are manifestly changed, often to the depth of several feet. But when we open the most solid rocks, or descend into the deepest mines, we shall find minerals undergoing alteration—new ones taking the place of old ones. Wherever water penetrates, even though the temperature be not raised, we may expect metamorphism. Indeed Bischoff, whose great work on Chemical Geology forms almost a new era in geology, regards these changes as universal. "All rocks," says he, "are continually subject to alteration, and their sound appearance is not any indication that alteration has not taken place." (Vol. 3, p. 426). If it be so, it shows us how wide and difficult is the field which lies open for geological research.

3. Metamorphism shows us that the earliest formed rocks on the globe may have all disappeared.-If we suppose, what geologists now generally admit, that the globe has cooled from a molten state, the earliest formed crust may have been a granitic rock. Now this crust, as a general fact, has been thickening. But the process in many places, and, perhaps, alternately all over the globe, has been reversed. Suppose, by the slow process of erosion, materials have accumulated in the bottom of the ocean to a great thickness, the effect would be to cause the line of fusion to ascend, it may be so far as to melt off all the rock originally deposited. In other places erosion might have worn off the upper part of this crust, and though this would cause the line of fusion to descend. and thus add new rock, yet between those agencies above and beneath, continued through countless ages, none of the first formed crust may remain. Or if any of it is left, it would be impossible to distinguish it from subsequent formations. So that the idea of a primary granite, or any other rock, in the strict sense of the term, has no foundation in nature.

4. Metamorphism furnishes the most plausible theory of the origin of the azoic stratified rocks.

The hypothesis that these rocks were deposited in a crystalline state, in an occan so hot that the materials would crystallize, is not consistent with what we now know of chemical geology. For water can not hold in solution silicates enough for the purpose, nor does the order in which the materials are arranged correspond with that in which they would crystallize if they were in solution. No possible reason can be given, for instance, for the