mica and quartz, to granitic porphyry and granite. On the other hand, from granitic greenstone there is a transition to sienite, and from sienite to true granite. Again: in the volcanic districts of Auvergne, we see scoriaceous lava become more compact, and at length, pass into well characterized black basalt, with the columnar structure. In other situations, currents of lava form obsidian or volcanic glass; and between basalt, phonolite, and pitchstone, there is an almost imperceptible gradation.

Thus it may be seen, that the whole family of trap rocks have, on the one hand, a close alliance with volcanic rocks; and on the other, with the more ancient rocks of porphyry and granite.

The gradation of trap rock, having in some parts a volcanic character, into true granite, has been described by Messrs. Hausmann and Von Buch as distinctly observable, and well marked, in a mountain near Christiania in Norway. The lower rocks are gneiss; over this occurs dark slate; and in the slate are several beds of blackish limestone, containing trilobites, and also orthoceratites several feet in length, with other marine organic remains. In some parts, a bed of gritstone or greywacke rests on the slate. The whole of these beds are covered by an enormous mass of porphyry varying in thickness from 1600 to 2000 feet. The porphyry is of a smoke gray colour, but is reddish in some parts; it is compact, and moderately hard, and contains large crystals of white felspar, and crystals of quartz, epidote, hornblende, iron pyrites, and magnetic iron ore. In the lower part of the bed, the porphyry becomes vesicular, and changes into an amygdaloidal basalt, containing crystals of augite. Near the sea, vast dykes of this porphyry, more than thirty yards in width, are seen cutting through the slate and beds of limestone. In another part of the country, at Holmstrand, the same mass of porphyry, covering beds of sandstone, is seen to pass in the lower part, by almost insensible gradations, into a hard finegrained black basalt, containing brilliant crystals of augite: in the upper part of the bed, the porphyry passes into a sienite of singular beauty, containing crystals of zircon; and above this the sienite passes into common granite. The dykes of porphyry cutting through the slate rocks, indicate the mode of formation of this porphyry, in a manner not to be mistaken by those who are acquainted with the basaltic dykes in the northern parts of Great Britain. These dykes were doubtles the fissures through which this vast mass of porphyry had been poured out over the slate rocks, though Messrs. Hausmann and Von Buch described them as veins descending from the porphyry. The reader may form a more distinct idea of the position of this porphyry and its relation to the subjacent rocks, which are intersected by dykes of the same porphyry, from Plate III. fig. 2. *a*.

Had M. Von Buch seen this remarkable mass of porphyry at Christiania, after his visit to the basaltic districts in England, he would I am persuaded, have at once recognised the agency of subterranean