

below the earth's crust would probably arise either from general refrigeration of the globe, or from local variation of heat. In such cavities the accumulation of elastic vapours is almost a necessary consequence, and it is conceivable that the crust of the globe would in parts yield to their force.

But Mr. Hopkins's reasoning would be in no degree invalidated, if for this mechanism of elastic vapours and cavities, an outward pressure derived from some other cause were hypothetically substituted, provided only that the area of its operation were sufficiently large, and its force *continuously augmented* until the earth's crust broke with the accumulated strain. The direction of the fissure at the instant of fracture can be determined mathematically, whether the intensity of the elevatory force be uniform at every point of the surface, or greater at particular points; provided the boundaries of the surface and the resistance offered by the cohesive power of the mass raised and broken be known. This last condition, indeed, does not require to be very precisely fulfilled, except in a horizontal direction; for in a vertical plane, the cohesive power may vary according to any discontinuous law, as must happen in every series of dissimilar strata. (The pre-existence of joints in the rocks raised offers greater difficulty; but as few of these traverse great masses of rock, and each stratum has some peculiarity in the distribution of the joints, it does not appear to us *necessary* to except even this case.)

The following are among the results of the investigation when applied to a case resembling the actual condition of the stratified crust of the globe.

1. *Production of longitudinal fissures.* — If the mass of ground raised by an elevatory force of uniform intensity be of indefinite length, and bounded laterally by two parallel lines, the extension and therefore the tension at any point will be in a direction perpendicular to the length; and the line of fracture will necessarily cross this direction, so that fissures cannot be produced under these circumstances, except in a longitudinal di-