

## A Geological Report

David Dale Owen, son of the well-known Scotch social reformer, Robert Owen, had a life of unusually varied experiences which prepared him for a wholly unforeseen exploit far from his native land. When the United States government needed accurate information about the mineral resources of the upper Mississippi Valley, he was selected to make the survey. His *Report of a Geological Exploration of part of Iowa, Wisconsin, and Illinois*, published in June, 1844, laid the foundation for the study of geology in this region.

Two factors in Owen's training united to make the book valuable and distinctive: his scientific method and his skill at drawing, and each of these was rooted in his earliest schooling. As a boy, Dale lived on his father's estate in Scotland where he had the opportunity to become acquainted with nature; but because his father expected him to take charge of factories he was given lessons in architectural drawing as a means of fostering mechanical skill. When he was in his teens, his father sent him to a "progressive" school near Berne, Switzerland, where for three years the boy specialized in mathematics and science. Mineral-

ogy, botany, and zoology were the chief subjects, and Dale sketched industriously on the many field trips which were part of his instruction.

Further scientific study, with the advantage of performing laboratory experiments, was carried on at the Andersonian Institute in Glasgow. Chemistry and geology particularly attracted Dale's attention, and he became so interested in the subject of industrial applications of scientific knowledge that he undertook to persuade his father that he should devote himself to industrial chemistry rather than manufacturing.

Robert Owen, displeased with developments in Scotland, had bought outright the town of New Harmony, Indiana, as a place to carry on his investigations in social reform, and thither Dale journeyed in 1827 intending to proceed with scientific research. However, Robert Owen's colony was not meeting any more success than the German religious-economic group which had founded the settlement, and the nearest possible approach to scientific activity was the recording of meteorological data.

Bored by his situation, young Owen first began to study lithography and printing in New Harmony, and then went to New York where he worked in a printing office and resumed his practice of drawing. A chance encounter reawakened

his taste for study, and this time he enrolled at the University of London where he specialized in chemistry, but upon completing his work he returned to New Harmony, which remained his home from 1833 until his death in 1860.

Within two years, Owen had become convinced that the most useful field of scientific activity in a pioneer land was geology. As he wished to do well whatever he undertook, he attended the Medical College of Cincinnati in 1835-36, in order that he might properly understand anatomy which was essential to paleontology, which in turn was requisite to competent geological work. He had no intention of practicing medicine, but his ten months of study entitled him to a degree and this accounts for the rather surprising appearance of M. D. after his name on the title-page of the *Geological Exploration*.

Owen's first professional work in geology was done for the State of Indiana, and it was so satisfactory that on July 31, 1839, he was appointed "Principal Agent to explore the Mineral Lands of the United States." The problem of disposing of the public land in the lead region was puzzling Congress. While the policy of selling agricultural land was well established, it seemed desirable to lease mineral rights. But no one knew how extensive the lead deposits might be. The Treasury

Department, which had charge of public lands, decided that a scientific survey was necessary. Since prospective settlers were very importunate, the Treasury Department asked Owen to secure the desired information that same year, even though he did not get his instructions until late in the summer and he could not expect to carry on field operations beyond the first days of November.

It was a prodigious assignment. How could he explore with scientific precision the 10,000 square mile area in the allotted time? His bold but successful decision was not to be penurious. No limit had been set to the expenditure he might make, and he concluded that Congress would more willingly pay a large sum for satisfactory results than a lesser amount for inadequate or belated information. Accordingly, he hired over one hundred men who were divided into twenty-four parties, each of which was assigned to cover a definite area. Among these men there was only one trained geologist, Dr. John Locke, who served as Owen's principal assistant. About twenty from New Harmony had attended the popular lectures Owen had given, but the others were probably completely devoid of geological knowledge. This situation Owen remedied as best he could by a short course started while the party was making

preparations in St. Louis and continued aboard the steamboat while they moved up the Mississippi River.

The actual survey began on September 18, 1839, with each group going to its assigned area from their landing place at Rockingham. Owen and Locke ranged back and forth to receive reports and to undertake personal investigation of those regions which the exploring parties reported to be mineral bearing. The survey worked steadily northward and by October 20th had finished the Dubuque district, which meant all of its work in Iowa, and thereupon crossed the Mississippi to repeat the established procedure.

Iowans were interested in the project, for they were proud of their land and felt that an unprejudiced report would spread its glories before the whole country. The mine owners were especially cordial and gave Owen every facility for inspecting their operations. However, part of the cordiality Owen met was due to his own gifts of understanding and tact, as evinced in his recommendation that the sale of non-mineral land should be postponed until spring in order to give the settlers a fair opportunity to locate claims.

The complete report of the survey was prepared in New Harmony and reached the Treasury Department in April, 1840. It was accompa-

nied by sketches, maps, charts, cross sections, and beautiful drawings of fossils which Owen himself carefully prepared. These illustrations, however, were not published in the first edition of the report issued in June. Despite the omission of the illustrations, there was such a steady demand for the report that exactly four years later it was reissued, this time fortunately with the drawings included.

The book itself is rather narrow for its height, measuring five and three-fourths by nine inches, and consists of 191 pages of text. The paper is soft and in perfect condition except for some foxing. Some of the maps, cross sections, and fossil plates are in color, but what attracts the casual eye are the naturalistic sketches of scenery which introduce an unexpectedly romantic note into a scientific work published by the government a hundred years ago.

One of the most interesting and best-known illustrations is a cross section of a lead mine. At the top, on the earth's surface, stand two men turning a common windlass by means of which a miner is being lowered down the cylindrical shaft. The man, wearing a kind of Prince Albert coat, stands nonchalantly on his right foot which is inserted into a noose in the rope, while his left foot guides his downward course by thrusting

against the wall to keep his body from scraping the sides. His hands could not fill this function because one holds a lighted torch above his head and the other dangles a pickaxe. The shaft ends in a chamber which is being further enlarged by the energetic blows of two men with pickaxes working in the illumination provided by a torch thrust into a crevice. A third man holds a large bucket in which the ore is removed from the mine. Thus the whole process depended upon man power, but as Owen sketched the scene it conveyed a sense of adventure rather than drudgery.

The true significance of Owen's report lay, of course, in the extensive and precise information it made available to prospective settlers. In addition to a general survey of the characteristics of the whole area explored, there were separate sections on lead, zinc, copper, iron, coal, building stone, and millstones — with corresponding tables showing where these were located.

While Owen's primary objective had been to locate the mineral wealth, he had also been instructed to report on the value and productiveness of the soil. The appendix, therefore, contained a summary of the character of each township setting forth its elevation, timber and water resources, and nature of soil. Owen pointed out the peculiar fact that contrary to the prevalent condi-

tion in mineral areas, the surface in Iowa and Wisconsin was such as to "afford promise of liberal reward, no less to the husbandman than to the miner;" and a chemical examination of the soils gave assurance that the promise would be amply fulfilled. It was, indeed, this double character of the Iowa-Wisconsin lands that had necessitated Owen's survey in 1839.

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