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THOMAS JEFFERSON AND THE GEOLOGICAL SCIENCES

By JOEL MARTIN HALPERN

Although the man who was instrumental in framing our constitution was interested in almost all phases of human knowledge, geology and poetry were subjects about which he professed to know least. He did not think particularly highly of the theoretical aspects of geology, but in regard to mineralogy he had more interest since he considered this particular phase of geology a subject more closely allied to human needs. Despite his seemingly negative attitude his activities in the field are of great interest.

Among his most notable work in this respect was the vital part he played in establishing the United States Coast Survey (1807) which was the historic forerunner of the United States Geological Survey and the United States Coast and Geodetic Survey. Although this organization did not become very active until the 1830's the initial impetus was of great importance. As President of the United States he sponsored the famous western expedition of Lewis and Clark (1803-1806) and of Zebulon Pike (1805-1807), and he encouraged the search for minerals and fossils.

Writing in 1789 to President Willard of Harvard, Jefferson remarked, "What a field have we to signalize ourselves in. The botany of America is far from being exhausted, its mineralogy is untouched and its natural history or zoology are totally mistaken or misrepresented." He was active in many scientific societies and was for a time President of the American Philosophical Society of Philadelphia.* He also corresponded with many notables in the world of science, among them Benjamin Rush, Joseph Priestly, Thomas Cooper and Patrick Kerr Rogers. The work of these men in geology, chemistry and the other natural sciences is well known.

* Science was more often called Natural Philosophy at that time.

Thomas Jefferson, despite the fact that he decried the theoretical aspects of geology, was very much interested in vertebrate paleontology. He is probably our only vice-president who carried fossil bones with him on his way to assume office so that he could have them identified. It seems that Jefferson was even something of a collector, for he mentions in a letter to Dr. Wiston in 1807 that General Clark had sent him a prehistoric tusk and a femur, "for a special kind of cabinet I have at Monticello."

Among Jefferson's voluminous writings is a little book called *Notes on Virginia* which he wrote for the French Ambassador. Aside from including information on the mineral and other natural resources of the state, the animals, plants and general geographical features are discussed. There are also included chapters on public finance, the local Indian tribes, militia, etc. The term "Virginia" is a bit misleading for at the time Jefferson wrote, the western boundaries of the Atlantic States were poorly defined or were non-existent; actually "Virginia" as Jefferson used it included parts of western Pennsylvania, all of West Virginia (this state split off from Virginia during the Civil War), parts of Kentucky and possibly Tennessee.

The section dealing with the mineral resources of the state discusses the occurrence of various minerals, mining, mineral springs and some of the very type of geological theorizing which he had professed to dislike. Among the mineral resources of the area he included isinglass (mica) found in several localities, loadstone (magnetic iron oxide), asbestos ("of ligneous texture"), chalk, and ochres (iron oxides). For Bedford County he states, "Some of the earth is believed to be gypseous" i. e. contains gypsum. He also mentions deposits of gold, lead, copper, coal, iron, marble, limestone, amethysts and fossilized marine shells

In regard to the coal deposits in Penn-

sylvania he prophetically notes, "The coal at Pittsburgh is of very superior quality. A bed of it at that place has been a-fire since the year 1765." Concerning gems Jefferson is skeptical of valuable deposits in the area, for he writes, "I have known of one instance of an emerald found in this country. Amethysts have been frequent . . . yet not in such numbers any of them, as to be worth seeking."

Jefferson must have taken a personal interest in mining; in commenting on the operations of a particular lead mine he suggests that the pounding mill and the furnace be on the same side of the river in order to increase the efficiency of the procedures. Some idea of the scope of mining operations in 18th Century America is revealed by the fact that this mine produced twenty to twenty-five tons of lead a year and employed thirty laborers. The ore and later the refined product were transported by canoe and wagon.

The finding of fossilized marine shells posed problems to Jefferson as it had to other thinking men since the time of Leonardo Da Vinci and even earlier. He mentions fossil shells being found in the Andes in South America at a height of 15,000 feet. Although some had cited this as proof of a universal deluge, Jefferson disagrees by saying, "If the whole contents of the atmosphere then were water instead of what they are, it would cover the globe but thirty-five feet deep." Discussing the pro and con aspects of this dispute and citing Voltaire's disbelief in the "Universal Deluge" Jefferson concludes, "These hypotheses are equally unsatisfactory (Voltaire's and his opponents), and we must be content to acknowledge that this great phenomenon is as yet unsolved."

He also was interested in describing certain sulphur springs: "The matter with which these waters is allied is very volatile; its smell indicates it to be sulphurous as also does the circumstance of its turning silver to black. They relieve rheumatism. Other complaints also of very different natures have been removed or lessened by them." These may have been the famous White Sulfur Springs now the site of a popular resort in West Virginia.

Jefferson also described Virginia's famous Natural Bridge (he owned the Bridge and the area surrounding it and built a guest house there), inquired into the deposits of saltpetre for the manufacture of gunpowder and described some of the limestone caves of the area.

In writing to Dr. John P. Emmett in 1826, he sums up his views on the subject:

"To learn . . . the ordinary arrangement of the different strata of minerals in the earth, to know from their habitual collocations (arrangements) and proximities where we find one mineral, where another, for which we are seeking, may be expected to be in its neighborhood, is useful. But the dreams about the modes of creation, enquires whether our globe has been formed by the agency or fire or water, how many millions of years it has cost Vulcan or Neptune to produce what the fiat of the Creator would effect by a single act of will, is too idle to be worth a single hour of anyman's life."

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