ADMINISTRATIVE REPORT

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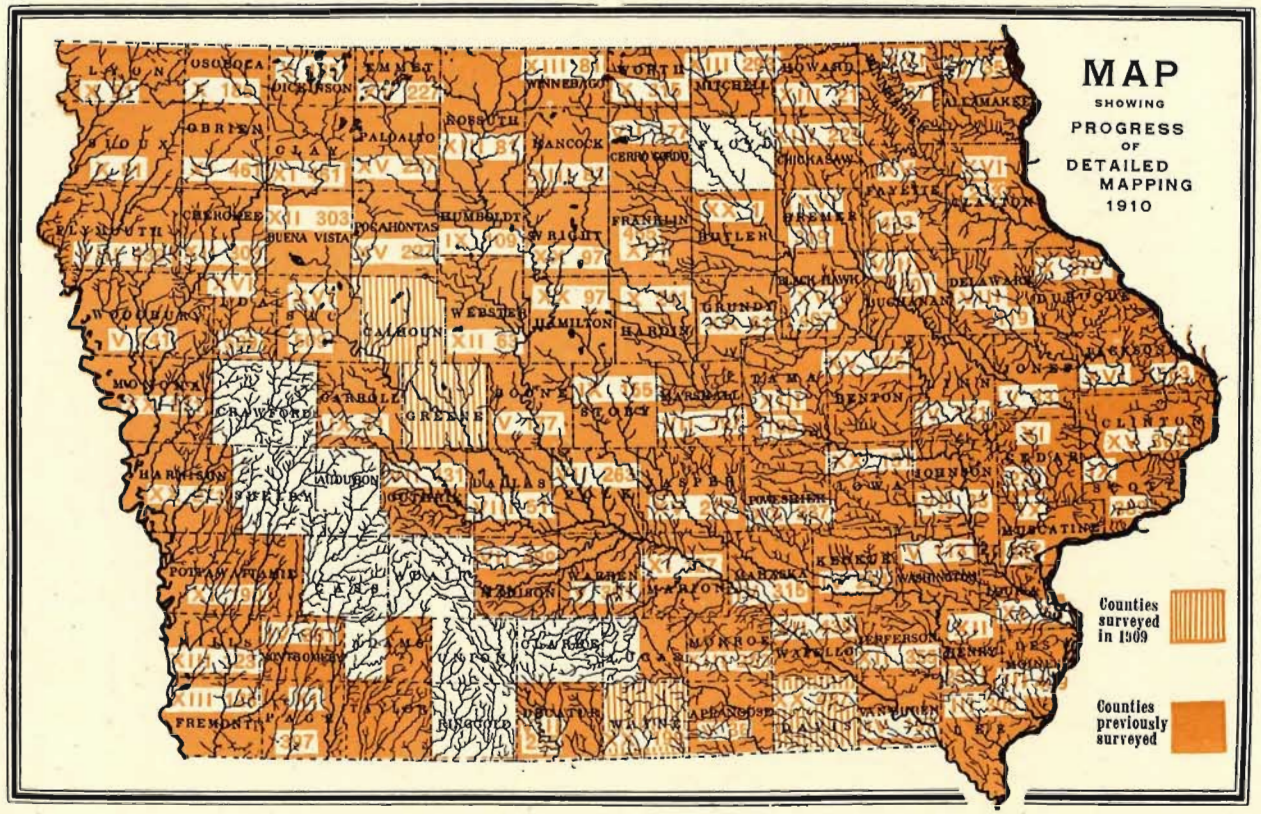
MAP
SHOWING
PROGRESS
OF
DETAILED
MAPPING
1910
Counties surveyed in 1909
Counties previously surveyed

EIGHTEENTH ANNUAL

Report of the State Geologist

IOWA GEOLOGICAL SURVEY,

DES MOINES, December 31, 1909.

To Governor B. F. Carroll and Members of the Geological Board:

GENTLEMEN:—I have the honor to report that during the year 1909 the Iowa Geological Survey has continued its investigations relative to the geological structure, geological history and geological resources of the state. Essentially the same plan of organization has been maintained as during the years immediately preceding, and the problems attacked have been much the same. The studies of the coal and peat resources of Iowa, bringing our information down to date, were practically finished in 1908, but additional data needed to make the report more complete were collected during the current year. Mr. J. H. Lees collected samples for analysis from a number of selected typical fields within the state and the samples were analyzed, in accordance with the methods adopted by the United States Geological Survey, by Mr. A. W. Hixson. All the information relating to coal and peat, collected to date, is embodied in the seventeenth annual report, volume xix, now in print and almost ready for distribution.

Papers relating to the geology of Iowa have been given to the public during the year through other channels than the regular annual volumes. In the Bulletin of Iowa State Institutions under the Board of Control, October, 1909, Mr. J. H. Lees presents a timely discussion of *The Water Problem in Iowa*; Mr. B. Shimek has published papers on *The Aftonian Deposits of Western Iowa* in *Science* and in the Bulletin of the Geological Society of America; and the Director of the Survey, in the Bulletin of

the Geological Society, has reviewed *The Present Phase of the Pleistocene Problem in Iowa* and in a second paper has described some of the large extinct mammals whose remains are found in deposits of the first interglacial stage in the western part of the state, under the title *An Aftonian Mammalian Fauna.* This remarkable interglacial fauna is not altogether new to science. The individual species, and to some extent the fauna as a whole, have for some time been known to students of paleontology. It has also been known that some of the species were at one or more times inhabitants of Iowa. But, so far as concerns Iowa, it was not known that the few discovered forms, which heretofore have been represented by isolated finds, were contemporaneous; and outside of Iowa, in territory ranging from Texas to western Nebraska, the exact age of the beds in which the remains of this assemblage of extinct mammals were found, was not definitely fixed. The fauna as a whole is markedly different from that familiar to the pioneer settlers of this state, very different from that known to the pioneers in any part of America. True horses were represented by at least two species, both quite distinct from our domestic species; there were three species of elephant, one of imperial size, and there were two mastodons, making in all five great proboscidians; there was at least one species of camel, an extinct bison, a gigantic stag, and two ponderous, awkward, clumsy ground sloths. The smallest of the three elephants seems to be identical with the hairy elephant or northern mammoth of Europe and Asia; it inhabited regions of moderately rigorous climate; it furnishes to this unique fauna a distinctively boreal element. The two great sloths, on the other hand, contribute an element distinctively South American. As found in Iowa, the age of the fauna is definite and clear. The beds in which the remains occur belong to the Aftonian stage; these animals lived, and the beds in which their remains were buried were laid down, in an interval of comparatively mild climate between the first and second stages of Pleistocene glaciation.

The office work during the year has been of the usual character. The Des Moines office has been in charge of the Assistant State Geologist, Mr. Lees, and the Secretary, Miss Newman, and here the greater part of the work has been done. Great numbers of

letters written by persons seeking information concerning our geological resources have been answered; many have personally called at the office to look up desired data, and they have been accommodated; volume xviii, and copies of the preceding volumes so far as they are available, have been distributed in accordance with the rules approved by the Geological Board; the several papers making up volume xix have been edited and prepared for the printer, the necessary maps and illustrations were selected and their engraving directed and supervised, the proof of the volume was read and re-read in the office,—taken all together, the direction of the publication of the annual report has been much the heaviest of the tasks falling to the members of the corps employed at the Des Moines office. Much material, supposed by the finders to have commercial value, has been determined and reported on by the officers of the Survey.

The regular field work of the year has been somewhat diversified, as will appear from the following summary:

Mr. James H. Lees visited Adams, Appanoose, Boone, Jasper, Lucas, Mahaska, Monroe, Taylor, Van Buren, Wapello and other coal-producing counties to gather information concerning the history of coal mining in these typical and important fields, and to collect a number of samples from most of the areas named for analyses. With the exception of the few weeks required for this work Mr. Lees has spent practically his entire time in the office in work connected with the preparation and publication of the annual report.

Dr. S. W. Beyer, assisted by W. F. Coover, continued the field study of the distribution and quality of the materials available for road making, at the same time collecting data relative to the deposits of sand and gravel which may be found to have additional value in connection with the rapidly growing use of cement as a structural material. In the laboratory tests of the sands and gravels used in making concrete Dr. Beyer has had the assistance of C. E. Scott.

Professor M. F. Arey completed the work in Davis county and made the geological survey of Wayne.

Professor B. Shimek, who spent the previous season in Harrison and Monona counties, found himself confronted with a num-

ber of unexpected problems of great interest, and their proper investigation necessitated the extension of the field work into a number of the adjoining counties. The new lines of inquiry have taken all the time he could spare for work in the field during the past season. The problems of the loess, the problems of the prairie and the problems of the formations and faunas of the first interglacial stage are the problems that, by a long period of observation and study, he is eminently fitted to solve.

Professor T. H. Macbride has given such time as he could spare from other pressing duties to the survey of Calhoun and Greene counties.

Mr. J. E. Carman spent the working season in an investigation of the drift deposits lying outside the marginal moraine in Buena Vista, Clay, Dickinson, O'Brien, Osceola and Sac counties. The Pleistocene problems presented by this region are numerous, and additional study will be required for their satisfactory solution.

Professor George F. Kay took up the study of the water powers possible along the streams of Iowa, and during the season his work covered about half of the state. Another season in the field will make it possible for him to present a report on a subject that, in point of commercial importance, stands next to the subject of fuel supplies.

Professor W. H. Norton has kept up the work of collecting data relating to the deep wells and underground waters of Iowa, a work that he has carried on with marked success practically since the organization of the present survey. The publication of a volume on this subject, setting forth all obtainable information, is among the plans for the near future.

The field work of the Director during 1909 was limited chiefly to more or less extended field conferences with the other members of the corps.

During the year the Iowa Survey has continued its co-operation with the United States Geological Survey in the making of topographic maps of areas selected by the Director of the Iowa Survey, and on the same terms as were agreed upon for the seasons 1907 and 1908. The work for 1909 was prosecuted in the Knoxville and Pella quadrangles.

The Survey has maintained the usual exchanges, both domestic and foreign. In this way a library of increasing value is being accumulated. The list of exchanges is constantly increasing and as a consequence, in addition to the increased scope of the library the publications of the Survey are becoming more widely distributed and more generally known.

In addition to the current numbers of the publications which are enumerated in preceding reports, new exchanges have been received as follows:

Alabama Geological Survey.
Florida Geological Survey.
Georgia Geological Survey.
Louisiana Geological Survey.
Mississippi Geological Survey.
Missouri Geological Survey, 3d series.
Nebraska Geological Survey.
American Mining Congress.
British Columbia Department of Mines.
British Guiana Geological Survey.
California Academy of Sciences.
Canada Department of Mines.
Field Museum, Geological Series.
Journal of Geology.
Lloyd Library.
University of Idaho Agricultural Experiment Station.
Pennsylvania Department of Forestry.
American Coal Journal.
Industrial World.
Mine and Quarry.
Northwest Mining News.

The publications of the Iowa state departments are also received in exchange for the reports of the Survey.

Herewith I take pleasure in submitting the following papers with the recommendation that they be published with all needed illustrations as part of volume xx:

Mineral Production in Iowa in 1909, by Dr. S. W. Beyer.
Geology of Hamilton and Wright Counties, by Thomas H. Macbride.
Geology of Grundy County, by Melvin F. Arey.
Geology of Iowa County, by Stephen W. Stookey.
Geology of Butler County, by Melvin F. Arey.
Geology of Harrison and Monona Counties, by B. Shimek.
Geology of Davis County, by Melvin F. Arey.
Geology of Wayne County, by Melvin F. Arey.
Geology of Poweshiek County, by S. W. Stookey.

Respectfully submitted,

SAMUEL CALVIN.