coast of Kamchatka				
26	09	08	46*	Off south coast of Kyushu, Japan. Felt on Yakashima. Depth about 60 km.	30	N.	130	E.
27	02	27	54*	Kermadec Islands region. Felt on Raoul Island. Depth about 200 km.	26	S.	177	W.
27	08	47	13*	Mariana Islands. Depth about 100 km	13	N.	145	E.
27	11	49	50**	Fiji Islands region				
27	17	20	42*	Kermadec Islands. Depth about 400 km	32	S.	180	
27	18	30	20**	Northern Chile. Felt				
29	04	53	43*	Kurile Islands. Felt	44	N.	148	E.
29	08	25	33*	Eastern Tibet	30	N.	90½	E.
29	16	04	45*	Southern Alaska. Felt. Depth about 100 km	59½	N.	154	W.
30	06	57	51*	Molucca Passage	½	N.	126	E.
30	09	26	13**	Fiji Islands region. Depth about 600 km				
30	12	06	12*	Near north coast of Java	6	S.	108	E.
31	05	00	06*	Peru-Chile border. Felt	18	S.	69½	W.
31	21	14	11*	Near south coast of Hokkaido, Japan. Felt	42	N.	142	E.

*Indicates probable error of 1/10 minute.
**Indicates probable error of 1/4 minute.

TABLE 3.—*Principal earthquakes of the world from January through December 1955*

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 earthquake; (3) earthquakes of unusual interest outside the 2 preceding categories; and (4) magnitude as determined by Pasadena.

1955	Origin Time G. C. T.			Region	Coordinates of provisional epicenter				Remarks
					Latitude		Longitude		
	h	*m*	*s*		°		°		
Jan. 5	00	50	12*	Off coast of South Island, New Zealand.	50	S.	162½	E.	Mag. 6.9.
13	02	03	43*	Fox Islands, Aleutian Islands	53	N.	167½	W.	Felt on Unalaska. Mag. 6.9.
31	05	03	03*	Mato Grosso, Brazil	12½	S.	57	W.	Mag. 6¾.
Feb. 17	19	31	31*	Near coast of southern Italy	39½	N.	14	E.	Depth about 470 km. Mag. 5½.
18	22	48	33*	Pakistan	30½	N.	67	E.	12 killed, many injured, and moderate property damage in the Quetta area.
21	19	46	42*	Near east coast of Greece	39	N.	23	E.	2 killed, 3 injured, and several houses destroyed in Volos.
27	20	43	24*	Kermadec Islands region	27½	S.	176	W.	Felt on Raoul Island, Tolaga Bay, and at Wellington, New Zealand. Mag. 7.4.
Mar. 1	01	46	14*	Off coast of Brazil	21	S.	37	W.	Felt at Espirito Santos. Mag. 6½.
18	00	06	42*	Near east coast of Kamchatka.	54½	N.	161	E.	Mag. 7.2.
22	14	05	04*	Indian Ocean	8½	S.	92	E.	Mag. 7.0.
31	18	17	00*	Near northwest coast of Mindanao, Philippine Islands.	8	N.	124	E.	432 killed and several million dollars damage to property and agriculture in Ilagan, Ozamis City, and Lake Lanao area. Mag. 7.3.
Apr. 14	01	28	58*	Sikang Province, China	30	N.	101½	E.	39 killed and 113 injured at Kangting City. Mag. 7.2.
15	03	40	52*	Kirghiz S.S.R.	40	N.	74½	E.	Felt at Rawalpindi, Pakistan. Mag. 6.9.
19	16	47	17*	Near east coast of Greece	39½	N.	23	E.	1 killed, many injured, and extensive property damage in the Volos area.
19	20	24	05*	Near coast of central Chile	30	S.	72	W.	1 killed, and extensive damage from water waves at La Serena and Tongoy. Mag. 7.0.
21	07	18	17*	Near east coast of Greece	39½	N.	23	E.	7 killed, 108 injured, and extensive property damage at Volos.
May 11	19	23	58*	Banda Sea	7	S.	123½	E.	Depth about 700 km.
17	14	49	47*	Nicobar Islands	7	N.	94½	E.	Mag. 7.1.
26	16	23	10*	Solomon Islands	10	S.	161	E.	Mag. 6.9.
30	12	31	41*	Volcano Islands	24½	N.	142½	E.	Felt at Tokyo. Depth about 570 km. Mag. 7.1.
July 16	07	07	08*	Dodecanese Islands	37½	N.	27	E.	4 killed, 20 injured, and extensive damage on Samos Islands, Greece, and in western Turkey. Mag. 6¾.
27	01	20	50*	Shikoku, Japan	34	N.	134	E.	1 killed, several injured, and minor damage at Tokushima.
Aug. 6	08	31	25*	Tonga Islands region	21½	S.	177½	W.	Felt on Raoul Island. Depth about 360 km. Mag. 6.9.
16	11	46	58*	Solomon Islands	6	S.	155	E.	Depth about 210 km. Mag. 6.9.
Sept. 1	17	33	01*	Costa Rica	10	N.	84½	W.	10 killed and 500 homeless in Toro Amarillo.
12	06	09	20*	Off coast of Egypt	32½	N.	30	E.	20 killed, many injured, and extensive property damage in the Nile Delta area. Also felt in Cyprus, Greece, Palestine, and Syria. Mag. 6½.
23	15	06	19*	Yunnan Province, China	27	N.	101½	E.	Mag. 6.9.
26	08	28	20*	Chiapas, Mexico	15½	N.	92½	W.	Felt in Chiapas and the Isthmus of Tehuantepec. Depth about 200 km. Mag. 6¾–7.

Footnotes at end of table.

TABLE 3.—*Principal earthquakes of the world from January through December 1955—Con.*

1955	Origin Time G. C. T.	Region	Coordinates of provisional epicenter		Remarks
			Latitude	Longitude	
	h m s		°	°	
Oct. 10	08 57 44*	New Britain	5 S.	153 E.	Felt at Kokopo and Rabaul. Mag. 7.1.
13	09 26 49*	Solomon Islands	10 S.	161 E.	Depth about 60 km. Mag. 7.1.
Nov. 22	03 24 00*	Eastern Tuamotu Archipelago.	24½ S.	123 W.	Mag. 6¾.
23	06 29 29*	Near south coast of Kamchatka.	50½ N.	157 E.	Depth about 70 km. Mag. 7.0.

*Indicates probable error of 1/10 minute.

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 Earthquakes* series and in S. P. 201, *Earthquake Investigations in California, 1934–35*. 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 25, D. C.

Units and 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 25, D. C.

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 periods 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 December 31, 1955*

NORTHERN CALIFORNIA

Station	Accelero-graph	Displace-ment meter	Weed
Berkeley, University of California	1		
Eureka	1		
Ferndale	1	1	
Hollister, Library	1	1	
Monterey, City Hall			1
Oakland, City Hall, basement	1		
Oakland, City Hall, 16th floor	1		
Oakland, Chabot Observatory			1
Sacramento, Federal Building			1
San Francisco, Alexander Bldg., basement	1		
San Francisco, Alexander Bldg., 11th floor	1		
San Francisco, Alexander Bldg., 16th floor	1		
San Francisco, 450 Sutter St., basement			1
San Francisco, 450 Sutter St., 29th floor			1
San Francisco, Golden Gate Park	1		
San Francisco, Shell Bldg., subbasement			1
San Francisco, Shell Bldg., 21st floor			1
San Francisco, Shell Bldg., 29th floor			1
San Francisco, Southern Pacific Bldg., basement	1	1	
San Francisco, Southern Pacific Bldg., 14th floor	1		
San Francisco, State Bldg., basement	1	1	
San Jose, Bank of America, basement	1	1	
San Jose, Bank of America, 13th floor	1		
Suisun Bay Bridge	1		

SOUTHERN CALIFORNIA

Arvin	1	1	
Bakersfield	1		
Bishop	1		
Cachuma Dam, Crest	1	1	
Cachuma Dam, Valve House	1	1	
Colton	1	1	
El Centro	1	2	
Hollywood Storage Co., basement	1		
Hollywood Storage Co., penthouse	1		
Hollywood Storage Co., adjoining P. E. Lot	1		
Long Beach	1		
Los Angeles, Edison Bldg., basement	1		
Los Angeles, Occidental Life Bldg., basement	1		
Los Angeles, Occidental Life Bldg., 11th floor	1		
Los Angeles, Subway Terminal, subbasement	1	1	
Los Angeles, Subway Terminal, 13th floor	1		
Los Angeles, Vernon, C. M. D	1		
Pasadena, California Institute of Technology	1		1
San Bernardino			1
San Diego	1		
San Luis Obispo	1		
Santa Ana			1
Santa Barbara	1		
Taft	1		
Westwood, University of California, Los Angeles	1	1	

TABLE 4.—*Coast and Geodetic Survey strong-motion stations in operation as of December 31, 1955*—Continued

OUTSIDE CALIFORNIA

Station	Accelero-graph	Displace-ment meter	Weed
Bozeman, Mont., Montana State College	1		
Butte, Mont., Montana School of Mines	1		
Hungry Horse, Mont., Hungry Horse Dam, Bureau of Reclamation	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 Agricultural College	1		
Olympia, Wash., Highway Test Laboratory	1		
Portland, Oreg., State Office Bldg	1		
Ross Dam, Wash., Block 16	1		
Ross Dam, Wash., Right Bank	1		
Seattle, Wash., Army Base	1		
Tacoma, Wash., College of Puget Sound	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	61	16	11

TABLE 5.—*List of shocks recorded and records obtained on strong-motion seismographs in 1955*

Date	Region and recording station	Records			
		Accelerograph	Survey displacement meter	Carder displacement meter	Weed
Jan. 25	Southern California, Long Beach	1		1	
Feb. 9	Peru, South America, Lima	1			
Mar. 2	Southern California, San Luis Obispo	1			
Apr. 25	Imperial Valley, California, El Centro	1	1	1	
June 13	Imperial Valley, California, El Centro	1	1	1	
Aug. 8	Southwestern Nevada, Hawthorne	1			
Aug. 29	Northern California, Eureka	1			
	Ferndale	1	1		
Sept. 4	West Central California, Hollister			1	
	Oakland, Chabot Observatory				1
	Oakland, City Hall	2			
	San Francisco, Alexander Building	3			
	San Francisco, 450 Sutter Building, 29th floor				1
	San Francisco, Shell Building				3
	San Francisco, Southern Pacific Building	2	1		
	San Francisco, State Building	1	1		
	San Jose, Bank of America Building	2		1	
Oct. 23	Central California, Berkeley	1			
	Hollister	1		1	
	Suisun Bay Bridge	1			
	Oakland, City Hall	2			
	San Francisco, Alexander Building, 11th and 16th floors	2			
	San Francisco, 450 Sutter Building, 29th floor				1
	San Francisco, Golden Gate Park	1			
	San Francisco, Shell Building				3
	San Francisco, Southern Pacific Building	2	1		
	San Francisco, State Building	1	1		
	San Jose, Bank of America Building	2		1	
Oct. 25	Imperial Valley, California, El Centro	1		1	
Nov. 2	Hollister, California	1		1	
Nov. 26	Imperial Valley, California, El Centro	1	1	1	
Dec. 16	Imperial Valley, California, El Centro	1	1	1	
Dec. 16	Imperial Valley, California, El Centro	1	1	1	
Dec. 16	Imperial Valley, California, El Centro	1	1	1	
Dec. 16	Imperial Valley, California, El Centro		1		
	Total	37	12	13	9

TABLE 6.—*Summary of outstanding instrumental and non-instrumental data for 1955*

PERU EARTHQUAKE OF FEBRUARY 9

Epicenter	Recording station and distance	Location of instrument	Intensity [1]	Acceleration	Displacement [2]
				cm./sec.[2]	*cm.*
Peru	Lima	1st floor		34	0.02
SOUTHERN CALIFORNIA EARTHQUAKE OF JUNE 13					
32°58′ N., 115°32′ W., near Brawley, V.*	El Centro, 12 miles	Subbasement	V	62	.06
SOUTHWESTERN NEVADA EARTHQUAKE OF AUGUST 8					
38.5° N., 118.8° W., near Hawthorne, V.*	Hawthorne, 9 miles	Basement	V	10	.02
NORTHERN CALIFORNIA EARTHQUAKE OF AUGUST 29					
40°25′ N., 124°11′ W., south of Ferndale, V.*	Ferndale, 12 miles	1st floor	V	118	.10
WEST CENTRAL CALIFORNIA EARTHQUAKE OF SEPTEMBER 4					
37°22′ N., 121°47′ W., east of San Jose, VII.* Mag. 5.5.	San Jose, 6 miles	13th floor	VII	124	3.
CENTRAL CALIFORNIA EARTHQUAKE OF OCTOBER 23					
37°58′ N., 122°03′ W., between Walnut Creek and Concord, VII.* Mag. 5.4.	Suisun Bay Bridge, 5 miles	Bridge pier	VI	118	.06
SOUTHERN CALIFORNIA EARTHQUAKE OF DECEMBER 16, 21:17					
33°00′ N., 115°30′ W., near Brawley	El Centro, 14 miles	Subbasement		33	.1
SOUTHERN CALIFORNIA EARTHQUAKE OF DECEMBER 16, 22:07					
33°00′ N., 115°30′ W., near Brawley, VII.* Mag. 5.4.	El Centro, 14 miles	Subbasement	VI	81	1.29

[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.

TABLE 7.—*Composite of strong-motion instrumental data for 1955*

PERU EARTHQUAKE OF FEBRUARY 9

Station and component	Instrument No.	T_o	V	Sensitivity	ϵ	Acceleration		Displacement		Remarks
						Period	Amplitude	Period	Amplitude*	
Lima:		sec.		cm./0.1 g		sec.	cm./sec.²	sec.	cm.	
Vertical	286	0.064	123	12.6	7	0.2	15		0.02	
N. 8° E	288	.063	122	12.2	9	.02	34		.001	
N. 82° W	287	.064	125	12.5	7	.2	21		.02	

SOUTHERN CALIFORNIA EARTHQUAKE OF JUNE 13

El Centro:										
Vertical	208	0.065	121		8	0.18	13		0.01	
N.–S.	206	.065	125		7	.16	62	0.2	.03	
E.–W.	207	.065	120		10	.13	53	.2	.06	
N.–S.	CDM–28	5.65	1		8					
E.–W.	CDM–29	5.89	1		7					
N.–S.	SDM–17	9.91	1		9					
E.–W.	SDM–17	9.82	1		9					

SOUTHWESTERN NEVADA EARTHQUAKE OF AUGUST 8

Hawthorne:										
Vertical	244	0.065	124	13.1	10	0.08	15		0.002	
N.–S.	245	.068	124	14.2	8	.16	31		.02	
E.–W.	246	.066	125	13.6	9	.11	42		.01	

NORTHERN CALIFORNIA EARTHQUAKE OF AUGUST 29

Ferndale:										
Vertical	247	0.066	124	13.5	12	0.3	15		0.03	
N. 44° E.	248	.066	125	13.7	9	.3	118	0.7	.09	
N. 46° W.	249	.065	123	13.0	11	.3	72	1.0	.10	

WEST CENTRAL CALIFORNIA EARTHQUAKE OF SEPTEMBER 4

Hollister:										
Vertical	238	0.068	122	13.9	8	0.3	13		0.03	
N. 1° E.	239	.066	124	13.2	8	.5	47	1.3	.55	
N. 89° W.	240	.066	121	12.9	10	.4	43	1.0	.75	
N. 1° E.	CDM–6	2.11	1		9					
N. 89° W.	CDM–5	2.22	1		9					
Oakland City Hall, 16th floor:										
Vertical	226	.045	117	5.8	9	.2	15		.02	
N. 26° E.	227	.047	115	6.2	7	.2	16		.02	
N. 64° W.	228	.047	117	6.5	8	1.4	24		1.2	
Basement:										
Vertical	235	.066	121	13.1	11	.1	4		.001	
N. 26° E.	236	.066	122	13.2	7	.2	7		.007	
N. 64° W.	237	.068	117	13.3	8	.2	5		.005	
San Francisco, Alexander Building, 16th floor:										
Vertical	181	.046	121	6.4	10	.2	9		.009	
N. 9° W.	180	046	121	6.4	9	.4	8		.03	
N. 81° E.	179	.046	120	6.2	7	.3	27		.06	
11th floor:										
Vertical	178	.045	120	6.1	13	.2	6		.006	
N. 9° W.	176	.046	119	6.2	15	.3	4		.009	
N. 81° E.	177	.045	122	6.2	9	.3	8		.02	

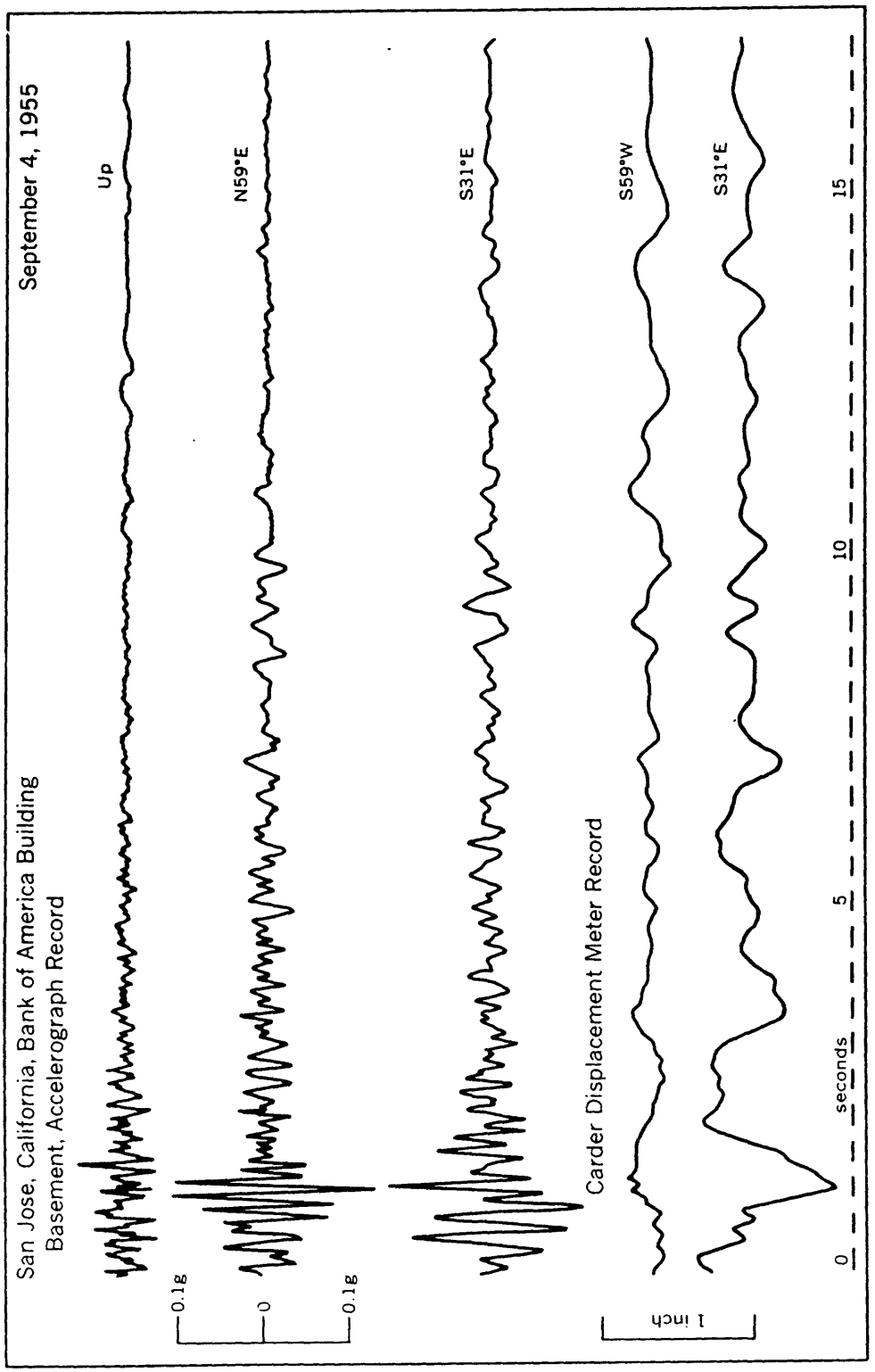

FIGURE 11.—Tracings of accelerograph and displacement meter records obtained at San Jose, Bank of America building basement, on September 4.

TABLE 7.—*Composite of strong-motion instrumental data for 1955*—Continued

WEST CENTRAL CALIFORNIA EARTHQUAKE OF SEPTEMBER 4—Continued

Station and component	Instrument No.	T_s	V	Sensitivity	ϵ	Acceleration		Displacement		Remarks
						Period	Amplitude	Period	Amplitude*	
San Francisco, Alexander Building, 16th floor:(Cont.)										
Basement:		sec.		cm./0.1 g		sec.	cm./sec.^{2}	sec.	cm.	
Vertical	199	.067	119	13.2	11	.2	2		.002	
N. 9° W	198	.069	120	14.3	11	.2	2		.002	
N. 81° E	197	.075	120	16.6	11	.4	8		.03	
San Francisco, 450 Sutter Building, 29th floor (Weed):										
N. 9° W	1	.19	8	7.2	2	.2	24		.02	
N. 81° E	1	.19	8	7.5	2	.3	23		.05	
San Francisco, Shell Building, 29th floor (Weed):										
N. 9° W	2	.18	7	5.4	3	.4	20		.08	
N. 81° E	2	.18	7	5.4	3	.4	18		.07	
21st floor (Weed):										
N. 9° W	3	.21	6	6.5	2	.4	14		.06	
N. 81° E	3	.21	6	6.5	2	.4	13		.05	
Basement (Weed):										
N. 9° W	4	.18	7	5.9	3	.4	2		.008	
N. 81° E	4	.19	7	6.0	3	.4	3		.01	
San Francisco, Southern Pacific Building, 14th floor:										
Vertical	184	.046	119	6.2	11	.17	14		.01	Sinusoidal vibration.
N. 45° E	183	.046	120	6.3	10	.5	34		.2	
N. 45° W	182	.046	122	6.3	10	.5	44		.3	Nearly sinusoidal.
Basement:										
Vertical	196	.067	121	13.6	11	.2	7		.007	
N. 45° E	194	.067	122	13.6	6	.4	11	1.0	.16	
N. 45° W	195	.067	122	13.5	7	.4	11	1.0	.1	
N. 45° E	SDM-18	9.8	1		10					
N. 45° W	SDM-18	9.8	1		10					
San Jose, Bank of America Building, 13th floor:										
Vertical	175	.045	120	6.1	12	.2	124		.1	
N. 31° W	173	.046	119	6.3	8	.4	106		.4	
						1.9	34		3	
N. 59° E	174	.046	120	6.2	8	.3	72		.2	
Basement:										
Vertical	202	.066	117	12.9	9	.2	42		.04	
N. 31° W	200	.066	116	12.7	10	.2	84	1.9	1.13	
N. 59° E	201	.066	119	12.7	7	.2	115	.2	.34	
N. 31° W	CDM-7	2.29	.85		7					
N. 59° E	CDM-8	2.29	.85		9					

CENTRAL CALIFORNIA EARTHQUAKE OF OCTOBER 23

Berkeley:										
Vertical	292	0.080	115	18.1	8	0.1	6		0.002	
N. 17° W	294	.080	115	18.0	11	.2	20		.02	
N. 73° E	293	.080	115	17.7	10	.1	18		.005	
Suisun Bay Bridge:										
Vertical	223	.047	120	6.5	9	.2	12		.01	
N. 31° W	225	.046	118	6.2	12	.14	118		.06	
N. 59° E	224	.046	117	6.2	9	.2	68		.07	
Oakland, City Hall, 16th floor:										
Vertical	226	.050	117	7.4	8	.2	20		.02	
N. 26° E	227	.054	115	8.3	8	1.1	18		.6	
N. 64° W	228	.052	117	8.0	9	1.3	37		1.6	

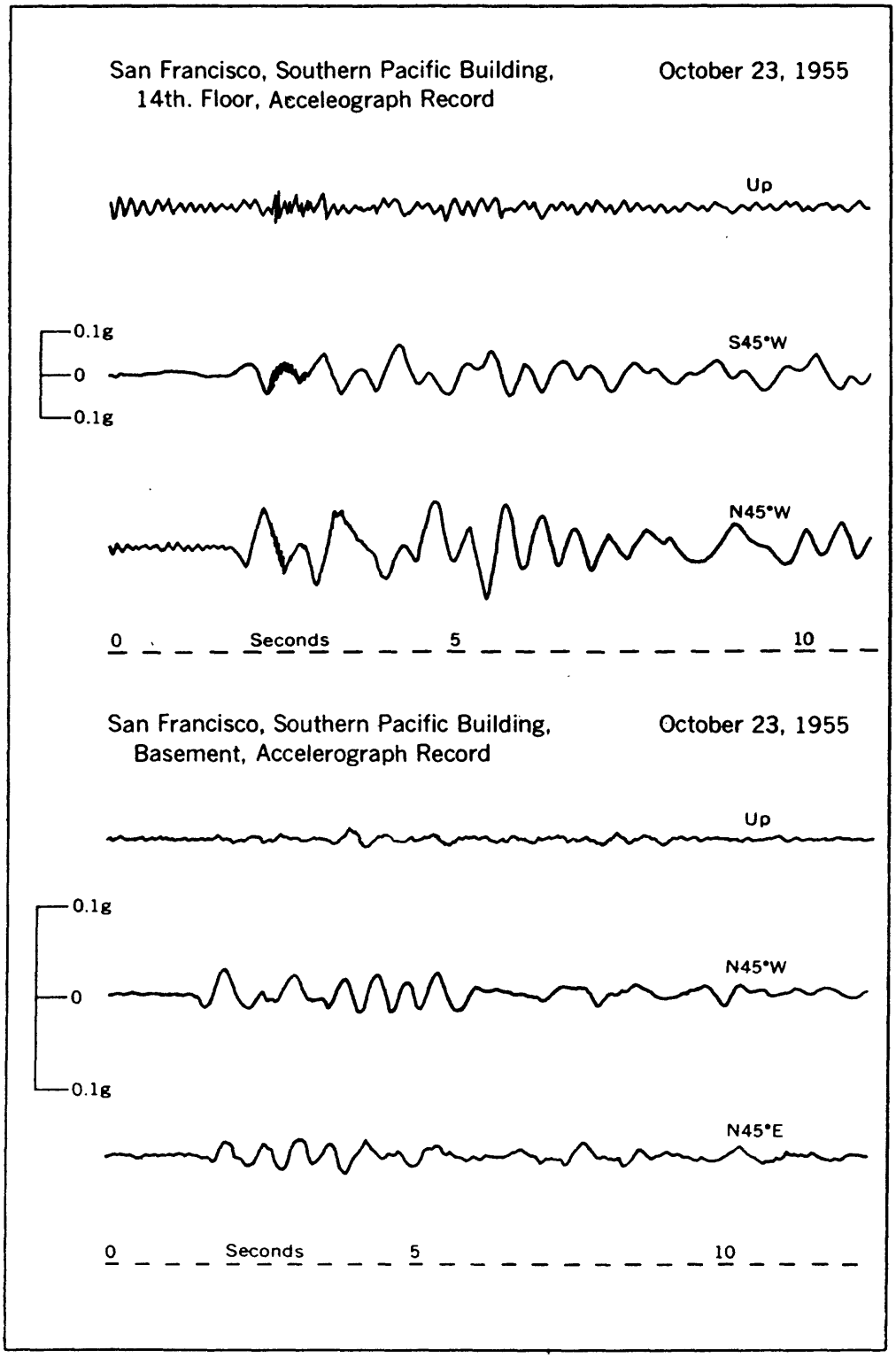

FIGURE 12.—Tracings of accelerograph records obtained at San Francisco, 14th floor and basement, on October 23.

TABLE 7.—*Composite of strong-motion instrumental data for 1955*—Continued

CENTRAL CALIFORNIA EARTHQUAKE OF OCTOBER 23—Continued

Station and component	Instrument No.	T_0	V	Sensitivity	ϵ	Acceleration		Displacement		Remarks
						Period	Amplitude	Period	Amplitude*	
Oakland, City Hall, 16th floor: (Cont.)										
Basement:		sec.		cm./0.1 g		sec.	cm./sec.²	sec.	cm.	
Vertical	235	.066	121	13.1	13	.1	6		.002	
N. 26° E	236	.066	122	13.2	7	.2	10		.01	
N. 64° W	237	.067	117	13.0	8	.4	23		.09	
San Francisco, Alexander Building, 16th floor:										
Vertical	181	.047	121	6.6	10	.2	16		.02	
N. 9° W	180	.046	121	6.5	10	.4	33		.1	
N. 81° E	179	.046	120	6.3	8	.5	31		.2	
11th floor:										
Vertical	178	.046	120	6.2	11	.2	9		.009	
N. 9° W	176	.046	119	6.2	14	.3	13		.03	
N. 81° E	177	.046	122	6.3	8	.2	16		.02	
San Francisco, 450 Sutter Building, 29th floor, (Weed):										
N. 9° W	1	.19	7	6.4	2	.5	38		.2	
N. 81° E	1	.19	7	6.4	2	.6	31		.3	
San Francisco, Shell Building, 29th floor (Weed):										
N. 9° W	2	.18	7	5.4	3	.7	103		1.3	
N. 81° E	2	.18	7	5.4	3	.9	45		.9	
21st floor (Weed):										
N. 9° W	3	.20	7	7.1	3	.8	28		.5	
N. 81° E	3	.20	7	7.1	3	.3	14		.03	
Basement (Weed):										
N. 9° W	4	.18	7	5.8	3	.8	3		.05	
N. 81° E	4	.18	7	5.8	3	.7	3		.04	
San Francisco, Southern Pacific Building, 14th floor:										
Vertical	184	.046	119	6.3	11	.2	22		.02	
N. 45° E	183	.046	120	6.4	10	1.0	57		1.4	
N. 45° W	182	.046	122	6.4	10	.5	99		.6	
Basement:										
Vertical	196	.067	121	13.6	10	.5	10		.06	
N. 45° E	194	.067	122	13.7	6	.5	18	1.1	.3	
N. 45° W	195	.067	122	13.5	7	.5	22	1.2	.5	
N. 45° E	SDM-18	9.9	1		10					
N. 45° W	SDM-18	10.0	1		11					
San Francisco, State Building:										
Vertical	232	.065	122	12.9	8	.6	7		.06	
N. 9° W	233	065	123	13.1	10	.8	16	.6	.19	
N. 81° E	234	066	120	12 9	13	.5	23	.5	.20	
N. 9° W	SDM-14	9 9	1		10					
N. 81° E	SDM-14	9 7	1		13					

SOUTHERN CALIFORNIA EARTHQUAKE OF DECEMBER 16, 21:17 PST.

El Centro:										
Vertical	208	0 065	121		9	0.10	9		0.002	
N.-S	206	.066	125		9	.17	33	1.6	.1	
E.-W	207	065	120		11	.2	18	2	.09	
N.-S	CDM-28	5.80	1		14					
E.-W	CDM-29	5 56	1		11					
N.-S	SDM-17	10.0	1		10					
E.-W	SDM-17	10.0	1		10					

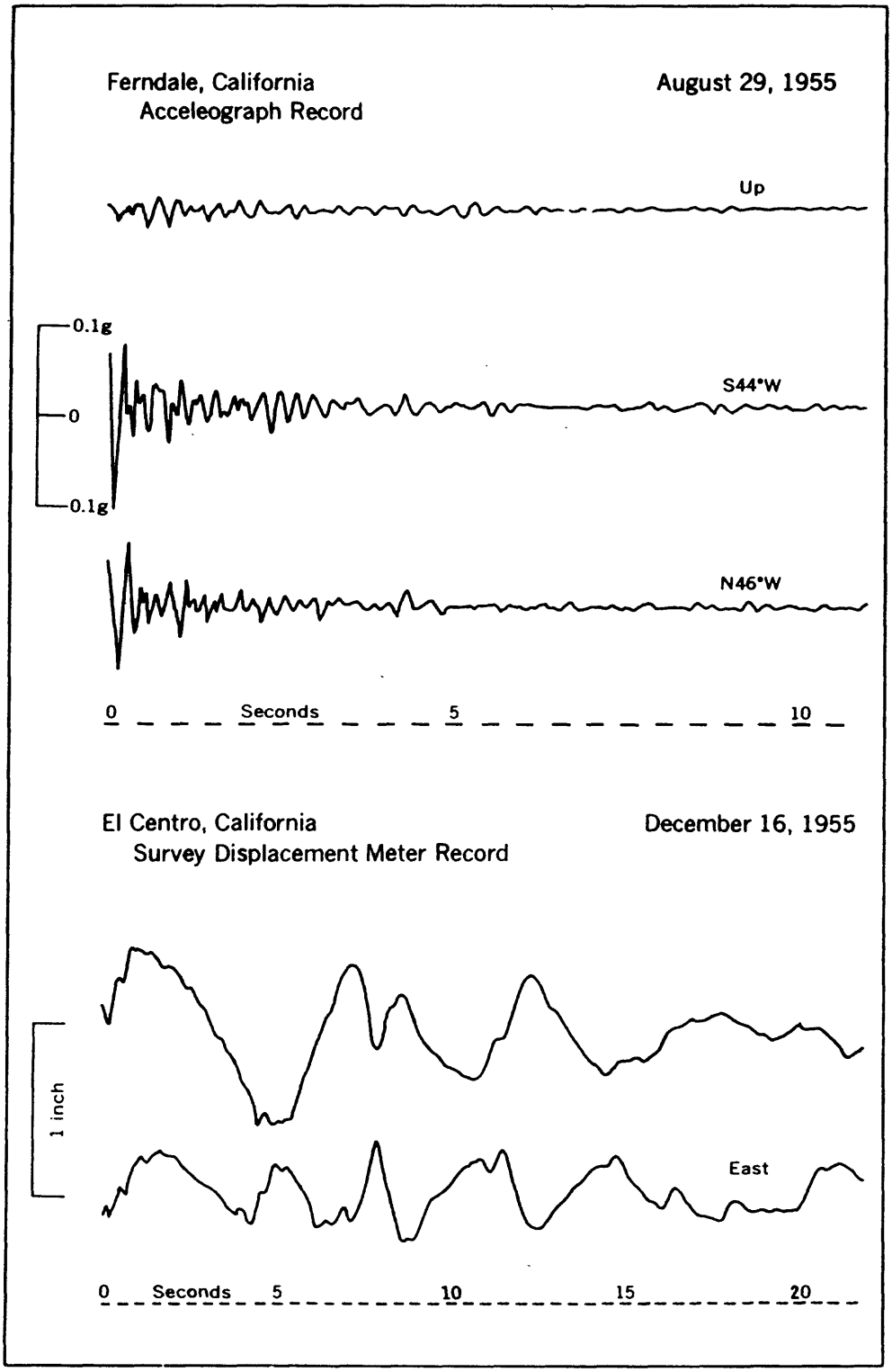

FIGURE 13.—Tracings of accelerograph records obtained at Ferndale on August 29, and displacement meter records at El Centro on December 16.

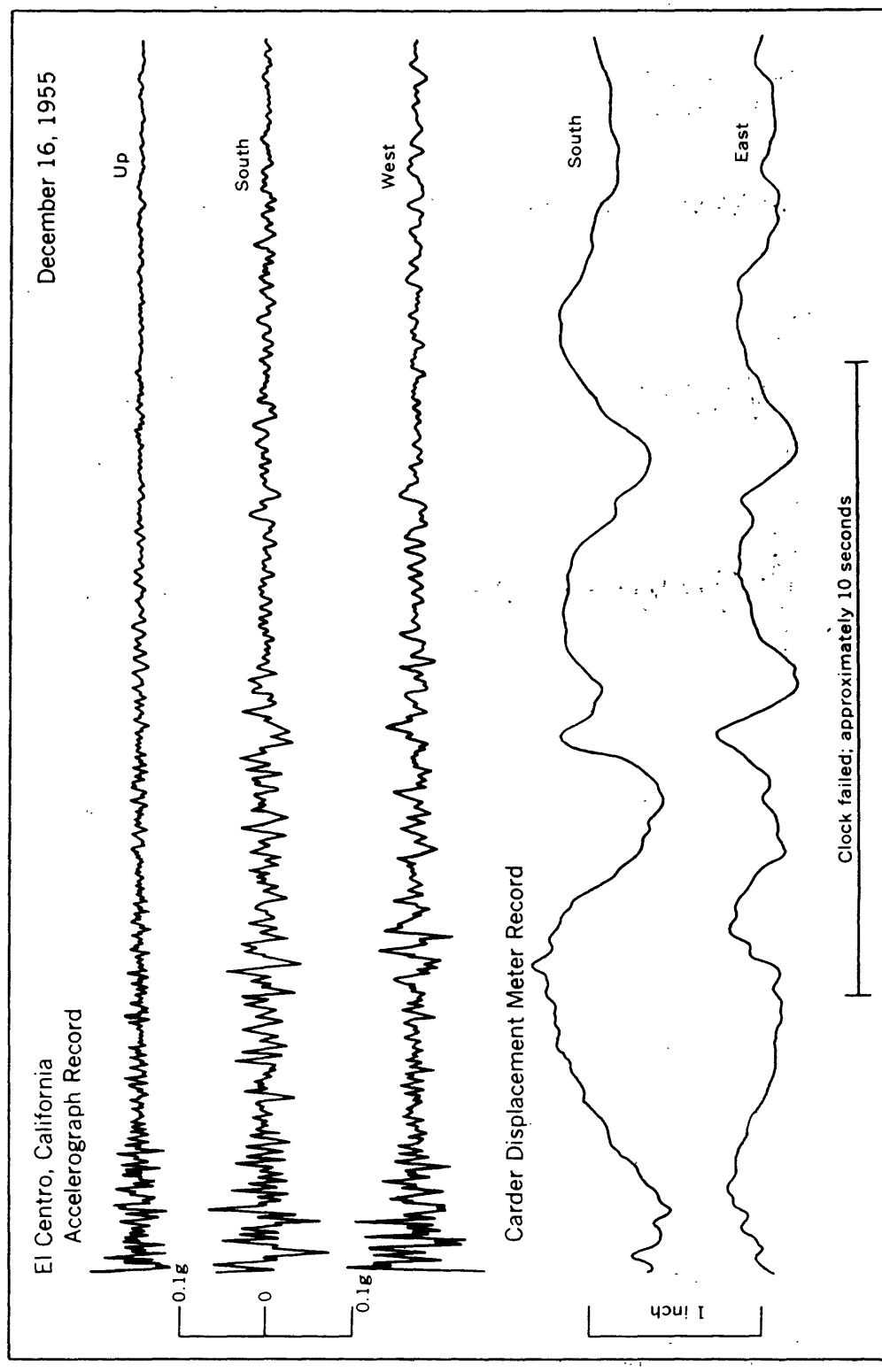

FIGURE 14.—Tracings of accelerograph and displacement meter records obtained at El Centro on December 16.

TABLE 7.—*Composite of strong-motion instrumental data for 1955*—Continued

SOUTHERN CALIFORNIA EARTHQUAKE OF DECEMBER 16, 22:07 PST.

Station and component	Instrument No.	T_s	V	Sensitivity	ϵ	Acceleration		Displacement		Remarks
						Period	Amplitude	Period	Amplitude*	
El Centro:		sec.		cm./0.1 g		sec.	cm./sec.²	sec.	cm.	
Vertical	208	0.065	121	12.6	9	0.1	57		0.01	
N.-S.	206	.066	125	13.5	9	.1	68	6	1.29	
E.-W.	207	.065	120	12 7	11	.1	81	3	.72	
N.-S.	CDM-28	5.80	1		14					
E.-W.	CDM-29	5.56	1		11					
N.-S.	SDM-17	10 0	1		10					
E.-W.	SDM-17	10.0	1		10					

* Estimated from acceleration if no entry in displacement period column.

TILT OBSERVATIONS

Four Merritt tiltmeter stations continued in routine operation.

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