

lateral pressure has been proved experimentally by Sorby, who effected perfect cleavage in pipe-clay through which scales of oxide of iron had previously been mixed.<sup>41</sup> Tyn-dall superinduced cleavage on bees-wax and other substances by subjecting them to severe pressure. More recently, Fisher has proposed the view that in nature it is not to the pressure which plicated the rocks that cleavage is to be attributed, but to the shearing movements generated in large masses of rock left in a position too lofty for equilibrium.<sup>42</sup> If such, however, had been the origin of the structure, it is difficult to understand why there should be such a prevalent relation between the strike and the cleavage; for if descent by gravitation were the main cause, we should expect to find the rocks sheared far more irregularly than even the most irregular disposition of cleavage. That in cleavage there has been a true distortion of the rocks is indubitable; and the amount of distortion may be ascertained by the extent of the alteration of shape of fossils (Figs. 85-88). Microscopic study of cleaved rocks shows that their fissility is not always due merely to a rearrangement of original clastic particles, but to the development of new minerals, particularly varieties of mica, along the planes of cleavage. This relation is well seen in the folded and cleaved Devonian and Carboniferous rocks of S. W. Ireland and Cornwall, in the Carboniferous shales of Laval, May-

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<sup>41</sup> Hopkins, Cambridge Phil. Trans. viii. (1847), p. 456. D. Sharpe, Quart. Journ. Geol. Soc. iii. (1846), p. 74; v. (1848), p. 111. Sorby, Edin. New Phil. Journ. lv. (1853), p. 137. W. King, Roy. Irish Acad. xxv. (1875), p. 605. The student will find recent interesting additions to our knowledge of the microscopic structure and the history of cleaved rocks in Mr. Sorby's address, Q. J. Geol. Soc. xxxvi. p. 72, and in Mr. Harker's very able essay, Brit. Assoc. 1885, Reports, pp. 813-852. See also E. Jannettaz, Bull. Soc. Geol. France, ix. (1881), p. 196; xi. (1884), p. 211. G. F. Becker, Bull. Geol. Soc. Amer. iv. (1893), p. 13.

<sup>42</sup> Geol. Mag. 1884, p. 396.