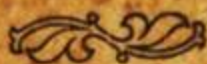
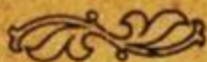


47  
Dominican Republic



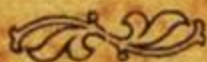
State Department Circulars

1312-1314



*Geological Formation*

*Agriculture*



MAY 24, 1912





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GEOLOGICAL FORMATION  
OF THE  
DOMINICAN REPUBLIC

.....

AGRICULTURAL  
REPORTS

# Dominican Republic

Department of State, Foreign Relations

SECRET

Box A

November 1914

Santo Domingo, May 2, 1915

To the Consul General:

For the same purpose as circular 1112, bearing this date and  
sent from this office, I invite your attention to the following  
data relative to foreign administration, which pertain to customs.  
You will refer to the various orders under your charge.  
The territory of the Republic has been divided into 17  
and 18 1/2 North latitudes, thus being included between the  
equatorial line of the and twenty degrees. It is well known  
that when the mean temperature of a zone recorded regularly  
over a long period of years has been ascertained by meteorology,  
certain latitudes, such zone is considered as corresponding  
to a certain temperature zone called climatic zone (clima-  
tological). It is the same in the case of the zone and  
called latitudes with relation to the water surface and  
to the atmosphere. Hence the term "climatic zone" is  
applied to the hydrographic system is also an error. It is  
correcting an error commonly made in the climate of that  
zone with a view to the tropical zone even in the tropics  
the case in the tropics of latitudes in the zone, and  
relation with the tropical zone in the zone, and  
the zone of latitudes in the Republic of Dominican



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# Dominican Republic

*Department of State of Foreign Relations*

CIRCULAR  
BOOK A  
NUMBER 1314

SANTO DOMINGO, MAY 24, 1912

*To the Consul General :*

For the same purposes as circular 1312, bearing this date and issued from this office, I invite your attention to the following data, relative to geologic stratification, which, pursuant to custom, you will communicate to the various offices under your charge.

The territory of the Republic lies between parallels  $17^{\circ}36'$  and  $19^{\circ}38'$  North latitude, thus being included between the isothermal lines of ten and twenty degrees. It is well known that when the mean temperature of a zone recorded regularly over a long period of years (ten years as required by meteorology) presents uniformity, such zone is considered as comprehended between corresponding lines called *isothermal* lines (uniform temperature). If there are noticeable variations, the lines are called *isocheimal* when uniform in the winter period and *isothermal* in the summer season. Where the territory is situated in the tropics, its hydrographic system is often so varied by extensive orography as to very favorably moderate the climate ; so that we may well speak of sub-tropical zones, even in the tropics, as is the case in the Province of Cundinamarca in the Republic of Colombia, with the capital, Bogotá, in the center ; and on the high plain of Quito in the Republic of Ecuador.

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Owing to this fortunate variation it is easy to understand why materially distinct agricultural zones from those of sub-tropical countries are not discussed, since, notwithstanding the sparsely wooded or barren tracts at the sea shore where there is an essentially tropical climate suitable to the cultivation of cane, cocoanut, textiles and bananas; yet the many branches of the mountain ranges form high plateaus and innumerable valleys, variously situated as to altitude and exposure so that the temperature decreases until at Valle Neuvo, more than two thousand meters above sea level, in the eruptive central group of the Great Range, in the winter months, the thermometer descends to zero.

It will thus be understood, in relation to the generally favorable composition of the soil, how it is possible, with good means of communication, to extend cultivation from the lowest table lands to the highest mountain elevations with assured success. It is also for this reason that it is not only possible, but also advantageous and even necessary to introduce the cultivation of cereals for the sustenance of men and animals, benefitting the population on the one hand and improving the herds on the other; until a generation of men of constant activity, by care in hygiene (filtered water, more complete nourishment and preservative methods) may comprehend and continue the application of principles of modern agriculture, living moderate lives, and until breeds of animals of great value (milch cows of large daily production, food animals of great weight and fine quality of meat for the slaughter, and draft animals of greater size and power than those now used in the various agricultural fields) may be secured in the same interior market for a consumption bound to increase by geometric progression.

*Geologic stratification:* It is well known that the geologic age of a given zone, especially if mountainous, is determined by the epoch of the last cap of sediment found on its slopes.

Notwithstanding the eruptive rocks of the central range, Dominican territory is considered to have been formed by ele-

ments of the tertiary times and particularly of the *eocene*, *miocene* and *pliocene* periods.

The *eocene* period, or period of greatest antiquity, is ascribed to the rising of the entire island from the depths of the sea, as is deduced from examination of the central range and of the cretaceous zone.

The *miocene* (or less recent; according to Greek etymology: *mion*, less, and *kainos*, recent) is made up of tertiary formations comprehended between the eocene and pliocene; in which period the climate and form of the emerged land changed.

The *pliocene* (or more recent; according to Greek etymology: *pleion*, more, and *kainos*, recent) is the latest or most recent period of the tertiary era, as to which era there is a belief as to the existence of man, or certainly in the quaternary period. Schematically, the geologic stratification of the territory may be represented as follows:

*Cretaceous zone* near the central mass.

*Miocene zone* (the true tertiary).

*Post pliocene zone* (the most recent).

The post pliocene zone comprehends two tracts: (1) Coralite of the coast; (2) gravel and sand of the coast and valleys.

(1) The tract of recent coralite begins at the mouth of the river Nizas on the south coast and extends in width fifteen to twenty kilometers to the northward of the capital, and continues to widen to a little distance southward of Higüey; thence circling the eastern part of the island to a short distance from Cape San Rafael, near the southern entrance of Samana Bay.

This same formation is again found at the mouth of the Yaque del Sur river and extends over the whole southern part of the Province of Barahona, with the exception of an interruption from the Barahona range to Pedernales.

Again in Cibao there is found a sharp triangle of the same formation at the innermost point of Samana Bay with its base running thence to the mouth of the Yuma river, and with its

vertex a little to the north of Matanzas, in the Province of Pacificador.

Another triangle begins near the mouth of the Yasica river in the Province of Puerto Plata and extends to the city of Puerto Plata. The tract, very narrow at the sea shore, continues through Isabella Bay and Punta Rusia on the north coast of Monte Cristi Province, and to Manzanillo Bay. This entire zone is particularly appropriate for the cultivation of cocoanuts, sugar cane, bananas, textile plants, and in various parts, the castor and yucca plants.

(2) The second tract of the same pliocene period, with a basic formation of coast and bank gravel and sand, particularly in Santo Domingo and Seybo provinces, extends to the north of the range above described, up to the foothills of the eastern ridge of the central range.

This same formation is found to the west of the capital in a zone of triangular form, with its base extending from San Cristobal to the mouth of Nigua, and its vertex a little to the west of Bani. It is likewise found in Barahona and Azua provinces in triangular form with base at Azua and Barahona and vertex near San Juan.

Another manifestation of the same nature is found in the Samana peninsula, in a zone limited to a small segment of a circle near the seat of that Province.

In all these tracts, the prevalence of micaceous clay with the presence of aluminum and iron, and the very meagre flora in general, and the tenacious aspect of the surface soil, have led the majority of observers to conclude that these tracts cannot be cultivated advantageously. I have before had occasion to demonstrate that what is really needed is merely good mechanical working, with a multiple or gang plough to facilitate the meteorization of the land, that is, to expose it to the beneficial influence of the rain, air and sun; and afterwards the introduction of leguminous vegetation, which would supply the organic matter



now lacking. All this zone above described is suitable for cultivating pine-apples, castor plants, sorghum, textiles, and in many places where there is sufficient rain, cotton also. It is a zone with a great future requiring only energetic development and methodical application of the principles of modern agriculture.

The *miocene* zone or tertiary formation is principally developed in the north in the Yuma and Yaque (Cibao) valleys and presents two distinct tracts :

(a) The lesser tract from the Mao gravel banks to the bay of Manzanillo, west of the first branches of the central range, to the south, and to Zamba hill on the north.

(b) The large tract covers the remainder of the valley to the Bay of Samana and to the northern limits of the cretaceous zone including Monte Cristi range. The general characteristics of this tract are slate, cobble stones and lime stone. A series of conglomerate beds of this slate with very irregular stratification is found above the eruptive rocks of the central mass.

In the inferior strata the conglomerates are cemented with sand or clay, and often substitutes for sand, the beds being less thick and separated by slate. This in the nordic hills of Espaillat province is greenish, while in the Santiago hills it is blue with complete disappearance of the sand and in the superior showing yellowish with a calcareous aspect.

The first tract, having numerous deposits of shells and consequently being phosphatic in substance, is destined to great future development with the aid of good roads; being a zone suitable for coffee, cotton and tobacco.

In the second tract in the valley properly so called there is room for all these various cultivations, such as of coffee in the whole Monte Cristi range tobacco in La Vega, San Francisco de Macoris, Santiago and Espaillat provinces and a part of Monte Cristi province; and cotton in the entire valley, with coffee and cocoa on the hills.

It has been well said that Santo Domingo is the "Garden of

the Antilles." Everything considered, there is no doubt that the province happily called "The Royal Vega" is the real garden of the Republic; and the splendid plains behind Moca, as for instance the zone to San Francisco de Macoris, offer ideal tillable lands where, with the application of the principles of agriculture, these various cultivations should produce fabulous crops.

The cretaceous zone (carbonate and lime) includes a surface in trapezoid form with its major base line from La Vega to San Cristobal and minor base from Higüey to Cape San Rafael; the north side following more or less closely the line from La Vega to Sabana de la Mar and the entire south side of Samana Bay. At the southwest the cretaceous zone continues to the sea between Bani and Azua, covering the greater part of this last named province.

There are other showing of cretaceous formation between the ridges of the central range, to the south as well as to the north. Among others are those which begin a short distance from Santiago where it is evident that the cultivation of olives and grapes (*vitis vinifera*) may be easily introduced by grafting wild plants and vines. All this cretaceous zone of the secondary period is generally suitable for coffee and also for cotton, although not so much so as that of the tertiary period, except where sufficient organic matter is found. The land, as for example in Seybo, is particularly well suited to the cultivation of coffee and cacho.

The zone of eruptive rocks is the central mass already described, from which ridges extend into the cretaceous zone in various directions, and in which slate schist formations abound. This zone also contains very hard siliceous rocks, (which do not effervesce in acid), formed of silicious acid and its components, silicate of soda, potash, lime, magnesia and iron, these being divided into amorphous and crystalline rocks. Among amorphous rocks are silex or flint, pudding stone (conglomerates of silex with silicious or calcareous cement), and sand, grains of

silex, conglomerates and grindstone formed by cemented sand, from which mill stones are procured,

Among the silicious crystalline rocks are quartz and rock crystals, variously colored, and mica, which is a silicate of aluminum and potash, frequently mixed with magnesia and iron oxide, calcareous rock or calcium carbonate which includes chalk (a fragile variety of carbonate of lime), common or rough calcium carbonate with fossils of shells incrusting in the mass, oolitic calcium carbonate, very hard, because of conglomerated grains like fish eggs, (in Bulla ravine, shaped like the Roman Amphitheater, near Guraba, eastern extremity of Monte Cristi province), and also marble, (very hard calcareous).

The argillacious rocks contain clay, earthy matter, composed of silica and aluminum by decomposition of silicious rocks reduced to paste by water, with grayish green colorations, attributable to silicates or oxides of iron; argillacious schist, very rich in clay, and laminated like its most important variety called slate; marl, or a lime and clay mixture which dissolves in water; soft formations containing carbonate of lime and serving to fertilize the organic or vegetable soil.

Salt rock containing gypsum, or sulphate of lime hydrate, very white, which loses its moisture by heating, and rock salt or chloride of crystalline sodium, may be found in the Neyba zone. The greater part of the rocks above mentioned belong to the class of stratified rocks and may be reduced to this simple list as regards chemical composition : *silica* in the silicious rocks; *carbonate of lime* (mixed with magnesia in dolomite) in the calcareous rocks; *silicate of aluminum* in the argillacious rocks.

It would be out of place to mention here the list of eruptive rocks of the central mass. The present considerations are of value only in so far as it is known that the chemical elements of agrarian soil are, as is understood, more or less the same as found in the original rocks gradually decomposed by atmospheric action (carbonic acid liberated by rain, with action of the sun

and air), carried along by the waters of brooks and torrents and distributed in the valleys in the form of ooze or mud, thus fertilizing less productive soil, as is the case at the mouth of the Yuma and Yaque rivers at the north and of the Yaque and others at the south.

From the foregoing it is clear that particularly in the rich valleys of the first mentioned river (Cibao) and also in many other parts of the southern region, with the aid of a good system of roads, which will reduce the cost of transportation, so important in economical cultivation for exportation, within a brief period it would be possible to develop astonishing latent riches in Dominican territory without fear of unfavorable comparison with lands whose wide famed formations, though veritable fountains of products *a la mode* (Vuelta Abajo, Brazil, Trinidad, etc.), do not show on careful examination the same basis of intrinsic value as is generally characteristic of a large extent of the Dominican Republic.

Yours truly,

MANUEL A. MACHADO,

*Secretary of State*

*of Foreign Relations.*

# Dominican Republic

## *Department of State of Foreign Relations*

CIRCULAR

BOOK A

NUMBER 1312

SANTO DOMINGO, MAY 24, 1912

### *To the Consul General:*

Pursant to the established policy that all Dominican Consular Offices shall maintain a common standard in everything and shall at all times be especially prepared to give any information which may be asked of them, this office invites your attention to the following information relative to cotton and cocoa, which may be regarded as a continuation of the information furnished you by circular number 907 of March 7, 1911, and number 728 of May 18 of the same year.

"Cotton, of the Sea Island variety, began to be cultivated in the Provinces of Montecristy and Santiago in this Republic in 1908, with notably beneficial results to the cultivators. The success obtained by the cultivators engaged in the planting of this cotton soon induced the commencement of its cultivation in the adjacent Provinces of Puerto Plata, Moca, La Vega and San Francisco de Macoris.

"The Sea Island variety of cotton now being cultivated in this Republic produces up to five crops with very moderate cost.

"Experience has proved that the average of production per plant may be estimated at three pounds of cotton with seed.

"It is quite common in this country to find cotton plants hav-

ing 800 tufts of cotton all visible at one time, and a single plant in the first crop has been known to yield five and one-half pounds of cotton with seed.

“In this Republic, as in the United States, cotton requires from six to eight days for germination and from four to five months to begin producing, with the advantage, however, that while in the United States the plants last only sufficiently long to produce one crop, on account of their destruction by frosts, in this Republic plants continue producing at least five years after planting. Naturally there are months in which the production is greater than in others. Native cotton continues in production for ten years or more.

“Experience has also proved that the larger the scale of planting cotton, the greater the economy in initial expenses, management and picking.

“The cost of preparing and seeding one acre of land, exclusive of enclosures, is \$12.70, distributed as follows:

Clearing, fallowing and root pulling.....	\$ 7.20
Ploughing the land.....	2.00
Seeding .....	.50
Four weedings per year.....	3.00
Total.....	<u>\$12.70</u>

The cost of enclosures cannot be accurately stated since this depends in every case upon proximity to timber for fence construction.

“The amount exported in the year 1909 reached 21,693 kilos with a declared value of \$6,798, and in 1910, 61,893 kilos, with a value of \$15,385. The production this year will triple that of last year, and with the enthusiasm prevalent in the entire Republic for the cultivation of cotton it is to be expected that within a short time it will become one of the most valuable products of our natural riches.

## COCOA.

"Next only to sugar, cocoa is the most valuable of our products.

"Its cultivation offers no difficulty whatever if care be exercised in the selection of land.

In deep alluvial lands having a permeable clay subsoil and a surface of loam formed by decomposed vegetation, such as valley, mountain and river land, cocoa flourishes and yields abundant returns.

"Cocoa begins to bear four or five years after planting. If wisely planted, two hundred and ten trees to the acre may be secured, which will produce an average of one kilogram per crop.

"For the first few years shade is very beneficial. In this Republic cocoa trees are protected during this early period by yucca and banana trees. When the trees reach a certain height shade is no longer necessary. Two good crops per year are produced, one during the months from April to June and the other in the months from December to February. During the remaining months small crops mature which serve to cover the cost of maintenance and conservation.

"The cost of preparing and planting an acre of cocoa equals that of an acre of cotton, slightly more or less.

"Cocoa exported in 1910 amounted to 16,759,227 kilos. The cocoa exports of 1909 and 1910 were lower in comparison than the exports of 1908 due to shrinkage suffered by the plantations of the Province of Semana and part of the Province of Seybo in consequence of a parasitic infection which fortunately remained localized.

"The origin of this infection is attributed to an excess of shade which deprived the planted trees of light and air and consequently favored the conditions indispensable for the development of the fungus."

Yours truly,

MANUEL A. MACHADO,

*Secretary of State,  
of Foreign Relations.*



