

"My pupils overrate me if they take enthusiasm and interest, and a little imperfect book-learning, as comprehensive and accurate knowledge. In teaching, I have but attempted to give them a glimpse into the beauties and wonders of the boundless regions of Natural Science, and to awaken in them a desire to go in and by patient study to view for themselves.

"Bluffs, stone ledges, water and ripple marks, and the small shells that are so thickly imbedded in the shales in the ravines, mean much to girls who are taking first lessons in observation, but mean nothing to men of mature study, except that to the latter even little things are of value in making estimations. I found, not far from the stone bridge a large granite boulder with striae upon it, and an injected vein of coarse granite. I do regard that as a specimen of value in a geological cabinet, and I had it taken to the Elizabeth Aull Seminary, where it remains. Beyond, and on the hill, I found a concretion resembling a petrified turtle, which is also now at the Seminary; and many small shells, besides two or three univalves, large and well preserved."

The granite boulder above referred to, with "striae" or glacial scratches upon it, is indeed a very interesting relic. The original bed or ledge from which it was broken must have been far to the north-west; and the scratches upon it would show that it was once embedded in the bottom of a glacier, or possibly a iceberg, and had ground along upon bed rocks as hard or harder than itself, thus leaving scratches or grooves upon it to tell the story of how it came to Lafayette county during the glacial epoch of the geological calendar. The "concretion resembling a petrified turtle," which she refers to is a fine and valuable specimen, but it is of mineral origin (sometimes called "septaria"), and not a fossil or petrification. In closing her modest and ladylike communication, Miss Wilber says: "Mr. George Wilson, to whom I have referred many questions, and Dr. Alexander, are so able in expression and so well informed with regard to geology and kindred subjects, that even were I a very great deal wiser, I could add nothing to what they can say."

GEOLOGICAL SURVEYS.

The first official geological work ever done in Missouri was by David Dale Owen, who was from 1847 to 1852, the United States geologist. In 1852, Lippincott, Grambo & Co., of Philadelphia, published Dr. Owen's elaborate report of his geological surveys in Wisconsin, Iowa and Minnesota, and a part of Nebraska. Missouri is not mentioned in the title page, but the text and accompanying maps show that he surveyed the Missouri river from Sioux City to its mouth. His map of the Missouri river notes geological sections taken from the bluffs on the north side opposite Napoleon and Wellington in this county, and on the south side at Lexington and again fourteen miles below. These are undoubtedly the first geological sections ever made in Lafayette county, but they are merely generalized and not given in detail, their only purpose being to show the relative position of the coal and any other valuable minerals or any good rock for

industrial uses. The Lexington section gives, from top downward, Chactetes limestone, [*chactetes* is a fossil coral], then shale, then coal 20 inches, then indurated slaty clay, then limestone, the river bedrock. Thickness of beds is not given except for coal. On this map he notes that there are "heavy beds of cannel coal back in the bluffs, some 200 to 300 feet above the Missouri, on both sides of the river." In the introduction to his great work, Prof. Owen says: "The thickest vein of coal detected in Iowa does not exceed from four to five feet; while in Missouri some reach the thickness of twenty feet and upwards." These quotations were written in 1851, just thirty years ago, and were based purely on geological observations and theories, for no such mines had then been worked. Coal beds of such thickness do not appear to have been yet found in Lafayette county; but the "History of Saline County," published this year (1881), by the Missouri Historical Company, says:

Township 49 and range 19, lying within the township of Arrow Rock, contains, perhaps, the richest deposit of coal in the county. The stratum of bituminous coal in this section varies from two to twenty feet in thickness, of the very finest quality of coal, and is interspersed in numerous places with *huge pockets of cannel coal* of a quality equalling the famous cannel coal of Kentucky. These pockets often present a face of from thirty to forty feet of coal. In this region is the famous cannel coal mine on the farm of the late Gov. C. F. Jackson, besides numerous others, nearly all of them of great thickness, from ten to thirty feet—of limited extent, and most of them reposing on the lower carboniferous rocks. South of Blackwater there is much the same coal deposit as that in the region just described. Cannel pockets are also here, as is proved by those found on the farm of the late C. G. Clark, now worked by Mr. Laner. Coal has also been found along the northern edge of the county near Miami, in township 52, ranges 19 and 21.

From Prof. Owen's work, page 137, we again quote: "The first workable bed of coal which I encountered in my descent of the Missouri river, was at Wellington. It is from twelve to fourteen inches thick, and lies a few feet above the bed of the river. * *. The bed of gray limestone which covers the principal coal-seam at Wellington, containing *chactetes capellaries* [a species of fossil coral called *chactetes milleporaceus* by later writers], occupies the same relative position over the coal at Lexington, but here it lies at a greater elevation above the river—fifty feet. One to two miles below Lexington, the coal and *chactetes* limestone are seen on the right bank of the river, forty-five feet above the water level. * *. At the bold promontory on the right shore, fourteen miles below Lexington, heavy beds of sandstone from fifteen to twenty feet in thickness, extend down to the river."

The above are a few of the main points of public interest, as relates to Lafayette county, which were developed by that first geological survey, thirty years ago. The first state geologist was Professor G. C. Swallow,