

### THE CULTIVATION OF COCOA IN THE WEST INDIA ISLANDS.

To the active young man possessed of a limited amount of capital, who is looking for an occupation as well as investment, in the Lesser Antilles or in many parts of Venezuela, the cultivation of cocoa is at the present time the most inviting of the agricultural pursuits. The island of Trinidad, which is the one most familiar to the writer, produces cocoa of a quality second to none, and only equaled by that grown in the vicinity of Caracas, and always brings the highest price in the London market. Considerable patience is required to grow it from the seedlings, as it takes five or six years of cultivation before there is a harvest worth mentioning, and seven or eight years before a full crop can be realized, but when the trees are once full grown they will continue to bear fruit for an almost indefinite time.

Cocoa has been grown on this island, as early as 1700, in considerable quantities, and there is so much of its area under cocoa cultivation that it is always possible to purchase bearing plantations at a price that would make a paying investment for the man who will give his own time to the management. Want of proper care seems to be the cause of more failures than the lack of the trees to produce paying quantities, or the market price of the product.

The cocoa tree seems to flourish best in the rich and well-watered soil along the banks of the many ravines that traverse the uplands of the island, where they are more or less protected from the violent storms. The small plants are reared in nursery grounds until they are ten or twelve inches high, when they are planted in rows like a northern fruit orchard. The cocoa tree must always be protected from the powerful rays of the tropical sun, that seems to blast the fruit. When young, they are shaded by growing bananas or plantains adjacent to the young tree; these grow very rapidly and furnish the required protection, as well as a source of some profit, while the cocoa is too small to bear. But it is necessary to provide for a future shade—for the cocoa after three or four years outgrows the banana—and for this purpose a tree known as the "Bois Immortel" (sometimes called the "Mother of the Cocoa") is planted at the same time as the cocoa tree; this is a tall tree with high and spreading branches that form a sort of canopy over the entire cocoa plantation and give it the required shade, making it resemble an open forest. The Immortels are shown in the illustration immediately behind the dry-houses, with the smaller cocoa trees underneath. The coffee tree, which is much smaller than the cocoa, is often grown in small quantities among the cocoa.

The cultivation of cocoa consists largely of draining the land, keeping down the undergrowth of bush and weeds, and trimming the trees. The flowers occur in clusters on the main branches and on the trunk of the trees, usually only one of each cluster reaching maturity. The fruit, which is seen in the illustration, is a hard pod six or seven inches long, resembling a cucumber, growing from the trunk or large branches, and looks very much as though it were artificially attached. Buds, blossoms and fruit, in all stages, occur side by side, and ripened fruit is harvested at all times of the year. The main crop, however, matures in the dry season and is usually harvested in February; only small quantities ripening during the remainder of the year.

The pods each contain five rows of seeds or beans, quite similar to a large, thick Lima bean, embedded in a pink, acid pulp. These seeds are the cocoa beans of commerce. The harvesting consists of cutting off the mature pods by means of a knife on a long bamboo pole, gathering

them into heaps on the ground, where they are allowed to lie for about twenty-four hours. They are then cut open with a cutlass, the seeds and pulp coming out in a mass; these are carried to the dry-house. The dry-house consists of a smooth, tight

time. This process requires very careful attention to prevent the temperature from getting too high and to stop the fermentation at the proper time to insure the proper flavor, as well as the fitness for the preservation of the beans.

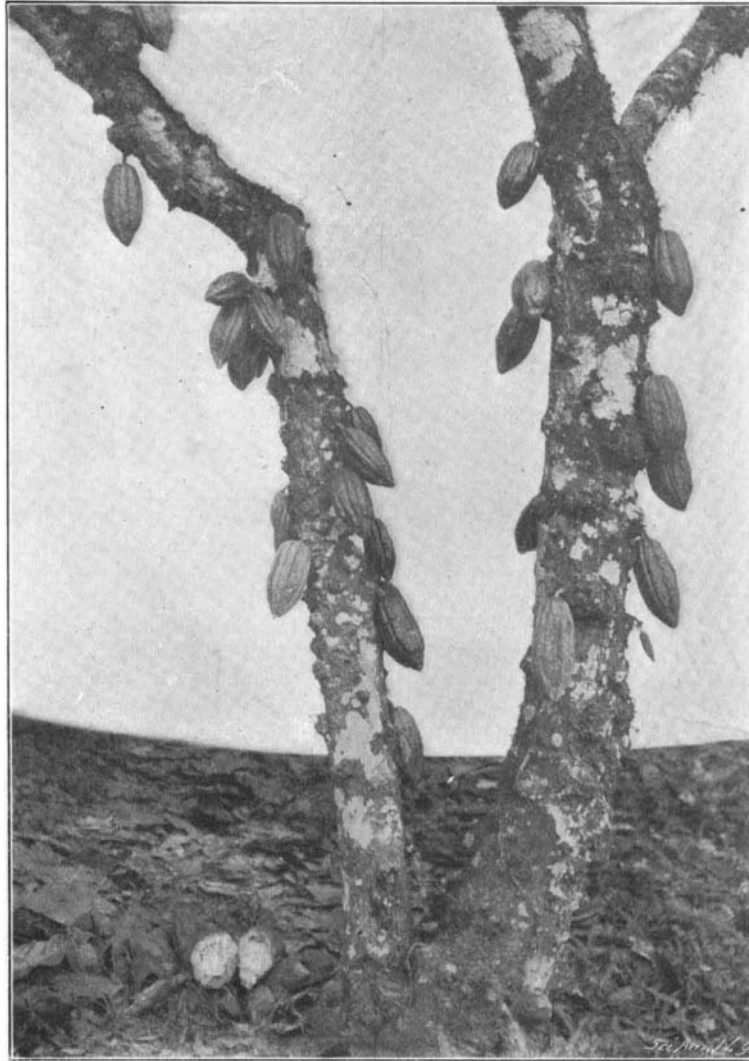
The next process is the drying, which is accomplished by spreading the beans in a layer over the platform and drying them in the sun. Laborers are kept constantly stirring them, while exposed to the sun, with a wooden rake, so that they will dry evenly. Each morning, during the early stages of the drying process, the beans are gathered into a heap in the middle of the floor and given a thorough mixing. This is sometimes accomplished by the laborers mixing and kneading them by treading them with their bare feet, as shown in the illustration. This is known as "dancing the cocoa" and renders the beans smooth and uniform in color. It usually requires ten days or two weeks to finish the drying, depending on the weather; a great many attempts have been made to dry the beans artificially with more or less satisfactory results, but no generally satisfactory drier has yet been designed, and the open dry-houses are in general use throughout the island. It only remains, however, for some ingenious mind to make a careful study of the requirements. The most difficult problem seems to be to get an artificial drier that will give the proper color to the dried beans—the brick-red color, and the property of retaining it is a very important feature in the cocoa market. The dried beans, when ready for market, are put in canvas bags holding about 150 pounds, and the name of the plantation stenciled on the bags, these names or brands at times becoming very prominent in the market for the quality of cocoa the plantation is reputed to produce.

The manufacturing, which is invariably done in northern factories, consists of roasting the beans in a revolving cylinder; this develops the aroma and fits them for crushing. After the beans are crushed they are screened to separate the "nibs," or crushed nuts, from the shells. The nibs are then ground to a fine meal; this is put in sacks and put in a powerful press, where it is subjected to heat and pressure, and the fat, known as "cocoa butter," is squeezed out, and the hard substance left in the sack has only to be broken or powdered to become the pure chocolate, and this more or less adulterated is the chocolate of commerce.

### THE PAN-AMERICAN EXPOSITION.

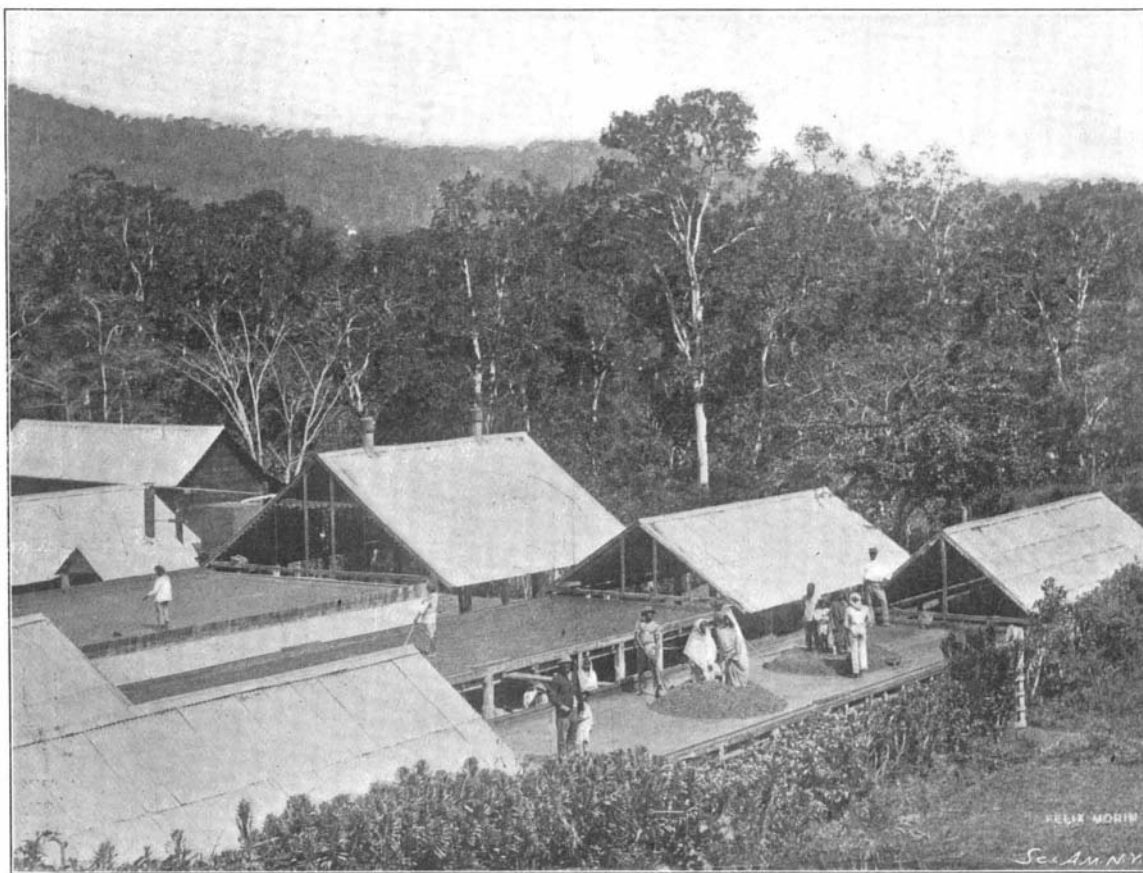
The Pan-American Exposition is rapidly nearing completion. There still remains considerable work for the gardeners, and a number of exhibits are yet to be installed. All of the principal buildings are entirely finished, and only a few minor structures are in a state of incompleteness. A notable exception, however, is the Art Building, which will not be opened for some weeks. We present a number of engravings prepared from photographs taken by the staff-photographer of the SCIENTIFIC AMERICAN. They embrace a number of new views and subjects which have not before been photographed. The current issue of our SUPPLEMENT is largely devoted to the Exposition and contains a large number of engravings of the various buildings and groups of statuary, and is accompanied by an extended article.

The pictures which we publish this week are intended, as far as possible, to give an idea of the attention which has been given, not to the buildings proper, but to what might be considered special features of the Exposition, such as the effects produced by the aid of canals, bridges and landscape gardening. The mall which connects the two most important entrances, which are most used by visitors, is spanned and decorated with orna-



COCOA PODS ON THE TREE.

floor, or platform, set on posts at a height of four or five feet above the ground to allow a free circulation of air underneath. A light iron T-rail is spiked on each side near the edge and extending one-half the length of the floor beyond each end; a corrugated iron roof, with its eaves level with the floor, covers the platform. This is carried on a frame, divided in the middle of the floor, mounted on small car wheels traveling on the rails. The drying of the beans is accomplished on this floor by spreading them over it and exposing them to the sun. The roofs are to pro-



COCOA DRY-HOUSES IN TRINIDAD—MIXING THE BEANS.

tect them from the rain and dews, and are kept wheeled back on the extended tracks when the sun is shining. As soon as the beans reach the dry-house, they are placed in the "sweat box" or pit, where they are closed up tight and allowed to ferment for some