

merged into the massive structure of granite; 'argillaceous limestone'—a rock in which the limestone is mixed with clay; "calcareous shale"—a fissile rock, consisting of clay with a proportion of lime. It is evident that such rocks may graduate so insensibly into each other, that no sharp line can be drawn between them either in the field or in their terminology.

As already alluded to, and as will be more fully explained in later pages, the progress of research goes to show that even in the same mass of eruptive rock considerable differences of chemical composition may be found. These differences seem to point to some separation of the constituents, by gravity or otherwise, before consolidation. Thus the picrite of Bathgate shades upward into a rock in which the heavy magnesian silicates are replaced in large measure by feldspars.⁷¹ Mr. Iddings has recently called attention to some remarkable gradations of composition among the volcanic rocks of the Tewar Mountains, New Mexico, where he believes a series of intermediate varieties to be traceable from obsidian at the one end to basalt at the other.⁷² A remarkable instance of a similar kind is described by Mr. Teall and Mr. Dakyns from the Scottish Highlands.

3. State of Aggregation.—The hardness or softness of a rock, in other words, its induration, friability, or the degree of aggregation of its particles, may be either original or acquired. Some rocks (sinters, for example) are soft at first and harden by degrees; the general effect of exposure, how-

⁷¹ Trans. Roy. Soc. Edin. vol. xxix. (1879), p. 504.

⁷² Bull. U. S. Geol. Surv. No. 66 (1890), Bull. Phil. Soc. Washington, xi. (1890), pp. 65, 191, and postea, pp. 457, 458. Teall and Dakyns, Quart. Journ. Geol. Soc. 1892.