

may not, however, be improper to state the nature of those causes, and to attempt an estimate of their effects.

There is no physical agent too weak to assist in altering the relative distribution of land and water. The soft breezes which blow at evening from the boundless ocean, the gentle shower which refreshes the thirsty earth, and even the heat and light which emanate from the great orb of day, have some influence in carrying on that constant series of changes observed on every hand by the man who devotes himself to the investigation. It is a common error that the most violent causes are the most destructive, and it would be scarcely admitted that rivers do more to change the superficial appearance of the earth than the devastating volcano. Time and persevering activity effect more than casual impetuosity; this is true in relation to mind, and it is equally true when used in reference to those agents which act upon matter. The volcano whose periods of activity may be years or centuries apart, does, when roused, produce terrible effects upon the district in which it is situated, but the river ripples along its course day after day, and is every hour bearing to some distant sea a portion of the material it has collected.

There are four agents remarkably active in the destruction and recomposition of rocks,—heat, air, water, and chymical action; and there are but two conservative principles,—vegetation and cohesion. The agents of destruction frequent, act in concert, and in many instances, by continuance, effect the decomposition of rocks capable of resisting an instantaneous effort of much more energetic activity. Water will cut a path through the hardest rock, and heat will reduce its materials to a state of fusion; or the two agents may act together upon a bed whose particles have very slight cohesion, but are bound by a luxuriant vegetation. A cliff composed of clay, for instance, may be periodically attacked by the water of the ocean, and in the interval dried by solar heat. This constant change of condition soon breaks away mass after mass, in spite of the binding influence of vegetation. But, in order to trace the changes which are in progress, it is necessary to examine the subject under two aspects,—the destruction and the recomposition of rocks.

Air and water act chymically and mechanically upon rocks. Both these elements, as they were called by the ancients, occasionally contain carbonic acid, which, together with the