

FORTIETH ANNUAL REPORT

OF

Department of Geology and Natural Resources

INDIANA

EDWARD BARRETT
State Geologist

1915

OHIO STATE
UNIVERSITY

FORT WAYNE PRINTING COMPANY
CONTRACTORS FOR STATE PRINTING AND BINDING
1916

OE 105
AIE
1915

THE STATE OF INDIANA,
EXECUTIVE DEPARTMENT,
August 2, 1916.

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

OFFICE OF AUDITOR OF STATE,
August 2, 1916.

No financial statement.

DALE J. CRITTENBERGER,
Auditor of State.

AUGUST 2, 1916.

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.

B. B. JOHNSON,
Secretary to the Governor.

AUGUST 2, 1916.

Filed in the office of the Secretary of the State of Indiana.

HOMER L. COOK,
Secretary of State

STATE OF OHIO

Received the within report and delivered to the printer, August 11, 1916.

VERIFIED

ED. D. DONNELL,
Clerk Printing Board.

LIST OF ASSISTANTS.

C. P. ERNI.....	Field Assistant
W. E. WILEY.....	Field Assistant
E. J. GRIMES.....	Field Assistant
WENDELL BARRETT.....	Field Assistant
C. H. ORAHOOD.....	Field Assistant
E. C. HERTENSTEIN.....	Field Assistant
PHILLIP MIDDLETON.....	Field Assistant
FLOYD E. WRIGHT.....	State Supervisor of Natural Gas
MARGARET M. KIRBY.....	Stenographer and Clerk
W. V. MOSS.....	Custodian and Messenger

G 301

TABLE OF CONTENTS.

	PAGE
Introduction. By Edward Barrett.....	7
History of Indiana During the Glacial Period. By Harry Warren Wood.....	11
Soil Survey of Wells County. By W. E. Tharpe, U. S. Department of Agriculture and W. E. Wiley, Indiana Department of Geology.	44
Soil Survey of Grant County. By L. A. Hurst, in Charge, W. I. Wat- kins, and W. E. Tharpe, of the U. S. Department of Agriculture, and Earl Hertenstein and Philip Middleton of the State of Indiana, Department of Geology.....	72
Soil Survey of White County. By T. M. Bushnell, U. S. Bureau of Soils, and C. P. Erni, Indiana Department of Geology.....	109
Soil Survey of Starke County. By E. J. Grimes, in Charge, and Wendell Barrett, of the Indiana Department of Geology, and T. M. Bush- nell, of the U. S. Department of Agriculture.....	156
Fountain County Soil Report. By C. H. Orahood.....	200
Geology of Dearborn County. By A. J. Bigney, President Moores Hill College.....	211
Geology and Natural Resources of Jefferson County. By Prof. Glenn Culbertson, Hanover College.....	223
Geology of Greene County. By W. B. Van Gorder.....	240
Oil and Gas. By Floyd E. Wright.....	267

STATE OF INDIANA.

DEPARTMENT OF GEOLOGY AND NATURAL RESOURCES.

INDIANAPOLIS, IND., August, 2, 1916.

Samuel M. Ralston, Governor of Indiana:

MY DEAR SIR—In accordance with the law governing the Department of Geology and Natural Resources of the State of Indiana, I submit to you the manuscript of the Fortieth Annual Report of said Department. For the fourth year the co-operative soil Survey of the State by counties has been conducted with the United States Bureau of Soils of Washington, D. C. This survey has been productive of much good to the agricultural and business interests of the State.

The submission of this report was delayed several months awaiting the report of inspection of the Soils Correlating Committee of the United States Bureau. Owing to the volume of work before it, this committee could not complete its work on the Indiana soils until a few days ago. Through the courtesy of Milton Whitney, Chief of the Bureau of Soils, the work was hurried on to completion, and our farmers will get the benefit this year of the work done in 1915 under the co-operative contract.

A review of the lines of work pursued by the Department for 1915 will be found in the introduction to this volume.

With the hope that the manuscript herewith submitted will meet your approval, and that the State Printing Board will order its early publication, I am,

Very respectfully,

EDWARD BARRETT,
State Geologist

INTRODUCTION.

BY EDWARD BARRETT, STATE GEOLOGIST.

It is contemplated in the law governing the Department of Geology and Natural Resources of the State of Indiana, that the State Geologist shall issue an Annual Report covering in as much detail as possible his surveys of as many of the natural raw materials of the State as he and his assistants can investigate in a calendar year.

The principal natural resources of Indiana are Coal, Stone, Shale, Clay, Oil, Gas, Water and Soils.

It is the purpose of the Department to gather and publish information on these resources each year. One of these is made the major line of investigation and others the secondary lines. The State Geologist has seen fit to select the Soils of the State for the heavier line of work, and upon which to spend the bulk of the annual appropriation of the Department. In the investigation of Soils the main problems to be worked out are geologic origin, nature of top and subsoils, topography, natural drainage, texture, mineral plant foods, amount of humus, and classification as to types.

The investigations do not include, except incidentally, cultural methods for crops. This phase of the work is left to the experimental, and extension work of Purdue University at Lafayette. With a view to secure for the farmers of the State the best information that can be gotten regarding their Soils under the above heads, the co-operative agreement between the Department of Geology of Indiana, and the United States Bureau of Soils, Washington, D. C., was continued in 1915 and 1916. Under this agreement the United States Bureau furnishes one expert soil man for each one furnished by the State of Indiana. The funds at the disposal of the State Geologist enabled him to request three soil experts from the United States Bureau, and to work with these three Indiana men. The United States Bureau paid all salaries and expenses of its men, and the Indiana Department of Geology paid salaries and certain expenses of its field men, not including any living expenses.

Three areas were selected jointly by Milton Whitney, Chief

of United States Bureau of Soils, and the State Geologist of Indiana, and included Wells, Grant and White counties. Later Starke county was added.

The work in Wells county was in charge of W. E. Tharp of the United States Bureau, and W. E. Wiley of the Indiana Department of Geology. These men went carefully over the county section at a time, and there were few farms, if any, that were not traversed.

One of the best map makers and soil experts of the United States Bureau is L. A. Hurst, who, with Phillip Middleton of the Indiana Department of Geology, made a detailed survey of the Soils of Grant county.

The work in White county was in charge of T. M. Bushnell of the United States Bureau and C. P. Erni of the Department of Geology. These men made a studious survey of the Soils of that county, and are to be commended for their energetic work.

E. J. Grimes who has had experience with the United States Bureau by agreement between Dr. Whitney and the State Geologist of Indiana, was assigned to Starke County. Mr. Grimes had as his assistant Wendell Barrett. The sands, marshes, mucks, and peats of Starke county presented many difficult problems to these men, but the Soil types and descriptions were worked out in a thoroughly satisfactory manner.

The Soils of Fountain county were worked out by C. H. Orahood who had spent a part of the seasons of 1914 and 1915 on them. Mr. Orahood's report is brief, though the Soil types are worked out in considerable detail on the map of the county. For descriptions of types found, the reader is referred to the same types in Montgomery and Parke counties.

Since two-thirds to three-fourths of Indiana are covered with glacial drift, and since the majority of our Soil types and the best of our Soils are glacial Soils, the State Geologist believes that knowledge of the Glacial Period in Indiana should be given from every possible angle. To this end he secured the services of Harry Warren Wood, a graduate student in Geology, to prepare a paper on "The History of Indiana during the Glacial Period." The paper is published in connection with our Soil investigations, that students of Soils may get a wider comprehension of our Glacial Soils and our Glacial Period.

The State Geologist was fortunate in securing the services of Dr. A. J. Bigney, President of Moores Hill College; Dr. Glen Culbertson, of the Department of Zoology and Geology, Hanover

College; and Prof. W. B. Van Gorder, Superintendent of Schools, Lyons, Indiana; to prepare reports on the geology and resources of their respective counties, Dearborn, Jefferson and Greene. These reports are included in the present volume.

The Fortieth Annual Report closes with the report of the State Supervisor of Natural Gas, Floyd E. Wright, who gives a review of oil and gas conditions and prospects in Indiana for the calendar year of 1915.

Much of the time of the State Geologist for the past year was spent in delivering lectures on the State Park Movement. More than fifty illustrated lectures were given in different parts of the State, the purpose being to arouse interest in the beautiful natural scenery which abounds in the State. The State Geologist, also, gave lectures on good roads and soil problems.

The correspondence of the Department was unusually heavy during the past year, taking much of the time of the State Geologist in answering inquiries pertaining to the work of the year.

