

A REVIEW OF THE FORMATION AND PHYSICAL

GEOGRAPHY OF THE CONTINENT.

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OUTLINE.

Introduction.

I. Archaean System and Eozoic Era.

II. Palaeozoic Rocks and Era.

1. Silurian (Age of Mollusks.)
2. Devonian (Age of Fishes.)
3. Carboniferous (Age of Coal.)

III. Mesozoic Era or Age of Reptiles.

1. Jura-Trias.
2. Cretaceous.

IV. Cenozoic Era or Age of Mammals.

1. Tertiary Period.
2. Quaternary Period.

V. Phychozoic Era or Age of Man.

Conclusion.

In studying historical geology we find that it is governed by certain general principles, in the same manner that human history is.

Human history is divided and subdivided into eras, ages, periods, epochs, etc., determined by great events. So, also, the history of the earth is divided into eras, ages, periods, etc., which are determined by the great changes in physical geography, climate and forms of organisms; and these divisions are recorded in separate rock systems, series and formations, according to their importance.

As the divisions of time in human history graduate, more or less insensibly, into each other; so, also, do the divisions in historical geology.

In human history each age is marked by the dominance of some characteristic social force or principle. So, also, in geology each age is marked by the dominance of some particular class of animals or plants. In both histories the dominant characteristic arises, culminates, and declines, but it does not necessarily perish.

The geological history of the earth is divided into five eras: 1. Eozoic, or dawn of animal life; 2. Paleozoic, or the era of old life; 3. Mesozoic, or the era of middle life; 4. Cenozoic, or the era of recent life; 5. Phychozoic, or the era of natural life. These eras are subdivided into periods and epochs.

I. The Archaean System and Eozoic Era.

We find the rocks of this division covering nearly the whole of Labrador and Canada, as shown in map 1. It extends into New York, another quite large area includes the Blue Ridge, and the eastern slope of the Appalachian system. A few smaller areas are found in

Map. 1.



Land of that time black; Portions of Continent then covered, light shade; Existing seas, lakes, etc., left white.

some of the great mountain systems, one in Missouri, and another in Texas. In map 2. these areas are represented by space marked ^{ooo}ooo. As these are stratified rocks this whole area was sea bottom at that time. We do not know exactly where the land from which these were formed was located, but probably it lay to the North.

II. Geography of the Paleozoic Era (Primary Rocks).

The Paleozoic:- The physical geography of the continent at the beginning of this system is shown approximately by map 1. Between this system and the Archaean, occur very great changes in physical geography, climate and forms of life. The rocks of this system reveal the unmistakable record of a distinct life system, while in the Archaean system there is little, or no evidence of life of any sort.

These rocks cover a larger part of the richest portion of the United States, as is shown in map 2. Their area is bounded on the north by the Great Lakes; on the east by the Blue Ridge; on the south the boundary line extends as far as the middle of Mississippi; from there toward the mouth of the Ohio River; then down through Arkansas, Oklahoma, and the Indian Territory; on the west by the great prairies.

The physical geography as shown in map 3. gives somewhat approximately the land area at the end of this period. By a comparison of maps 1. and 3. we may see some of the changes that took place during this era.

The Palaeozoic era is divided into three ages, each represented by a corresponding rock system: 1. Silurian System; the Devonian System; 3. the Carboniferous System.

The physical geography of this age shows the formation of permanent land areas; where we now find, Minnesota, Wisconsin, North-

ern New York, and New Jersey, much of Ontario, and western New England; the Southern part of Ohio, and Central Kentucky and Tennessee; also part of Missouri had been uplifted into one or more islands of considerable size. These areas are represented in map 2. by the use of the following marks.++

The result of the Devonian system, or the Age of Fishes, was the formation of an area, which borders the Silurian in general on the south and southwest, and extending far south in the middle region, including Indiana, and part of Ohio and Kentucky. There are areas of Devonian formation of considerable extent in the Rocky Mountain region, but little is known of their limits. The above areas are represented in map 2. by

The Palaeozoic era was a time of gradual growth of the continent, beginning by the additions to the Archaean, first of the Silurian, then of the Devonian, and now of the Carboniferous Ages.

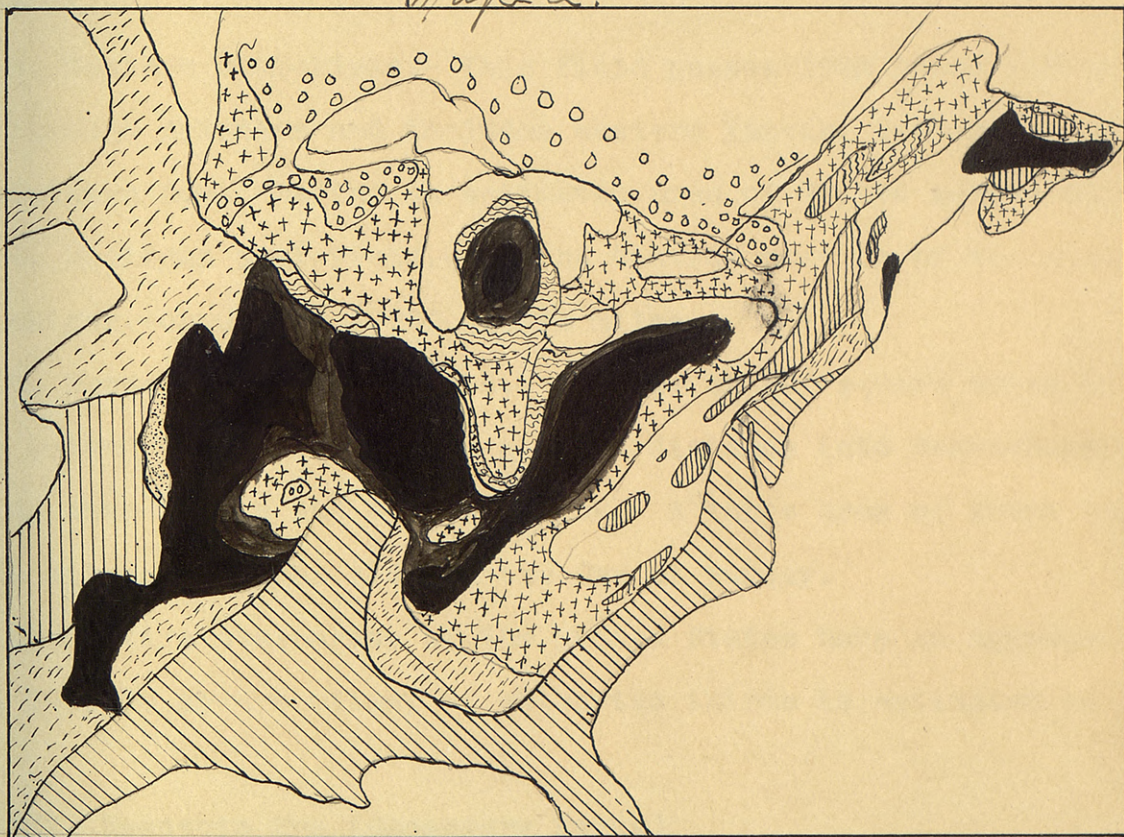
The form of the continent at this time was practically represented by map 3. It is almost certain that at this time the areas of coal measures were not permanent land. but were in rather an uncertain state, sometimes swampy, and sometimes covered with water. The continent had grown to a considerable size at this time, but still it was much smaller and lower than at the present time.

None of the great mountain chains of the country were yet formed. The principal carboniferous areas in the United States are represented on map 2. by blocks The coal areas of the United States are more extensive than in any other country. They are divided into six fields.

1. Appalachian coal field, - The greatest one in the world.

It occupies the western slope of the Appalachian from New York to Alabama having an area of at least 60,000 square miles. It includes

Map L.



- Achean ---- ○○○○
- Silurian ---- ++++
- Devonian ---- ~~~~
- Sub-Carboniferous ---- ■
- Carboniferous ---- ■
- Permian ---- ▨
- Jura-Trias ---- ▩
- Cretaceous ---- ▧
- Tertiary ---- ▦

most of Pennsylvania, and eastern Ohio, a large portion of West Virginia and eastern Kentucky, eastern Tennessee, northwestern Georgia and northern Alabama.

2. Central Coal-Field.- This covers the larger portion of Illinois, Indiana, and Kentucky, with an approximate area of 47,000 square miles.

3. Western Coal-Field.- This field passes from Texas northward through Arkansas and includes eastern Kansas, western Missouri and southern Iowa: having an estimated area of 78,000 square miles.

4. Michigan Coal-Field.- In the Central portion of the state of Michigan.-occupying 6,700 square miles.

5. Rhode Island Coal-Field.- An area of 500 square miles in Rhode Island and extending for a short distance into Massachusetts.

6. Nova Scotia and New Brunswick.- A large area of about 18,000 square miles on either side of the Bay of Fundy.

The entire coal-areas of the United States have an aggregate of about 190,000 square miles, of which two thirds is estimated as workable.

III. Mesozoic Era (Secondary Rocks)

While the Palaeozoic era was long and consisted of three ages the Mesozoic era consists of only one age.- The so-called "Age of Reptiles." This era is divided into three periods.- 1. Triassic, 2. Jurassic, 3. Cretaceous.

These three are distinct periods in Europe, but in America the Triassic and Jurassic are very closely related, but distinct from the Cretaceous.

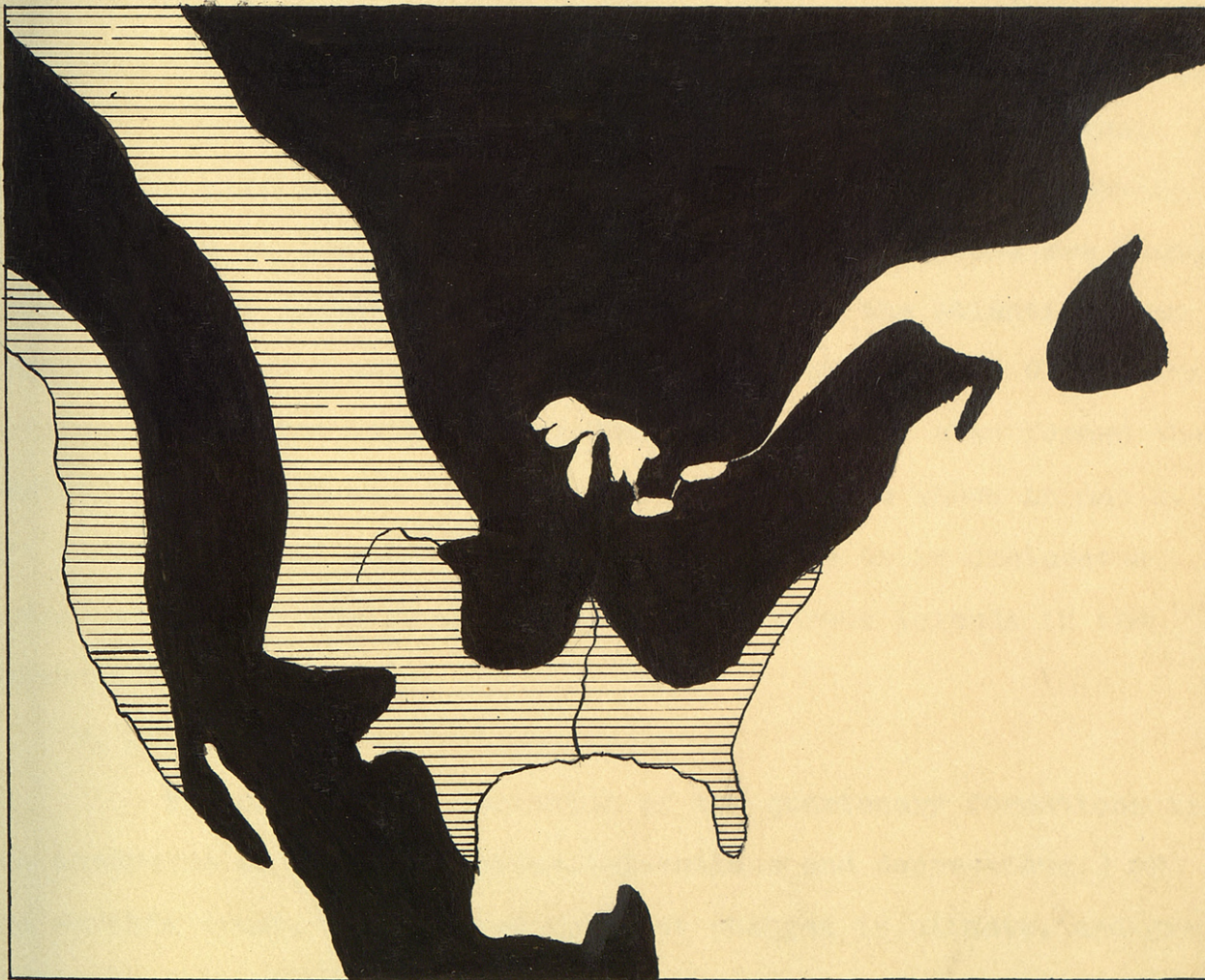
During the Jura-Triassic period it is thought that the New England shore line extended out somewhat farther than at present. "During the same time the Wahsatch and the Siena ranges was land: but

all between this and the Palaeozoic area of North America, including the plateau region, the eastern Rocky Mountain region and the regions of the plains, was covered by a shallow inland sea, with imperfect connections, or none at all, with the ocean, and in which, therefore, gypsum deposited by evaporation."

The areas formed during this period are represented by, |||| on map 2. and are found in elongated patches along the eastern slope of the Appalachian chain, north of South Carolina. A few patches are also found in New York, New Jersey, Pennsylvania, Maryland, and Virginia.

In the Cretaceous period we find the formations were made in the following places. In the Atlantic coast region more are found north of Long Island; south from here there is a strip running through New Jersey, and Maryland; then there are a few small patches in North Carolina, South Carolina and Georgia.

In the Gulf region it forms a broad crescent shaped band, starting in western Georgia, covers the prairie regions of middle Alabama and the northeastern part of Mississippi, then extends northward through Tennessee nearly to the mouth of the Ohio. It also forms much of the western plateau region. On the Pacific border, the Cretaceous strata forms practically all the coast ranges, and in places some of the low foot-hills of the Sierra range. From the above distribution we see that the northern Atlantic shore was farther out or east than now; from New Jersey south it was farther in than now. The Gulf shore line was much more extended both to the north and west than now. It went through middle Alabama and northward to the mouth of the Ohio, and southward again, from there for some distance. From the Gulf there was an inland sea five or six



Map 3.- North America in Cretaceous Times

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hundred miles wide extending northwestward, covering the entire plains and plateau region, and probably dividing the continent into two parts. On the Pacific boarder the Sierras formed the shore line. An idea as to how the continent looked at this time may be obtained from map 3.

IV. Cenozoic Era (Tertiary Rocks).

The Cenozoic era shows great advancement in the animal kingdom and also numerous new formations and changes in the physical geography of the country. The formations of this era are found from New Jersey southward forming a strip along the Atlantic ocean and Gulf, extending as far northward as the mouth of the Ohio. Thus forming all the low Atlantic and Gulf states. They also formed the Pacific coast range and its foot-hills. These are shown in map 2. by The physical geography was much the same as in Cretaceous times, except for the formation of quite numerous islands in the inland sea.

V. Psychozoic Era (Tertiary Rocks).

The chief characteristics of the quaternary formations is the occurrence of the wide spread. (elevations and depressions.) of the earth's crust, accompanied by great changes in climate. and great advancement in the animal kingdom.

The Psychozoic Era is marked by the supremacy of man and the reign of mind. The large and dangerous animals have decreased in size and numbers, and the useful animals and plants were introduced or preserved by man. Several important changes in the physical geography of the country have taken place, and are still going on; but we are all acquainted with these, so they need no describing.

From the above facts we may see that by a careful study of the historical geology of our country we may trace out the origin of the different varieties of rock, and tell in what age each was formed; and we may also learn the entire history of our country, as to age, formation, and size and shape in the different ages, from the beginning to the present time.
