

upper part of the block. The plane of dislocation is nearly always inclined from the vertical, and the side to which the inclination rises, and from which it "hades," is the upthrow side. Faults of this kind are termed *normal*, and are by far the most common in nature. In mountainous regions, however, instances frequently occur where one side has been pushed over the other, so that lower are placed above higher beds. Such a fault is said to be *reversed*. It indicates an upward thrust within the crust, and is often to be found associated with lines of plication. Where a sharp fold, of which one limb is pushed forward over the other, gives way along a line of rupture, the result is a reversed fault. The details of these features of geological structure are reserved for Book IV. Part VI.

§ 4. The Metamorphism of Rocks

Metamorphism is a crystalline (usually also a chemical) rearrangement of the constituent materials of a rock.⁵⁵ In its production the following conditions have been mainly operative. (1) Temperature, from the lowest at which any change is possible up to that of complete fusion; (2) pressure, the potency of the action of heat being, within certain limits, increased with increase of pressure; (3) mechanical movements, which so often have induced molecular rearrangements in rocks; (4) presence of water, usually containing various mineral solutions, whereby chemical changes would be effected which would not be possible in dry heat; (5) nature of the materials operated upon, some being much more susceptible of change than others.

A metamorphosed rock is one which has suffered such a

⁵⁵ See A. Harker on the Physics of Metamorphism, *Geol. Mag.* vi. (1889), p. 15. J. W. Judd, *ib.* p. 243, and Book IV. Part VIII. of this Text-book.