

it is not represented upon the map, because the greater part is covered by tertiary deposits, but may be occasionally observed in deep excavations. There is some uncertainty respecting the northwestern limit of this system, but it is no doubt of as much extent as is indicated upon the map. Other Cretaceous beds are marked upon the map in Yucatan, Mexico, and the north part of South America. Dr. J. S. Newbury, United States Geologist, who has just returned (1860) from exploring the San Juan and Upper Colorado Rivers, in Utah and New Mexico, found the Cretaceous system there 4,000 feet thick, and "occupying an immense area west of the main divide of the Rocky Mountains."

About 100 species of shells have been discovered in this system, of which twenty-five per cent. are identical with European forms. Several interesting forms of vertebrate life have been discovered, as the *Hadrosaurus* in New Jersey—an animal resembling the Iguanodon of England.

The area occupied by the Mesozoic upon the map, shows what were the outlines of North America in the Cretaceous period. The Atlantic coast was at the western margin of this group, and the Gulf of Mexico extended even into British America, covering the cretaceous rocks. A part of the Rocky Mountains was also beneath the water, as some of their summits contain marine shells of Cretaceous age. Yet the interior ocean may have been shallow, and thus the continental area have been substantially the same as at present.

Gypsum is found in small quantities in Mesozoic rocks in North America. But the most extensive deposit is probably of Cretaceous age. Captain Marcy, in exploring the sources of the Red River in 1852, traced out a thick deposit of this substance extending from the Canadian River, in 99° W. longitude, nearly to the Rio Grande, at least 350 miles long, and from 50 to 100 miles broad.

#### TERTIARY SYSTEM.

The surface represented as Cainozoic upon the map is mostly overlaid by the Tertiary system. There are three great deposits. 1. Along the Atlantic coast, outside of or covering the cretaceous rocks, from Boston to Southern Mexico, including the whole of Florida and large parts of Louisiana and Mississippi. 2. Along the Pacific coast, from Lower California to Russian America. 3. Occupying the great table lands of the Rocky Mountains, covering more square miles than the Cretaceous system, though not as wide, though we suspect, since Dr. Newbury's researches, that here is some mistake. Other deposits of small extent are found along the Alleghany ranges, upon the shores of the Arctic ocean, in Yucatan, and in South America. There are also several detached tertiary tracts upon the great interior cretaceous deposit which are not represented upon the map.

The latest researches show that the European divisions of Eocene, Miocene, and Pliocene, can be traced upon this continent. The deposits along the Atlantic seaboard (including the Mexican Gulf) have received local names. The *Clairborne group* corresponds to the older Eocene, having the following characteristic fossils: *Cardita planicosta*, *C. Blandingii*, *Crassitella alta* and *Ostrea sellieformis*. The *Vicksburg group* corresponds to the newer Eocene, containing the following characteristic fossils: *Dentalium thaloides*, *Sigaretus arctatus*, and *Terebra costata*. The *Yorktown group* embraces both the Miocene and Pliocene.

The Eocene strata are in too many localities to be here specified. The great *Zeuglodon cetoides* is found in them in the Southern States.

A most extraordinary Miocene deposit has been brought to light in one