

taining plant-remains, among which *Glossopteris* is said to have been recognized. This series is unconformably surmounted by the "Kimberley shales," which pass up into the "Karoo beds." The latter are generally regarded as Triassic.

North America.—The Permian system is hardly represented at all in this part of the globe. In Kansas certain red and green clays, sandstones, limestones, conglomerates, and beds of gypsum lie conformably on the Carboniferous system, and contain a few genera and species of mollusks (*Bakevellia*, *Myalina*, etc.) which occur in the European Permian rocks. It has been urged, however, that the upper part of the Appalachian coal-field should be regarded as belonging to the Permian system. These strata, termed the "Upper Barren Measures," are upward of 1000 feet thick. At their base lies a massive conglomeratic sandstone, above which come sandstones, shales, and limestones, with thin coals, the whole becoming very red toward the top. Professors W. M. Fontaine and I. C. White have shown that, out of 107 plants examined by them from these strata, 22 are common to the true Pennsylvanian Coal-measures and 28 to the Permian rocks of Europe; that even where the species are distinct they are closely allied to known Permian forms; that the ordinary Coal-measure flora is but poorly represented in the "Barren Measures," while on the other hand vegetable types appear of a distinctly later time, forms of *Pecopteris*, *Callipteridium*, and *Saportæa* foreshadowing characteristic plants of the Jurassic period. These authors likewise point to the indications furnished by the strata themselves of important changes in the physical condition of the American area, and to the remarkable paucity of animal life in these beds, as in the red Permian rocks of Europe. The evidence at present before us seems certainly in favor of regarding the upper part of the Appalachian coal-fields as representing the reptiliferous beds overlying the Coal-measures at Autun and their equivalents."²⁷¹ In Nova Scotia also a similar upward passage has been observed from true Coal-measures into a group of reddish strata containing Permian types of vegetation.

Passing to the western regions of the continent, we find

²⁷¹ "On the Permian or Upper Carboniferous Flora of W. Virginia and S. W. Pennsylvania," Second Geol. Surv. Penn. Report, P.P., 1880.