

ON THE EARTHQUAKE OF JANUARY 2, 1912, IN THE
UPPER MISSISSIPPI VALLEY.

ANTON D. UDDEN,

Augustana College, Rock Island, Illinois.

On January 2, 1912, the northwestern part of Illinois and surrounding territory were visited by an earthquake. Immediately after the shock the author began to collect information concerning the effects of the disturbance. The description in this paper is based upon the accounts of the earthquake contained in seventy-

⁸ Danville Folio, p. 1, et seq.

eight daily and weekly papers, and upon fifty-five letters from editors of newspapers. Information has been received from about 150 localities in and about the affected area.

The distribution of intensities in an earthquake such as that which occurred on January 2 is conveniently studied by the so-called Rossi-Forel scale of intensity. According to this scale, intensities are denoted increasingly by the numerals from one to ten. The scale is not often seen in print, and since the author has made some additions to the scale, it has been inserted at the end of this paper.

The author believes that the data collected concerning this earthquake are sufficiently complete to determine with a fair degree of accuracy the intensities at about ninety-five cities. At thirty-five of these cities the disturbance is described as being "not noticed," while for the remaining sixty the accounts are more or less complete. The following isoseismal chart of the earthquake is based upon the intensities as determined for these cities according to the Rossi-Forel scale.

It will be seen on the accompanying map that the intensities vary from one to six. The general appearance of the isoseismal

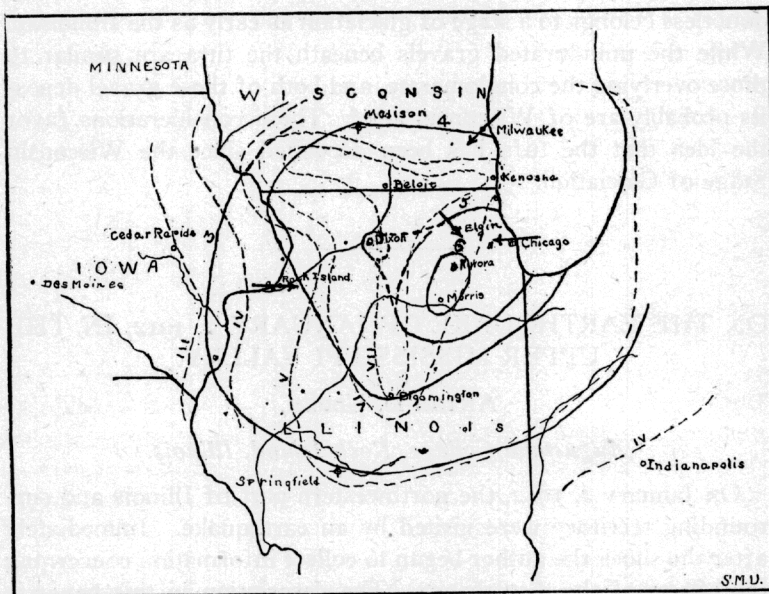


Figure 1. Map of earthquake of January 2, 1912. Full lines=isoseismals of January 2, 1912 earthquake. Broken lines=isoseismals of May 26, 1909 earthquake.

lines suggests that there was one distinct epicentre from which the waves spread in the form of ever-widening circles. The earthquake was most severe within the area enclosed by the isoseismal whose intensity is six. The cities in this area which report the most violent effects are Morris and Aurora, for which the intensities are more nearly seven than six.

While the principal epicentre is the one just described, there appears to be also a secondary epicentre whose intensity is five. This is at Dixon, Illinois, about fifty-five miles west of the first epicentre. With the data on hand it is difficult to determine whether this is a distinct epicentre of less intensity or whether Dixon should be included in the area enclosed by the isoseismal whose intensity is five. The dotted line indicates the direction which this isoseismal would take in the latter case. That there were two epicentres appears to be supported by observations on the number of shocks reported to have been felt at different localities. The majority of these observations state that there were two distinct shocks—one of greater intensity, preceded or followed by one of less severity.

Observations upon the directions of motion of the earthquake waves are reported from four different localities—Chicago, Milwaukee, Elgin and Rock Island. The directions are indicated on the map by means of arrows drawn through the respective cities. While the arrows do not intersect at a common point, yet in a general way they converge toward the region of greatest disturbance.

The area sensibly affected by this earthquake covers about 40,000 square miles. It is possible that the earthquake did not extend for any considerable distance beyond the limits of the sensible area. In a letter, Professor J. B. Goesse, S. J., states that the seismograph belonging to the meteorological observatory of the St. Louis University in St. Louis did not record any vibrations which could with certainty be referred to this earthquake disturbance. Francis J. Glover, S. J., of Brooklyn College, Brooklyn, New York, states that if their seismograph recorded the earthquake the record was obliterated by local disturbances caused by nearby railroad traffic.

The observations on the time of occurrence and duration of the earthquake do not warrant any deductions. The time of occurrence is variously stated from 10:15 to 10:35 a. m., while the reports on duration range from one second to three minutes.

It is interesting to compare this earthquake with the one which

occurred on May 26, 1909. The latter was more extensive and of greater severity than the one here described. This can readily be seen by referring to the isoseismal drawing of the earthquake of May 26, 1909, by Dr. J. A. Udden, in the Transactions of the Illinois State Academy of Science for 1910. In several instances newspapers have made statements comparing the intensity of the more recent earthquake to that of the former. The intensity for cities lying within the mesoseismal area of the recent earthquake is stated to be "equal to" or "more severe" than in the earlier earthquake. Cities lying beyond the mesoseismal area describe the earthquake as being less severe than that of May 26, 1909. These statements conform quite satisfactorily with the isoseismals of the two earthquakes.

The epicentres of the two disturbances are differently located, but the areas affected by both are substantially the same. By referring to the drawings it is seen that the isoseismals of each spread out from a nearly common center. The coincidence of these two earthquake areas can hardly be regarded as a matter of chance. It is probable that the two shocks were directly connected with a gradual readjustment of the same strata.

THE ROSSI-FOREL SCALE ACCORDING TO DUTTON.

1. Microseismic Shock: Recorded by a single seismograph or by seismographs of the same model, but not by several seismographs of different kinds; the shock felt by an experienced observer.
2. Extremely Feeble Shock: Recorded by several seismographs of different kinds; felt by a small number of persons at rest.
3. Very Feeble Shock: Felt by several persons at rest; strong enough for the direction or duration to be appreciable.
4. Feeble Shock: Felt by persons in motion; disturbance of movable objects, doors, windows, creaking of ceilings; *rattling of dishes*.*
5. Shock of Moderate Intensity: Felt generally by everyone; disturbance, furniture, beds, etc., ringing of some door bells (old style door bells); *articles fall, dishes break*.*
6. Fairly Strong Shock: General awakening of those asleep, general ringing of bells, oscillation of chandeliers; stopping of clocks, visible agitation of trees and shrubs; some startled persons leave their dwellings.

7. Strong Shock: Overthrow of movable objects, fall of plaster, ringing of church bells; general panic without damage to buildings.

8. Very Strong Shock: Fall of chimneys, cracks in the walls of buildings.

9. Extremely Strong Shock: Partial or total destruction of some buildings.

10. Shock of Extreme Intensity: Great disaster, ruins, disturbance of the strata, fissures in the ground, rock-falls from mountains.

The original data, newspaper clippings, letters, etc., upon which this paper is based have been left in the Denkmann Memorial Library of Augustana College, where they may be obtained by application to the Librarian.
