

GEOLOGICAL HISTORY OF NORTH AMERICA.

(Continued.)

At the close of this period the water had probably receded as far as the present limits of New York, for the coal beds of the Carboniferous do not reach it. Where the Rocky and Appalachian Mountains now stand were coral reefs, islands, and shallow sea, as is proven by the fact that the limestones of the Carboniferous age are found here at an elevation of 13,000 feet above sea level. Nearly the whole of that vast stretch of territory now the Mississippi valley, then formed a vast shallow sea. As time advanced the bed became higher, and the great marshes which characterize the Carboniferous age made their appearance.

This is one of the greatest periods in American geological history, interesting because of its abundant animal and vegetable life, and important on account of the great beds of coal, or carbon, which were then deposited. These coal fields cover large areas in the Appalachian Mountains, in Illinois, Michigan, Missouri and other of the central states, and vary much in thickness and character of deposit.

That these coal beds are of vegetable origin is hardly to be doubted, for they and the surrounding strata abound in fossil leaves and stems, and the coal itself consists chiefly of vegetable fiber. The vegetation of this period was very luxuriant, owing to the great amount of water, and a warm moist climate.

Plants were still of the lower orders, belonging to the Acrogens and Gymnosperms. Although in modern times plants belonging to these orders are usually small, yet, in the Carboniferous age, they constituted dense forests and jungles. Here were immense tree-ferns some of them reaching to the height of eighty feet; species of the Lycopods from sixty to eighty feet high; great ferns sometimes with fronds eight feet long; indeed, the period is distinguished from all others by the gigantic and exuberant growth of its plants. Yet even at this time there were no flowers, and the nearest approach to anything like modern foliage is found in the Conifers, which had leaves much like the pine of to-day.

Although coal was formed only where there were marshes, and where the deposit was afterward covered by other material, as clay or sand, there was probably luxuriant growth all over the

land. Life in the sea was much the same as in proceeding ages. Insects were numerous and of many species, while the first Reptiles are found in the beds of this age.

Owing to the general flatness of the country, probably as yet no large rivers were formed. It is thought that the St. Lawrence and Connecticut existed, and that the Mississippi river had a part of its length.

The Carboniferous age ends the second great division in geological history, the next period, the Triassic, being the first of the third division, or Mesozoic, called the "Age of Reptiles." During this period the animals of former times, such as Mollusks, Radiates, etc., became less abundant, and Reptiles, most of which grew to enormous sizes became the characteristic animals. There were swimming reptiles from fifteen to twenty feet long; snake-like reptiles from ten to seventy feet long; flying reptiles, some with a spread of wings of twenty-five feet.

Besides the great number of its Reptiles it is remarkable as producing the first Mammals and Birds in the animal kingdom and the first Angiosperms in the vegetable. In the sea the fishes developed from those having vertebrated tails, to those with half vertebrated tails, and finally to those having none at all. Although in the east the continent stood above water, excepting a strip along the Atlantic ocean, and the southern part of the Mississippi valley, yet a large part of the Rocky Mountain region was barely above water, while the western part of the great plateau, and the Pacific slope was still a part of the Pacific Ocean.

The following period, the Jurassic, is much allied to the Triassic, life being much the same, Reptiles still predominate, though of a higher order. The abundance of fossils prove that the foliage was luxuriant, and the sea, air, and land teemed with life.

Although the foliage of the Jurassic age was abundant, yet in the beginning of the Cretaceous there was great change. Until this time great fern-like trees predominated, but as the age progressed, trees, many of them allied to those of the present time, came to be the characteristic plants of the day. The general appearance of the Cretaceous forests might have been much like those of modern times, the trees not exactly like ours, yet similar. Remains have been found of those allied to the Beech, Oak, Maple, Willow, Poplar, Hickory and many others.