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REPORT ON THE BAUXITE POSSIBILITIES OF CUBA

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Introduction

The recent discovery of extensive bauxite deposits in the red and buff clays of Jamaica suggested the desirability of a search for similar occurrences in Cuba, especially as lateritic iron ore was known to occur in Cuba. The writer spent the period from May 9 to July 16, 1943, in this examination, two weeks of which were spent in Jamaica. The investigation was under the auspices of the State Department and the Interdepartmental Committee for Cooperation with the American Republics. Mr. Charles Ducoté, Commercial Attaché, and Mr. C. A. Botsford, Minerals Attaché of the American Embassy in Havana, were of much assistance in arranging facilities for transportation and in other ways. Mr. Robert Donald of the Metals Reserve Company Agency at Santiago de Cuba kindly arranged for some analyses of samples in the Agency laboratory.

Conclusions

No bauxite was found in the parts of Cuba that were examined. The widespread "lateritic" soils of Cuba nowhere seem to have reached the stage of weathering and leaching that eliminates the silica from a clay to produce the aluminum hydroxide, bauxite. The few samples analyzed would seem quite inadequate except that they were selected as the least obviously ferruginous clay. Some check on the chemical composition is available from analyses in an early soil survey, and more from the examination and analyses of many samples collected recently from many parts of Cuba by a private geologist.

An attempt was made to select for examination areas that seemed most likely to have some aluminous laterite developed. Particular attention was therefore devoted to plateau areas of limestone with a mantle of red soil because of the similarity to the mode of occurrence of the bauxite in Jamaica. The limestone plateau area north of Guantanamo seemed especially favorable because it may possibly be a part of the same surface on which residual iron ore is developed in the Sierra de Nipe. Samples collected from this area proved to contain only slightly more aluminum than the clay in the low plains of Cuba. No reason is apparent for the lack of development of bauxite in this area, which seems to have an environment similar to that of the bauxite area in Jamica. A possible explanation may include the fact that some bentonitic tuff is interbedded with the Eocene limestone in this area, which may be sufficiently impervious to have prevented a free percolation of water and leaching of the aluminous residues of the limestone.

The large areas of Cuba covered by a red "lateritic" clay, usually on limestone bedrock, and the difficulty of recognizing with certainty the Terra Rosa type of bauxite such as occurs in Jamaica make it unjustifiable to eliminate Cuba as a possible source of some bauxite. The failure to find promising occurrences in this brief survey indicates, however, that large deposits of bauxite are not present at the surface as in Jamaica. The evidence available suggests bauxite is less likely to be encountered in Cuba at depth than at, or near, the surface. Without some evidence that certain areas were particularly favorable, an extensive program of boring would not seem justified.

Areas examined and results

A brief visit was made to the Mayari and Moa iron ore areas to examine the

old surface on which these lateric iron ores were formed, in the hope that this old surface might be projected, or in some way correlated and recognized in other areas, The same geologic processes that produced ferruginous laterite from serpentine on this old surface may have produced aluminous laterite on other types of bedrock. A flight over these areas and the rest of Oriente Province was also made with Mr. Philip Guild of the Geological Survey, who arranged for the trip in a plane from the Guantanamo Naval Base. As a result of this preliminary examination, two areas of limestone plateau area with a red soil were visited and samples collected.

The area near Florida Blanca southwest of the Sierra de Nipe has only a red clay developed on the high mesa of Eocene limestone. Boring was unnecessary as the red clay is only three to six feet thick and in road cuts and recently eroded gullies could be seen to grade down into nearly white bentonitic tuff that is interbedded in the limestone.

A larger area north of Guantanamo seemed particularly promising, as the limestone plateau at about 2,000 feet shows a karst topography and red soil and thus resembles the mode of occurrence of bauxite in Jamaica. The red clay mantle is well exposed in gully washes along the trail and is obviously an ordinary plastic clay. Borings were made at three localities within a radius of one mile of the little store known as Guayabal de Peru (see Military Map of Cuba, Sheet 65). The samples were likewise a rather plastic clay, and of no value, as confirmed by partial analysis at the chemical laboratory of the Metals Reserve Company in Santiago. The following three partial analyses of these samples indicate that there has been little reduction in the silica content from what would be expected in a ferruginous clay.

	Fe_2O_3	Al_2O_3	SiO_2
C-1, Boring 6 ft. below surface, 1 mile south of Guayabal	21.79 -	36.31 -	22.35
C-2, Bottom of 4 ft. gully along trail, 1 mile north of Guayabal	30.10 -	26.35 -	26.57
C-3, Boring 6 ft. below surface about ½ mile to NW of sample. C-2	13.67 =	36.91 -	23.59

A flight was made from the Army airfield at Camaguey over northern Camaguey Province and part of Santa Clara Province. The red surface material on limestone in the Sierra de Cubitas appeared interesting, and this area was visited. The gullies along the road cuts show red clay with abundant ferruginous "buckshot" (perdigones) resting directly on the Cretaceous (?) limestone. Even the lowest part immediately above the limestone is a plastic clay, and the samples collected were subsequently discarded without chemical analysis because they were so similar to other samples of the Matanzas clay soil type. This same red Matanzas clay soil extends over a large area of the flat country between the Sierra de Cubitas and the north coast.

A large area of the same type of red clay occurs in the area between Ciego de Avila and Gaspar in Camaguey Province. This is well exposed in cuts along the Central Highway and rests directly on Tertiary limestone. The following partial analysis indicates that it is an ordinary ferruginous clay:

	Fe_2O_3	Al_2O_3	SiO_2
C-4, Clay overlying limestone in road cut on Carretera Central at 10 km east of Ciego de Avila	27.92 -	27.08 -	27.48

Many exposures of the Matanzas type of red clay were seen in various parts of Havana and Matanzas Provinces, such as the area southeast of the town of Matanzas between Coliseo and Limonar. The red clay with abundant perdigones or iron oxide pellets rests on Tertiary limestone. A sample was collected from a road cut that was 6 feet below the original surface, at 0.5 Km east of San José de las Lajas in Havana Province, and the following partial analysis of it indicates the usual alumina-silica ratio for a clay:

Fe_2O_3 - 13.74; Al_2O_3 - 30.69; SiO_2 - 34.84

Some analyses of this red clay are given by Bennett and Allison in The Soils of Cuba.

After a flight over Pinar del Rio Province from the Army Field at San Antonio, the area of red soil to the north and northwest of Pinar del Rio was visited. The peculiar isolated knobs of Jurassic limestone, called Magotes, are bare of any soil but there is a red clayey soil in the plains surrounding them. This clay contains much very fine quartzose silt and is obviously even higher in silica than the clays of Cuba which are quartz-free, as a rule. The red-weathered areas of Jurassic phyllite in Pinar del Rio Province are only partially weathered and apparently not very greatly changed from their original composition.