

## INTRODUCTION.

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The law passed at the Forty-sixth Regular General Assembly of the State of Indiana creating the office of State Geologist places him at the head of a Geological and Scientific Department, to act in connection with and under the control and management of the Indiana State Board of Agriculture, for the purpose of collecting information designed to promote the interests of agriculture, arts, manufactures, and mining.

The law not only requires of the State Geologist that he shall institute a geological survey to make known the mineral resources of the State, but that he shall likewise establish an analytical laboratory at Indianapolis, fitted up with all the necessary chemical apparatus for analyzing such ores and substances as may be deemed useful to the State, and to build up a Geological and Natural History Cabinet, and to publish the results of his labors in the annual reports of the Indiana State Board of Agriculture.

Soon after receiving the appointment of State Geologist from his Excellency, Conrad Baker, Governor of Indiana, I proceeded to pack my large and valuable collection of minerals, fossils, shells, and other objects of natural history, also my chemicals and chemical apparatus, etc., etc., preparatory to making my residence in Indianapolis, and with a view to arranging them in the rooms of the Geological Department at the State House.

On arriving at the Capitol with this collection, it was soon made manifest that the room set apart for the use of the State Geologist was totally inadequate to hold the na-

tural history specimens and chemical apparatus, and to be used, at the same time, as office and laboratory.

From a high appreciation of the importance of the labor to be performed, the State officers, with one accord, decided to have a small addition, suitable for a chemical laboratory, built on the east side of the State House, adjoining the rooms of the Indiana State Board of Agriculture.

The erection of this addition, together with the time necessarily spent in arranging the office, testing and purifying the chemical reagents, greatly delayed the chemical work, and will account for the limited number of analyses given in this report. But, through the hearty coöperation of our appreciative and energetic State officers, Indianapolis can now boast of one of the best arranged and most completely equipped analytical laboratories in the West. I trust soon to be able to commence a series of elaborate investigations of the iron smelting coals, iron ores and fluxes used in the blast-furnaces of Indiana, that will, it is confidently believed, prove of great utility to the iron-masters, and materially advance the manufacturing interests of the State.

In addition to the delay caused by arranging the office and laboratory, a considerable portion of my time has been taken up in receiving visitors and imparting geological information to capitalists, from various parts of the country, who are desirous of investing their money in the coal lands and in blast-furnaces, and other branches of manufactures in this State. To collect and furnish such information has always given me pleasure, and appears to be strictly in accordance with my duties.

As some of the fruits of the Geological Bureau, already made manifest, it may be stated that it has been the means of drawing the attention of wealthy manufacturers from Pennsylvania, Ohio, and other States, to Indiana, inducing large investments in coal lands, and the taking of decided steps for the erection, at different points, of several new blast-furnaces for smelting iron; also for the building of glass works at Indianapolis.

The gentlemen engaged in the latter enterprise were desirous to learn of the Geological Department if they could find, convenient to Indianapolis, suitable material for the manufacture of glass. Their attention was at once called to specimens of sand suitable for the purpose, from various localities in the State. One of the best samples, a soft, white sandstone, from Pendleton, in Madison county, on the Bellefontaine railroad, about twenty-five miles northeast of this city, was tested in the laboratory and a glass made from it that proved to be as clear as crystalized quartz. The result was entirely satisfactory, and I have been informed that several barrels of the Pendleton sandstone were subsequently shipped to Pittsburgh, Pennsylvania, where similar results were obtained in a practical way in the glass works of that city. Thus, being fully satisfied of the excellence of the sand, fire clay for glass pots, lime, coal, and other material essential to the manufacture of glass, that are to be found here in close proximity, ground has been broken and the glass works are now being rapidly pushed forward to completion. It is but fair to presume from the railroad facilities that give assurance of low freights, and the proximity of Indianapolis to a coal field which furnishes an abundant supply of the best bituminous splint coal for manufacturing purposes to be found in the country, that this pioneer establishment will soon be followed by others.

From the information which has been furnished and the encouragement given to manufacturers, it is believed that the State has already been benefitted more than tenfold the cost of sustaining the geological survey. The above explanation of the duties which have devolved on the State Geologist, outside of field explorations, will serve as an apology for any apparent dereliction of duty or want of finish in the published results of the department for the year 1869.

The limited amount of funds at my disposal would only admit of the employment of a small corps of assistants, who were kept at work but a small portion of the season.

Dr. G. M. Levette, of Indianapolis, has been engaged to collect information on the natural history of the State, and otherwise assist in the laboratory, office, and field work, and I take pleasure in acknowledging the valuable aid which the geological department has received from his labors.

Dr. Rufus Haymond, of Brookville, Franklin county, Indiana, was employed to make a survey and report on Franklin county. Although neither valuable metaliferous ores nor coal are to be found in this county, the law contemplates a complete survey of the entire State, and it was therefore deemed necessary to pay some attention to the resources of such counties as well as those more favored with mineral wealth. Franklin county was selected on account of being the home of the assistant, who was thus enabled to accomplish the same amount of work at a less cost than if sent to some distant county.

Prof. Frank H. Bradley, late of Hanover College, Ind., was engaged to make a survey of Vermillion county, he having previously acquired an extensive knowledge of the geology of that county from examinations made while surveying the adjoining counties in the State of Illinois.

The reports of these gentlemen are herewith respectfully submitted.

My first desire, on commencing the survey of the State, was to confine my own researches in the field, this season, to Clay and Greene counties, on account of the large amount of capital invested in mineral lands and blast-furnaces within their limits. But the great interest manifested, and intense excitement which continues to prevail in the country with regard to the developments of the iron-smelting coal known as "block-coal," subsequently determined me to push my investigations to the northern limits of the coal field in Warren county.

On my first visit to Brazil, in Clay county, the general impression seemed to prevail that the peculiar variety of coal familiarly known as "*block coal*," or "*Brazil coal*," was confined to a small basin, isolated from the great bitu-

minous coal fields of Indiana and Illinois, and limited to an area of a few square miles.

Indeed I found, at Brazil, those who were presuming enough to stand in the door of Rigby's Hotel and point out to me the extreme limits of the "Block coal" field in every direction. Of the fallacy of this prevailing opinion, regarding the coal fields of Indiana, I felt it to be my first duty to disabuse the public mind, and to do so it became necessary to extend the line of observations beyond the bounds first laid down. By thus increasing the field of labor, the survey of Clay and Greene counties has not been made as thorough as desirable, but on the other hand, from the fact that splint, or "block coal," has been traced from the southern limits of Greene county to Warren county on the north, a more extended knowledge of the iron-smelting coal has been acquired, and the mining and manufacturing interests of the State has been more fully advanced.

As the survey progresses, it is my intention to publish maps of each county, on which will be marked the boundaries of geological formations, and the location of coal mines, ore banks, stone quarries, etc., the county maps to be finally collated into a geological map of the entire State. In the present report will be found maps of Greene, Clay and Vermillion counties.

It affords me great pleasure, before closing these introductory remarks, to return my sincere thanks to the citizens of the districts surveye'd, for the uniform kindness and attention that has been everywhere received at their hands, and for the deep interest which they manifested in the geological developments of the State.

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