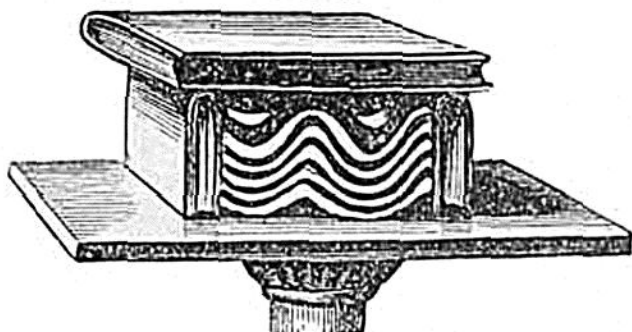


tion which is concealed beneath the sea-level, as also that which is supposed to have once existed above the present surface.

We may still more easily illustrate the effects which a lateral thrust might produce on flexible strata, by placing several pieces of differently colored cloths upon a table, and when they are spread out horizontally,

Fig. 65.



cover them with a book. Then apply other books to each end, and force them towards each other. The folding of the cloths will exactly imitate those of the bent strata. (See fig. 65.)

Whether the analogous flexures in stratified rocks have really been due to similar sideway movements is a question of considerable difficulty. It will appear when the volcanic and granitic rocks are described, that some of them have, when melted, been injected forcibly into fissures, while others, already in a solid state, have been protruded upwards through the incumbent crust of the earth, by which a great displacement of flexible strata must have been caused.

But we also know by the study of regions liable to earthquakes, that there are causes at work in the interior of the earth capable of producing a sinking in of the ground, sometimes very local, but sometimes extending over a wide area. The frequent repetition, or continuance throughout long periods, of such downward movements seems to imply the formation and renewal of cavities at a certain depth below the surface, whether by the removal of matter by volcanoes and hot springs, or by the contraction of argillaceous rocks by heat and pressure, or any other combination of circumstances. Whatever conjectures we may indulge respecting the causes, it is certain that pliable beds may, in consequence of unequal degrees of subsidence, become folded to any amount, and have all the appearance of having been compressed suddenly by a lateral thrust.

The "Creeps," as they are called in coal-mines, afford an excellent illustration of this fact.—First, it may be stated generally, that the excavation of coal at a considerable depth causes the mass of overlying strata to sink down bodily, even when props are left to support the roof of the mine. "In Yorkshire," says Mr. Buddle, "three distinct subsidences were perceptible at the surface, after the clearing out of three seams of coal below, and innumerable vertical cracks were caused in the incumbent mass of sandstone and shale, which thus settled down."* The ex-

* Proceedings of Geol. Soc. vol. iii. p. 148.