

that volcanic forces were vigorously active, not only during a portion of the later Trias, but also in the earlier Carboniferous and later Jurassic.

The Trias was first recognized as existing probably in Sonora, Mexico, by A. Rémond (J. D. Whitney, *Am. Jour. Sc.*, 1866). He speaks of it as consisting of sandstones and conglomerates with coal-bearing clay shales. He adds that the metamorphic slates of the Altar and Magdalena districts, which include the richest gold placers of Sonora, may possibly be of Triassic age, but that it is also possible that they are Jurassic, as they "resemble rather the Jurassic gold-bearing slates of the Sierra Nevada."

Jurassic.

Jurassic beds are found at the west base of the Black Hills in Dakota, where the rock is limestone with intercalated marls. The thickness, 200 feet, increases to 600 feet 40 miles from the Hills (Newton), indicating, as W. O. Crosby implies, less subsidence in the sea-bottom about the Archæan center than at a distance from it. They also come out to view at points along the base of the Laramie Mountains, the Big Horn Mountains, the Wind River, and other mountains in the Rocky chain. They overlies Triassic through much of the Summit Region within the United States, both east of the Great Basin or Plateau belt, and, as has been mentioned, along its western border beyond $117\frac{1}{2}^{\circ}$. Farther north in the same belt, they have been observed by Diller on the Blue Mountains of Oregon.

The Upper Jurassic in Colorado, Wyoming, and Montana includes the freshwater *Atlantosaurus* beds of Marsh, from 100 to 300 feet thick, which have afforded, near Morrison and Cañon City in Colorado and elsewhere, the remains of many large Reptiles, teeth and jaws of Marsupial and Oviparous Mammals. The *Baptanodon* beds of Marsh, when present, are next below. They contain remains of large aquatic Reptiles, besides some marine invertebrate fossils.

The Jurassic beds are found along a large part of the western slope of the Sierra Nevada. The first discoveries were made in Plumas County, on the north slope of Genesee valley, by Clarence King, of the Whitney Survey, in 1863. They were afterward discovered in the auriferous slates of the Mariposa region and identified by fossils (Gabb, 1864; Meek, 1865).

In the Taylorville region in Plumas County, the Jurassic beds, according to Diller and Hyatt, are found to consist of nearly 1500' of sandstones, 10' to 30' of limestones, and 500' of tufa. The series represents, as Hyatt has found from the fossils, the Lias and the Lower and Upper Oölyte. The Upper Oölyte has also been identified by fossils over a wide range of the western slopes of the Sierra, where the rocks are upturned metamorphic slates, hydromica, mica, and siliceous schist, with sandstone, and in some parts, serpentine, and thin beds of crystalline limestone, besides more coarsely crystalline rocks. The belt of slates—which is in general 20 to 25 miles wide—contains the chief part of the gold-bearing veins of quartz, some of which are of great width. Turner describes the Mariposa slates as including much diabase tufa, besides some conglomerates made of siliceous pebbles from the associated rocks (1894).

The most abundant fossil in the Mariposa beds is a species of *Aucella* (see beyond, page 760), and hence related beds have been called *Aucella* beds. The Mariposa rocks were pronounced Jurassic by Gabb (1864) and Meek (1865), and recently also by Hyatt.