eruptive bosses which have not yet been laid bare by denudation.

3. As the alteration increases in intensity with greater proximity to the plutonic rock, it must be regarded as a result of the protrusion of that rock. But there occur exceptional areas or bands which have undergone a minor degree of change even in the midst of highly altered portions.

4. The character of the metamorphism depends fundamentally upon the nature and mass of the invading rock and on the composition and texture of the materials which have been affected. Sandstones have been changed into quartzite; siliceous schists into hornstone, Lydian-stone, etc.; clay-slates into spotted schists, chiastolite-schists, micaschists, etc.; argillaceous graywacke and graywacke-slate into "knotenschiefer," mica-slate, and gneiss; limestone into garnet, hornblende, and other minerals. Alternations of distinct kinds of sedimentary strata, such as slate and sandstone, are represented by distinct alternating metamorphic bands, such as quartzite and mica-schist.

5. In some cases, the transformation of a thoroughly clastic rock (clay-slate, graywacke, graywacke-slate, or flagstone) into a completely crystalline one (andalusiteschist, mica-schist, gneiss) has been effected with little or no alteration of the ultimate chemical composition of the mass. In other cases a perceptible alteration in the proportions of the chemical ingredients is traceable.⁴⁰ The

⁴⁰ This is specially noticeable in the proportion of silica, which is sometimes found to be largely increased in the altered zone, either by an absolute addition of this acid, or by solution and removal of some of the bases. See Kayser, Z. Deutsch. Geol. Ges. xxii. p. 153. The development also of such minerals as tourmaline suggests that boric and other acids have been introduced into the rocks.