

they have undergone least disturbance, and where therefore the way in which they traverse the adjacent rocks can be distinctly perceived. They are there seen to cross many successive zones of sedimentary material, to send out veins and protrusions, and to inclose portions of the adjacent rocks, while at the same time the surrounding masses present many of the familiar features of contact-metamorphism. Sections where these phenomena can be satisfactorily observed are no doubt comparatively rare, for in general the rocks have been so crushed and recrystallized that their original relations have been destroyed. It is in consequence of these subsequent movements that so much difficulty has been found in determining the igneous nature of the gneisses and their intrusive character with reference to the rocks adjacent to them. The abundant veins which, as in ordinary granite bosses, proceeded from the original gneiss have been compressed into long parallel bands which seem to alternate with the schists among which they were injected, while portions of the surrounding rock inclosed within the gneiss have had a foliation superinduced upon them parallel to that of these bands. Any one who first studied the older rocks where such structures are visible might easily be deceived into the belief that these alternations of parallel strips of gneiss and schist, or gneiss and limestone, really represented a continuous sequence of sedimentary material. Nor would he readily perceive his mistake until he could trace the junction-line into some tract where, by cessation of the deformation, the original relation of the two groups of rocks could be observed.<sup>6</sup>

It is not difficult to obtain conclusive proof that in the

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<sup>6</sup> See A. C. Lawson, *Bull. Geol. Soc. Amer.* i. 1890, p. 184.