erroneously determined) as a basis of petrographical arrangement.[163]

In the following arrangement the threefold division first mentioned above is adopted, according to the relative abundance of silica: 1st, Acid; 2d, Intermediate; 3d, Basic. In each of these series there is a range of structure from completely crystalline to completely glassy. The holocrystalline rocks are as a rule the deep-seated representatives of each series, while the vitreous and semi-vitreous are those which have either been erupted to the surface or have been connected with volcanic rather than plutonic action. No system of classification yet proposed can avoid incongruities, and it must be remembered that the hard and fast lines of our nomenclature do not represent any really abrupt demarcations in nature. As one rock graduates into another, our terminology should be elastic, so as to include such transitional forms.

i. Acid Series

In this family the silicic acid has been in such excess as often to separate out in the form of free quartz. Sometimes, as in granite, it has not assumed a definitely crystallized form, but is molded round the other crystals as a later stage of consolidation. In other rocks (quartz-porphyry, etc.) it occurs as a product of earlier consolidation, and often assumes perfect crystallographic contours, occurring even in double pyramids. The texture of the rocks is (1) holocrystalline or crystalline-granular (granitoid), as typically developed in granite; (2) hemi-crystalline (porphyritic, trachytoid), as in quartz-porphyry or felsite; (3) vitreous, as in obsidian.

Granite.[164]—A thoroughly crystalline-granular admixture of

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[163] For a tabular arrangement of the massive (eruptive) rocks and critical remarks on their classification, see Rosenbusch, Neues Jahrb. 1882, ii. p. 1.

[164] On the structure of granite, see the manuals of Zirkel and Rosenbusch and the memoirs there cited; also Zirkel's "Microscop. Petrography," 1876, p. 39; Phillips, Q. J. Geol. Soc. xxxi. p. 330; xxxvi. p. 1. J. C. Ward, op. cit. p. 569; and xxxii. p. 1. King's "Systematic Geology" (vol. i. of Explor. 40th