

## CHAPTER IV.

### PETROGRAPHY.

THE investigation of the rocks which compose our earth's crust has always been conducted along two directions of study: (1) the investigation of the mineralogical and chemical composition, the structure of rocks, their mode of occurrence; (2) the investigation of their mode of origin.

The systematic arrangement and the morphology of rock-varieties has been constructed mainly upon a mineralogical basis; the questions concerning the origin of rock-varieties have been handled more from the geological and chemical side. A distinction between massive eruptive rocks and stratified deposits was early recognised in petrographical literature. Hutton's was the genius which first differentiated clearly between plutonic, volcanic, and sedimentary rocks in point of origin; while Werner, too biassed by Neptunistic doctrines to perceive the fundamental truths which Hutton had taught, nevertheless accomplished the task of erecting a systematic classification of rocks upon mineralogical considerations.

During the first half of the nineteenth century, all petrographical works followed Werner's system. His determination of rocks as simple or composite occurs in most of the later attempts at classification, and also his fundamental principle of differentiating the essential and the accessory minerals in mixed rocks has been continued to the present day.

Brongniart had in 1813, in his table of Composite Rocks, assigned great importance to the structural relations, and distinguished accordingly three chief classes: 1, the "isomerites," or granitoid varieties of rock, in which the individual elements are united only by crystalline aggregation, and there is no finer matrix, *e.g.*, granite, syenite, protogine; 2, the "anisomerites," or porphyritic and hemicrystalline varieties,