

carbonic acid in solution came in contact with the alkali metals. Mendelejeff likewise believes in the action of subterranean water upon certain iron ores and metallic carbides at high temperatures. But these theories have not been accepted by geologists, as they are not in harmony with the occurrences of the oil. All other hypotheses consider the decay of organic substance essential to the production of the series of mineral oils. Bischof in his *Chemical Geology* derives asphalt and petroleum from the slow decay of vegetable matter, an explanation which he bases upon the frequent occurrence of marsh-gas in peat-mosses. Quenstedt thinks the impregnating oil in the Swabian shales has been originated by the decomposition of fishes and other animal organisms interred in the shales. A similar explanation is given by Sterry Hunt for the petroleum oils in North America. While Quenstedt and Hunt regard the oil as produced *in situ* in the strata containing the decaying organisms, many geologists hold the opinion that the hydro-carbonaceous products of decay collect in the stratigraphical horizons above those which actually contain the decaying material.

Engler tried experimentally to distil fish-train oils; under a pressure of 20 to 25 atmospheres, and at a temperature of 365° to 420° , a distillate is procured which approaches the characters of the natural Pennsylvanian petroleum, and, as Heusler has shown, after treatment with aluminium chloride, is identical with it.

Ochsenius argues that the mineral oils have been prepared pre-eminently in shallow estuaries where animal remains and algæ have undergone decomposition in salt-water containing a rich supply of chlorides, more particularly magnesium chloride.

It has been observed by Andrussow, Natterer, and Barrois, that petroleum in minute quantity bubbles up to the surface of the water and mud in the Kara Boghaz on the shores of the Caspian Sea, in Bitter Lakes of the Isthmus of Suez, and in the desiccating saline basins of Brittany, all of these being localities where considerable accumulations of animal remains and plant detritus collect.

E. *Volcanoes*.—The controversy between Neptunists and Volcanists, which had still continued keenly in Germany during the early years of the nineteenth century, relaxed after the desertion of Alexander von Humboldt and Leopold