

**THIRTY-SEVENTH ANNUAL REPORT OF
THE STATE GEOLOGIST**

IOWA GEOLOGICAL SURVEY,
DES MOINES, DECEMBER 31, 1928.

To Governor John Hammill and Members of the Geological Board:

GENTLEMEN: Three papers are herewith submitted to the Board with the recommendation that they be published as Volume XXXIV—the Thirty-Seventh Annual Report of the Iowa Geological Survey. The titles and authors of the papers are as follows:

The Pre-Illinoian Pleistocene Geology of Iowa by George F. Kay and Earl T. Apfel

The Maquoketa of Iowa by Harry S. Ladd

Mineral Production in Iowa in 1927 by James H. Lees.

The paper of nearly three hundred pages by Doctor Kay and Doctor Apfel represents the results of many years of field and laboratory study. It includes chapters on the Bedrock Surface of Iowa, the Topography and Drainage of Iowa, the History of Investigations and Classifications of the Pleistocene Geology of Iowa, the Nebraskan Glacial Stage, the Aftonian Interglacial Stage, the Kansan Glacial Stage, and the Yarmouth Interglacial Stage. As stated in the Preface, "It is the purpose of this paper to present the results of extensive field and laboratory studies made with special reference to the pre-Illinoian glacial and interglacial deposits. Some conclusions have been reached which differ from those of previous workers, and some new criteria have been found which aid in the interpretation of the complex history of the early part of the glacial period. The paper has been written with the hope that it will be of interest not only to students of Pleistocene geology but to the general reader as well." Elsewhere in the paper is the following statement: "It is now conceded by students of the Pleistocene that Iowa is an area where the records of the glacial and interglacial stages of



the Glacial Period have been best preserved and where the deposits, glacial and interglacial, have been best studied in such detail as to permit of their satisfactory interpretation and classification." The detailed information given in this report about the various kinds of deposits which constitute the mantle materials of Iowa will furnish a basis for a better understanding of the characteristics, the origins, and the histories of the soils of the different parts of our great agricultural state.

Doctor Ladd's paper is Part I of a report on the stratigraphy and paleontology of the Maquoketa shale of the Ordovician system of northeastern Iowa. After a careful historical account of former work done on this formation, Doctor Ladd shows that the Maquoketa has two distinct lithological facies referred to as the Northwest Area and the Southeast Area. The latter consists chiefly of shale, the former of limestones and shales. The Maquoketa, long held to be Upper Ordovician in age, is still retained in that position. The author, however, feels it should be placed in the Silurian, final disposition depending on the age of the subjacent Dubuque dolomite, whose stratigraphy and paleontology are not yet satisfactorily determined. The author points out that the Richmond of Michigan is quite similar to the Maquoketa of Iowa and a possible correlation also with the Richmond of Ohio is considered. A depauperate zone at the base, a graptolite zone just above the base, and the Cornulites zone at the top are quite constant over both areas. The Depauperate fauna is thought to have invaded the region from the south as it is typically developed in the Cason shale of Arkansas. Certain fossils in the Northwest Area are boreal in aspect. Among these are *Streptelasma haysii* and a new *Lindströmia*. Hence a northern invasion in later Maquoketa time is suspected. Many of the brachiopods of the Maquoketa are Richmondian in aspect but the author believes that close study will serve readily to distinguish them from those of the Ohio valley. A number of such closely related species are here carefully compared with typical Richmond shells and their differences are pointed out. A complete report on the fauna, extending to more than two hundred species, will compose Part II, to appear later. In the forthcoming study Doctor Foerste will discuss the cephalopods and Doctor Shideler the bryozoa.

The paper by Doctor Lees on Mineral Production in Iowa in 1927 refers to the anomaly of an increase in value in 1927 in most branches of the industry but a decrease in total value in comparison with the figures for 1926. This was due to the strike among the union coal miners, which brought production of coal down from 4,625,487 tons in 1926, valued at \$14,214,000, to 2,949,622 tons in 1927, with a value of only \$9,304,000. On the other hand, shipments of cement made in the state were 18 per cent greater than in the previous year. One new plant was added to the list, that of the Dewey Portland Cement Company, at Davenport. This state now has an annual capacity of 7,935,000 barrels of finished cement.

The manufacture of clay brick and sewer pipe was somewhat less in 1927 than in 1926, but the production of hollow ware was somewhat greater and the output of drain tile was more than doubled. Total values for the industry were over half a million dollars greater in 1927 than in the preceding year.

The importance of the gypsum industry to Iowa increases almost every year. In 1927, 723,942 tons of gypsum and its products were marketed for \$6,713,497, the highest figure reported except that for 1925. The chief items sold are wall plasters and wall and plaster board, each of which amounts to over two and one-half millions of dollars in value.

Limestone production shared the increased output noted in other branches of the industry, owing chiefly to the large use of crushed stone for concrete roads and buildings and road metal. The value of this class of material rose from \$599,490 in 1926 to \$839,463 in 1927. The next most important use of limestone is for agriculture, and \$156,069 worth was sold in 1927.

Production of sand and gravel increased 1,279,161 in tonnage and \$270,170 in value. This increase was chiefly in gravel and may be accredited largely to road building activities. Prices for most uses ranged from 36 cents to \$2.27 per ton, the former being the price realized for paving sand and the latter for cutting sands.

So far as statistics for 1928 have been received they show increased production in nearly all parts of the mineral industry. Cement and limestone experienced a noteworthy impetus and coal mining apparently is recovering from the severe setback of

the biennial strike. Gypsum manufacture, however, underwent a serious reaction, both in amounts calcined and in prices received.

The following table shows data for the years 1926, 1927, and 1928:

Mineral Production, 1926 to 1928

Product	1926		1927		1928	
	Quantity	Value	Quantity	Value	Quantity	Value
Cement, bbls.	4,788,639	\$ 8,167,341	5,661,234	\$ 9,124,405	6,880,731	\$10,734,838
Clay wares		4,495,088		5,194,780		5,048,654
Coal, tons	4,625,487	14,214,000	2,949,622	9,804,000	3,683,635	10,525,000
Gypsum, tons	683,201	6,588,203	723,942	6,718,497	719,736	5,855,214
Stone and lime, tons	944,371	952,141	1,278,056	1,267,033	1,668,727	1,761,908
Sand and gravel, tons	2,701,982	1,569,006	3,981,143	1,839,176	3,423,619	2,094,955
Totals		<u>\$35,985,779</u>		<u>\$33,442,891</u>		<u>\$35,520,569</u>

Respectfully submitted,

GEORGE F. KAY,
State Geologist.