

to one position, that must of course determine a cleavage-plane. Thus we see the infinitesimal crystals of fresh precipitated sulphate of barytes, and some other such bodies, arrange themselves alike in the fluid in which they float; so as, when stirred, all to glance with one light, and give the appearance of silky filaments. Some sorts of soap, in which insoluble margarates* exist, exhibit the same phenomenon when mixed with water; and what occurs in our experiments on a minute scale may occur in nature on a great one."†

Professor Phillips has remarked, that in some slaty rocks the form of the outline of fossil shells and trilobites has been much changed by distortion, which has taken place in a longitudinal, transverse, or oblique direction. This change, he adds, seems to be the result of a "creeping movement" of the particles of the rock along the planes of cleavage, its direction being always uniform over the same tract of country, and its amount in space being sometimes measurable, and being as much as a quarter or even half an inch. The hard shells are not affected, but only those which are thin.‡ Mr. D. Sharpe, following up the same line of inquiry, came to the conclusion, that the present distorted forms of the shells in certain British slate rocks may be accounted for, by supposing that the rocks in which they are imbedded have undergone compression in a direction perpendicular to the planes of cleavage, and a corresponding expansion in the direction of the dip of the cleavage.§

More recently (July, 1853), Mr. Sorby has demonstrated the great extent to which this mechanical theory is applicable to the slate rocks of North Wales and Devonshire,|| districts where the amount of change in dimensions can be tested and measured by comparing the different effects exerted by lateral pressure on alternating beds of finer and coarser materials. Thus, for example, in the accompanying figure (fig. 708), it will be seen that the sandy bed *d f*, which has offered greater resistance, has been sharply contorted, while the fine-grained strata, *a, b, c*, have remained comparatively unbent. The points *d* and *f* in the stratum *d f* must have been originally four times as far apart as they are now. They have been forced so much nearer to each other, partly by bending, and partly by becoming elongated in the direction of what may be called the longer axes of their contortions; and lastly, to a certain small amount, by condensation. The chief result has obviously been due to the bending; but, in proof of elongation, it will be observed that the thickness of the bed *d f* is now about four times greater in those parts lying in the main direction of the flexures than in a plane perpendicular to them;

* Margaric acid is an oleaginous acid, formed from different animal and vegetable fatty substances. A margarate is a compound of this acid with soda, potash, or some other base, and is so named from its pearly lustre.

† Letter to the author, dated Cape of Good Hope, Feb. 20, 1836.

‡ Report, Brit. Assoc., Cork, 1843, Sect. p. 60.

§ Quart. Geol. Journ. vol. iii. p. 87. 1847.

|| On the Origin of Slaty Cleavage, by H. C. Sorby, Edinb. New Phil. Journ. 1853, vol. iv. p. 137.