of combined silica and in the comparatively high percentage of magnesia. These nickel ores do not seem to have been considered by the various writers who have discussed the question "What is laterite?"

Laterite and Clay

Fermor defines laterite, and distinguishes it from clay, in the following words:—

> One should not decide whether a given rock is laterite on the basis of the presence or absence of alumina in quantity, but on the presence or absence of any considerable proportion of combined silica. Combined silica means the presence of kaolin or lithomarge, and the larger the amount of such material the closer does the rock approach a clay in composition. Now clays[a] are to be regarded as the end products resulting from one mode of superficial decomposition of rocks, and laterites as the end products of another totally distinct mode of decomposition. When a rock breaks down into a *clay* hydrated aluminum silicate is to be regarded as the pure end product, all oxides being removed in solution. When a rock is converted into *laterite*, on the other hand, the reverse holds; aluminum and other oxides are decomposed, and the silicate is removed in solution, presumably in the colloidal form, whilst the oxides of iron, aluminum, titanium, and manganese, which were relatively insoluble under the clay-forming conditions, are relatively insoluble under laterite-forming conditions. The oxides of calcium, magnesium, sodium, and potassium are apparently soluble under both sets of conditions. I do not propose to advance here any reasons to account for these two diverse modes of surface alteration of rocks, nor to say anything about the conditions, whether climatic or organic, that bring them about, but to deal only with the results of such changes. *Pure clay*, then, is hydrated aluminous silicate, whilst *pure laterite* is a mixture of one or more, or all, of the oxides of iron, aluminum, titanium, and manganese, more or less hydrated, which I refer to in this paper as the lateritic constituents. Manganese oxide is a somewhat exceptional constituent, and when present usually segregates into masses of comparatively rich manganese-ore, as a rule either psilomelane or pyrolusite.[1]

C. M. Weld in describing the Cuban deposits gives a definition of laterite similar to that of Fermor, as follows: "The ore is, in fact, a laterite, a product due to the peculiar form of decomposition known as laterization, which is common to humid tropical climates. The essential characteristic of laterization is the breaking-up of the silicates, with the ultimate almost complete removal of the silica, wherein it differs radically from the kaolinization-processes of the temperate zones."[2]

In order to show the difference in the products of weathering of rocks of similar character in tropical and temperate climates, respectively, Hugh Warth published some interesting analyses of dolerites of India and Great Britain and of their weathered products.[3] The following table shows the results of analyses, the comments on the table being taken from Warth's paper:—

> Column i of the table represents the composition of the original Rowley Regis rock, which was obtained as the average of three analyses, two of them by J. H. Waller and a third analysis by Henry.
>
> Column ii, the weathered product of Rowley Regis (steam dry).
>
> Column iii, composition of Dolerite from Poonah on the Western Ghâts in the Bombay Presidency (analysed by my son F. J. Warth, M.Sc.).
>
> Column iv, the composition of the Laterite which rests on the dolerite at Mahabaleshwar, which is also situated on the Western Ghâts (see p. 155, Dec iv, Vol. X, of this Magazine, April, 1903, by H. & F. J. Warth).

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[a] i.e., clays formed in situ as distinguished from those deposited as aqueous sediments.

[1] Geol. Mag., Vol. VIII, 1911, pp. 459, 460.

[2] A.I.M.E., Vol. XL, p. 305.

[3] Geol. Mag., 1905, p. 21.