

markable deposits of lead in the world, in the Hudson River group. It covers 3,000 square miles, chiefly in Wisconsin, but found also in Iowa and Illinois. The greatest amount of lead produced from it in any one year was 315,700 tons.

Copper is abundant in the same vicinity; but especially about Lake Superior, in Potsdam sandstone. Masses of native copper have been uncovered there weighing fifty tons; and bowlders from the lodes are scattered over an area of several thousand square miles.

The salt springs of the United States issue invariably from the silurian rocks.

Probably all the gold in the United States, both along the eastern and western shores, is located in metamorphic rocks of Silurian or Devonian age. Along the Appalachian ranges it has been found all the way from Canada East to Alabama, being particularly abundant in North Carolina. The California deposits are the most extensive in the world.

DEVONIAN SYSTEM.

The formations of the Devonian system are ten in number in New York, which may be arranged, by structural resemblances, into five groups.

The *Oriskany Group* embraces the Oriskany sandstone and the Cocktail grit. The group extends from southern New York southwesterly to Tennessee, and westerly about 300 miles. The upper part is characterized by a fucoid resembling the tail of a cock, whence its name.

The Upper Helderberg group embraces the Schoharie grit and the Upper Helderberg limestone, or, as at first divided, the Corniferous and Onondaga limestones. The limestones of this group are widely developed through the Appalachian chain south of Hudson River, and westward, both in the United States and Canada, as far as the palæozoic rocks have been explored. It is also represented in the Dorset limestone of New England, a belt of limestone in Northern Vermont east of the Green Mountains, and probably at Bernardston, in the northern part of Massachusetts, upon Connecticut River. It is the lowest rock in North America which contains ichthyolites.

The three remaining groups are mostly sandstones and shales. The *Hamilton division* embraces the Marcellus shales, Hamilton group, and Genessee slate. This division is best developed in the Appalachian chain in Pennsylvania and Virginia, thinning out gradually between the Hudson and Mississippi Rivers. The Hamilton group in Iowa is mostly calcareous, containing many interesting fossils.

The fourth group embraces the Chemung and Portage rocks of New York. From New York they extend southwesterly to Tennessee. In Ohio they have received the provincial name of Waverly sandstone. Farther west and north their equivalents have not been ascertained.

The fifth group is the Catskill red sandstone, lithologically the *old red sandstone* of Europe. This is principally developed in New York and Pennsylvania, so far as its equivalency has been determined.

Devonian rocks are found in Eastern Massachusetts, Maine, Canada East, and in the more northern parts of the continent, but their equivalency with the deposits already specified has not been determined.

From the study of the Silurian and Devonian systems the following conclusions have been reached: 1. Until we reach the Genessee slate, all the organic remains found in these two great systems are marine. Here the first land plants are found. The *formations* appear to have been deposited successively near the shore of the palæozoic ocean, for besides the fossils ripple