can be no doubt that by examining the edges of inclined beds of fossiliferous rocks, we often see ten miles at least into the interior.

We may next recall to mind that all the solid, fluid, and gaseous bodies which enter into the composition of the earth, consist of a very small number of elementary substances variously combined: the total number of elements at present known is less than sixty; and not half of these enter into the composition of the more abundant inorganic productions.

Some portions of the compounds above alluded to are daily resolved into their elements; and these, on being set free, are always passing into new combinations. These processes are by no means confined to the surface, and are almost always accompanied by the evolution of heat, which is intense in proportion to the rapidity of the combinations. At the same time there is a development of electricity.

It is well known that mixtures of sulphur and iron, sunk in the ground, and exposed to moisture, give out sufficient heat to pass gradually into a state of combustion, and to set fire to any bodies that are near. The following experiment was first made by Lemery: Let a large quantity of clean iron filings be mixed with a still larger proportion of sulphur, and as much water as is necessary to make them into a firm paste. Let the mixture be then buried in the earth, and the soil pressed down firmly upon it. In a few hours it will grow warm, and swell so as to raise the ground; sulphureous vapours will make their way through the crevices, and sometimes flames appear. There is rarely an explosion; but, when this happens, the fire is vivid, and, if the quantity of materials is considerable, the heat and fire both continue for a long time.*

The spontaneous combustion of beds of bituminous shale, and of refuse coal thrown out of mines, is also generally due to the decomposition of pyrites; and it is the contact of water, not of air, which brings about the change. A smouldering heat results from the various new combinations, which immediately take place when the sulphur and other substances are set free. Similar effects are often produced in mines where no coaly matter is present, where substances capable of being decomposed by water are heaped together.

On what principle heat is generated, when two or more bodies having a strong affinity for each other unite suddenly, is wholly unexplained; but it is a singular fact that, while chemical combination causes heat, the disunion of elements does not produce the opposite effect, or a corresponding degree of cold. It may be said that decomposition is usually brought about by the combination of one or more of the elements with a new substance, and this concomitant agency might be supposed to neutralize or counterbalance any frigorific effects which might otherwise be sensible. But this explanation is, in many cases, wholly inapplicable; as, for example, when the voltaic pile is used for decomposition, or in the more

* Daubeny's Volcanos, p. 356.