

striking instance of the well-known detonating powder, the iodide of nitrogen, which explodes with violence in the open air, the instant it is touched by a cold substance. The two elements into which this binary compound is resolved fly off in a gaseous form, and do not unite with any other body, the iodine rising in a purple vapour, while the nitrogen may be collected separately. Yet sudden as is the process by which their union is broken, we find that heat and light, instead of cold, are generated.

Electricity a source of volcanic heat.—It has already been stated, that chemical changes develop electricity; which, in its turn, becomes a powerful disturbing cause. As a chemical agent, says Davy, its silent and slow operation in the economy of nature is much more important than its grand and impressive operation in lightning and thunder. It may be considered, not only as directly producing an infinite variety of changes, but as influencing almost all which take place; it would seem, indeed, that chemical attraction itself is only a peculiar form of the exhibition of electrical attraction.*

Now that it has been demonstrated that magnetism and electricity are always associated, and are perhaps only different conditions of the same power, the phenomena of terrestrial magnetism have become of no ordinary interest to the geologist. Soon after the first great discoveries of Oersted in electro-magnetism, Ampere suggested that all the phenomena of the magnetic needle might be explained by supposing currents of electricity to circulate constantly in the shell of the globe in directions parallel to the magnetic equator. This theory has acquired additional consistency the farther we have advanced in science; and according to the experiments of Mr. Fox, on the electro-magnetic properties of metalliferous veins, some trace of electric currents seems to have been detected in the interior of the earth.†

Some philosophers ascribe these currents to the chemical action going on in the superficial parts of the globe to which air and water have the readiest access; while others refer them, in part at least, to thermo-electricity excited by the solar rays on the surface of the earth during its rotation; successive parts of the land and sea being exposed to the influence of the sun, and then cooled again in the night. That this idea is not a mere speculation, is proved by the correspondence of the diurnal variations of the magnet with the apparent motion of the sun; and by the greater amount of variation in summer than in winter, and during the day than in the night. M. de la Rive, although conceding that such minor variations of the needle may be due to thermo-electricity, contends that the general phenomena of terrestrial magnetism must be attributed to currents far more intense; which, though liable to secular fluctuations, act with much greater constancy and regularity than the causes which produce the diurnal variations.‡ The remark seems just; yet it is difficult to assign limits to the accumulated influence even of a very

* *Consolations in Travel*, p. 271.

† *Phil. Trans.*, 1830, p. 399.

‡ *Biblioth. Univers.*, 1833, *Electricité*.