

## CHAPTER XXXIII.

## PLUTONIC ROCKS — GRANITE.

General aspect of granite—Decomposing into spherical masses—Rude columnar structure—Analogy and difference of volcanic and plutonic formations—Minerals in granite, and their arrangement—Graphic and porphyritic granite—Mutual penetration of crystals of quartz and felspar—Occasional minerals—Syenite—Syenitic, talcose, and schorly granites—Eurite—Passage of granite into trap—Examples near Christiania and in Aberdeenshire—Analogy in composition of trachyte and granite—Granite veins in Glen Tilt, Cornwall, the Valorsine, and other countries—Different composition of veins from main body of granite—Metalliferous veins in strata near their junction with granite—Apparent isolation of nodules of granite—Quartz veins—Whether plutonic rocks are ever overlying—Their exposure at the surface due to denudation.

THE plutonic rocks may be treated of next in order, as they are most nearly allied to the volcanic class already considered. I have described, in the first chapter, these plutonic rocks as the unstratified division of the crystalline or hypogene formations, and have stated that they differ from the volcanic rocks, not only by their more crystalline texture, but also by the absence of tuffs and breccias, which are the products of eruptions at the earth's surface, or beneath seas of inconsiderable depth. They differ also by the absence of pores or cellular cavities, to which the expansion of the entangled gases gives rise in ordinary lava. From these and other peculiarities, it has been inferred, that the granites have been formed at considerable depths in the earth, and have cooled and crystallized slowly under great pressure, where the contained gases could not expand. The volcanic rocks, on the contrary, although they also have risen up from below, have cooled from a melted state more rapidly upon or near the surface. From this hypothesis of the great depth at which the granites originated, has been derived the name of "Plutonic rocks." The beginner will easily conceive that the influence of subterranean heat may extend downwards from the crater of every active volcano to a great depth below, perhaps several miles or leagues, and the effects which are produced deep in the bowels of the earth may, or rather must be, distinct; so that volcanic and plutonic rocks, each different in texture, and sometimes even in composition, may originate simultaneously, the one at the surface, the other far beneath it.

By some writers, all the rocks now under consideration have been comprehended under the name of granite, which is, then, understood to embrace a large family of crystalline and compound rocks, usually found underlying all other formations; whereas we have seen that trap very commonly overlies strata of different ages. Granite often preserves a very uniform character throughout a wide range of territory, forming hills of a peculiar rounded form, usually clad with a scanty vegetation.