

## The Marion Meteor

On February 25, 1847, Governor Ansel Briggs approved an act of the First General Assembly creating the State University of Iowa. That was a very significant occasion. The pioneer law makers realized no doubt that they were laying the foundation for an institution that was destined to exert an important influence upon the cultural history of the state. Very few citizens knew that anything unusual had happened. The act was not acclaimed as a great achievement in the progress of education.

Even in Iowa City the people were probably more concerned with the sound of loud explosions that were heard in the middle of the afternoon. The noise seemed to come from the north. C. W. Irish said that the explosions caused great alarm. Men asked each other what the cause could be. It was a strange experience. If they had known that a meteor had fallen over near the Cedar River in Linn County, the more superstitious might have wondered what such a celestial visitation portended. The establishment of the university and the arrival of the first great meteor in Iowa on the same day may be mentioned as an interesting coincidence.

Though people at a distance could only guess what caused the explosive sounds that winter day in 1847, there were a few men who were fortunate enough to see the meteor. One who was cutting wood, startled by the noise, noticed smoke in the direction of Marion and thought the town had been blown up. Several others actually saw fragments of the meteor hit the snow nearby.

News of the strange event soon spread. Newspapers published items about it. The fragments that had been picked up were described. Scientists heard of the meteor and collected all the information they could get. Fortunately, Charles Upham Shepard of Amherst College, one of the most active students of such phenomena at that time, investigated the Iowa meteor of 1847. He wrote four articles about it in the *American Journal of Science*. His prompt work preserved essential facts that would otherwise have been lost.

Hearing of the meteor in Iowa, Shepard at once wrote for particulars to his old friend, the Reverend Reuben Gaylord, who was the minister of the Congregational Church at Hartford in Des Moines County. During the summer, Gaylord visited Linn County and conducted what seems to have been a very thorough investigation of the various phenomena concerning the meteor. He interviewed eye-witnesses, made notes of his own personal observations, and, returning to his home, wrote a complete report.

It is fortunate indeed that, in almost every period of Iowa history, thoughtful people, often at great effort and inconvenience to themselves, have taken the trouble to record such valuable information, thus making it available to posterity. Were this not so, scientific events of importance would soon become only matters of tradition; for, even now, it would probably be impossible to find and interview a single person who actually witnessed the fall of this great Iowa meteorite. The souls of most of those then living have long since passed on to the abode from whence meteors seem to come, and yet they can make no use of such "messengers from heaven" as means of direct communication with those still remaining on the earth.

One of the essential facts concerning meteors, in which people are greatly interested, is the exact location of the "fall," if but a single stone came down, or of the "meteoric field," if a "shower" occurred. In the present instance the "meteoric field" lay in the rough timber country along the Cedar River, from three to four miles south of the present station of Bertram on the Chicago and North Western Railroad. This spot is seven or eight miles southeast of Cedar Rapids. At the time the meteor fell, however, the literature upon the subject reported it as being "approximately nine miles due south of Marion," the county seat.

As usual in such events, there was considerable discrepancy in reports regarding the exact hour

of the fall. This could be explained by the excitement of the moment, for few observers thought to look immediately at their clocks or watches. Moreover, the time pieces varied. It was impossible for people in those days to regulate their watches by radio or telegraph. The range in time given in the various reports on the Marion meteor was remarkably small. Most of the times mentioned were within a period of fifteen minutes. One of the most careful and reliable observers said that the meteor "fell at about ten minutes before 3 o'clock," which for all practical purposes is sufficiently correct.

At this time the atmosphere was almost clear. A slight haze did not obstruct perfect vision. The bright winter sun had so warmed the air that the snow on the ground was somewhat softened, and the temperature was close to the freezing point. According to Gaylord, quoting from his letter, "the attention of the people in that region was arrested by a rumbling noise as of distant thunder; then three reports were heard one after another in quick succession, like the blasting of rocks or the firing of a heavy cannon half a mile distant. These were succeeded by several fainter reports, like the firing of small arms in platoons. Then there was a whizzing sound heard in different directions, as of bullets passing through the air."

According to persons at "a distance of ten miles in each direction the sound was like the rolling of a

heavy wagon passing swiftly over frozen ground. Smoke was seen in the direction from which the sound seemed to proceed. The smoke appeared in two places, apparently about six or eight feet apart, above the elevation of light clouds, and having a circular motion. The motion of the meteoric body was supposed from the reports which were heard, to be towards the southeast, or rather south of east."

Another description of the aerial display was published nearly twenty years later, in an article prepared by C. W. Irish, a civil engineer, who lived at Iowa City. In his study of Iowa meteors, he interviewed as many eye-witnesses as possible. His information about the Marion meteor was obtained chiefly from Judge James Cavanagh who, with two of his sons, was at the time cutting wood on the Cedar River, about nine or ten miles southeast of the place where the meteor struck.

In relating his experience Cavanagh said that, "suddenly there came from the sky above and to the west of them, a rushing humming sound, mingled with a whistling as if thousands of bullets were flying through the air. The humming sound was very loud and impressive and rapidly increased to a roar, which seemed to shake the very earth, and all these sounds ceased suddenly in a series of tremendous explosions, which appeared to be northwest of where he stood, and as he thought might be Marion . . . all blown to pieces."

In the opinion of the Judge there were from four to seven distinct sharp explosions. "After the explosions he noticed a rattling rushing sound coming from the southwest, which continued for several seconds, when all the sounds ceased and he saw what he had not before noticed — a bunch of very black clouds close down to the horizon to the northwest of where he stood, and there were no other clouds in sight. Judge Cavanagh said that although he was not at all inclined to be superstitious, yet the affair made such an impression upon him that he and his sons quit their work and went home, where they found the household in great consternation and trouble at what had occurred."

Many other people had observed the meteor. "The neighborhood was in a turmoil about it, and some of the men set out to discover what had happened, and on returning a day or two after, related that a stone had fallen on the high bluffs north of the Cedar river, in township 83 north, in range 6 west of the 5th principal meridian, at the time of the occurrence of the great explosions and other sounds described, and to this stone was given all the credit for producing them."

According to Irish the explosions were "distinctly heard at Iowa City, twenty-two miles south from the place of the fall, and great was the alarm caused by them." He had no doubt that the meteoric body travelled through the air in the direction from south to north and passed directly over Iowa

City. He no longer remembered in 1886 how much the meteorite weighed, but thought it was between eighty and one hundred pounds. So far as he knew only one stone was found, but he believed that a great many more fell in the vicinity, "which at the time was a wild district, having no inhabitants, and thus the chances for finding the stones which fell were small."

If Irish had consulted the available literature on the subject in the library of the State University, he might have learned that a number of fragments were ultimately discovered. The fact that his work was evidently independent, makes his report more valuable. He was not influenced by the findings of Gaylord, and consequently his review was a new contribution to the subject.

In spite of the fact that the country was new and only partially settled at the time, there were actually several eye-witnesses who saw fragments of the meteor hit the ground. "Two men were standing together where they were at work; they followed with their eye the direction of one of these sounds, and they saw about seventy rods from them the snow fly. They went to the spot. A stone had fallen upon the snow, and bounded twice, the first time as was supposed about eight feet, the second time about two feet. The stone weighed two pounds ten ounces. The same persons heard another stone strike as it fell, supposed to be small, but they could not find it."

In the following spring, another stone was picked up "about one mile and a quarter west from the place where this fell. It was in two pieces lying together, weighing forty-six pounds. Another fragment, a portion of the same rock, was found about half a mile from the former," which Gaylord estimated from descriptions must have weighed about fifty pounds. "These were coated with a thin black covering."

Daniel C. Rogers, a farmer residing on section 21, Putnam Township, about nine miles due south of Marion, heard "a loud explosion in the air and immediately ran to his door. He heard the stone and several others whiz through the air and strike the ground, and saw the snow and dirt fly where this stone struck. The weight of the stone before it was broken up was 42 pounds." This may have been the stone that Gaylord had estimated to weigh fifty pounds. Joshua Barney, the United States land agent at Dubuque, in making the above report, wrote that, "one of the surveyors who was engaged on the survey of the public lands 40 miles distant from Mr. Rogers' house," heard the explosion distinctly.

A more exact description of the larger portion of the meteor, which was found on section 20, about a mile or a mile and a half west of the place where the Rogers stone was picked up, was published by Shepard in the *American Journal of Science* in 1848. This really proved to be two sep-

arate masses and not, as at first supposed, fragments of a single broken stone. The larger of the two stones (whose weight was estimated at about forty pounds) "was cracked through the centre, by its fall upon the frozen ground. One of these halves (weighing 21 lbs. 7 oz.) is in my possession."

This meteorite was "an irregularly shaped, four-sided pyramid," the summit of which was an edge four or five inches long. The base of the pyramid was formed by the fractured surface which was nearly a plane, having a texture resembling fine-grained granite. "The natural outside of the stone," reported Shepard, "presents the customary depressions, though they are less distinct than we sometimes observe in these productions." The crust was unusually thick and "its adhesion to the unaltered stone strong, while its line of junction" was perfectly defined. "When narrowly observed, it is discovered that the surface of this crust is divided off, by cracks, into polygonal areas, of from  $\frac{1}{4}$  to  $\frac{1}{2}$  inch in diameter, a consequence no doubt of sudden cooling."

A smaller stone, wrote Shepard, was "represented by the finder of it, as pyramidal in its shape; and to have measured not far from 10 inches in length, by 8 at its base, and 4 at the smaller extremity. It was completely coated by a black crust, like the other two stones. This stone (as well as one-half of the larger mass) has been

broken up, and for the most part entirely lost. The few fragments of it in my possession, sufficiently evince that it differs in no sensible manner from the other two."

Three years after his first investigation, Gaylord obtained another Marion meteorite which weighed twenty pounds and sent it to his friend Shepard. "It was found (in the summer of 1847) in Hooshier grove by Abner Cox," he wrote on July 3, 1850. "He was in company with John Hollis, of whom I obtained two fragments three years ago. They have had the stone two years or more, and by lying in the loft of a smoke cabin it is somewhat dingy in appearance. This John Hollis is the man who ground up so much of the stones that were seen to fall, in order to get silver. He was the means, however, of the careful preservation of the present mass.

"The three pieces into which it broke in striking the ground fit together exactly, so as to reproduce the original stone, with a complete coating over the whole, except on one side where several small fragments were broken out by the fall. These were gathered up and carefully preserved by the finder."

In commenting upon the appearance of this Marion meteorite, Professor Shepard declared that the "stone is perhaps the most remarkable one thus far described, for its highly regular prismatic figure, which at once suggests the idea of a por-

tion of a basaltic column. Nor can the geologist look upon it without feeling almost certain, that it once formed part of some extensive formation in the world from whence it came." Two surfaces of the stone, which were nearly flat, presented "a peculiar wavy, undulating surface and a deeper black color than belong to the other faces of the stone, a difference which appears to originate in the nature of the horizontal cleavage of the mass as contrasted with that which is vertical or oblique." The greatest diameter of the base was ten and a quarter inches.

The texture and composition of the meteoric material, while not entirely homogeneous, was sufficiently uniform, in appearance at least, as to involve no serious question concerning its correct identity or the true relationship existing between the several pieces. Inside the thin dark brown coating or crust, said to be of the "thickness of a bonnet-pasteboard," formed by fusion from the heat of friction while passing swiftly through the earth's atmosphere, the color of the stone was a uniform pearl gray. Closer inspection revealed many small specks of iron rust scattered through the mass, and numerous, "highly brilliant globules of nickeliferous iron." Also present were some small grains of magnetic pyrites, though far less abundant than the metallic grains.

The lumps of nickeliferous iron attracted attention. "Some were taken out as large nearly as a

grain of corn," according to Gaylord. "A man from whom I obtained a fragment insisted that they were silver. He had ground up a considerable portion of the rock to obtain this silver, and he thought he had saved enough to make fifty cents." Professor N. R. Leonard of Iowa City, writing in the *Iowa Historical Record*, stated that most of the largest specimen was "broken up and reduced to a powder by the finder on the supposition that it contained some valuable mineral."

In scientific parlance the stones were described as being "veined white chondrite." The term chondrite signifies that the meteoric material is characterized by the presence of rounded mineral granules called chondrules. The most remarkable feature of the Iowa stone, however, was the homogeneousness of its earthy mineral which "existed in an almost perfectly insulated state." While this substance was common in meteoric stones, it had previously escaped separate recognition. To it Shepard gave the name "*howardite*," in honor of "an individual whose early scientific labors in this branch of meteorology" ranked him among the foremost scholars.

Despite the several reports upon the subject, it is difficult to state with positive certainty, either the exact number of specimens recovered from the Marion shower, or their precise individual or combined weight when picked up. This is due, in part, to a strange vagueness in the writings of the sev-

eral authorities, which might be expected when second or even third hand information is employed as the basis of scientific reports. It may also be explained by the confusing duplication of some of the records which, in this instance, seemed quite unavoidable. Moreover, several of the pieces were either partially or wholly broken up and destroyed by the finders, and therefore were not preserved in any of the permanent collections of the world. Other pieces were sawed and widely distributed in such a manner that it is hard to determine beyond doubt what individual stones these various slices came from. All this adds to the confusion of the problem, making its solution difficult if not altogether impossible.

A careful examination of the literature on this subject does not reveal whether the exact number of sizeable pieces recovered was four or five. Perhaps there were even more. Their total weight was apparently not less than forty-six pounds, and probably not more than seventy-five pounds. For his trouble Professor Shepard seems to have secured the largest masses now known to exist. One weighed 21 pounds and 7 ounces and the other 20 pounds. They now repose in the cabinets of Amherst College. Another large mass, weighing 432 grams, is at Tubingen. The catalogues of the Field Museum list two pieces: one, number 255, weighing 128 grams, a complete specimen with crust, and intersected with numerous fine

cracks; and a second, number 1749, weighing 60 grams, a mass with crust and polished surfaces. Other fragments and sections are distributed throughout the important collections of the world, but their exact whereabouts is uncertain. It likewise is not beyond the range of probability that pieces yet remain upon the meteoric field along the banks of the Cedar River in Linn County.

After ninety years, however, such fragments would probably be so weathered through long exposure that only an expert could discern their true identity. Nevertheless, people are continually picking up meteorites which probably came to earth before the dawn of history. Who knows what a thorough search of the several meteoric fields of Iowa might yield? Some Boy Scout would win the approbation of astronomers and scientists if he were able to find and salvage one or more fragments of the Marion meteor.

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