James Forbes has so ably explained, showing that it is due to the fissuring of a viscous body in motion.*

Whatever be the cause, the result, observes Darwin, is well worthy the attention of geologists; for in a volcanic rock of the trachytic series in Ascension layers are seen often of extreme tenuity, even as thin as hairs, and of different colors, alternating again and again, some of them composed of crystals of quartz and diopside (a kind of augite), others of black augitic specks with granules of oxide of iron; and lastly, others of crystalline felspar. It is supposed in this case that the crystallizing force acted more freely in the direction of the planes of cleavage, produced when the pasty mass was stretched, whether because confined vapors were enabled to spread themselves through the minute fissures, or because the ultimate molecules had more freedom of motion along the planes of less tension, or for some other reasons not yet understood.

After studying, in 1835, the crystalline rocks of South America, Mr. Darwin proposed the term *foliation* for the laminæ or plates into which gneiss, mica-schist, and other crystalline rocks are divided. Cleavage, he observes, may be applied to those divisional planes which render a rock fissile, although it may appear to the eye quite or nearly homogeneous. Foliation may be used for those alternating layers or plates of different mineralogical nature of which gneiss and other metamorphic schists are composed. The cleavage planes of the clay-slate in Terra del Fuego and Chili preserve a uniform strike for hundreds of miles in regions where these planes are quite distinct from stratification. In the same country the planes of foliation of the mica-schist and gneiss are parallel to the cleavage of the clay-slate. Hence, we are tempted, at first sight, to infer that some common cause or process, and that cause not connected with sedimentary deposition, has impressed cleavage on the one set of rocks and foliation on the other. But such an inference can only be legitimately drawn in those rare cases where we are able, by a continuous section, to prove that not only the strike, but the dip of the slaty cleavage on the one hand, and of the foliation on the other, precisely coincide; the cleavage at the same time not being parallel to the stratification in the slate rock. In some examples cited by Mr. Darwin, in Terra del Fuego, the Chonos Islands, and La Plata, this uniformity of dip seems to have been traced in a manner as satisfactory as the nature of such evidence will allow. But we must be on our guard against a source of deception which may mislead us in this chain of reasoning. We are informed that in South America, as in other countries, the strike of the cleavage in clay-slate conforms to the axis of elevation of the rocks in the same districts. Hence it must follow that the *folia* of gneiss, mica-schist, limestone, and other crystalline rocks, even if they strictly coincide with the planes of original stratification, will run in the same direction as the strike of the slaty cleavage; for the true strata always

* Darwin, Volcanic Islands, pp. 69, 70.