

Ramsay attributes the transportation of the blocks to floating ice. Boulders in beds of great thickness and coarseness, glacial-like, with many of the boulders scratched, occur toward the bottom of the Tálchir group of India, regarded as Lower Permian; in equivalent beds of the Salt Range of northern India; in the related Ecca beds of South Africa, below the Karoo beds; in beds beneath the *Glossopteris* Coal-measures of eastern Australia, and also other beds overlying the same, called the Hawkesbury sandstone; and also in Victoria and Queensland. In New Zealand similar boulder beds are referred by Dr. Hector to the Trias.

The above facts have led some geologists to the conclusion that over India, Australia, and South Africa, there were glacial conditions in the course of the Permian era—a time when Europe and America were under luxuriant vegetation.

The Permian has much extent also in Bohemia and Moravia. On both sides of the Alps are red sandstones underneath Triassic beds, which are referred to the Permian. In France, its beds lie at the base of the Vosges, whence they extend into the Black Forest; at Autun, the thickness is 3000'; the rocks are, as usual elsewhere, sandstone, marlytes, and conglomerates.

In the Indian peninsula, according to the report of W. T. Blanford, Director of the Geological Survey, the Damúda series in western Bengal, with its valuable coal-beds, and also the underlying Tálchir beds,—called together the Lower Gondwána series,—correspond to the upper part of the Carboniferous and the Permian, excepting the Panchet group at the top, which is Triassic. The beds have a thickness of 6000' to 11,000', and the coal-beds an aggregate thickness of 175' or more. A 6-inch bed of coal occurs in the Tálchir group. The Coal-measures of Karharbári overlie the Tálchir beds. The Damúda beds contain species of *Glossopteris* (*Glossopteris Browniana* most abundant), *Alethopteris*, *Taniopteris*, *Sphenopteris*, *Sphenophyllum*, *Gangamopteris*, *Sagenopteris*, besides *Pterophyllum* and other Cycads, *Voltzia heterophylla*, *Vertebraria*, etc. The Rájmahál group, of the Upper Gondwána series, is supposed from its fossil plants to be Lower Jurassic, Cycads being the prevailing species, as much so as *Glossopteris* and *Vertebraria* are in the Damúdas.

In Australia, the coal formation, with excellent coal, occurs in Illawarra, also on Hunter's River, and elsewhere; and, from the fossil plants, the absence of *Lepidodendrids* and *Sigillarids*, and the abundance of *Glossopteris*, with species of *Sphenopteris*, *Vertebraria*, etc. (the range of species much resembling that of the Damúda beds), together with the occurrence, immediately below, of shales containing Carboniferous Brachiopods, Conulariæ, etc., and a heterocercal Ganoid, *Urosthene australis* D., the series was referred by the author (in his *Wilkes Exped. Geol. Rep.*, 1849) to the "Upper Carboniferous or partly Lower Permian." It is made the equivalent of the Damúda series by Blanford. W. B. Clarke mentions the occurrence of leaves of *Glossopteris* in the Coal-measures, having a length of about 2', and of the frond of a *Sphenopteris*, which when entire must have measured 5' in length. The Coal-measures are about 480' thick, and contain 11 seams of coal. D. Stur has shown that in Germany and Austria the Permian is characterized by related species of *Taniopteris*, *Pterophyllum* and *Sagenopteris*, closely representing those of India and Australia.

The Lower coal-beds occur in Australia also, below the above-mentioned beds, in the Hunter's River region, and westward through Durham, Brisbane, etc., which contain species of *Lepidodendron*, *Sigillaria*, *Knorria*, *Cyclopteris*, etc. Above the Upper Coal-measures in Australia comes the wide-spread Hawkesbury sandstone and the