to be evolved from Vesuvius—and the chlorine may have been derived from sea salt; which was, in fact, extracted by simple washing from the Vesuvian lava of 1822, in the proportion of nine per cent.* But it was answered, that Sir H. Davy's experiments had shown, that hydrogen is not combustible when mixed with muriatic acid gas; so that if muriatic gas was evolved in large quantities, the hydrogen might be present without inflammation.† M. Abich, however, assures us, "that although it be true that vapour illuminated by incandescent lava has often been mistaken for flame," yet he clearly detected in the eruption of Vesuvius in 1834 the flame of hydrogen.‡

M. Gay Lussac, in the memoir just alluded to, expresses doubt as to the presence of sulphurous acid; but the abundant disengagement of this gas during eruptions is now ascertained: and thus all difficulty in regard to the general absence of hydrogen in an inflammable state is removed; for, as Dr. Daubeny suggests, the hydrogen of decomposed water may unite with sulphur to form sulphuretted hydrogen gas, and this gas will then be mingled with the sulphurous acid as it rises to the crater. It is shown by experiment, that these gases mutually decompose each other when mixed where steam is present; part of the hydrogen of the one immediately uniting with the oxygen of the other to form water, while the excess of sulphurous acid alone escapes into the atmosphere. Sulphur is at the same time precipitated.

This explanation is sufficient; but it may also be observed that the flame of hydrogen would rarely be visible during an eruption; as that gas, when inflamed in a pure state, burns with a very faint blue flame, which even in the night could hardly be perceptible by the side of red-hot and incandescent cinders. Its immediate conversion into water when inflamed in the atmosphere, might also account for its not appearing in a separate form.

Dr. Daubeny is of opinion that water containing atmospheric air may descend from the surface of the earth to the volcanic foci, and that the same process of combustion by which water is decomposed may deprive such subterranean air of its oxygen. In this manner he explains the great quantities of nitrogen evolved from volcanic vents, and thermal waters, and the fact that air disengaged from the earth in volcanic regions is either wholly or in part deprived of its oxygen.

Sir H. Davy, in his memoir on the "Phenomena of Volcanos," remarks, that there was every reason to suppose in Vesuvius the existence of a descending current of air; and he imagined that subterranean cavities which threw out large volumes of steam during the eruption, might afterwards, in the quiet state of the volcano, become filled with atmospheric air.§ The presence of ammoniacal salts in

* Ann. de Chim. et de Phys., tom. xxii.
† Quart. Journ. of Science, 1823, p. 132, note by editor.
‡ Phénom. Géol., &c. p. 3.
§ Phil. Trans. 1828.