

the ground permitting the formation of veins would be measured by the line where the pressure in the synclinals counterbalanced the relief afforded by the anticlinal elevations. Whatever approximation theoretical calculations may allow to this line, in view of the thickness of the strata concerned in these movements, it may safely be assumed that it is at a depth beyond the present reach of the miner. Mr. F. B. Bulkely in a paper read before the Philadelphia (1884) meeting of the American Institute of Mining Engineers on the intrusive bedded felsite dykes of Leadville, Colorado, puts this view as follows:—That the application to rock beds of a tangential pressure leads not only to their folding but to their partial separation, and in this connection gravity becomes an important factor.

The following figure, taken from his paper, represents an ideal anticlinal fold produced by the horizontal force PP . Thus the resultant $P'P'$ of this force as applied at O and O' , shows an uplift applied equally to all the strata, which is consequently exerted with increasing effect upon the uppermost sheets, causing a tendency to separation of the strata. The force of gravity is represented by GO, GO' , and it is evident that at the

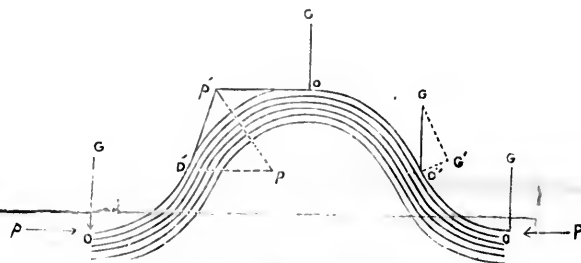


FIG.—An ideal anticlinal fold.

summit and at the foot of the anticlinal, as at $O O$ this whole force is exerted in a direction at right angles to the bedding planes of the structure, its whole effort being exerted to prevent a separation of the strata, while at other points, midway between the foot and summit, at O' , the force thus exerted is much less. An analysis shows that the force exerted at right angles to the plane of the stratification is directly proportional to the cosine of the angle of dip, and is represented by $G' O'$

Stratigraphically, the Nova Scotia veins conform to the conditions implied in such foldings. The present surface of a gold field may be represented as a horizontal section of an anticlinal, in some cases drawn near to its apex, but frequently so low down as to expose nearly all the beds of the gold-bearing horizon. Mining explorations in numerous districts have shown that veins, several inches thick at the surface, gradually thin and disappear within short vertical distances, that "cross cuts" driven at various depths below the surface have intersected veins which did not outcrop, and that some few veins have maintained nearly uniform dimensions to depths varying from 300 to 700 feet, the maximum depths as yet attained in our workings. The lateral thinning out of a vein is often seen to be succeeded by the commencement of another a few inches or feet to one side of the line of its course, as well as the passage more or less abrupt of the plane of a vein through a bed of rock to resume again its normal dip. Similarly, veins have been known to turn almost at right angles across the strata for a distance of a few feet or yards,