

mica-schists and clay-slates in the districts above mentioned never occur overlying the gneiss strata unconformably. On the contrary, they are so intimately connected that a gradual transition is generally observed to take place between them; the gneiss gradually changes into mica-schist, the latter gradually becomes less crystalline, and finally argillaceous and chloritic rocks result.

A further modification of the above type of the structure of the slate rocks occurs when the granite is so extensively protruded as to overlie the gneiss strata, or when the latter have not been forced up to the surface. In this case the micaceous or argillaceous slate is found immediately reposing upon or at least in contact with the granite. In this manner the mica-schist with interstratified limestones, north of Drontheim in Norway, overlie the granite of Vestfjord, and in this way also the killas or clay-slates of Cornwall lean upon the granite of Dartmoor. In the latter cases no lithological transitions are observable between the slates and the granite, while in former cases, where gneiss is interposed between them, the transition from the latter rock to granite is distinctly observable. This phenomenon, it will be observed, however, is not inconsistent with the explanation here given of the origin of these rocks.

I have thus attempted to explain some of the most remarkable phenomena connected with the primary rocks. It will be observed that in so doing, I have tried to elaborate and combine together many of the ideas expressed by different geological authorities. I am far however from maintaining that the theory here given is adequate to account for all the facts observable in connection with these rocks. Nor is it at present necessary that this explanation should be perfect. There must be in geology as in other sciences, obscure problems always awaiting solution. The best apology which I can offer for presuming to attempt an explanation of the enigmatical phenomena connected with the primary rocks, is in the following words of McCulloch :\* "The human mind is so constituted that it cannot rest content with facts. If it possesses innate propensities, the investigation of causes is assuredly one of them. The very geologist who disclaims all theory has his own; the lowest of the vulgar desire reasons. The laws which govern the phenomena of nature force themselves irresistibly on our attention. They are strictly involved with the analogies which regulate all our reason-

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\* *System of Geology*, vol. i, p. 485.