INDIANA.

DEPARTMENT

OF

Geology and Natural Resources.

THIRTY-FOURTH ANNUAL REPORT.

W. S. BLATCHLEY,
STATE GEOLOGIST.

1909.

INDIANAPOLIS:
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1910

THE STATE OF INDIANA,
EXECUTIVE DEPARTMENT,
June 30, 1910.

Received by the Governor, examined and referred to the Auditor of State for verification of the financial statement.

OFFICE OF AUDITOR OF STATE,
INDIANAPOLIS, July 19, 1910.

The within report has been examined and found correct.

JOHN C. BILLHEIMER,
Auditor of State.

JULY 19, 1910.

Returned by the Auditor of State, with above certificate, and transmitted to Secretary of State for publication, upon the order of the Board of Commissioners of Public Printing and Binding.

MARK THISTLETHWAITE,
Secretary to the Governor.

Filed in the office of the Secretary of State of the State of Indiana. July, 19, 1910.

FRED A. SIMS,
Secretary of State.

Received the within report and delivered to the printer July 19, 1910.

A. E. BUTLER,
Clerk Printing Board.

State of Indiana,
Department of Geology and Natural Resources.
INDIANAPOLIS, IND., June 30, 1910.

HON. THOS. R. MARSHALL, *Governor of Indiana:*

MY DEAR SIR—In accordance with law I have the honor to submit to you herewith the manuscript and illustrations of the Thirty-fourth Annual Report of the Indiana Department of Geology and Natural Resources, the same being for the calendar year 1909.

Yours very truly,

W. S. BLATCHLEY,
State Geologist.

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B. A. Kinney	State Supervisor of Natural Gas.
Isadora Kessler	Clerk.
Millard Gilliam	Messenger and Janitor.

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DEPARTMENT OF GEOLOGY AND NATURAL RESOURCES.

INDIANAPOLIS, INDIANA.

W. S. BLATCHLEY, State Geologist.

Please acknowledge receipt of this volume.

In return, scientific books, fossils and implements of the "Stone Age" are acceptable.

State Museum, Room 126, Third Floor, State House.
Open to the Public from 8 a. m. to 5 p. m., except on Sundays and legal holidays. Admission free.

Office of State Geologist, Room 89, Third Floor, State House.

INTRODUCTORY.

The work of the Indiana Department of Geology during the field season of 1909 was carried on along two lines. The Soil Survey, begun in 1907, was continued by Messrs. A. E. Taylor and Chas. W. Shannon. Between April 15 and November 1 Mr. Taylor covered Randolph, Wayne, Union, Fayette, Franklin, Rush and Henry counties. Mr. Shannon was in the field from June 1 to September 15, and covered Gibson, Pike, Vanderburgh and those portions of Warrick and Spencer counties not treated by the U. S. Soil Survey.

Their reports, accompanied by maps showing the exact area covered by each type-soil, form the first part of the present volume. Each of the principal soils found in the area surveyed is fully described, its origin traced, and an analysis given showing its constituents. By aid of the analyses and other data gathered in the field, they have shown the use to which each type-soil can best be put, and the kind of fertilizer most needed. Methods of crop rotation, tiling and other matters are discussed and much information given which will undoubtedly prove of value to the landowners, both present and future, of the areas surveyed.

During the three seasons of 1907, '08 and '09, thirty-three counties in southern Indiana have had their soils classified, mapped and treated in detail by the Department Survey, and the work thus begun will be continued each season until the State is wholly covered.

The second line of field work carried on by the Department during 1909 was the gathering of detailed data regarding the undeveloped water-power sites of the larger streams of the State. Within the past five years methods of transmission of power for long distances by electric current have been so improved and put in practical use that an enormous saving of expense and energy has resulted. It has long been known that falling water, when properly harnessed, offers the cheapest source of water power known to mankind. For thousands of years millions of horse-power have been annually wasted along the streams of Indiana. The early settlers

made use of some of it in their grist and sawmills, but aside from that it has been wholly unutilized. With the rapid disappearance of the stored fuels, petroleum, natural gas and coal, the question of the development of the better water-power sites of the country as a source of much of the energy and heat of the future has become a most important subject of discussion. Up to the present the only sites of importance developed within the State are on the St. Joseph River, near Elkhart and South Bend, where large dams and extensive machinery have been installed, which produce power for running and lighting a number of the larger factories of those cities. One site on the West Fork of White River, a few miles above Noblesville, is also being improved and will soon be ready to furnish power to that city.

From trips made in a rowboat over all of the larger streams of the State, the writer became convinced that each of them offered a number of sites of value, and it was therefore determined to make a special investigation and survey of the more important of these. Mr. W. M. Tucker, a graduate student in geology at Indiana University, was put in charge of this work. Assisted by J. A. Smith, he spent four months of the season in southern Indiana, making topographical maps, installing gauges, measuring the current and determining the amount of available power of the more important and best located sites. This work will be continued in northern Indiana by Mr. Tucker during a part of the season of 1910, and if completed will be published in the next annual report of the department.

During the past year the State Mine Inspector, James Epperson, of Linton, Indiana, and his four deputies have enforced impartially the laws relating to the mining industry and have looked after the interests of both miner and operator in such a way that today the coal mines of the State are in better condition than ever before in all matters pertaining to ventilation, sanitation and safety appliances. In his report, which forms a part of the present volume, the State inspector has full and complete tables of statistics relating to the coal industry for the year. From these have been compiled the following condensed table showing the relative rank of the thirteen coal-producing counties of the State, with the output of each in tons and the amount of wages paid in each.

TONS OF COAL PRODUCED AND WAGES PAID TO MINERS IN 1909 BY COUNTIES.*

Counties.	*Tons produced.*	*Wages paid.*
Vigo	3,490,349	$2,870,418 91
Sullivan	2,800,570	2,314,440 21
Greene	2,602,876	1,909,393 93
Vermillion	1,350,053	1,151,403 96
Clay	912,567	989,233 12
Parke	703,014	701,880 71
Knox	559,943	402,668 69
Warrick	392,583	275,669 29
Pike	372,182	290,535 12
Vanderburgh	250,218	235,949 41
Gibson	208,654	194,364 86
Daviess	47,772	42,850 38
Perry	1,308	1,242 45
Totals	13,692,089	$11,380,051 04

The table shows an increase in output for the year of 1,694,785 tons, or 14.1 per cent. over that of 1908. This substantial increase shows that the mining industry in Indiana is once again on the upward grade after the slump in 1908, due to the financial depression, and there is little doubt but that the annual output will reach twenty millions of tons before 1915. In 1898 the amount of coal mined in the State was but 5,146,920 tons; in 1909, or eleven years afterward, it was 13,692,089 tons, or an increase of more than 166 per cent. Not only was the output greater in 1909 than ever before, but the number of tons mined per death in the mines was greater than in any recent year, the number being 273,841 tons for each death. Aside from the explosion in the Sunnyside mine in March, when six men were killed, all the other accidents were single, and due largely to falling slate, a condition which will always exist as long as coal is mined. The percentage of deaths in the Indiana mines, based on the tonnage, is far less than in any other State having as large an output.

Of the coal produced, 718,213 tons were block and the remainder bituminous. The output of block coal was 134,747 tons, or 15.8 per cent. less than in 1908. This loss was due to the working

*This table, as in all those of recent years, is based upon the output of the shipping mines, or those working more than ten men, which are the only ones required by law to make monthly reports to the State Inspector. However, statistics gathered from the small local mines show their total output to have been approximately 350,000 tons for the year, or a grand total of 14,042,089 tons produced in the State.

out and abandoning of a number of the block coal mines. The area producing this fine domestic coal is limited, is rapidly being exhausted, and the supply will last but a few years. Of the block coal produced, Clay County yielded 406,618 tons, Parke County 198,946 tons, and Vigo County 112,649 tons.

While very few of the coal mines of Indiana contain inflammable or explosive gases in any quantity, such gases are always liable to accumulate in some deserted room or working. Moreover, there is not a mine in the State but that is liable to catch fire in some manner, and thus endanger the lives of all the miners. Recent accidents in Illinois, Kentucky, West Virginia and other States in which scores or hundreds of men lost their lives in mines which were considered "safe," show that accidents by fire and explosion are bound to occur when least expected. I would strongly urge, therefore, the passage of a law requiring each mine to be equipped with one or more manway escape shafts, such shafts to be located one-fourth to one-half mile from the main shaft. If both sides of the mine are connected by several cross-entries, one escape shaft at some distance from the main shaft would be sufficient, but where the only passageway from one side to the other of a large mine leads by the main or hoisting shaft, each side should be equipped with an escapeway. While all the larger mines of the State at present have an air-shaft, it is usually within a few hundred feet, or at most yards, from the main shaft, and an accident to the latter is very apt to shut off escape by the air shaft. Our coal mines are the only places in the State where hundreds of men are compelled to work with but one, or at most two, adjacent openings between them and liberty in case of a fire. A tax of five cents on each ton of coal produced in the State would yield $684,604 in one, or $1,369,208 in two years, a sum far more than sufficient to equip each mine in the State with a hole and a ladder, thus giving the occupants at least a fighting chance for life when the main shaft is shut off by fire or explosion.

The report of the State Gas Supervisor, B. A. Kinney, of Marion, Indiana, follows that of Mr. Epperson, and gives the latest information regarding that once abundant but now almost exhausted fuel, natural gas. His report shows that under the direction of the supervisor or his deputies 3,029 abandoned gas and oil wells were properly plugged during the year 1909. In the southern third of the old Central-Eastern Indiana gas field, where the gas wells were never drawn upon for manufacturing purposes, many

companies are still supplying natural gas for domestic use, especially for cooking.

In the Oakland City pool of southwestern Indiana a number of new gas wells of large capacity were finished during the year, but they were so isolated one from another and from cities or towns of any size that the product at present is being used only in the field and in Oakland City. The results of drilling during the year 1910 will doubtless prove either the value or worthlessness of this Oakland City area.

Following the precedent of ending each volume with a paper on natural history, an extended illustrated paper on the Coleoptera or Beetles of Indiana was prepared by W. S. Blatchley and offered for publication as a part of this annual report. The State Printing Board refused to publish it as a part of the volume, and it is therefore being published as Bulletin No. 1 of the Indiana Department of Geology, in accordance with an act providing for the issuing in that manner. As the funds for its publication must be paid from the sum allotted the Department of Geology for expenses, but 1,000 copies of the Bulletin can be printed.