

each other that they cannot be adequately understood unless considered in their mutual relations.

1. **Destructive action.**—Still dry air, not subject to much range of temperature, has probably little or no effect on minerals and rocks. The chemical action of the atmosphere takes place almost entirely through dissolved moisture. This subject is discussed in the section devoted to Rain. But sunlight produces remarkable changes on a few minerals. Some lose their colors (celestine, rose-quartz), others change it, as cerargyrite does from colorless to black, and realgar from red to orange-yellow. Some of these alterations may be explained by chemical modifications induced by such causes as the loss of organic matter and oxidation.

Effects of lightning.—Hibbert has given an account of the disruption by lightning of a solid mass of rock 105 feet long, 10 feet broad, and in some places more than 4 feet high, in Fetlar, one of the Shetland Islands, about the middle of the 18th century. The dislodged mass was in an instant torn from its bed and broken into three large and several lesser fragments. "One of these, 28 feet long, 7 feet broad, and 5 feet in thickness, was hurled across a high point of rock to a distance of 50 yards. Another broken mass, about 40 feet long, was thrown still further, but in the same direction and quite into the sea. There were also many lesser fragments scattered up and down."⁸

The more usual effect of lightning, however, is to produce in loose sand or more compact rock patches of vitreous drops or bubbles coating the surface, also tubes termed *fulgurites*, which range up to 2½ inches in diameter. These tubes descend vertically, but sometimes obliquely, from

⁸ Hibbert's "Shetland Islands," p. 389, quoting from the MS. of Rev. George Low.