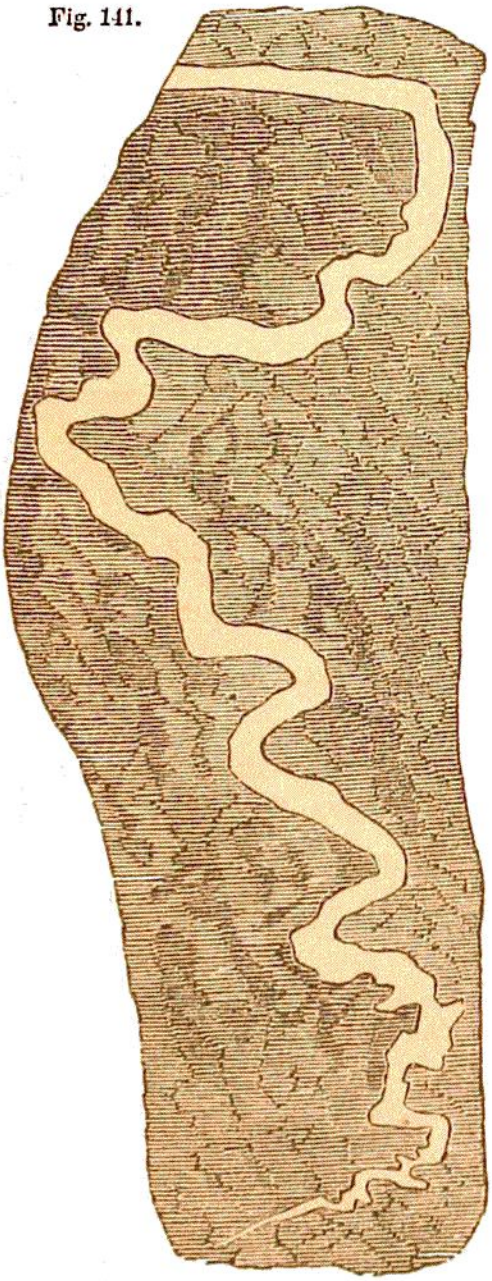
the same locality; and, indeed, the specimen exhibited on Fig. 18 shows to the eye a multitude of such curvatures too minute to be exhibited on the drawing. They seem to be the result of strong pressure on fine folia of rock, and having somewhat of stiffness, so that a lateral force would crumple it up, rather than produce regular curves.

4. Granitic veins and trap dykes in the crystalline rocks have been subject to dislocations and foldings, such as indicate a semi-plastic condition of the rock into which they have been injected. We give only two examples to illustrate this argument. The figure below (Fig. 141) shows a vein of granite (nearly all feldspar) in micaceous limestone, which has neither foliation nor stratification. But that the vein fills a crack in the limestone is obvious from its tapering to a point at one end. Yet it is impossible that a rock could have been split open in such a serpentine course, with pieces of the rock projecting one or two inches on the side, yet often not a quarter of an inch thick. Our theory, therefore, is, that when the crack was made and filled (not, probably, by injection, but by deposition from aqueo-igneous fusion), it was not so crooked as it now is, but was subsequently crumpled up and the folia obliterated by the semi-fusion. The vein is certainly not one of segregation, as that term is usually understood; for how improbable that granite should be segregated from limestone? Neither can melted matter have been injected into it mechanically, without tearing off the projecting laminæ of rock.

Fig. 141.



The next case is that of a trap or greenstone, possibly doleritic dyke in gneiss, in a bowlder four feet in diameter, found in Pelham, Massachusetts. This dyke, nowhere more than two inches wide, encircles the whole bowlder; but on one side the two tapering extremities are separated about five inches by intervening gneiss. On the other side the dyke appears to have been fractured and the ends separated, say half an inch, as shown in Fig. 142 Yet the whole rock shows very distinctly the foliated structure of firmly compacted gneiss, whose layers are entirely parallel, save that for a few inches between the extremities of the dyke they are turned aside a few degrees, as shown below.

No one can look at this rock without being satisfied that the gneiss must have been in a plastic state when the dyke was formed, and especially when, by a lateral movement, it was broken off. In this case there is no appearance