

the granitic rock, under the double influence of humidity and the tropical sun, how is it to be conceived that these oxides are spread so uniformly over the whole surface of the stony masses, and are not more abundant round a crystal of mica or hornblende than on the feldspar and milky quartz? The ferruginous sandstones, granites, and marbles, that become cinereous and sometimes brown in damp air, have an aspect altogether different. In reflecting upon the lustre and equal thickness of the crusts, we are rather inclined to think that this matter is deposited by the Orinoco, and that the water has penetrated even into the clefts of the rocks. Adopting this hypothesis, it may be asked whether the river holds the oxides suspended like sand and other earthy substances, or whether they are found in a state of chemical solution. The first supposition is less admissible, on account of the homogeneity of the crusts, which contain neither grains of sand, nor spangles of mica, mixed with the oxides. We must then recur to the idea of a chemical solution; and this idea is no way at variance with the phenomena daily observable in our laboratories. The waters of great rivers contain carbonic acid; and, were they even entirely pure, they would still be capable, in very great volumes, of dissolving some portions of oxide, or those metallic hydrates which are regarded as the least soluble. The mud of the Nile, which is the sediment of the matters which the river holds suspended, is destitute of manganese; but it contains, according to the analysis of M. Regnault, six parts in a hundred of oxide of iron; and its colour, at first black, changes to yellowish brown by desiccation and the contact of air. The mud consequently is not the cause of the black crusts on the rocks of Syene. Berzelius, who, at my request, examined these crusts, recognized in them, as in those of the granites of the Orinoco and River Congo, the union of iron and manganese. That celebrated chemist was of opinion that the rivers do not take up these oxides from the soil over which they flow, but that they derive them from their subterranean sources, and deposit them on the rocks in the manner of cementation, by the action of particular affinities, perhaps by that of the potash of the feldspar. A long residence at the cataracts of the Orinoco, the Nile, and the