

David Dale Owen's Geological Survey of Minnesota

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A HUNDRED years ago the great Northwest area which now comprises the states of Minnesota and Wisconsin was still unknown territory to most Americans. Since the seventeenth century this region had been the abode of Indians and fur traders, but in the 1840's it became the New West and the land of opportunity for the pioneer. In the first half of the century explorers like Stephen H. Long, Henry R. Schoolcraft, George W. Featherstonehaugh, and Joseph N. Nicollet journeyed through the Minnesota country and described its physical characteristics. The many traders who operated in Minnesota and Wisconsin for British and American fur companies also gathered much information about the lakes and rivers and valleys. Although some of these men were good practical scientists, none were trained geologists or mineralogists, and no detailed or completely accurate accounts of the natural resources of Minnesota were available. Nevertheless, on the basis of scanty and not always trustworthy intelligence, thousands of farmers and lumbermen, in the 1830's and 1840's, penetrated the lands bordering on the Mississippi River in Iowa, lower Wisconsin, and Minnesota. The lead-bearing ores of the region had been exploited, and the copper deposits of the Upper Peninsula of Michigan had been discovered.

Pioneers like Henry H. Sibley, long connected with fur-trading enterprises, saw a great future for the Northwest and exerted pressure on the national government for assistance in opening up the region. They wanted the Indians removed, the land surveyed and offered for sale, and its mineral and agricultural resources located and described. The stories of Indian removal and land survey have been told elsewhere; this article is concerned with the first comprehensive geological survey of Minnesota.

In 1839 the United States land office authorized a survey of the mineral resources of a considerable part of eastern Iowa and southern Wisconsin. At the time, the land office was interested in determining the exact location of mineral, especially lead, deposits, in order that such areas might be reserved from general land sale and be held for leasing according to a policy set forth by Congress.¹

The man selected to make the survey was David Dale Owen, a son of Robert Owen, the English socialist who in 1825 founded the co-operative colony at New Harmony, Indiana. The son went to the United States to make his home at New Harmony and to become an industrial chemist in the factories that his father had planned for the colony. The elder Owen's community soon broke up, however, and young Owen, who was trained as a scientist in Europe, decided to become a geologist. He spent a year at the University of London and later received the degree of doctor of medicine from the Medical College of Ohio in Cincinnati. At the same time he did much independent research and created a laboratory and museum at New Harmony that perhaps ranked as the best in the Middle West at the time. Following his appointment in 1837 as the first state geologist of Indiana, he carried out a brilliant survey of that state. Because of his excellent work, James Whitcomb, the commissioner of the federal land office, selected Owen to conduct a mineral survey of Iowa, southern Wisconsin, and northern Illinois. In a very short time Owen completed the task of determining the lead-bearing areas to be reserved for leasing; thus the agricultural land could be offered for sale. For several years after his survey of 1839 Owen engaged in geological research and writing, and he was recognized as the leading western geologist.²

Through the decade of the 1840's immigration into Minnesota

¹ James F. Callbreath, *Government Control of Minerals on the Public Lands* (64 Congress, 1 session, *Senate Documents*, no. 430 — serial 6952).

² Owen, *Report of a Geological Reconnoissance of the State of Indiana, Made in the Year 1837* (Indianapolis, 1859); *Continuation of Report of a Geological Reconnoissance of the State of Indiana, Made in the Year 1838* (Indianapolis, 1859). See also the present writer's study of *David Dale Owen: Pioneer Geologist of the Middle West*, 3, 13-16, 23, 41-83 (*Indiana Historical Collections*, vol. 27 — Indianapolis, 1943), and his article on "David Dale Owen and the First Geological Survey," in the *Annals of Iowa*, 24:3-13 (July, 1942).

and Wisconsin increased, some of the Indian titles to the land were extinguished, and Congress provided for the survey and sale of some of the public lands. In 1846 Congressional legislation put a stop to the leasing of mineral lands in Iowa and southern Wisconsin—the area that Owen had surveyed in 1839—and provided that such tracts might be sold, although at a higher price than agricultural land. As a result there was a demand that this policy be extended to the entire region of Minnesota, Wisconsin, and upper Michigan, and in 1847 Congress authorized geological surveys for a part of the region. Two new land districts were created: upper Michigan and most of the Lake Superior shores of Wisconsin were designated as the Lake Superior Land District, and southern Wisconsin and southern Minnesota east of the Mississippi River, as the Chippewa Land District.³ The latter district was assigned to David Dale Owen for survey. After he completed the work in the summer and fall of 1847, Congress appropriated funds for the extension of the survey to the rest of Wisconsin, Minnesota, and Iowa. In 1848 and 1849 Owen headed surveying parties in the region, and in 1852 he prepared a comprehensive report of the results of the survey. The story of his survey of the Northwest, as recounted in his *Report of a Geological Survey of Wisconsin, Iowa, and Minnesota*, is a thrilling narrative. Owen and his companions penetrated the wilderness and, with the aid of French-Canadian voyageurs, paddled birchbark canoes up and down swift-flowing rivers and through placid lakes, and sailed along the rocky shores of Lake Superior. A general account of this survey has been presented in another place, and the scientific results have been fully reviewed.⁴ The adventures of Owen and his assistants in the wildest part of the Northwest, the future territory of Minnesota, are the subject of the present article.

Owen built his geological reconnaissance about Lake Superior and the three great rivers of the Minnesota country—the Minnesota, the Red, and the Mississippi.⁵ From these main arteries, side excursions were made on the tributary rivers and on the numerous

³ United States, *Statutes at Large*, 9:37, 146, 179–181.

⁴ Hendrickson, *David Dale Owen*, 84–106.

⁵ Like most explorers of his day, Owen called the Minnesota River the St. Peter's. He used the latter name in his reports.



THE DALLES OF THE ST. CROIX

[From an engraving by E. P. Vullum, in Owen, *Report*, 142.]

lakes. The result was a connected picture of the geological and physiographical structure of Minnesota. Although the geologists were primarily concerned with finding and describing mineral deposits and rock formations, they paid much attention to the terrain, to plant and animal life, and to the potentialities of the region for developing lumbering and farming.

The field parties spent most of the season of 1847 in southern Wisconsin, touching on the future territory of Minnesota only when they descended the St. Croix River to the Mississippi, and it was not until the summer of 1848 that Owen devoted his attention to the latter. He planned a journey down the Red River, and assigned to his principal assistant, Joseph G. Norwood, the task of examining the St. Louis and Mississippi rivers and the Lake Superior shore. Other parties were directed to make a section by section examination of southern Minnesota, and one corps, under Benjamin Shumard, was sent up the Minnesota River.⁶

⁶ As a result of his experience with Owen, Norwood was placed in charge of the Illinois State Geological Survey in 1851, and he later assisted with the Missouri survey. Owen, *Report of a Geological Survey of Wisconsin, Iowa, and Minnesota*, xxv, 482 (Philadelphia, 1852).

In electing to explore western Minnesota, Owen chose to invade the least settled and least known part of the region. He was convinced that, considering the nature of the terrain of interior Minnesota, he could only hope to obtain a comprehensive view of its geological structure by following a "course along the deep cuts of the great valleys." Owen himself chose to explore the Red River of the North. He proposed to descend the stream as far as Pembina, cross over into Canada to reach the Red River settlements, and travel thence to Lake Superior by way of the Lake of the Woods and Rainy Lake. His previous year's experience in Wisconsin had clearly demonstrated that one of the perils besetting explorers in the Northwest was lack of adequate food. Since there were few settlements where stocks might be replenished, an exploring party had either to pack enough to last until its return to civilization, or plan definitely, even if it meant going out of the way, to stop at a supply depot. There were just two possible places where food might be obtained in the Red River country—the American Fur Company's post at Pembina and the Hudson's Bay Company's establishment at the mouth of the Assiniboine River in Canada. With these considerations in mind, Owen applied to the British legation in Washington for a letter of introduction to the Hudson's Bay Company agents in Canada before he took to the field. This proved to be a wise move, for when the explorer reached Pembina he found the American Fur Company unable to supply his needs.⁷

Owen took advantage also of connections farther south in the Minnesota country. Sibley, who represented the American Fur Company at Mendota, was able to give the geologist and his assistants much practical help when, in the spring of 1848, they at length ascended the Mississippi to the Falls of St. Anthony. Sibley's fur-trade connections and wide acquaintance throughout the Northwest were useful to the explorers. Furthermore, he occasionally acted as Owen's financial agent and arranged for canoes and voyageurs for the surveying parties.⁸ At the falls the group divided, Shumard

⁷ Owen, *Report*, xxiv, xxv, 178; John F. Chambers to the Hudson's Bay Company, April 12, 1848, Owen Papers. The latter collection is in the possession of Mrs. Caroline Dale Snedeker of Nantucket Island, who placed it at the author's disposal.

⁸ See letters to Sibley from B. C. Macy, March 23, 1848; John Evans, July 18, 1848;

turning up the Minnesota, while Owen and Norwood, with their corpsmen, continued their course up the Mississippi to Crow Wing near the mouth of the Crow Wing River. At an American Fur Company post there, the explorers expected to recruit guides and canoemen from among the employees of the company, mostly French-Canadian half-breeds. Since Crow Wing was a shipping point for furs collected during the winter, the voyageurs congregated there in the spring when the season's work was over.⁹

But the geologists arrived just a week too late. Most of the traders and voyageurs had already departed for the summer, and Owen found that the few still at Crow Wing were reluctant to go into the Red River country. To them it was unknown territory, and Owen said that none of them had even heard of any white man who had made the descent of the river. But, after much persuasion, two guides were obtained for a part of the journey, and Owen set out with his assistant, Abram Litton, his secretary, John Evans, and three young men recruited at Prairie du Chien and St. Paul, none of them expert canoemen. From the Mississippi, Owen and his party ascended the Crow Wing to the Leaf River and thence proceeded to the series of small lakes now known as Leaf Lakes. By making a portage of a mile and a quarter over a prairie eighty feet above the level of the most westerly of the Leaf Lakes, the men reached Otter Tail Lake. Owen noted correctly that the prairie was a watershed separating two river systems, one of which went into Hudson Bay, and the other into the Gulf of Mexico.¹⁰

From Otter Tail Lake the party entered what Owen called the Red River, but from his account it is not clear whether he went immediately into what is now known as the Otter Tail River, or went first through some of the many lakes of the area. The season was a very wet one, and the area was far more swampy than it is today. Owen records that he passed through ten lakes, all connected

Owen, August 9, 1848, May 12, 1849; and Joseph G. Norwood, May 23, 1849, Sibley Papers, in the possession of the Minnesota Historical Society.

⁹ Owen, *Report*, 295.

¹⁰ Owen, *Report*, xxvi, xxvii, 170, 296. Litton later assisted with the Missouri State Geological Survey, and Evans surveyed Washington Territory under the direction of Governor I. I. Stevens.

with one another, before arriving at the point where the Otter Tail and the Bois des Sioux join to form the Red River.¹¹

With but one mishap, when the canoes were caught in swift water on the Otter Tail, Owen and his party made the trip down the Red River in safety. The fears of the voyageurs at Crow Wing proved unfounded; the Red River was neither rocky nor rapid, and throughout its length the travelers passed through broad, grassy plains which Owen called "savanahs." They were devoid of geological significance, being covered with glacial drift, with the underlying limestone visible at only a few points. During the long descent of the river, the party encountered only one small band of Indians and saw only a few elk and large yellow wolves. There were signs of buffaloes, but none of the beasts themselves.¹²

The geologist realized that the Red River Valley had agricultural possibilities. He reports that "the general agricultural character of the Red River country is excellent. . . . The principal drawbacks are occasional protracted droughts, during the midsummer months, and, during the spring, freshets, which, from time to time, overflow large tracts of low prairies, especially near the 'Great Bend'" where the Otter Tail and Red rivers meet.¹³

On the morning of July 5 Owen and his companions saw a place where trees had been felled with an ax, and in the afternoon they reached the mouth of the Pembina River and the little settlement of Pembina. There the party rested for a few days, and Owen and Litton explored the neighborhood for minerals, but found none. Unable to obtain supplies at Pembina, the geologists went on to Fort Garry, a Hudson's Bay Company's post, to secure men and provisions for the remainder of the trip. After investigating the geology of the Fort Garry country, Owen and his party, refreshed and re-equipped, turned eastward, journeying on waters that demanded the utmost skill of the canoemen. Their route took them into Lake Winnipeg, up the Winnipeg River to the Lake of the Woods, by way of Rainy Lake, the Rainy River, and other border lakes and

¹¹ Owen, *Report*, 172.

¹² Owen, *Report*, xxviii, 173, 177.

¹³ Owen, *Report*, xxxi.

streams to Fort William on Thunder Bay of Lake Superior, and thence to the Mississippi.¹⁴

Since the survey of the Lake Superior and upper Mississippi country was entrusted to Norwood, Owen did not record his observations while traveling through that section of the Northwest. The seasons of 1848, 1849, and 1850 Norwood devoted to his survey of a region which he described as embracing "all that part of the Territory of Minnesota lying west of the St. Croix and Bois Brulé Rivers, and east of the Mississippi, and stretching northerly to the boundary line of the United States." This "area of about 40,000 square miles," he recorded, "is included within a line extending along the Mississippi River as far as Red Cedar or Cass Lake, and thence to Red Lake; from the sources of Big Fork River, along that stream, to Rainy Lake River, and thence along the boundary line between the United States and British Territories to Lake Superior, at the mouth of Pigeon River; and from that point, along the shores of Lake Superior to the mouth of the Bois Brulé River, and up that stream to its source, and down the St. Croix to its junction with the Mississippi."¹⁵ Norwood was a thoroughly competent geologist and his report, printed in full in Owen's volume, is a careful account of the physical and geological features of the huge region he surveyed. Later geologists have found it of great value, and for the men of the 1850's who began the occupation of interior Minnesota, Norwood's discussion of the climate and the mineral, agricultural, and lumbering resources was of immediate practical help.

When Norwood left Crow Wing on June 15, 1848, he headed up the Mississippi to Sandy Lake, where he arrived on June 22. From there he and his party set out for Lake Superior by way of the West and East Savannah rivers, over the divide between the eastward and westward flowing rivers. Norwood found the six-mile portage between the rivers to be extremely difficult in places. "The east end

¹⁴ Owen, *Report*, xxx, 177, 183-185. Owen's account of the route followed to Fort William is not clear.

¹⁵ "Dr. J. G. Norwood's Report," in Owen, *Report*, 213. Because it was described by other members of the Owen expedition, Norwood does not give a detailed account of the area south of a line from the mouth of the Rum River to the St. Croix.

of the portage," the explorer notes, "for the distance of a mile and a half, runs through a tamerack swamp, which was flooded with water, and next to impassable." He records that "It is generally considered the worst 'carrying place' in the Northwest, and, judging from the number of canoes which lie decaying along this part of it, having been abandoned in consequence of the difficulty experienced in getting them over, its reputation is well deserved." After crossing the Savannah Portage, however, the party made good time, reaching the St. Louis River and floating down to Fond du Lac, near the present city of Duluth. There the explorers arrived on June 28.¹⁶

Using Fond du Lac as a temporary base, Norwood dispatched two men to La Pointe, Wisconsin, for provisions enough to last three months, while he investigated the local geology and made a quick trip along the North Shore of Lake Superior as far as the mouth of Two Island River. Upon returning to Fond du Lac, Norwood set out for the interior, ascending the difficult St. Louis to the Upper Embarrass River, and then traversing a series of portages and lakes to the Vermilion River. There Norwood and his men found it necessary to stop and rest for three days. All equipment and supplies, including flour, their basic food, had become thoroughly water-soaked, and the latter was in danger of spoiling. Besides, two men had been injured in carrying the heavy canoes over a portage.¹⁷

After encountering many more difficulties and hardships, Norwood and his companions made their way to the Rainy Lake country, arriving on September 10 at Fort Frances at the falls of the Rainy River. From there the party, by way of the Big Fork River, Round Lake, and connecting streams, entered Lake Winnebago-shish, and then went on to Cass and Red lakes. Although Norwood found no indications of minerals, he was enthusiastic about the agricultural possibilities of the Red Lake-Lake Winnebago-shish region. "So far as the mere support of life is concerned," he writes, "this region is equal, if not superior, to many portions of the settled States. The rice-fields, which require neither sowing nor cultivation, only harvesting," he believed could "yield all that is essential for

¹⁶ Norwood, in Owen, *Report*, 296, 298-301.

¹⁷ Norwood, in Owen, *Report*, 301-312.

breadstuff." Norwood adds, however, that "corn can be cultivated with as little or less labour than in the Middle States. Potatoes, far superior in size and flavour to any I have seen in the Ohio Valley, are grown with little attention; and turnips and beets produce abundantly." The explorer notes further that "natural meadows border the lakes and streams, the luxuriant grasses of which are sweet and nutritious, and eagerly eaten by cattle; while the streams and almost innumerable lakes abound with a great variety of fish of the finest quality, and which may be taken at all seasons with little trouble. The uplands are generally covered with a good growth of both hard and soft woods, sufficient for all the wants of man. The sugar-maple is abundant, sufficiently so to yield a supply of sugar for a large population. In addition to all this, the forests are stocked with game, and the lakes and rice-fields must always, as they do now, attract innumerable flocks of water-fowl."¹⁸ Unfortunately, the section thus described has not justified Norwood's optimistic predictions. Nevertheless, it is just such glowing accounts of a land of milk and honey that have drawn Americans ever westward. Norwood's and Owen's reports, although intended to be coldly factual, contain many such enthusiastic passages, and they must have inspired many a settler to move to the Northwest.

After further exploration in the region of Lake Winnebagoishish, Norwood started down the Mississippi, making a side excursion through Mud River, Mille Lacs Lake, and Rum River. He eventually reached the mouth of the Minnesota on October 18, and concluded the work of the season of 1848.¹⁹

In the next year Norwood continued his survey, this time covering the region north and west of Lake Superior. He examined the shore from Two Island River northward to Fort William. He investigated many of the short rivers flowing into the lake, and he made one long journey up the Pigeon River.²⁰ On this trip Norwood was accompanied by Major Richard Owen, David's younger brother, who was also a geologist. Both brothers were competent artists, and

¹⁸ Norwood, in Owen, *Report*, 322-325.

¹⁹ Norwood, in Owen, *Report*, 329-332.

²⁰ Norwood's account of the North Shore begins on page 341 of Owen's *Report*.

the Wisconsin, Iowa, and Minnesota report is illustrated with many of their landscape sketches and detailed drawings and diagrams of rock formations.

While Owen and Norwood explored the northern and western parts of the future state of Minnesota, the southern area was surveyed by Owen's second assistant, Shumard. The valleys of the Minnesota and the Mississippi were the keys to the geology of this region. In 1848 Shumard started his season's work at Fort Snelling. His party of ten, including four voyageurs, left the post in two bark canoes to ascend the Minnesota. On the whole theirs was an unexciting trip. One member of the group, Robert B. Haines, a young Quaker from Philadelphia, reported that much of the route was through "almost unexplored country." He explains, however, that "we made no great discoveries for the simple reason there was nothing to discover," since the Minnesota Valley had "no coal & no minerals."²¹

Shumard and his party traveled through low, wet meadows in the bottom lands near the mouth of the Minnesota. Farther upstream they passed the Indian village at Shakopee, ascended the Little Rapids about fifty miles upstream, and then entered upon a territory where prairies extended back from high bluffs along the river bank. On October 6 the exploring party arrived at Traverse des Sioux near the present city of St. Peter. Upon reaching the mouth of the Blue Earth River, Shumard explored the stream and some of its tributaries. Then the party returned to the Minnesota and went upstream as far as the mouth of the Redwood River. There Shumard, who had been suffering intermittently from pleurisy, became much worse, and it was decided that he should go no farther, but should return at once to Traverse des Sioux. When the party reached that place, Shumard was quite ill, and there was nothing to do but leave him at the Indian mission. For a time it was feared that he might not recover, but with careful nursing he finally was sufficiently improved

²¹ "Dr. B. F. Shumard's Report" appears in Owen, *Report*, 481-503. See also Owen to Sibley, August 9, 1848, Sibley Papers; Haines to Margaret Haines, June 24, 1848; to Charles S. Rannells, August 3, 1848. The Minnesota Historical Society has photostatic copies of Haines's letters; the originals are owned by his son, Mr. Jansen Haines of Philadelphia.

to be taken to Fort Snelling, where he was cared for by one of the officers.²²

While Shumard was convalescing at Fort Snelling, Haines and two other members of his group went to Stillwater, the rendezvous for several surveying parties, to procure money and supplies for the rest of the season's work. In the meantime Shumard resumed his duties and examined the geological formations along the Mississippi River from Fort Snelling to Prairie du Chien.²³

Prairie du Chien was the final rendezvous for the exploring parties. There the voyageurs were dismissed, and equipment and geological specimens were packed for shipment to Owen's laboratory at New Harmony. After their strenuous summers in the field, the geologists spent the winter months in the quietness of preparation, classifying and analyzing minerals and rocks and drafting maps. When all the information they had gathered in the West was collated and summarized, reports were published so that all the world might know of the natural wealth and beauty of the great Territory of Minnesota.

²² Owen, *Report*, xxiii; Shumard, in Owen, *Report*, 481-484, 492.

²³ Haines to Margaret Haines, August 18, 1848, Haines Letters; Shumard, in Owen, *Report*, 495-503.



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