

in which the chief mineral constituents lie imbedded in a "matrix" or ground-mass, *e.g.*, gneiss, schist, phyllite, porphyry, trachyte, obsidian, lava; 3, the "aggregated" or fragmental varieties, which take origin by mechanical means, and whose ingredients are cemented together by subsequent infilling of material, *e.g.*, psammites (sandstone, greywacke), pudding-stones, and breccias.

Brongniart, as well as his predecessors Hauy and Cordier, confined themselves exclusively to the mineralogical composition and structure of the rocks, without respect to their mode of occurrence, their age, or their origin. While this method of treatment proved undoubtedly beneficial to the development of systematic petrography, it endangered the connection between geology and petrography, and in this respect the direction initiated by the French petrographers must be regarded as retrograde in comparison with the Wernerian School.

The best and most complete work of that time on petrology was Leonhard's¹ *Charakteristik der Felsarten* (1823-24). In this work likewise the mineralogical standpoint predominates, but the Wernerian influence is apparent in the frequent digressions which give information regarding the occurrence of the different kinds of rock in the field and their mode of origin. Leonhard distinguished four sub-divisions of rocks: 1, rocks composed of unlike elements; 2, rocks apparently uniform; 3, derivative or fragmental rocks; 4, friable and incoherent rocks. As all Leonhard's distinctions were founded on macroscopic examination of the rocks, the group of the "apparently uniform" rocks is quite artificial, and the limits of the others are unsatisfactory.

Cordier² had suggested in 1815, according to the precedent

¹ Carl Cäsar von Leonhard, born 1779 at Rumpenheim near Hanau, studied in Marburg and Göttingen; in 1800 entered into the Hessian Government Service; in 1810 was appointed Councillor of the Exchequer in Chur Hesse, and afterwards Director of Domains; in 1816 accepted a call to the Munich Academy, but left Munich in 1818 to be Professor of Mineralogy and Geognosy at the University of Heidelberg, where he died on the 23rd January 1862.

² Pierre Louis Antoine Cordier, born 1777 in Abbeville, began life as a mining engineer in 1797; took part under Dolomieu in the Egyptian Expedition; in 1819, succeeded Faujas de Saint-Fond as Professor of Geology at the Botanical Garden, and at the Restoration of the Empire was made a peer of France. He died in 1862.