

GEOLOGICAL MAP OF IOWA.

BY CHARLES R. KEYES.

The geological map of to-day is a mine of information. Aside from an accurate representation of the geographical features of a region, as in the best atlases, a properly constructed geological map is ever so much more. It indicates within a few feet the elevation above the sea-level of every point within the area of the map; it notes all the drainage basins and water powers; it marks the distribution and limits of the geological formations, each of which contains different kinds of ores, building stones, clays, and all minerals of economic use; it locates all the best places for obtaining these substances; it is also a reliable soil map.

Of course the construction of a map of this kind is not the work of a few days or a few weeks, but the labor of several years. The Iowa Geological Survey has undertaken the preparation of a map of the State in connection with its work on the economic resources. It will appear in its reports on the different substances which go to make up the mineral wealth of the State. According to the plan proposed each county will have a detailed map on which is indicated all the information just alluded to. Accompanying each will be a report with an explanation of the mineral resources of the district, embracing a full description of the characters of the different soils, and their capabilities for agricultural purposes; the extent and value of the various deposits of coal and lead, iron and other ores; the distribution, properties and uses of the exhaustless beds of valuable clays; the accurate determination of the areas for artesian waters; the analyses of the many mineral waters; the relative value and durability of the numerous kinds of building stones; and many other kindred subjects, of such prime importance to the citizens.

There is also to be a general map of the State. A small copy of the preliminary map showing the approximate boundaries of the different geological formations is shown in the accom-

panying colored plate, with which is also a colored geological section of the rocks represented and their relative thicknesses.

In considering the various mineral deposits of the region an accurate knowledge of the distribution of the several geological formations is of the greatest importance. Iowa possesses a measurably complete sequence of strata. The Palæozoic beds from the Cambrian to the upper Carboniferous are very fully represented. The Mesozoic deposits, of Cretaceous age chiefly, are found in considerable thickness. Over all spreads a thick mantle of drift, or glacial debris. Beneath the deposit of unconsolidated drift material the harder rocks are everywhere exposed through erosion. The complete vertical section of the rocks of Iowa indicates a thickness of at least 5,000 feet.

Algonkian Rocks. These are the hardest rocks found in place in the State and are regarded as the oldest geologically. The formation called the Sioux quartzite or Sioux "granite" is well exposed in the extreme northwestern corner of the State. It is everywhere thoroughly crystalline in its structure, often quite vitreous, not unlike red jasper in its general appearance and properties. It forms one of the most durable of building stones and exhaustless quantities occur in Lyon county and the adjoining portions of Dakota and Minnesota.

Cambrian. In Iowa this formation includes what is called the Saint Croix sandstone which is exposed in the valleys in the extreme northeastern part of the State. Building stone and pure sand for the manufacture of glass, constitute its chief economic value.

Silurian. This formation occupies a large portion of eastern Iowa from Davenport to the north State line. It is subdivided into seven minor formations. At the base is the Oneota limestone which furnishes an excellent quality of building stone and lime and also some lead ore. Overlying it is the Saint Peter sandstone which supplies large quantities of very pure sand well adapted for the manufacture of glass. The Trenton limestone comes next. These rocks form a very durable building material and are largely quarried. A very

good quality of lime is also manufactured from this stone. The clay shales separating the limestone beds afford excellent material for the manufacture of light colored brick. In the Galena limestones are found the ores of zinc and lead which have been so extensively mined, since the earliest settlement of the Upper Mississippi valley. The Maquoketa shales may be utilized in the manufacture of brick and pottery. The Upper Silurian limestone, comprising the Le Claire and Niagara, supplies in unlimited quantities fine building stones and also furnishes the best lime in the world.

Devonian. West of the Silurian area in Iowa there is a broad area extending in a belt thirty to forty miles in width from the mouth of the Iowa to the Minnesota line. Wherever the rock is exposed good building material can be readily obtained. In the northern part a fine quality of plastic clay exists, forming a valuable material for the manufacture of brick. The different formations represented are the Independence shales, the Cedar Valley limestone, Montpelier sandstone and the Lime Creek shales.

Lower Carboniferous. This formation is made up chiefly of limestone and extends in a narrow belt from the southeastern corner of the State northwestward into Minnesota. The limestone furnishes a good grade of building stone, and some of the best paving bricks in the West are made from portions of the shale. There are three different formations, the Kinderhook, Augusta and Saint Louis.

Upper Carboniferous. The chief portion of this formation is made up of the productive coal measures which form Iowa's greatest source of mineral wealth. Besides the valuable deposits of coal there are exhaustless beds of clay capable of supplying the whole country with all the products manufactured from it that may be needed for ages to come.

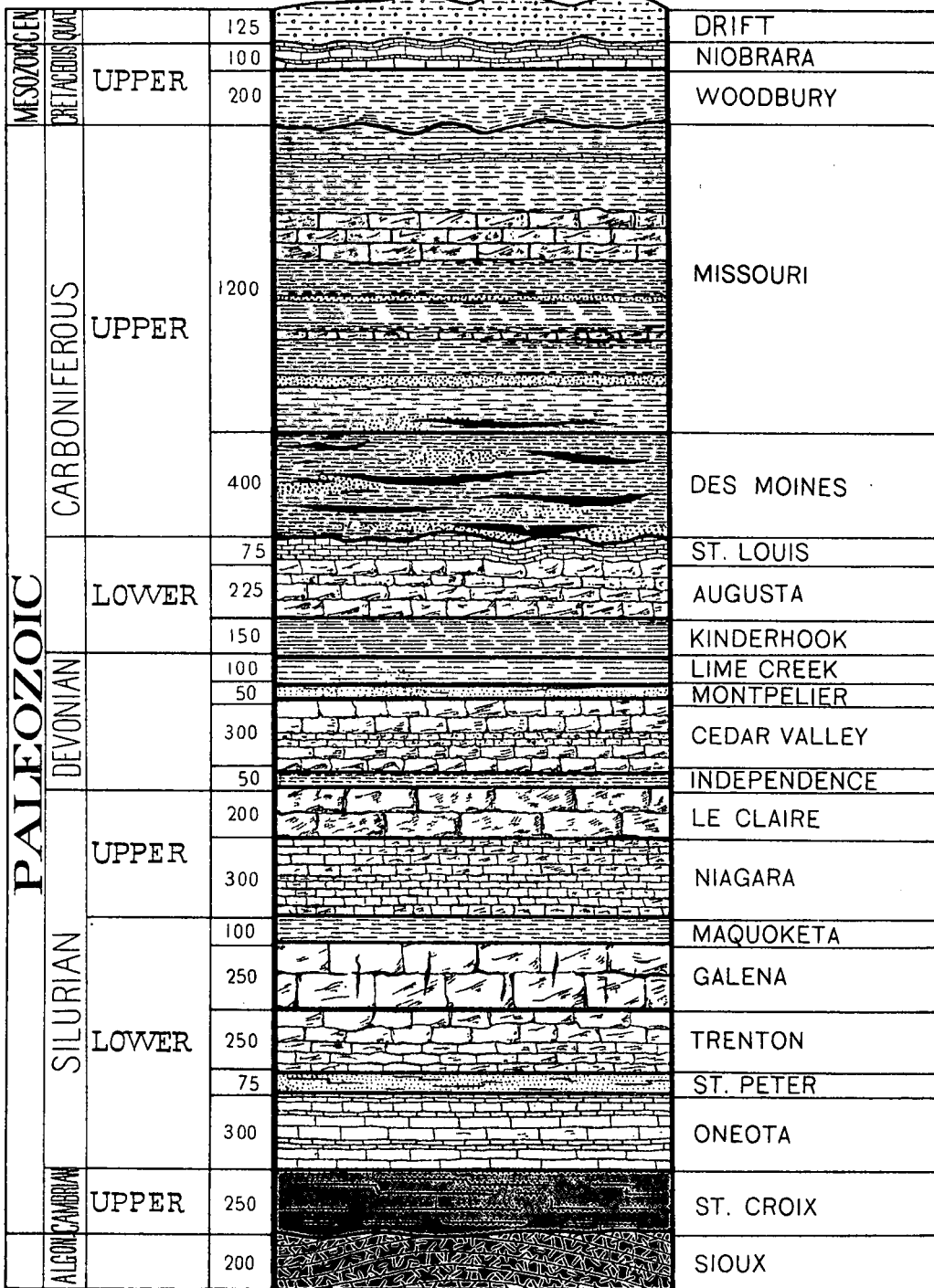
Cretaceous. The rocks of this age occupy a large area in the northwestern quarter of the State. The different formations are the Nishnabotany sandstone, the Fort Dodge beds, Woodbury shales and the Niobrara chinks. Besides the great gypsum deposits near Ft. Dodge this formation contains un-

A
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 1892



LEGEND

- CRETACEOUS
- U. CARBONIFEROUS
- L. CARBONIFEROUS
- DEVONIAN
- SILURIAN
- CAMBRIAN
- ALGONKIAN



GENERAL GEOLOGICAL SECTION OF IOWA.

limited quantities of good clay material for the manufacture of Portland cement, and some building stone. There probably exist also valuable beds of brown coal. Some of the seams are known to be upwards of four feet in thickness.

Pleistocene or Surface Deposits. This formation is the mantle of loose incoherent material which spreads over all the hard rocks. The pure clays form good material for the manufacture of brick, while certain portions can be utilized in glass making.

AN IOWA BENEFACTOR.

Abraham Slimer, of Waverly, this State, is not understood to be millionaire, but according to his means he deserves the name of benefactor quite as much as those who draw checks for larger amounts. He is devoting his fortune to objects of charity, and what is even better, he is giving his time and judgment to see that his bounty serves its intended purpose. To bequeath money after it can be no longer used is not uncommon, but to let go of it in the strength of health is far more unusual. This Mr. Slimer has done repeatedly. An Associated Press dispatch to the *Democrat* states that this good man of Waverly had presented the Board of Supervisors of Bremer county his home and his spacious grounds surrounding it, all valued at \$20,000. The condition attending the gift is that the house shall be used as a home for poor people, and Mr. Slimer takes it upon himself to meet the expenses during his life. This grand act had been carefully thought out. Mr. Slimer had taken time to investigate the good done by such institutions as the Cook home for women and the Fejervary home for men in Davenport, and others of similar character elsewhere. About a year ago he founded and endowed a home for aged and unfortunate Jews, on Drexel avenue, in Chicago, and in other ways he has helped the helpless. Personally Mr. Slimer is one of the most modest and unassuming of men, one who prefers not to be known. He seeks to avoid rather than court public attention. He is thoroughly business-like in all that he does,

and his acts are characterized by the highest intelligence. It makes no difference what his creed may be, or his political affiliation, or his nativity. He is one of Iowa's benefactors, one whose deeds will make his memory blessed.—*Davenport Democrat*.

HISTORY OF THE BAHAMA EXPEDITION.

BY PROF. C. C. NUTTING, OF THE IOWA STATE UNIVERSITY.

The Bahama Biological Expedition from the State University of Iowa was largely an experiment along educational lines. It afforded the first opportunity ever enjoyed by students to engage in deep-sea dredging and to study the animal forms thus secured fresh from their native element. The enterprise differed from its predecessors in being the first attempt to do scientific dredging at any considerable depth without the use of steam either to propel the vessel or to work the dredge.

The vessel chartered for the occasion was the "Emily E. Johnson," a two-masted schooner, tonnage, 116 net. She was chartered for three months, and cheaply yet conveniently fitted up for the occasion, by flooring over the hold and placing comfortable bunks, tables, etc., in the after part. A convenient laboratory for marine biology and a good library of reference were provided by the University. The cabin was furnished with all necessary comforts for the ladies who accompanied the expedition. A cheap and effective dredging equipment, devised by Prof. L. G. Weld, furnished a means of working down to about 260 fathoms. An experienced and entirely satisfactory sailing master was secured in the person of Captain Charles Flowers, who is an expert dredger as well as sailor.

The following persons constituted the party which sailed from Baltimore, May 5, 1893: Instructors—G. L. Houser and H. F. Wickham and Professor C. C. Nutting, Executive Committee. Mrs. H. F. Wickham, Mrs. Gilman Drew, Dr. Leora Johnson, Miss Margaret Williams, Miss Bertha Wilson,

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