

couver and Queen Charlotte Islands is referred to the Lower Cretaceous. On Queen Charlotte Islands, fossil plants of Lower Cretaceous species occur in the beds, as first discovered in 1872, and reported in the following year by Dawson. G. M. Dawson makes five subdivisions of the beds; and the three lower, C, D, E, 9500 feet thick, are now regarded as identical with the Shasta group, on the basis of several common fossils (Whiteaves, C. A. White, T. W. Stanton).

*Arctic Ocean.*—On western Greenland, in the vicinity of Disco Island, there are deposits containing Cretaceous and Tertiary plants, and the lower part are the Komé group, of Heer (1882), referred by him to the Neocomian of Europe, and by Newberry and Fontaine to the age of the Kootanie and Potomac.

A portion of the Potomac formation in Maryland was referred, on account of its stumps of Cycads, in 1860, by P. T. Tyson to the "Wealden"; and in 1875 to the same by W. B. Rogers. A careful study of the many fossil plants led Fontaine (1889) to essentially the same conclusion. The remains of Reptiles which it has afforded (see beyond) are pronounced Jurassic by Marsh.

The Potomac formation in the region of the Chesapeake Bay, in Maryland, is described by N. H. Darton (1893) as overlaid by beds of white sand, gravels, and brownish sandstones, which he calls the *Magothy* formation. It contains lignite and plant remains; but no fossils are mentioned for identifying or distinguishing it; and its separation from the Potomac by a plane of erosion is of uncertain importance. The *Albirupean* group of Uhler (1888) consists chiefly of white sand-beds occurring along the Chesapeake Bay, and is largely exposed near the head of Magothy River; and it is supposed to belong in part with the Potomac formation. But such evidence is very doubtful; for the deposits of sand, mud, and gravel now forming about Chesapeake and Delaware bays, and elsewhere along the Atlantic border, show that kinds of material, color, coarseness, texture, structure, are nearly valueless characters for determining the equivalency of Cretaceous and later-time beds as well as those of earlier time. All sorts are formed contemporaneously, and the same sorts at successive epochs.

On the Gulf border, the *Tuscaloosa* group in Alabama, as described by Smith and Johnson, consists of clayey layers with intercalated beds of sand; it outcrops beneath and either side of Tuscaloosa, along the northern limit of the Cretaceous belt. The thickness is about 1000'. The Eutaw beds of Mississippi, first described by E. W. Hilgard, are referred to the group, as far as non-marine, by C. A. White. The Tuscaloosa group is described in detail by E. A. Smith and L. C. Johnson, in Bulletin 43, *U. S. Geol. Surv.*, 1887, and some observations are added on the Eutaw group in Mississippi.

In Texas, the Lower Cretaceous has a thickness to the northeastward, at Red River, of 1000'; to the southwestward, on the Rio Grande, of 5000'; and northwestward it extends into New Mexico. At Kent, 163 miles east of El Paso, the westernmost station in Texas, the thickness is made about 600' by Dumble and Cummins; 550' of it belong to the Washita division, and are characterized by the *Gryphaea dilatata* var. *Tucumcari* of Marcou, a fossil well known from the Cretaceous of New Mexico. In Kansas, the whole thickness is but 150', half of it Trinity sands, and the rest, the Fredericksburg beds (Cragin).

The more important older investigations in Texan geology are those of Ferdinand Roemer (1852), B. F. Shumard (1856-1860), Marcou (1854-1859). Shumard made the Washita and Comanche Peak groups Upper Cretaceous; and Marcou placed the upper line of the Lower Cretaceous between these two groups, with the Comanche Peak limestone above.