

four toises thick; and this geological fact proves on the one hand the identity of the alpenkalkstein with the zechstein of Thuringia, and on the other the affinity of formation existing between the alpine limestone and that of the Jura.* The strata of marl effervesce with acids, though silex and alumina predominate in them: they are strongly impregnated with carbon, and sometimes blacken the hands, like a real vitriolic schistus. The supposed gold mine of Cuchivano, which was the object of our examination, is nothing but an excavation cut into one of those black strata of marl, which contain pyrites in abundance. The excavation is on the right bank of the river Juagua, and must be approached with caution, because the torrent there is more than eight feet deep. The sulphurous pyrites are found, some massive, and others crystallized and disseminated in the rock; their colour, of a very clear golden yellow, does not indicate that they contain copper. They are mixed with fibrous sulphuret of iron,† and nodules of swinestone, or fetid carbonate of lime. The marly stratum crosses the torrent; and, as the water washes

* The Jura and the Alpine limestone are kindred formations, and they are sometimes difficult to be distinguished, where they lie immediately one upon another, as in the Apennines. The alpine limestone and the zechstein, famous among the geologists of Freyberg, are identical formations. This identity, which I noticed in the year 1793 (*Über die Grubenwetter*), is a geological fact the more interesting, as it seems to unite the northern European formations to those of the central chain. It is known that the zechstein is situated between the muriatiferous gypsum and the conglomerate (ancient sandstone); or where there is no muriatiferous gypsum, between the slaty sandstone with roestones (*bunte sandstein*, Wern.), and the conglomerate or ancient sandstone. It contains strata of schistous and coppery marl (*bituminoce mergel* and *kupferschiefer*) which form an important object in the working of mines at Mansfeld in Saxony, near Riegelsdorf in Hesse, and at Hasel and Prausnitz, in Silesia. In the southern part of Bavaria (Oberbaiern), I saw the alpine limestone, containing these same strata of schistous clay and marl, which, though thinner, whiter, and especially more frequent, characterize the limestone of Jura. Respecting the slates of Blattenberg, in the canton of Glaris, which some mineralogists, because of their numerous impressions of fish, have long mistaken for the cupreous slates of Mansfeld, they belong, according to M. von Buch, to a real transition formation. All these geological data tend to prove that strata of marl, more or less mixed with carbon, are to be found in the limestone of Jura, in the alpine limestone, and in the transition schists. The mixture of carbon, sulphuretted iron, and copper, appears to me to augment with the relative antiquity of the formations.

† Haarkies.