

SEISMOLOGICAL NOTES-NOVEMBER AND DECEMBER, 1968

JAMES F. LANDER, EDITOR

All time is given in Greenwich Civil Time unless otherwise specified. Reports followed by (USCGS) are taken from "Preliminary Determination of Epicenters" by the U. S. Coast and Geodetic Survey. Magnitude (PAS), (BRK), (PAL), or (GOL) refers to an estimate of the Richter magnitude by the Seismological Laboratory of Pasadena (PAS); the Seismographic Station Berkeley (BRK); Lamont Geological Observatory of Palisades (PAL); or Colorado School of Mines (GOL). Magnitude (CGS) is m_b of Gutenberg and Richter computed from the P phase only; it is an average value determined from data forwarded by cooperating standard stations and other observatories. Magnitude CGS M_s is based on the average of surface wave magnitudes determined from amplitude data from Standard long-period horizontal seismometers supplied by cooperating stations. Depth restricted to 'normal' (33 km) or to agree with depth phase are indicated by "restricted". Listed below are located United States earthquakes which are reported felt, and foreign or domestic events of seismological interest.

Yugoslavia, November 3, 1968, 04h49m31.8s, 42.1°N, 19.4°E, focal depth about 17 km (USCGS).

One killed, 5 injured at Pistula near Ulecinj. Felt VI-VII at Ulecinj (BCIS No. 156). At Pistula a local church and school were razed and a score of houses were demolished. Five additional injuries occurred at Bar. Considerable damage reported to other towns throughout south Montenegro. Felt as far as Skopje (Press). Magnitude 5.0 (CGS), 5.3 (CGS MS).

New Hebrides region, November 4, 1968, 09h07m38.5s, 14.2°S, 172.0°E, focal depth about 585 km restricted (USCGS). Magnitude $6\frac{1}{2}$ (PAS), $6\frac{1}{2}$ (BRK), 5.8 (CGS).

Unimak Island region, November 7, 1968, 00h48m33.6s, 54.3°N, 164.6°W, focal depth about 37 km (USCGS). Felt at Cape Sarichef. Magnitude 5.1 (CGS).

Noraya Zemlya, November 7, 1968, 10h02m05.3s, 73.4°N, 54.9°E, focal depth 0 km restricted (USCGS). Magnitude $6\frac{1}{2}$ - $6\frac{1}{2}$ (BRK), 6.0 (CGS).

Southern Illinois, November 9, 1968, 17h01m41.1s, 38.0°N, 88.5°W, focal depth about 19 km restricted (USCGS). "Seismic waves generated by November 9 earthquake in southern Illinois were felt in central U. S. area exceeding 400,000 sq. mi. Maximum intensity VII assigned to epicentral area roughly bounded by villages of Dale, Walpole, and Broughton in south Hamilton County. Damage included twisted and thrown chimneys, toppled parapets, cracked windows and plaster, and broken TV masts. Sounds described as sonic booms, waves on ponds, and wildly swaying power lines accompanied earthquake. Approximately 40 per cent of the chimneys were damaged in the epicentral area. At McLeansboro, shear cracks formed in brick exterior walls and cornices toppled from tower at Methodist Church and plaster cracked at Hamilton County Courthouse. At Eldorado a parapet atop First State Bank left in danerous condition and bricks loosened above entrance to Adult Education Center. Scattered damage, mainly thrown chimneys, over a wide area of southern Illinois" (Field reconnaissance by David Gordon, C&GS, ESSA, Rockville, Maryland).

"I would like to report an observation of the recent St. Louis earthquake (9 Nov. 1968). Since I heard no other reports of it being felt in the eastern states, and since my observation was unequivocal, I think it is of some interest.

"My wife and I were standing in our apartment on the twelfth floor of a sixteen floor high high rise building (Westgate) on the M.I.T. campus when we first noticed the swaying sensation so familiar to us as the result of spending most of our lives in the San Francisco Bay area. We immediately surmised that, although improbable, it must be an earthquake. Our clock said 12:15 p.m., but it was known to be approximately 5 minutes fast. A slight dizziness resulted from the swaying and by looking out a window the relative movement of the building was quite obvious. The period of vibration was estimated to be between $\frac{1}{2}$ and 5 seconds. A mini-seiche was set up in dishwater in the sink. This continued to oscillate for a minute or so after the building vibrations ceased. Incidentally, the building rests on piles driven through filled land adjacent to the Charles River and is square in cross-section. The direction of motion seemed to coincide with the axis of the building oriented approximately N21°W.

"From newspaper accounts of the epicenter and origin time, and from our observations above, I determined that we must have felt the transverse *Lg* phase" (Personal communication, David M. Boore, MIT).

"The shock waves as recorded gave three distinct phases. At 12h03m31s the arrival of *P* waves caused a feeling of chattering to people in their homes standing still or at rest. Then at 12h03m35s the waves enlarged causing a feeling shock combined with slight rippling to anyone inside. The main earthquake feeling came at 12h03m53s when surface waves arrived causing swaying of structures, rattling of dishes, pendulum clocks stopped. Felt by all in and out of doors.

"A careful survey of the effects around the Terre Haute area reveal the following:

(1) There was slight damage; cracked plaster was reported in 17 different interviews. Twenty-three persons had dishes broken. Three persons reported window glass broken. Three said cracks appeared in cement structures. One X crack was located in a brick building.

(2) Seventy per cent of the people said they felt the earthquake including those in and out of doors. Thirty per cent experienced such things as dishes rattling, moving of doors, rocking feeling, etc.

(3) Ground water as measured in open wells remains the same. No dirty water has been reported as a result of the earthquake and water level changes noted except at the time of the earthquake.

"In the interviews people were asked as what they thought had caused the shock. The majority assumed old mine tunnels had collapsed or caves had collapsed. About ten per cent assumed an explosion had occurred.

"The psychological results on the population of Terre Haute may be summed up in the following statements. Much was learned of mass hysteria as the phones were overloaded and for a period no one could have gained the aid of doctors, fire protection, ambulance service, or police. Evacuation of persons was carried out in some instances but far too many persons remained in dangerous places. Police and fire personnel acted very wisely by complete removal of fire equipment to open areas. All in all the medical, fireman, and police did amazingly well under the circumstances" (Abstracted from a preliminary report by Gerald J. Shea, Terre Haute, Indiana). Magnitude 5-5½ (PAL), 6.0 (GOL), 5.3 (CGS).

Molucca Passage, November 9, 1968, 20h30m41.9s, 2.4°N, 126.8°E, focal depth about 33 km restricted (USCGS). Magnitude 6.1 (PAS), 5.5 (CGS) 6.0 (CGS M_s).

Southern Alaska. The following earthquakes were reported felt:

November 11, 1968

03h49m30.9s, 61.6°N, 150.1°W, focal depth about 33 km restricted (USCGS). Felt at Palmer.

December 7, 1968

22h54m31.5s, 61.8°N, 149.1°W, focal depth about 33 km restricted (USCGS). Felt at Palmer.
Gulf of Alaska, November 15, 1968, 00h07m09.7s, 58.3°N, 150.4°W, focal depth about 26 km (USCGS). Magnitude 6¼-6½ (PAS), 5.1 (CGS).

Fiji Islands region, November 16, 1968, 07h45m51.7s, 16.6°S, 175.9°E, focal depth about 66 km (USCGS). Magnitude 6.1 (PAS), 6.3-6.5 (BRK), 6-6½ (GOL), 5.6 (CGS).

Venezuela, November 17, 1968, 00h16m08.6s, 9.6°N, 72.6°W, focal depth about 172 km restricted (USCGS). Slight damage at Maracaibo. Felt at San Cristobal and Caracas. Magnitude 6¼-6½ (PAS), 5.7 (CGS).

Mindanao, Philippine Islands, November 25, 1968, 18h36m53.0s, 5.0°N, 126.9°E, focal depth about 31 km (USCGS). Magnitude 5.4 (CGS), 6.2 (CGS M_s).

Near coast of Oaxaca, Mexico, November 28, 1968, 10h36m07.7s, 15.4°N, 94.6°W, focal depth about 33 km (USCGS). Felt in Mexico City where lamps swayed in tall buildings (Press). Magnitude 6.1 (PAS), 5.2 (CGS), 6.4 (CGS M_s).

Yugoslavia, December 3, 1968, 20h57m31.2s, 44.6°N, 18.4°E, focal depth about 7 km (USCGS).

At least 35 injured at Tuzla where walls were reported cracked and chimneys fell. Panic and extensive damage were also reported. Felt strongly at Sarajero and as far as Slavonia Brod, 150 miles north of Tuzla. Magnitude 4.7 (CGS).

Iceland region, December 5, 1968, 09h44m11.0s, 63.9°N, 21.7°W, focal depth about 5 km restricted (USCGS). Felt at Hafnarfjordur with intensity VI and Reykjavik with intensity V-VI. This is the sharpest earthquake in southwestern Iceland since 1929 when considerable damage occurred. More than 100 after shocks were recorded during first seven hours. The epicenter was in a volcanic area about 35 km SSW from Reykjavik (Smithsonian Institute, Center for Short-