

gularity of the inclination of its strata, and its parallel position with the two declivities of the Hartz and the upheaved chain of the Alps; while the simultaneous presence of sulphur, oligist iron, and the sulphurous acid vapours which precede the formation of sulphuric acid, seem to manifest the action of forces placed at a great depth in the interior of the globe.

XI. FORMATION OF MURIATIFEROUS CLAY (WITH BITUMEN AND LAMELLAR GYPSUM) OF THE PENINSULA OF ARAYA.—This soil presents a striking analogy with salzthon or leberstein (muriatiferous clay), which I have found accompanying gem-salt in every zone. In the salt-pits of Araya (Haraia), it attracted the attention of Peter Martyr d'Anghiera, at the beginning of the sixteenth century. It probably facilitated the rupture of the earth, and the formation of the gulf of Cariaco. This clay is of a smoky colour, impregnated with petroleum, mingled with lamellar and lenticular gypsum, and sometimes traversed by small veins of fibrous gypsum. It incloses angular and less friable masses of dark brown clay, with a slaty and sometimes conchoidal fracture. Muriate of soda is found, in particles invisible to the naked eye. The relations of position or superposition between this soil and the tertiary rocks does not appear sufficiently clear to enable me to pronounce with certainty on this element, the most important of positive geology. The co-ordinate layers of gem-salt, muriatiferous clay, and gypsum, present the same difficulties in both hemispheres; these masses, the forms of which are very irregular, everywhere exhibit traces of great commotions. They are scarcely ever covered by independent formations; and after having been long believed, in Europe, that gem-salt was exclusively peculiar to Alpine and transition limestone, it is now still more generally admitted, either from reasoning founded on analogy or from suppositions on the prolongation of the strata, that the true location of gem-salt is found in variegated sandstone (buntersandstein). Sometimes gem-salt appears to oscillate between variegated sandstone and muschelkalk.

I made two excursions on the peninsula of Araya. In the first, I was inclined to consider the muriatiferous clay