Earthquakes in Iowa

The evening of December 15, 1811, was clear and quiet when the inhabitants retired in the little frontier community of New Madrid, Missouri. At two o'clock in the morning they were suddenly awakened by the "groaning, creaking, and cracking of timbers" and the "crash of falling chimneys." Trembling with fear, they groped their way frantically from their homes to escape the falling debris. They were forced to spend the night shivering in the cold as intermittent shocks continued to weaken their tottering dwellings.

The New Madrid disturbance was one of the three major earthquakes in the United States. The shock was felt from Canada to New Orleans and from the headwaters of the Missouri River to Boston. This is said to exceed the extent of any other known earthquake in this continent. If the earthquakes at Charleston in 1886 and at San Francisco in 1906 are better known, it is only because of the destruction of life and property in more densely populated regions.

Only roving bands of Indians inhabited Iowaland at the time of the New Madrid catastrophe, which explains the absence of any record of the

shock in this section of the country. Since the intensity and scope of earthquakes may be measured by effects, the testimony of witnesses is particularly valuable in determining the character of the phenomenon. N. H. Heck in his *Earthquake History of the United States* has adopted the Rossi-Forel scale of classifying earthquakes in ten fairly distinct groups.

The weakest tremor in the Rossi-Forel scale is the *microseismic,* which is recorded by a single seismograph or by seismographs of the same model, but not by several seismographs of different kinds. Next comes the *extremely feeble shock* which is recorded by several seismographs of different kinds and may be felt by a small number of persons at rest. The third type, a *very feeble shock,* appreciable to people at rest, is strong enough to determine the direction or duration. A *feeble shock* of the "force of 4" may be felt by persons in motion and is capable of disturbing movable objects, rattling windows, and cracking ceilings. The fifth class is a *shock of moderate intensity* which is felt generally by every one. It is marked by the ringing of bells and the disturbance of furniture and beds. Next came a *fairly strong shock* which awakens sleepers and is attended by the ringing of bells, the oscillation of chandeliers, and the stopping of clocks. Some startled per-

sons may even leave their dwellings. The seventh intensity is indicated by a *strong shock* capable of overthrowing movable objects and ringing bells, by falling plaster, and by general panic without seriously damaging buildings. Falling chimneys and cracked walls rank eighth in the Rossi-Forel scale with the rating of a *very strong shock*. The ninth, or *extremely strong shock*, involves the partial or total destruction of buildings; and a shock of *extreme intensity* with the "force of 10" results in great disaster, ruins, disturbance of the strata, fissures in the ground, and the fall of rocks from mountains.

Since the available evidence is adapted to this classification, the divisions of the Rossi-Forel scale will be used to indicate the nature of Iowa earthquakes. The first earthquake recorded by Heck in this region occurred ten years after permanent settlement began in eastern Iowa. On January 4, 1843, a severe shock at Memphis, Tennessee, caused walls to crack, chimneys to fall, and windows to break. No mention is made of the Territory of Iowa in the government report, but the Fort Madison *Democrat* contained the following item, recording the first known earthquake in Iowa: "The shock of an earthquake was sensibly felt" in Burlington on Wednesday evening "at about five minutes before nine o'clock.

Several buildings were perceptibly affected by the shock, and in some parts of the city loose articles were moved four inches from their place. Some of our citizens were considerably alarmed, but no injury done."

The next earthquake known to have visited Iowa was in 1858. The Sioux City *Eagle* recorded a shock "accompanied by heavy rumbling" on the third of July. The movement was from west to east, and the tremors were of sufficient force to shake "pictures and crockery" from their places, indicating approximately a fourth class shock.

The states of Kansas, Nebraska, Missouri, Illinois, Indiana, and possibly Ohio were visited by a quake on April 24, 1867. Although Iowa is not mentioned in Heck's report, it was probably the motion of this tremor which the editor of the Wapello *Republican* described as "not violent, but easy and swinging, giving one a sensation something like the first effects of a dram of whiskey". The Dubuque *Times* of April 25th declared that several shocks were "distinctly experienced". In the composing room of that paper the "cases shook agueishly and the gas burners vibrated like pendulums", while inmates of the *Herald* building "rushed out" into the street. People in Bishop's Block felt the "walls were sinking from a defective foundation" and fled outside in alarm. The

shock was felt "very sensibly" on the outer levee and the occupants of the Pilots' Association rooms "rushed out in dread of their lives" when the plaster commenced to fall from the ceiling.

Three years later, on October 20, 1870, a strong earthquake rocked the St. Lawrence Valley between Montreal and Quebec and the New England coast from Portland to New York. It was widely felt, being reported at Richmond, Virginia, and Sault Ste. Marie, Michigan. "A distinct shock of earthquake was felt" at Dubuque "about ten o'clock on Thursday morning by parties occupying the second and third stories of buildings and by not a few who were on terra firma. The motion continued several seconds and struck terror to nervous people occupying elevated positions but did no damage."

Western Iowa suffered a shock on October 9, 1872, when Sioux City and the adjoining territory in the Dakotas felt seismic tremors. Although the shock was not violent, the Sioux City *Journal* declared it to be of "sufficient force to set the ground a trembling and cause buildings to vibrate". The effect went unnoticed on the bluffs but was distinctly felt on low ground. Some attributed the "unusual thrill" to a "slight dizziness or nervous attack". Men, women, and children fled from the Hubbard House and teachers attending the insti-

tute at the high school "scattered in undignified haste, fearful that the structure was about to collapse". Several gentlemen in the third story of the First National Bank declared the building "swayed fully two feet" and the "pell-mell manner in which they came down the stairs indicated that they felt the necessity for sudden exit very imperative." Since an earthquake was not "dreamed of", some thought it due to the strong gusts of wind, others believed the buildings were settling, while still others imagined the floors were giving way. The jokers declared it was merely "Greeley's tidal wave sweeping the country" while supporters of Grant assured their Liberal friends that it was nothing but "the Republican thunder in honor of the result of Tuesday's elections."

Five years later, on November 15, 1877, another earthquake was felt throughout Iowa, eastern Nebraska, northwestern Missouri, Kansas, the Dakotas, Wisconsin, and Minnesota. The area was elliptical in form, 600 miles by 300 miles, though the vibration was strongest in the Missouri Valley. Numerous citizens in Council Bluffs "experienced a severe shock, sudden and terrible, as though the earth was being shaken to its center". High school teachers and students were "struck with terror" as desks "swayed to

and fro for an instant and the entire building trembled". It was only by "coolness and presence of mind" that teachers were able to maintain an orderly exit so that no panic was created and no one injured. At one point west of Omaha the quake was said to have "caused a worse shock to citizens than could have been experienced by the combined cases of ague all over the United States had they centered in one man".

Accompanied by a "peculiar rumble like that of a railroad train", the same quake, of the "force of 7", caused Sioux Citians to suffer three-quarters of a minute of horror. As the Sioux City *Journal* records: "Buildings rocked, articles were displaced in homes and buildings, clocks stopped, doors opened as if by unseen hands, windows rattled, dishes and tinware tumbled from their accustomed places. The manifestation consisted of a shock and a recoil, both of which were the most vigorous ever felt in these parts. The streets filled very suddenly, district court was in session and a stampede took place from the Court House. Panic was averted at the Catholic Church, where confirmation services were taking place, by the presence of mind displayed by cool-headed men. Schools were emptied quickly and accident averted by prompt action of the teachers. There were no fatalities but damage to several buildings in

the way of large cracks in their walls was the result of the shake-up."

It was about ten o'clock on the evening of August 31, 1886, when a low rumbling sound was heard by residents of Charleston, South Carolina. The rumble rapidly deepened into a mighty roar, and the mild trembling of the earth soon became violently destructive. More than a score of lives were lost as buildings fell, railroad tracks twisted, fissures and craters formed, and water, mud, and sand spouted from the earth. The earthquake at Charleston was felt over an area with a diameter of a thousand miles, from Boston to Cuba and from Bermuda to Iowa.

Several towns in eastern Iowa "distinctly felt" the tremors but no damage was done. A number of people in Keokuk noticed the ground tremble and occupants of high buildings in Burlington "beat a hasty retreat" to the streets when they became suddenly aware of the effects of the first shock. At Dubuque the printers in the fourth story of the *Herald* building "ran for their lives down the stairway" and the audience in the opera house was "very much frightened". Iowa was one of the farthest points affected by the Charleston earthquake.

An earthquake of varying degrees of intensity was reported throughout Iowa shortly before

eleven o'clock on Saturday night, September 26, 1891. At Amana a number of persons distinctly felt a "shaking", at Tipton a "rumbling" was heard which sounded like the passing of a train, while at Cedar Rapids the shock was of "considerable violence", the vibrations being strong enough to cause windows and doors to rattle and to awaken people from a sound sleep. Dr. J. M. Shaffer felt a "distinct shock" at Keokuk and recorded it in his journal: "I was wide awake, and the house seemed to vibrate or move back and forth; sensation was very singular; listened for some movable trifle to fall, but heard none and observed none. Motion lasted perhaps half a minute." Mild as it was, the editor of the Keokuk *Gate City* deemed it "considerable of a luxury" and believed many residents would "deplore the fact that they were not awake to enjoy it."

Lest the good citizens of Keokuk should feel slighted, apparently, mother earth had a "Fit of Ague" at about 5:30 on the morning of October 31, 1895. It was declared to be the most pronounced quake experienced there in the history of Iowa. This is not altogether surprising, for Heck describes it as "the hardest shock in the entire region since the New Madrid earthquake." Twenty-three States reported the shock.

The Keokuk *Gate City* was quite voluble over

the advent of such a "luxury". "Many of the less soundly sleeping citizens", it declared, "were aroused" by the "unusual trembling of their houses or the elbows of their better halves. The early awakening was heralded by the glimmering of lights in bed chambers and the hasty exit from their homes of women and children. There were two distinct shocks (some say three) lasting about twenty-five seconds each with a short intermission. The rattling of windows, shaking of beds and in one or two instances the falling of brick from toppling chimneys" were all experienced at Keokuk. Apparently the vibrations were of the eighth intensity. E. T. Bartruff, in his excitement, declared that "several gallons of cream were churned into fine butter" on his farm near Moar. Walter Brinkman was delighted to note that the "ashes were shaken out of the furnace", but B. F. Hagerman was somewhat chagrined to find the "buttons were missing from his trousers" and, not to be excelled in imagination, insisted that "the shock shook them off."

The earthquake of 1895 was probably felt throughout Iowa, particularly in the southeastern half of the State. It was reported by many towns from Lansing to Sidney and southward. The houses at Keosauqua were shaken so violently that dishes rattled on the shelves and people

sleeping in the upper stories were "considerably alarmed". Two shocks were felt in Dubuque. Buildings trembled, dishes rattled, and people were awakened from their sleep, but no serious damage was done.

An earthquake occurred in Nebraska, South Dakota, and western Iowa on July 28, 1902. A despatch from Omaha stated that the "seismic disturbances were felt at a large number of towns in the three states and lasted ten to fifteen seconds." No damage was reported, although the shock was "sufficient to rattle dishes and shake bell towers" at various points. On the same date heavy shocks were registered in California.

Three years later, on April 13, 1905, Heck records several shocks of the "force of 5" at Keokuk. Buildings were shaken but no serious damage was done. Burlington was inclined to believe it "inopportune" to report an earthquake at that time. "A seismic disturbance", declared the Burlington *Hawk-Eye*, "would shatter the best dam that could be constructed. If enterprising correspondents in the Gate City must have or see things, they ought to describe the symptoms in a different manner." The shock was apparently local in character but important enough to be located on a government map showing the historic earthquakes of the United States.

Three earthquakes were recorded in Iowa in 1909. An intensity of 8 in the first of these was noted in portions of northern Illinois and southern Wisconsin, and the shock was felt over an area eight hundred miles in diameter from Missouri to Michigan and from Minnesota to Indiana. The disturbance caused widespread alarm throughout eastern Iowa — several towns reporting tremors of varying intensities.

In Dubuque the effect was particularly noticeable in the higher buildings. The overall factories were "jarred" so sharply that the girls fled from their machines to the street in terror. Occupants of the Bank and Insurance Building thought a heavy body had fallen down the elevator shaft, and hurried from their offices apprehensively. A workman on a forty-foot scaffolding at the Presentation Convent became terrified and jumped, alighting fortunately on a pile of sand. "Pictures were left topsy turvy on walls", observed the *Telegraph-Herald* of May 26, 1909, "vases were overturned, crockery 'sang' out when it came in contact with other crockery, glasses on sideboards and on bars tinkled". The dishes at Althauser's and Becker-Hazelton's "danced blithely about, developing a code of their own. The festivities were brief but furious and in the excitement several platters jumped to the floor."

On July 18, 1909, another earthquake with the epicenter a little north of Springfield, Illinois, rocked eastern Iowa. Beds and tables were shaken and dishes rattled at Iowa City. Chimneys were reported down at Davenport. A number of people telephoned the Davenport *Times* that they had been awakened from their sleep by the shock. Others said that pictures on the walls moved and dishes in the pantry rattled perceptibly. Some described it as a hard shock followed by two lesser tremors. Many people rushed out of their homes and congregated with neighbors in the street to await another shock which failed to come.

The third 1909 earthquake in Iowa occurred on September 27th. It was strongest in Indiana, though recorded in Kentucky, Illinois, Missouri, Arkansas, Kansas, and southwestern Iowa.

Western Iowa experienced a mild quake on June 2, 1911. The shock, which was felt over an area estimated at 40,000 square miles, affected chiefly South Dakota and Nebraska. Two slight tremors were noted but no damage was done. The first report in Sioux City came from the Farmers Loan & Trust Building and similar accounts were quickly received from other buildings. A little later, descriptions of the phenomenon came from the residence district where dishes in the

china closet and pictures on the wall quivered. Persons seated in office buildings were given the sensation of dizziness.

On January 2, 1912, an earthquake of the force of 5 and 6 was felt in northern Illinois and southern Wisconsin. Three distinct tremors were observed in Dubuque at 10:22 A. M., the most perceptible being in the residence districts. Everything was "nice and quiet", according to the *Telegraph-Herald*, when "suddenly 'Crash!' down comes all your nice China and musses up the dining room floor you have just swept. Immediately a thousand housekeepers all over the city ran to the telephone and called up the weather man just as if he was to blame".

The last earthquake known to have visited Iowa was felt throughout the southeastern section of the State on the afternoon of April 9, 1917. The direction of the shock was northwest by southeast, covering an area of 200,000 square miles from Kansas to Ohio and from Wisconsin to Mississippi. The maximum force was 6 and the epicenter was in the New Madrid region, according to the seismograph at Saint Louis University. At Iowa City the offices in the Johnson County Bank Building were jarred, tables and desks moved, and books were shaken out of place. Considerable vibration was felt in private residences

throughout the city. Residents on the third floor of the Y. W. C. A. at Burlington found the sensation "decidedly unpleasant". Similar effects were reported at Bellevue, Cedar Rapids, Clinton, Davenport, Keokuk, Lineville, Mount Vernon, Muscatine, and Ottumwa.

Ninety years have elapsed since the first earthquake was chronicled in Iowa. During this time, seventeen shocks have been recorded and a number of milder disturbances may have occurred but remain unknown. An average of one quake every six years might cause some alarm, but close analysis of the facts should remove all apprehension. During this period, although the shocks have ranged from 3 to 8 in intensity, not a single life has been lost and the damage to property has been negligible. The heavy glacial drift, which covers Iowa like a huge mantle, has served as a shock absorber for any seismic disturbances that have yet occurred.

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