

schists had been, he thought, parts of the original granitic crust of consolidation, which had been similarly converted by pressure-metamorphism into banded, foliated, and cleaved rock-facies. Lossen subsequently examined and mapped the Harz mountains geologically, and found further confirmation of his theory of "dislocation metamorphism." He demonstrated in the Harz mountains that the same rocks which extended over wide regions as ordinary shaly sediments could be traced into a zone of crust disturbance, where they became crystalline and schistose, and were split by planes of cleavage superinduced upon the rock-strata at various angles with the planes of stratification. Although Lossen's work threw a new interest into phenomena of cleavage, the presence of cleavage-planes had long been known in certain rocks. As far back as the eighteenth century, Lasius and Voigt had drawn attention to the difference between the planes of stratification and planes of cleavage, but could not find any explanation. Sedgwick (1822 and 1835) suggested that the cleavage of rocks might be due to the action of polar forces along a definite direction, causing orientation of crystals in that direction. J. Phillips, in 1843, at a meeting of the British Association, pointed out the deformation of fossils in cleaved rocks, and thought cleavage was the result of a slow creep of the minute rock particles in a definite direction. An important observation was made by the brothers Rogers, who showed, in 1837, that the cleavage-planes in the Alleghany mountains extended parallel with the main axis of upheaval of this mountain system, but in explanation they accepted Sedgwick's theory of polar attraction.

Almost simultaneously, the action of lateral pressure was suggested by two observers: in 1846 by Baur, an overseer of mines in Eschweiler, who explained the cleavage of the greywackes in the Rhine Province by this means; and in 1847 by D. Sharpe. Sorby in 1853 made pressure experiments, and succeeded in reproducing cleavage artificially in different kinds of rock. His results were supported by the later experiments of Tyndall (1856) and Daubrée (1861).

When, therefore, Lossen from his actual field observations drew the important conclusion that crust disturbance had been the chief agent in effecting cleavage metamorphism, he was in a position to refer to the confirmatory evidence in favour of