

formation lying on the primitive mica-slate of Araya, or whether it owe its origin merely to a change of composition and texture in the beds of mica-slate. I lean to the latter proposition; for the transition is progressive, and the clay-slate (thonschiefer) and mica-slate appear to me to constitute here but one formation. The presence of cyanite, rutile-titanite, and garnets, and the absence of Lydian stone, and all fragmentary or arenaceous rocks, seem to characterise the formation we describe as primitive. It is asserted, that even in Europe ampelite and green stone are found, though rarely, in slates anterior to transition-slate.

When, in 1785, after an earthquake, a great rocky mass was broken off in the Aroyo del Robalo, the Guaykeries of Los Serritos collected fragments of alum five or six inches in diameter, extremely pure and transparent. It was sold in my time at Cumana to the dyers and tanners, at the price of two reals* per pound, while alum from Spain cost twelve reals. This difference of price was more the result of prejudice, and of the impediments to trade, than of the inferior quality of the alum of the country, which is fit for use without undergoing any purification. It is also found in the chain of mica-slate and clay-slate, on the north-west coast of the island of Trinidad, at Margareta, and near Cape Chuparuparu, north of the Cerro del Distiladero.† The Indians, who are naturally addicted to concealment, are not inclined to make known the spots whence they obtain native alum; but it must be abundant, for I have seen very considerable quantities of it in their possession at a time.

South America at present receives its alum from Europe, as Europe in its turn received it from the natives of Asia previous to the fifteenth century. Mineralogists, before my travels, knew no substances which, without addition, calcined or not calcined, could directly yield alum (sulphate of alumina and potash), except rocks of trachytic formation,

* The real is about $6\frac{1}{2}d.$ English.

† Another place was mentioned to us, west of Bordones, the Puerto Escondido. But that coast appeared to me to be wholly calcareous; and I cannot conceive where could be the situation of ampelite and native alum on this point. Was it in the beds of slaty clay that alternate with the alpine limestone of Cumanacoa? Fibrous alum is found in Europe only in formations posterior to those of transition, in lignites, and other tertiary formations belonging to the lignites.