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COCOA:

ALL ABOUT IT



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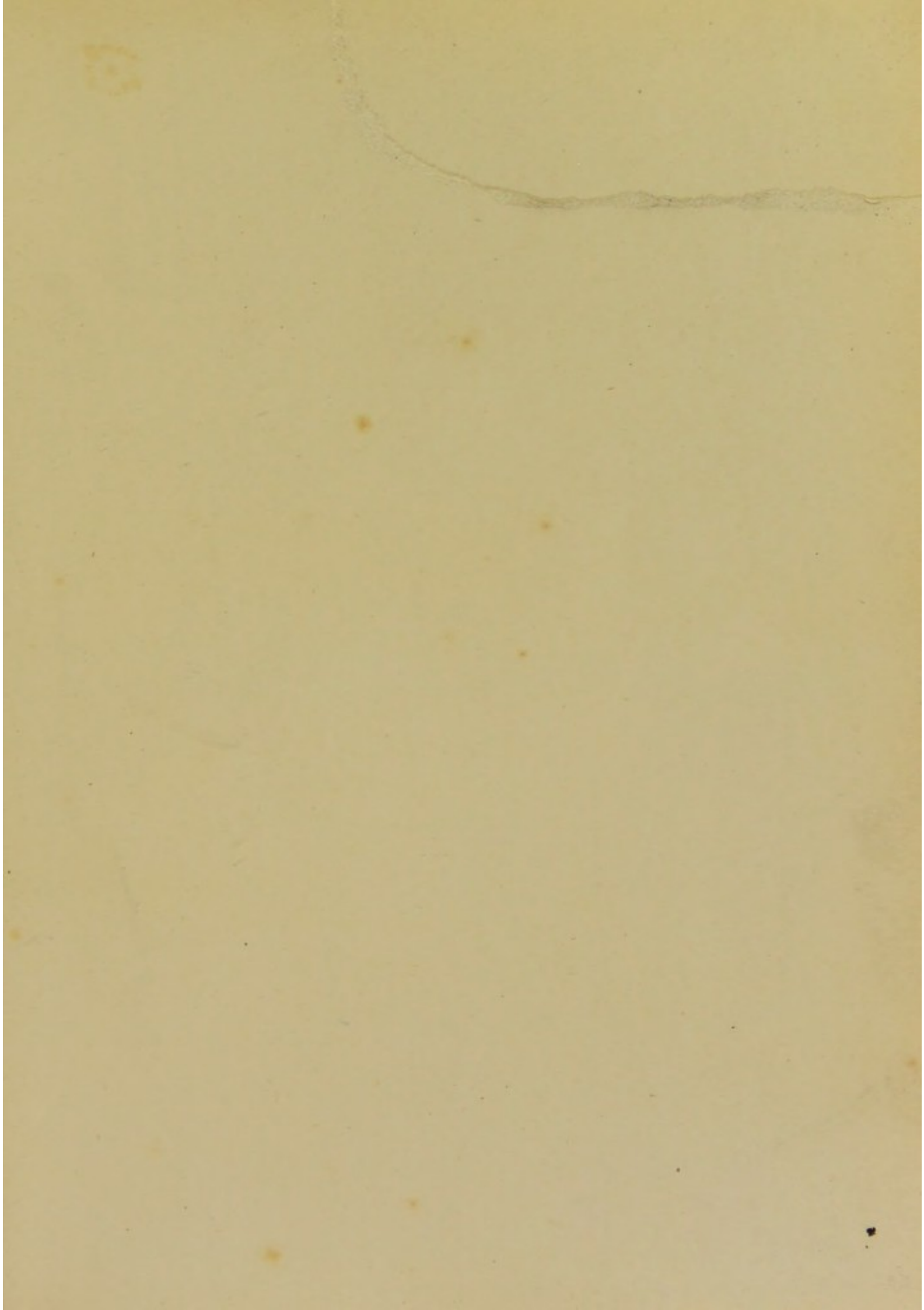
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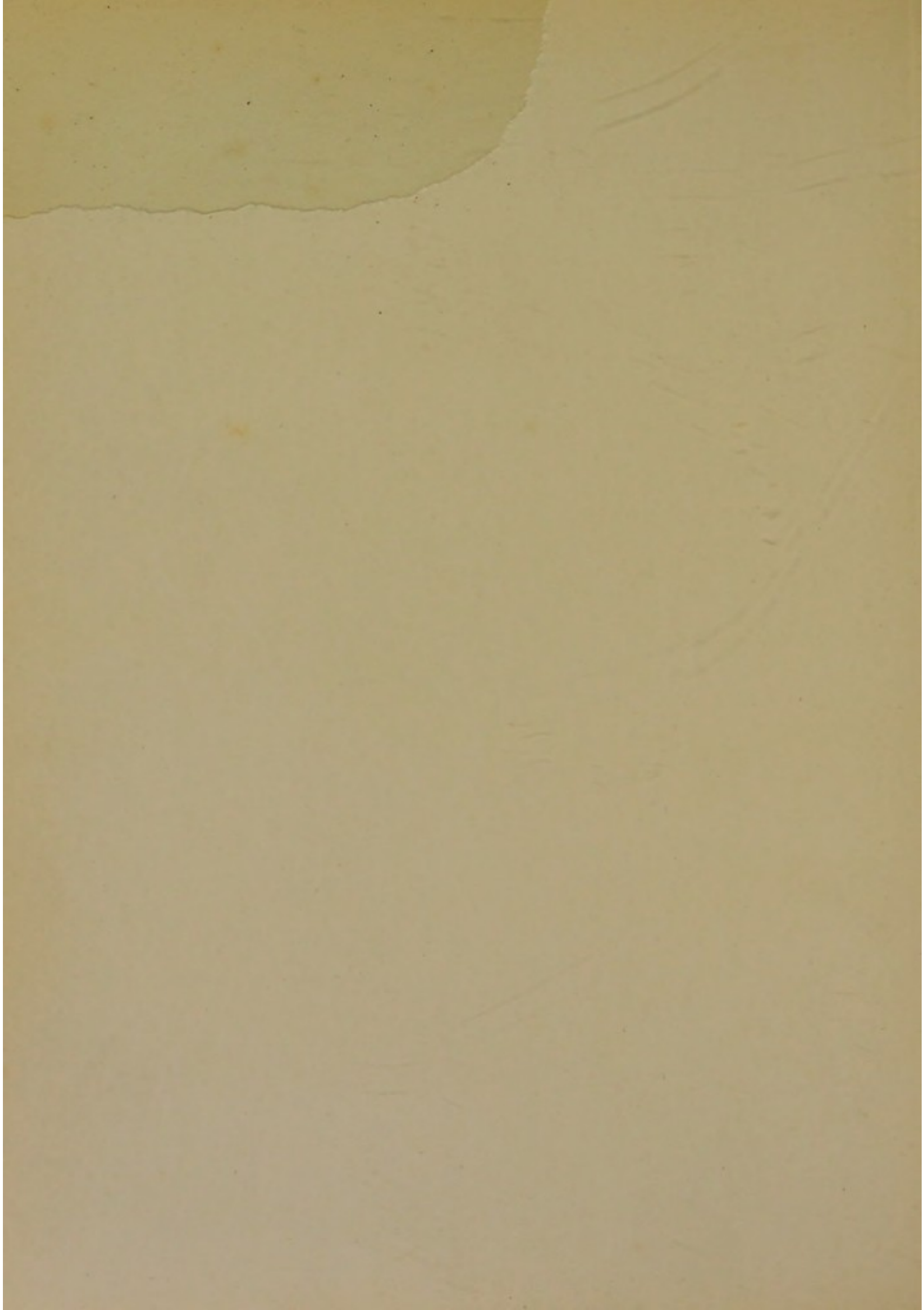


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COCOA:
ALL ABOUT IT.

PORTION OF AN ODE TO THE CHOCOLATE TREE.

Dedicated to CARDINAL FRANCIS MARIA,

BY

ALONSIUS FERRONIUS, a Jesuit—1664

O nata terris Arbor in ultimis,
Et Mexicani gloria littoris,
Fœcunda succo, quo superbit
Aethereum Chocolata nectar.

Tibi omne lignum cedit, et omnium,
Propago florum ; Laurus adoreas
Nectens triumphis, Quercus, Alnus,
Et Libani pretiosa Cedrus.

TRANSLATED.

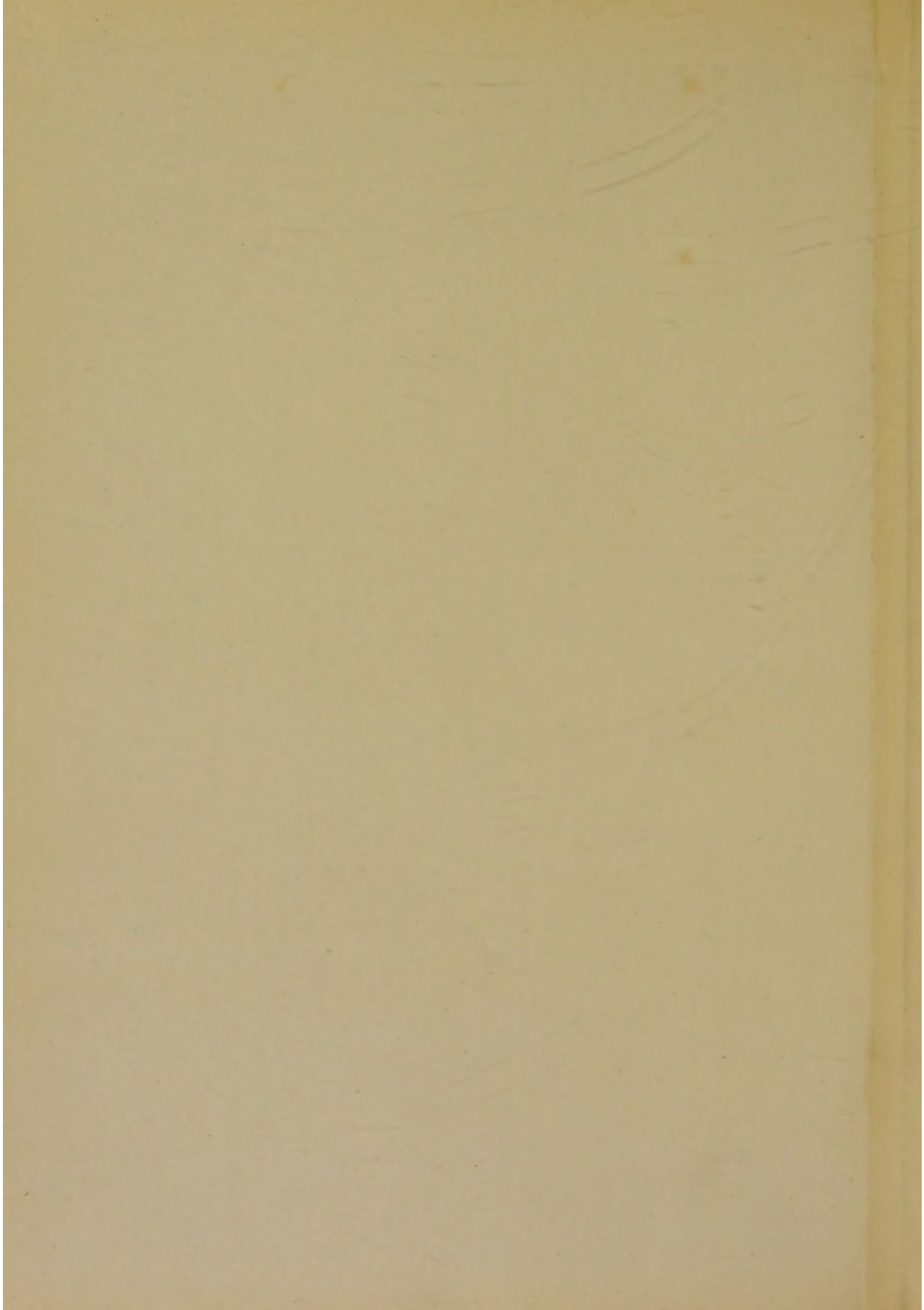
O tree, upraised in far off Mexicos,
The glory of their golden strands ;
As heavenly nectar from a chalice flows
Its Chocolate for other lands.

To thee, the palm of every tree is given,
And every flower yields thee homage sweet ;
The Laurel crowns thy head ; the Oak, the Alder tree
And precious Cedar triumph at thy feet.





Reproduction of the Frontispiece of a very old Latin Book on Chocolate, published in 1639. The subject is allegorical, representing a Casket of Chocolate being handed to Neptune to make known to the Countries of the World.



Cocoa:
All About It.

By "HISTORICUS" [i.e. Richard Cadbury]

London:

SAMPSON LOW, MARSTON AND COMPANY, LIMITED

ST. DUNSTAN'S HOUSE,

FETTER LANE, FLEET STREET, E.C.

1896.

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INTRODUCTION.

THREE years ago the writer ventured to place before the public some details respecting the cultivation and use of Cocoa, and he has since been enabled to collect much new, and as he believes, valuable information. Few early books treat accurately or exhaustively of the subject, but nearly all the earlier travellers and settlers refer to Cocoa as an important article of consumption in South America and Mexico, long before it was known in Europe. A number of extracts have been made from publications and manuscripts in the British Museum and elsewhere, and exact copies of some very rare plates have been produced by the photo-zinco process, which it is hoped will prove of general interest.

We owe much to adventurous navigators and explorers for luxuries that have now become a necessity of civilisation, and to capitalists who have made use of their wealth to develop and improve the cultivation of now familiar products.

Vast tracts of rich alluvial soil still remain uncultivated, and are likely, if properly utilized for generations to come, to be at once means of employment and sources of supply ; and it is generally admitted that Cocoa claims probably more attention than any other food product throughout the tropical zone in which it flourishes.

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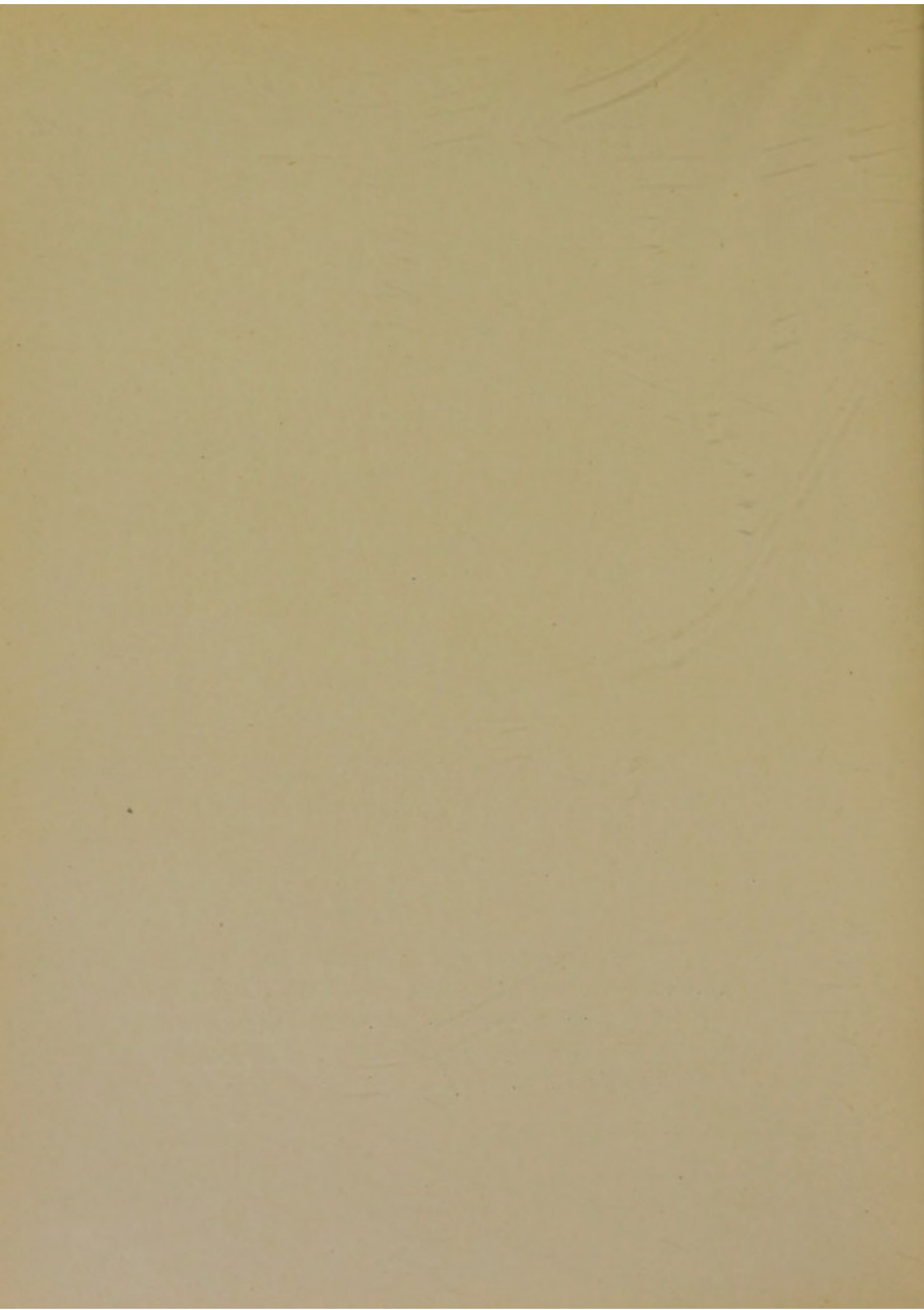
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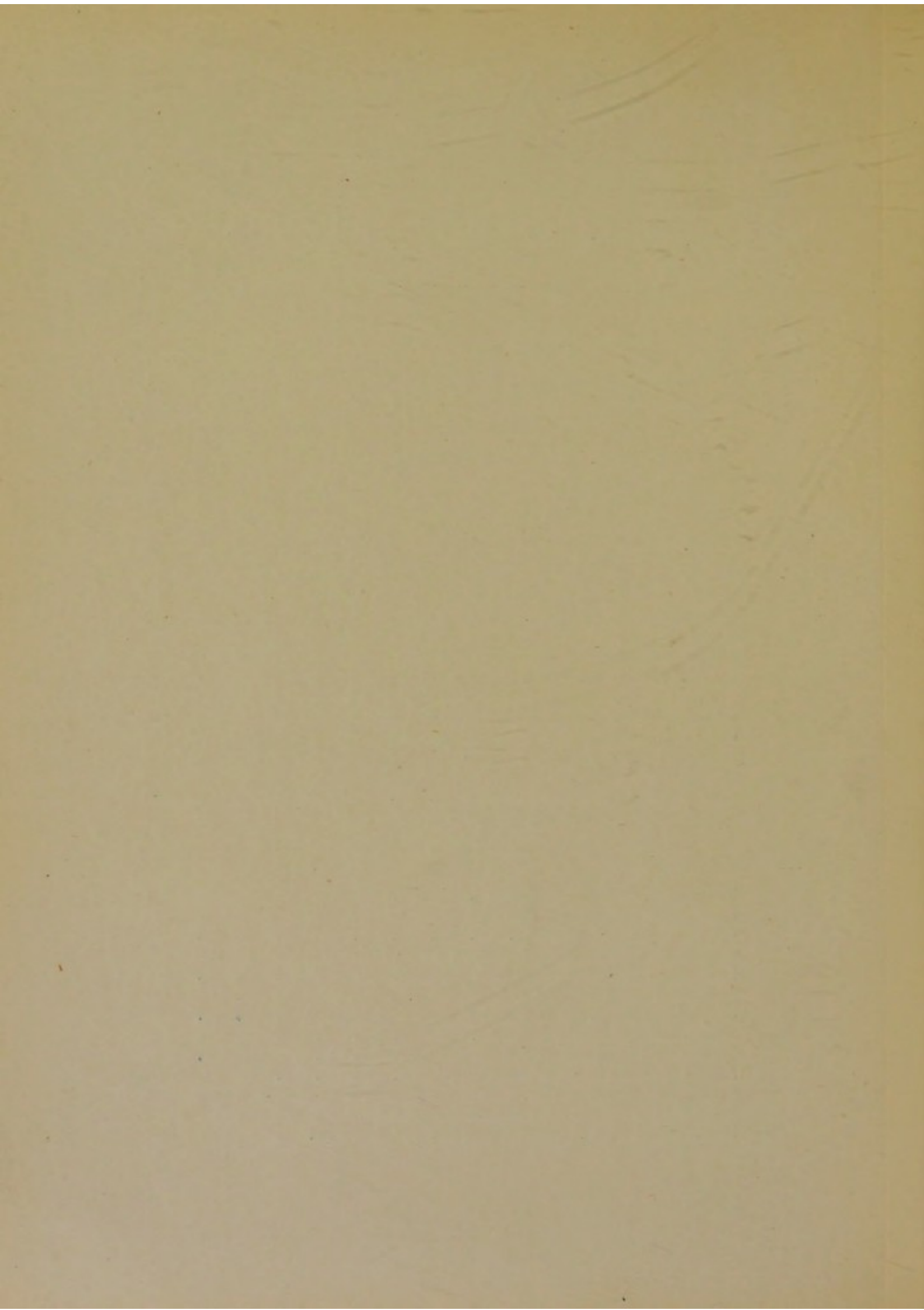
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COCOA: ALL ABOUT IT.

CHAPTER I.

—:O:—

HISTORY AND CULTIVATION OF THE PLANT



Store House for Cocoa and Other Fruits, Thatched with Thick Branches of Palm-like Trees.

From DE BRY'S "HISTORY OF AMERICA." 1600 A.D.

IT was one of the dreams of our childhood to sail on the bosom of that mighty river whose watershed drains the greater part of the northern portion of the continent of South America, and to explore the secrets of its thousand tributaries that penetrate forests

untrodden by the foot of man ; forests teeming with innumerable brilliantly-coloured birds and insects, luxuriating in their own Paradise of tropical plants and flowers. Far into the dark recesses of these forests the

tributary streams of the Amazon flow, shadowed by trees growing to the water's edge and festooned by gigantic creepers which hang in rich foliage and flower over them.

We follow these streams towards their sources among the snow fields and rocky defiles of the Andes, amidst the ruins of an ancient world and people, almost extinct as nations, but whose history brings thrilling memories of by-gone days of civilization and government. The country through which we pass was the original home of the Cocoa plant, and it is found at the present day growing there in all its pristine luxuriance.

Its ancient history is embalmed in travellers' stories, combining the real and the legendary, that is to say, the instructive and entertaining.

Mendoza, in his "Collection and Interpretation of Hieroglyphics," is thus quoted in "Aglío's Antiquities of Mexico:" "The last king of the Tultecas, Quetzalcohuatl, saw great prosperity among his people. This king having drunk a beverage given to him by a magician, Titlacahua, on the pretence that the king would thereby be transported to a distant city, which he desired to see, lost his self-possession, and began to weep bitterly, and was moved to leave his country.

"With the resolution which he had now formed, in consequence of the art and incantations of the magicians, he caused whatsoever he possessed, made of silver and of shells, to be burned, and buried, with other precious things, beneath mountains and beds of rivers; and as he was a magician, he changed the Cocoa trees into others of a different kind called Mizquitl, and he

commanded every species of bird which solaced and charmed that region to fly away to the country of Anahuac, which is more than a hundred leagues distant from Tula."

Purchas gives us the history of the Mexican nation in his "Travels in America," and informs us that the Mexicans first arrived at the site of the City of Mexico, A.D. 1324. "And because they liked well the greatness and situation of the place, after that they had travailed in their journeys and wandered many years from country to country, * * * being come from far countries in following their journies * * * they came and settled down in the place of Mexico." It is interesting to note that probably America was thus early colonised from Europe—as Montezuma confessed to Cortés that he and his nobles' ancestors had come from the same part of the globe as the Spaniards, a part situated towards the rising sun. The civil polity also agrees in many respects with that of the Jewish nation, so that this and other facts point to them as the parent race of the rulers of Mexico.

He also tells us of the particular tributes which every town subdued paid to these Lords of Mexico, mainly consisting of baskets of Cocoa, which will be treated of in the chapter "History of the Use of Cocoa."

A MS. in the Manuscript Room of the British Museum, written in Old English characters, and entitled "A Voyage to the West Indies and New Spain (Yucatan), made by John Chilton in the year 1560," says: "So we were provided of victualls till we came where Townes were in the province of Soconusco, where groweth Cacao, w^{ch} the Christianes carrye from thence unto Nova Hispaniola becaus y^t will not growe in a cold countrie. * * * Their

chiefest marchandize is Cacau." Further on, describing the principal town of the province of Guasaqualco (Merida), he adds, "Where there is a byshopp and almoste a hundred Spaniardes. The Indians of this province paye their tribute in mantellas of cotton woll and Cacau. There is no porte in this province for a ship of a hundred tun to ryde in, save only in the river of Tabasco, by w^{ch} this citey of Merida standeth."

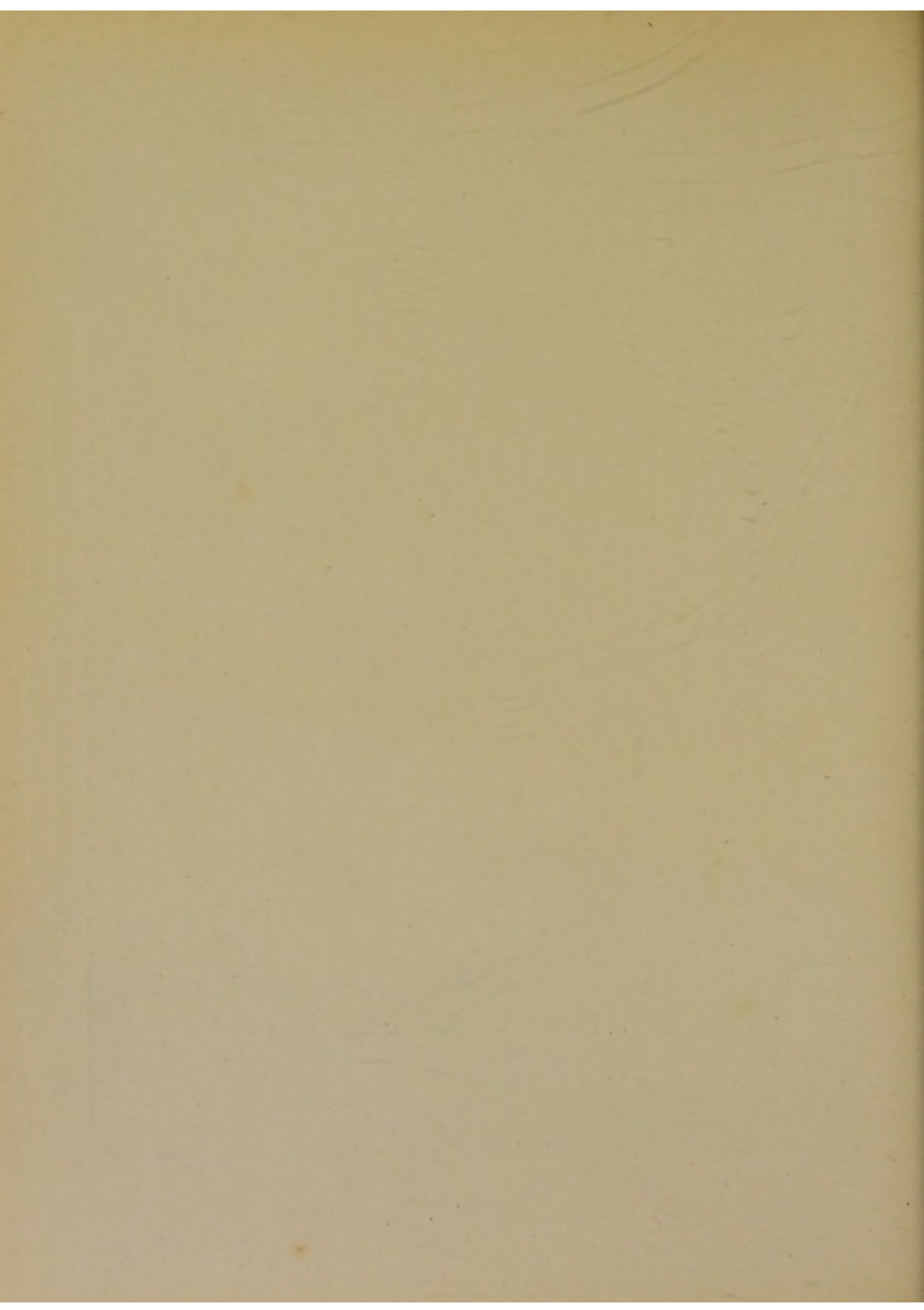
Bancroft, in his "Native Races of the Pacific States," speaks of some curious customs among the Maya races : "Before planting the seed they hold a festival in honor of their Gods, Ekchuah, Chac, and Hobnil, who were their patron deities. To solemnize it they all went to the plantation of one of their number, where they sacrificed a dog having a spot on its skin of the color of cacao. They burned incense to their idols, after which they gave to each of the officials a branch of the cacao plant." Palacio also tells us that "Pipiles before begining to plant gathered all seeds in small bowls, which after performing certain rites with them before the idol, among which was blood drawn freely from different parts of the body, with which to anoint the idol;" and as Ximinez states, "the blood of slain fowls was sprinkled over the land to be sown."

The growth of Cocoa is now distributed over a great portion of the tropical world, and it will thrive within 23 parallels of latitude, but luxuriates within 15, and is cultivated at an altitude of 1,700 feet above the level of the sea, but not successfully over 1,000 feet.

The finest qualities are grown in Central America, Trinidad, and Ceylon; in the latter the plant is of comparatively recent cultivation, but it is the most delicate in colour, flavour, and aroma,



NATIVES CARRYING COCOA, FRUITS, AND OTHER PRODUCE, AS TRIBUTE.
DE BRV'S "HISTORY OF AMERICA." FRANKFORT: A.D. 1600.



and consequently commands the highest prices on the market.* One of the finest growths, however, is that of Soconosco, on the coast of Guatemala, which was, at one time, monopolised for the use of the Spanish Court, and still realises very high prices.

Cocoa is also grown in Mauritius, Madagascar, Isle de Bourbon, Australia, the Philippine Islands, the Island of St. Thomé, off the west coast of Africa, and some portions of the continent of Africa.

By far the most important sources of supply, however, are the districts of Central America, the northern portion of the South American Continent, the Antilles, and, in recent years, the island of St. Thomé.

Florida, in that part which borders the Gulf of Mexico and the southern part of Louisiana, marks the most northerly limit in which Cocoa naturally grows.

A traveller in Louisiana, in 1796, speaks of the Cocoa tree among others, "covering with delightful shade the shores of the Mississippi," and on "the banks of the Alatamaha, in Florida;" but it is only toward the latitude of 22° that the climate is favourable to its cultivation, both north and south of the Equator.

* Ferguson, in "Ceylon in 1884," remarks:—"Cocoa can never be cultivated in Ceylon to the same extent as Coffee, Tea, or Cinchona, for it requires a good depth of good soil and shelter from the wind, and these are only to be found in very limited areas. To the late R. B. Tytler belongs the credit of introducing this cultivation, and in his hands Ceylon Cocoa speedily realized the highest prices in the London market, experienced brokers remarking that there must be something in the soil and climate of the districts where it is cultivated in Ceylon peculiarly suited to Cacao. There are 10,000 acres now planted, and it is expected that ten years hence an area exceeding 30,000 acres under this plant will enable Ceylon to send 120,000 to 150,000 hundredweights of its products to European markets."

Cortés found Cocoa to be one of the principal sources of wealth, and the Spaniards for a long time preserved the plantations, until the rich silver mines proved more attractive, if not more remunerative.

Guatemala is a country of extreme fertility, and produces an abundance of the finest Cocoa; indeed, the Cocoa of Soconusco has ever held the palm as the royal brand; here, again, the Spaniards gathered more solid riches from its growth than from any other source, although they despised the land as containing no mines of gold or silver. Vast plantations were found on the plains about the volcano of Guatemala, which, more than once, covered them with its ashes.

Honduras and Nicaragua both produce large harvests, but their early history is little known, owing to the action of those greedy conquerors whose war of extermination almost destroyed the people and burnt their hieroglyphics, in which lay the history of these peoples. Columbia, from the earliest times, produced large quantities of Cocoa, but as the inhabitants were less civilised than the Mexicans, it only served to feed the parrots and monkeys which swarmed in the forests; it is now, however, a great source of wealth and prosperity.

The valleys of Guayaquil and Quito produce the largest quantities of any districts in the world. Guayaquil Cocoa has a speciality of its own, both in shape and aroma, and is easily distinguished from the Cocoa of other districts. The lower qualities are very strong and coarse in flavour, but the finer beans contain a large percentage of Theobroma, and are much valued on that account.

Turning to the Eastern coast, Venezuela produces the Caracas Cocoa, which is well known to connoisseurs as one of the most delicate and delicious in existence.

This country is traversed by a chain of mountains intersected by little valleys, where the Cocoa tree finds shelter, heat and irrigation, and also equality of temperature, all of which are essential to its perfect cultivation. This fertile land was discovered by Columbus, and occupied by Ojeda and other adventurers, who only travelled over it in order to seize the gold with which the poor Indians adorned themselves, and for re-peopling the islands for purposes of war, and for working in the mines. In 1634 the Dutch took possession of the island of Curaçoa, which they made an entrepôt for American produce, and it was they who stimulated the Spaniards to the serious cultivation of Cocoa, which has since acquired so high a reputation in the markets of the world.

The credit is, however, due more to the Jesuit missionaries than to the sovereigns who owned the land, for it was they who engaged the natives to form small plantations on the borders of the Orinoco, and to gather the wild Cocoa of which Father Gumilla, in his "History of Orinoco," says: "I have seen in these plains forests of wild Cocoa trees laden with bunches of pods, supplying food to an infinite multitude of monkeys, squirrels, parrots, guacamayas, and other animals."

In French Guiana, Cocoa was scarcely cultivated until about 1734, when a forest of Cocoa was discovered on a branch of the Yari, which flows into the Amazon. From this forest seeds were gathered, and plantations laid out in Cayenne.

The Cocoa of Para and Maranham differs from all other growths; the bean is much smaller and more round and elongated,

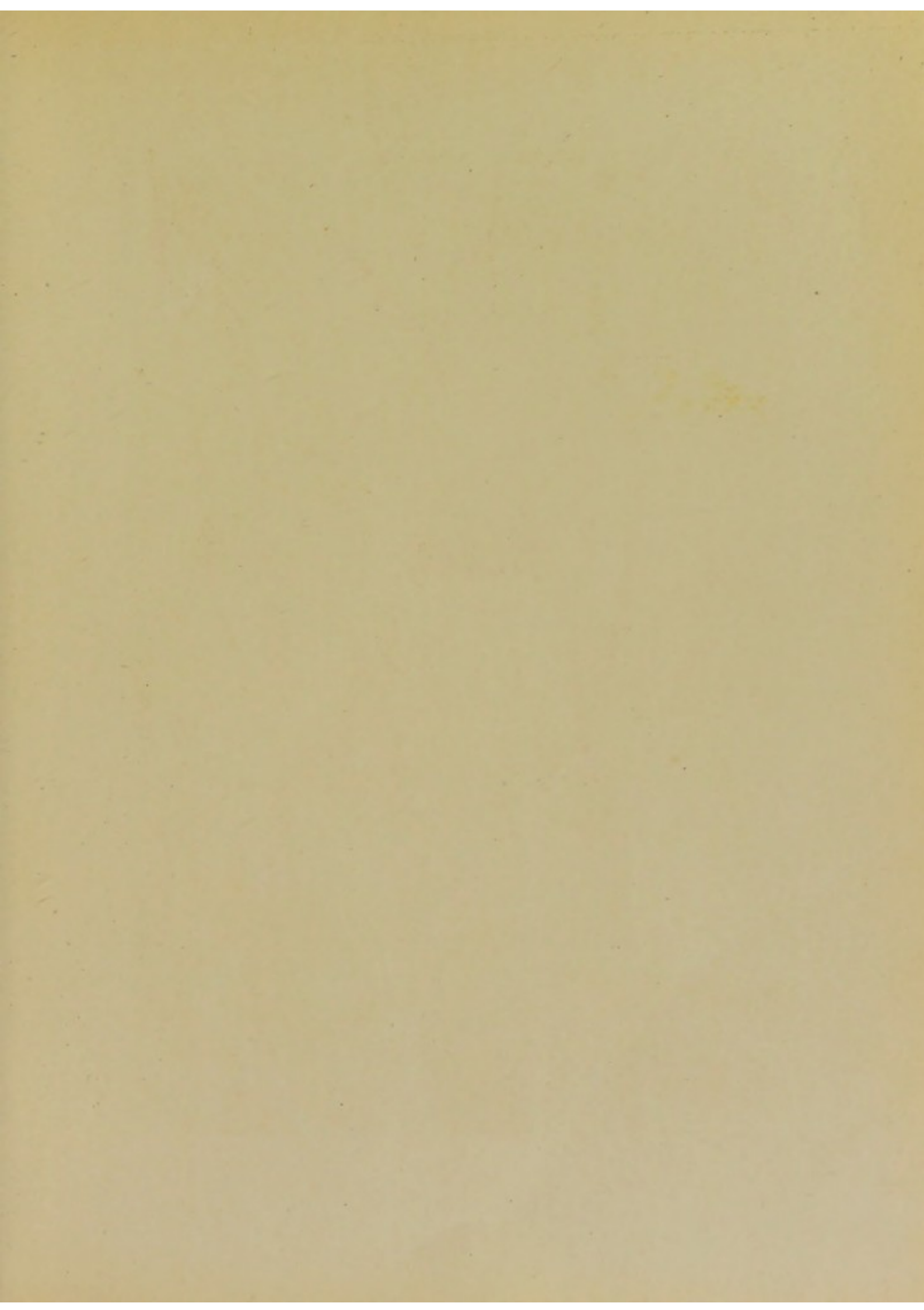
but when well cured, is mild, has a very pleasant flavour, and is much valued by manufacturers on that account.

Bahia produces large quantities of Cocoa which, formerly, was of a very inferior quality, principally owing to careless cultivation and indiscriminately mixing all that was brought from the interior, some of which was wild and uncured. Recent years have entirely altered this state of things, and the good quality of "fermented" Bahian Cocoa is fully recognised.

A little Cocoa is grown in the low-lying parts of Rio Janeiro, but it is not to be met with beyond this latitude.

At the present day, the smaller islands of the Antilles divide the glory of supply with the American Continent. The Great Antilles, including Cuba, San Domingo, and Jamaica, although of such large area, and in a favourable latitude, only produce inferior Cocoa; while Guadaloupe, Dominica, Martinique, Grenada, and Trinidad not only produce large quantities, but some of the finest qualities grown. Dominica was the first of the Antilles on which the Spaniards cultivated Cocoa, the first Cocoa tree being planted by M. Dogeron in 1665.

In Martinique the Cocoa tree is said to be indigenous. All the Cocoa trees were destroyed in 1727 by a terrific hurricane and inundation. A few years afterwards, a royal edict reduced the duty on imports from French Colonies, which encouraged the cultivation so that in 1775 about one-and-a-half million trees were bearing fruit. St. Lucia formerly belonged to France, and, as early as 1784, there were over two millions of Cocoa trees under cultivation. It is now a prosperous English Colony. Grenada also belonged to the French, who planted the first Cocoa tree about the year





COCOA FLOWERS AND PODS.

PODS ON BRANCH.

1714 from seeds supplied by the merchants of Martinique, who also sent over slaves to cultivate the plantation. It is now one of the most prosperous of the Little Antilles, and, as an English possession, provides us with large supplies of Cocoa.

Trinidad is, however, by far the most important of our English possessions in the Little Antilles. The Spaniards established themselves there in 1525, and applied much care to the cultivation of Cocoa, which attained so high a value that it was preferred to the finest growths of Caracas. These plantations were totally destroyed by a hurricane in 1727, and the island was almost abandoned. About 60 years later, a Catalan sailor was so much struck with the fertility of the soil that he took possession of the beautiful valley of Yaguaraparo, and was successful in again establishing Cocoa plantations on the island. Soon after that time Trinidad was definitely ceded to England, and it has not only regained its former reputation for some of the finest brands of Cocoa in the world, but has for many years been one of the chief sources of supply to Britain. Trinidad, at the present time, produces over 22 million lbs. per annum.

An interesting account of the rise and growth of the West India Islands, written by Dalby Thomas in 1690, appeared in the "Harleian Miscellany," and we extract the following amusing account of this early attempt and failure by the English to cultivate Cocoa:—"Cocoa is now a commodity to be regarded in our colonies, though at first it was the principal invitation to the peopling of Jamaica, for those walks the Spaniards left behind them there, when we conquered it, produced such prodigious profit with so little trouble that Sir Thos. Modiford and several others set

up their rests to grow wealthy therein, and fell to planting much of it, which the Spanish slaves had always foretold would never thrive, and so it happened; for though it promised fair, and throve finely for five or six years, yet still, at that age when so long hopes and cares had been wasted upon it, withered and died away by some unaccountable cause, though they imputed it to a black worm, or grub, which they found clinging to its roots." The account continues :—"And did it not almost constantly die before, would come into perfection in 15 years' growth, and last till 30, thereby becoming the most profitable tree in the world, there having been £200 sterling made in one year of an acre of it. But the old trees, being gone by age, and few new thriving, as the Spanish negroes foretold, little or none now is produced worthy the care and pains in planting and expecting it. Those slaves gave a superstitious reason for its not thriving, many religious rites being performed at its planting by the Spaniards which their slaves were not permitted to see. But it is probable that where a nation, as they, removed the art of making cochineal and curing vanilloes into their island provinces, which were the commodities of those islands in the Indians' time, and forbade the opening of any mines in them for fear some maritime nation might be invited to the conquering of them, so they might likewise in their transplanting Cocoa from the Caracas and Guatemala, conceal wilfully some secret in its planting from their slaves, lest it might teach them to set up for themselves, by being able to produce a commodity of such excellent use for the support of man's life, with which alone and water some persons have been necessitated to live ten weeks together without finding the least diminution of health or strength."

From the Colonial Series of State Papers, February, 1668, we learn, that, "Cocoa was the chief produce of the Island of Jamaica; neither sugars nor indigo will turn to account nearly so well; but in 1671 there was a terrible heat and drought which blasted all the Cocoa trees, as well as in San Domingo and Cuba; so that the Governor, Sir Thomas Lynch, had great difficulty in sending to England some Cocoa and Vanillas for the King."

Joseph Acosta (1604), in his "Historie of the East and West Indies," says: "The Cocoa is a fruite little less than almonds, yet more fatte, the which being roasted hath no ill taste. It is so much esteemed among the Indians (yea, among the Spaniards), that it is one of the richest and the greatest traffickes of New Spain."

Cocoa Plantations in Mexico must have been of large extent in early times, if we can rely on what Ogelby tells us in his folio volume on America, 1671: "Not far from St. Iago is a place called Yzaleos, where there are orchards of cocoa, two leagues square, each of them producing yearly as much as 50,000 men can carry." And in speaking of New Spain, he says: "The English Commander, Thomas Candish, coming into the haven Guatalco, burnt 200,000 tun of Cacao; it proved no small loss to New Spain; the provinces of Guatemala and Nicaragua not producing so much in a whole year."

This inestimable plant, named by Linnæus, *Theobroma* (from *θεός* and *βρῶμα*, the food of gods), is an evergreen which grows to the height of from 15 to 30 feet, with drooping bright green leaves, in shape oblong, eight to twenty-five inches long, and pointed at the ends. The flowers and fruit, which it bears at all seasons of

the year, grow off the trunk and thickest parts of the boughs, with stalks only an inch long. Humboldt saw the flower bursting through the earth out of the root, and wondered at the prodigious vital force of the plant. The flowers, which grow in tufts or clusters, are very small, having five yellow petals on a rose-coloured calyx. The fruit is five-celled, without valves, from seven to nine-and-a-half inches in length, and three to four inches in breadth, of an elliptic, oval-pointed shape, something like the vegetable marrow, only more elongated and pointed at the end, tough and quite smooth, the colour varying, according to the season, from bright yellow to red and purple. The rind of the fruit is very



Pod, Leaves and Flower.—Pod cut open shewing Seeds.

thick and similar to a very hard, tough apple in substance, and has a slightly sweet taste ; if allowed to ripen this changes into a shell of a weak nature. The seeds contained in each pod vary in



FRUIT OF THE "CACAO THEOBROMA.

1. Pod, fully developed.
2. Pod, first development.
3. Flowers.



number from twenty to forty, and are embedded in a soft pinky-white acid pulp. The cocoa tree, while growing in that portion of the earth wherein the heat is greatest, yet requires a sheltered situation for its perfection.

A writer in *Belgravia* graphically describes the beauty of a Cocoa plantation with its luscious fruit:—

“The branches do not grow low, so that in looking down a piece of ground the vista is like a miniature forest hung with thousands of golden lamps—anything more lovely cannot be imagined.

“The Erythrina, or Coral-tree, or Cacao Madre, are first planted to protect the young Cocoa tree from the sun. The Coral tree grows to about the height of sixty feet and entirely drops its leaves about the end of March, and then becomes covered with flowers of a bright crimson, and shafted like a scimitar. At this season an extensive plain covered with Cocoa plantations is a magnificent object when viewed from a height. The tops of the far-stretching Erythrina then present the appearance of being clothed with flames. As we rode along in admiration of the lavish profusion of nature, we, for the first time since we left the San Juan river, saw the Toucan, and one or two other varieties of new and brilliant birds. They were very tame, and evidently felt at home among the Cocoa groves. Connected with Senõr Hurtados' establishment is a large and exceedingly well-kept Cocoa plantation. The mazy walks were wide and clean, and so effectually roofed in by the broad tops of the cacao-madre that one might almost imagine oneself within the spacious aisles of some grand natural temple.

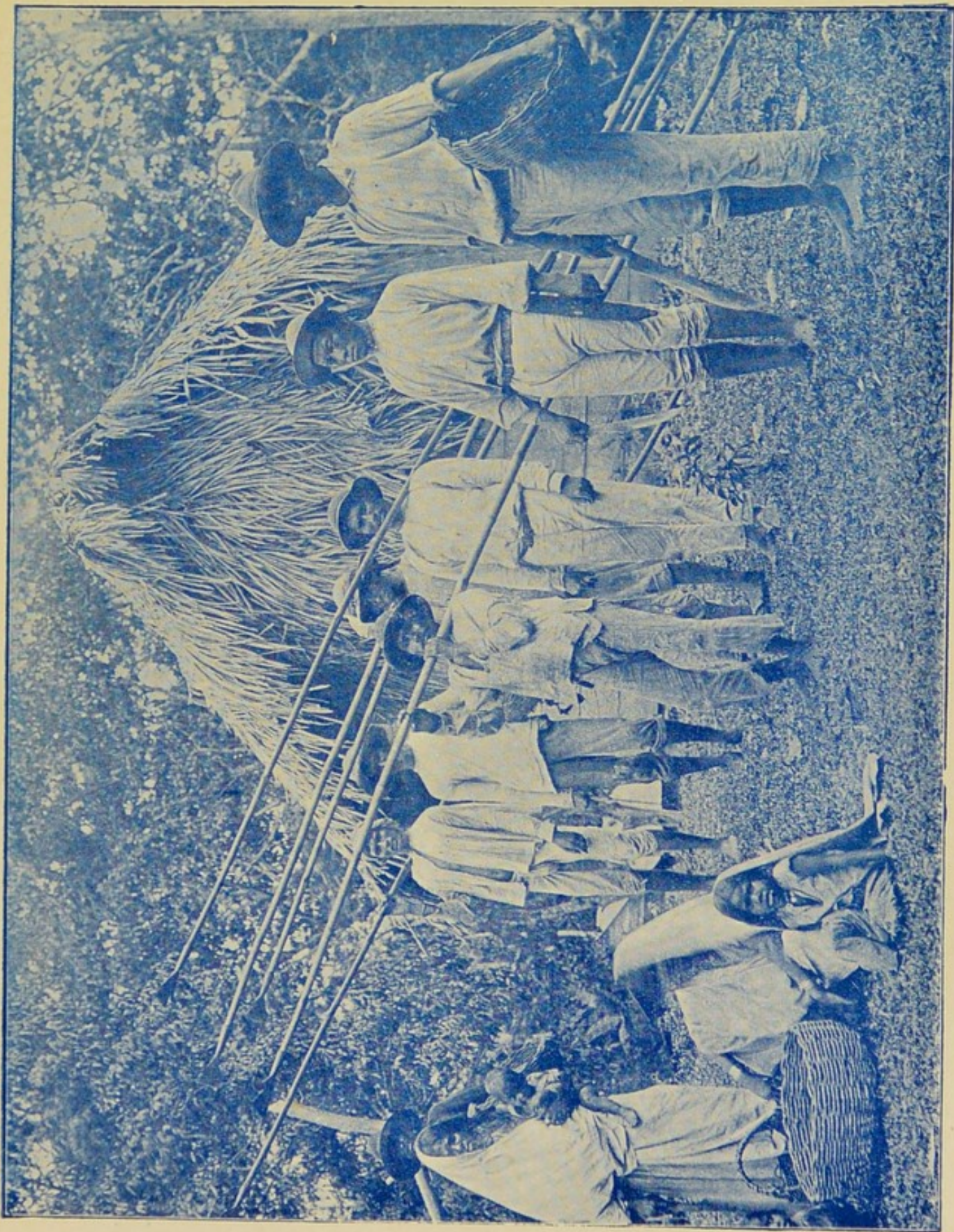
“As we approached, we heard bursts of laughter, and the tinkling of musical instruments. We spurred forward and were soon in the midst of a scene as novel as it was inspiring. There were broad avenues of huts, festooned with hammocks in front, in which the Señoritas were reclining in lively conversation with their red-sashed beaux, who idly thrummed their guitars, while the elders of both sexes, seated in the background, smoked their puros and cigaretós, pictures of indolence. Behind, the cattle were tethered to the trees, and here, too, were the fires for culinary purposes, around which the cocineras, chattering like parrots, were preparing the evening cup of Chocolate. Here we found most of our fair friends of the balconies, sipping Chocolate in a hurricane of spirits.”

There are several enemies to the Cocoa tree, among them being the monkey, squirrel, and deer, which are particularly fond of its tender fresh leaves. Parrots also are equally to be dreaded in a Cocoa plantation, but are more easily found out by the planter in consequence of their loud garrulity when they alight in flocks, but wherever they pick a pod with their bills, it rots, and falls to the ground.

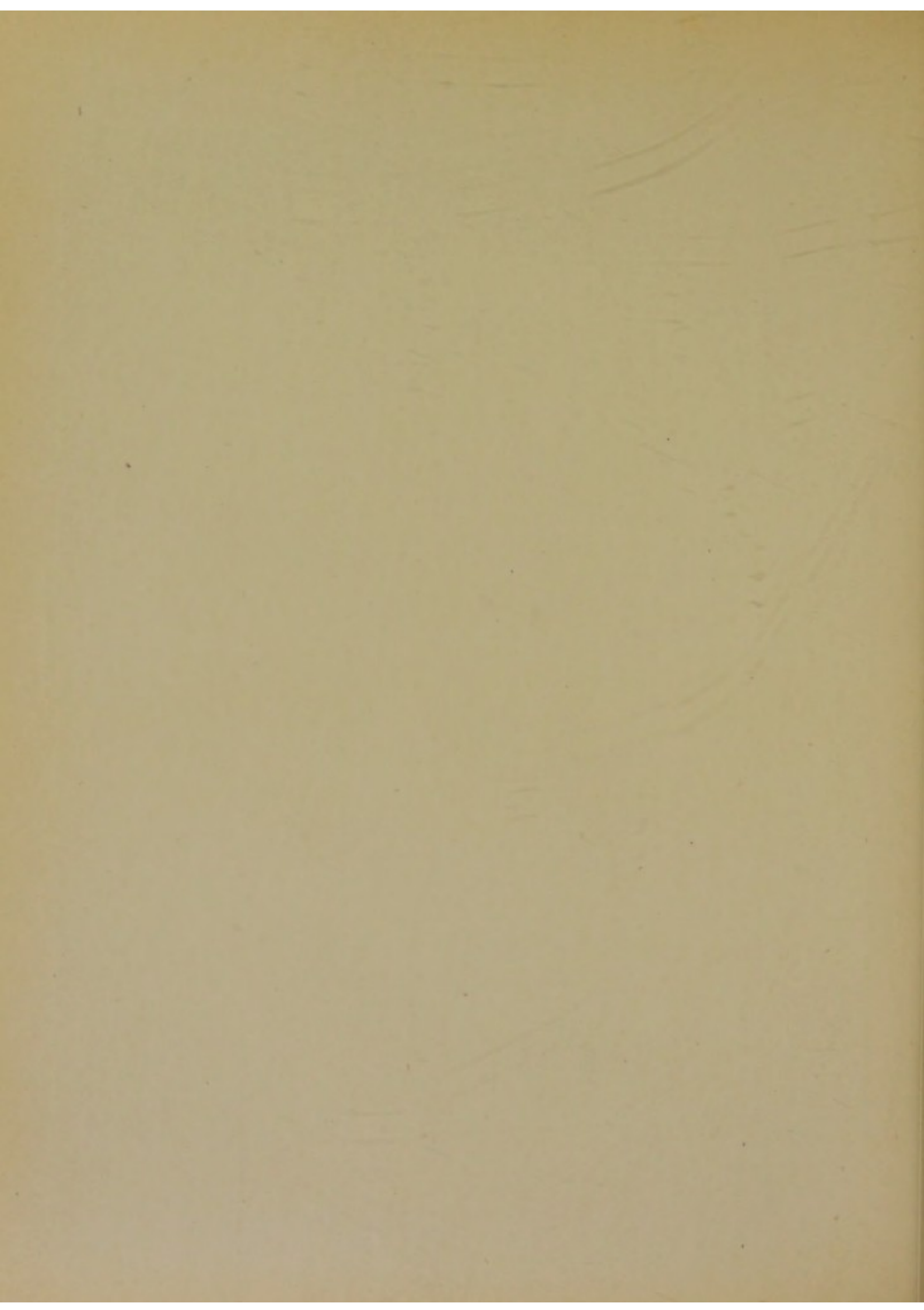
Of the varieties and cultivation of Cocoa in Trinidad and Grenada, the following extracts are from the pen of D. Morris, M.A., F.G.S., Director of Public Gardens, etc., Jamaica (1882):—

CACAO: HOW TO GROW AND HOW TO CURE IT.

“As in a large number of cultivated plants entirely propagated from seed, the Cacao plant is liable to considerable variation, even when seed is taken from the best kinds. It is important, therefore,


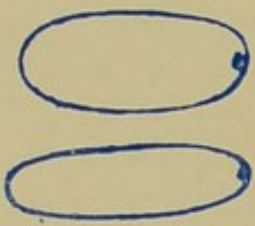


GANG MUSTERING FOR WORK. THE LONG POLES ARE FOR CUTTING DOWN THE COCOA PODS BEYOND HAND REACH.
TRINIDAD, 1894.



that the Cacao planter should make himself acquainted with the chief varieties, and cultivate only those specially suited for his soil and climate—carefully weeding out, or ‘roguing,’ all those which, from habit of growth, yield, character of produce, and other circumstances, are unsuitable for his purpose.

“The following are some of the well marked varieties of Cacao as known in Trinidad :—

				Typical shape of Cocoa bean, viewed edgewise.
1.	Cacao Criollo (Red—Thin Skinned)—			
	Var. a. Cundeamor verugosa amarillo (yellow)			
	b. „ „ colorado (red)			
2.	Cacao Forastero (Thick Skinned)—			
	c. Liso amorillo (yellow)			
	d. „ colorado ... (red)			
	e. Amelonado amarillo ... (yellow)			
	f. „ colorado ... (red)			
	g. Calabacilla amarillo ... (yellow)			
	h. „ colorado ... (red)			

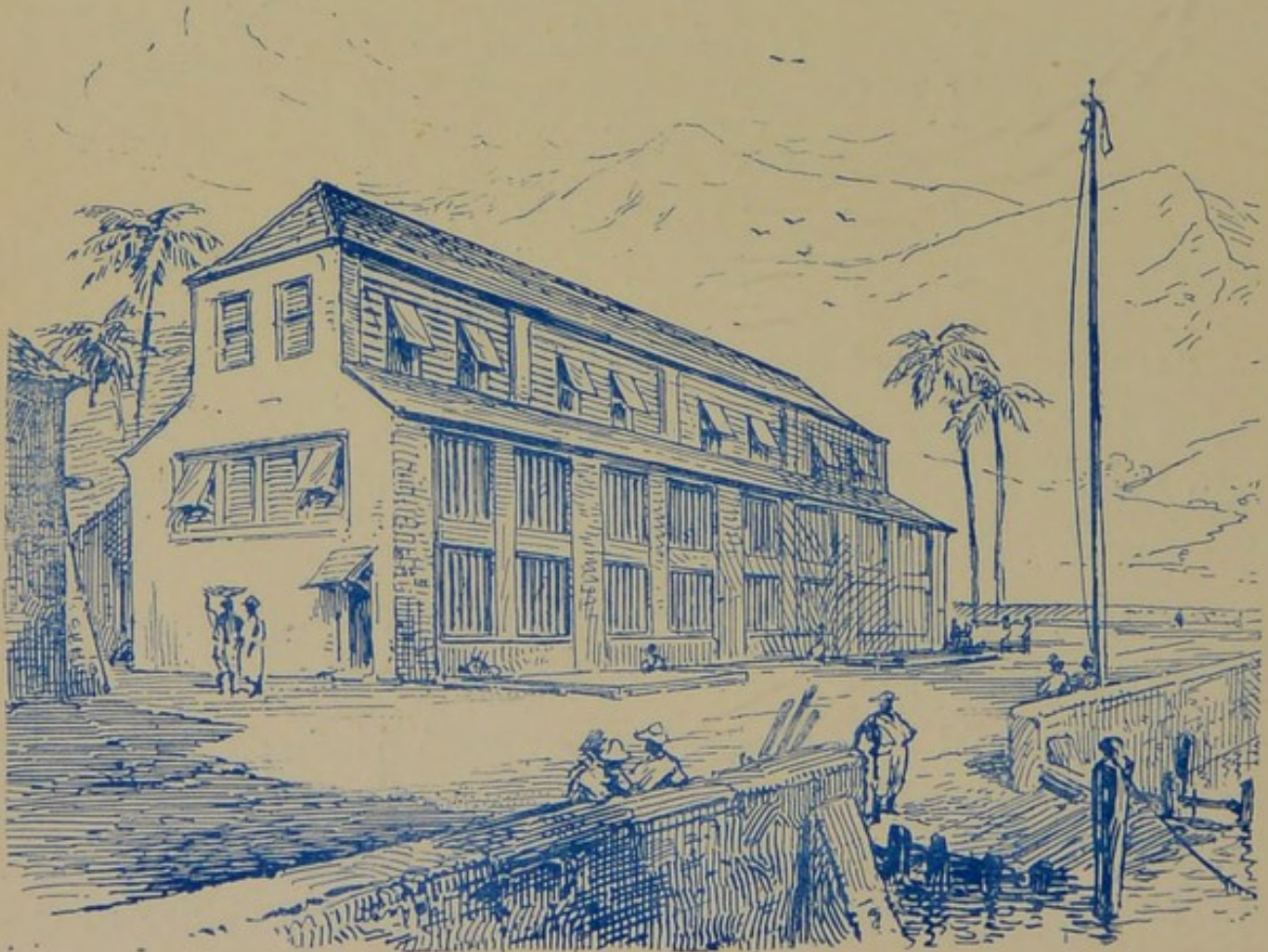
“It will be noticed that the varieties are divided into two great classes, Cacao Criollo and Cacao Forastero. Mr. J. Hinchley Hart, F.L.S., Superintendent of the Royal Botanical Gardens in Trinidad, divides them into three classes.

“Of the Forastero varieties the best are the *Verugosa Amarillo* (Yellow) and the *Verugosa Colorado* (Red). Of these two the yellow kind is said to yield a larger proportion of seeds than the red, and they are said to require less time for fermentation. It appears that in Grenada also the yellow is preferred to the red, both on account of its yield and its greater adaptability to the exigencies of cultivation.

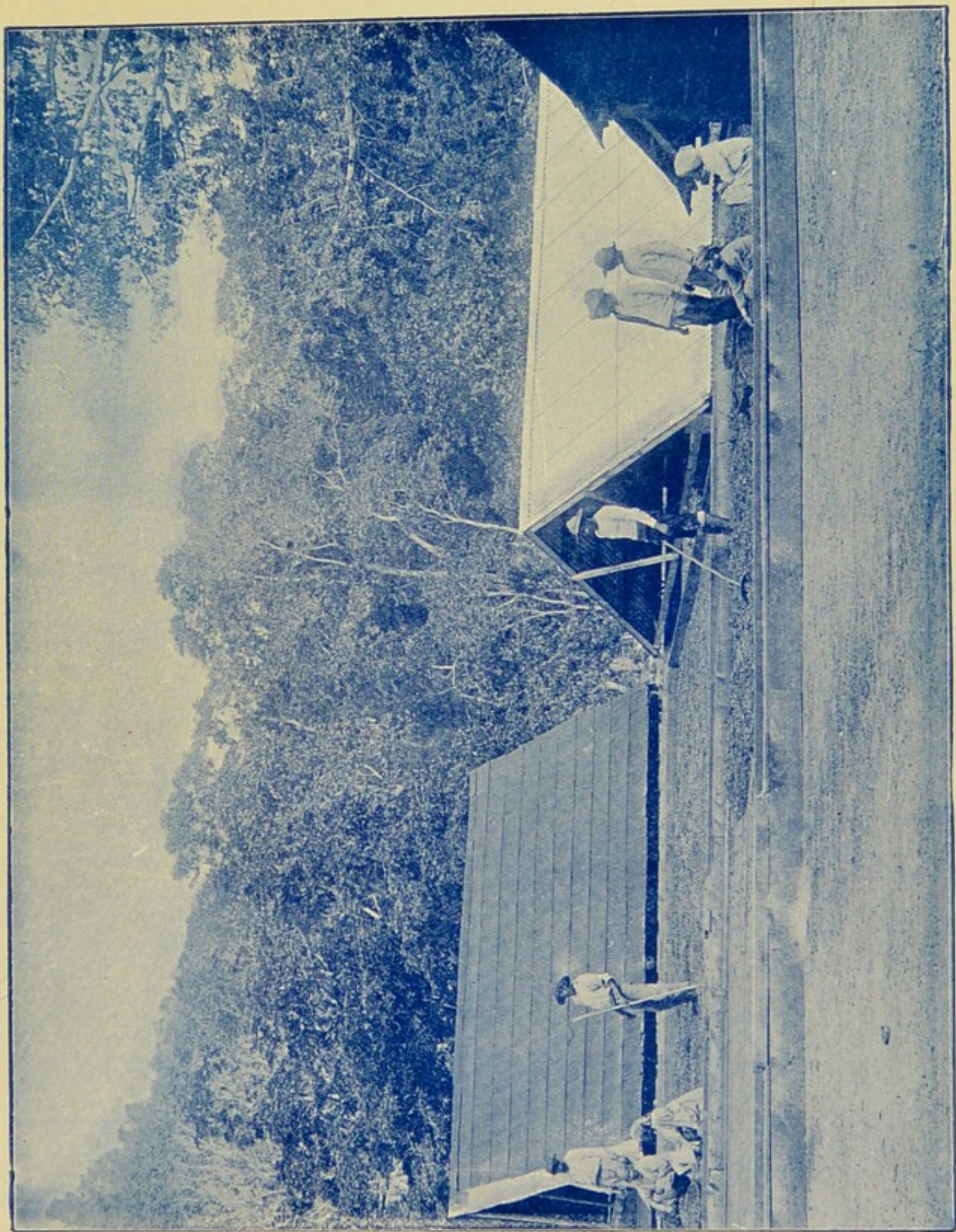
“The average mean temperature of the plains and valleys of Trinidad are naturally higher than similar localities in Jamaica, but if we would compare the temperature of Jamaica with that of the plains and valleys on the coasts of Guatemala and Mexico it would be found that our temperature is quite high enough for the successful cultivation of the Cacao plant.

“As regards elevation, with the exception of some mountain ranges in the North, rising into sharp peaks of about 3,000 feet, the surface of Trinidad is in general flat, or gently undulating.

“The highest cultivated lands seldom exceed 200 feet or 300 feet, and no parts are inhabited above 500 feet. In Arima and



Curing House in Grenada.



ROW OF DRYING HOUSES.
PHOTOGRAPH TAKEN IN TRINIDAD, 1894



the Montserrat districts, the Cacao estates occupy open glades and moderately undulating country, ranging from almost sea level to 150 feet or 200 feet. The sub-soil in these districts is of a marly character, overlaid, chiefly in hollows, by gravelly loam, moderately deep and remarkably free from rocks and stones.

“In Grenada, Cacao is generally cultivated at a higher elevation than in Trinidad, some estates occupying hill slopes up to 800 feet.* The best estates are, however, at the foot of the hills or in sheltered glades, on land formerly cultivated in sugar.”

As regards the planting, Cacao requires more care and thought than is generally imagined.

For instance, it is not only necessary to be ready beforehand with Cacao seeds or plants, but the plants have to be shaded and protected by larger trees, which are put in either before the Cacao or at exactly the same time. The Cacao are planted at exactly the same distances apart, and in the centres of squares.

* Mr. R. S. Ross gives us some interesting particulars of a Cocoa plantation, during a visit to the West Indies, about 1874 :—“It was in the mountains, several hundred feet above the level of the sea. The climate was quite European, the thermometer seldom rising above 76°. In the distance the deep blue sea, in the valley below the groves of Cocoa trees, interspersed with coker-nut trees and stately palms. Of the trees planted to shelter the Cocoa I will describe but a few. The Caracoli, as large as an elm, is planted in rows ; it is a splendid evergreen, bearing a sweet white blossom. Among other large trees are the bread-fruit, the shaddock, and the glorious mango, which is the size of a large horse-chestnut, and is thickly covered with leaves. The fruit is not unlike an egg-plum in shape, but three times as large and of a beautiful golden colour, streaked with red.’

Close to the Cacao plants are small shade plants to protect them for a few months : further off are the bananas and plantains, one between each Cacao plant, to last for about two or three years ;



Copy of an old engraving (said to be the oldest in existence relating to Cocoa) showing the way in which the Cocoa Tree is shaded by other larger trees. (From Bontekoe's Works.)

and lastly there come the permanent shade trees, at distances of 39 or 40 feet, which at the end of three or four years will be the

only occupants of the ground besides the Cacao.* The plant delights in a deep and moderately rich soil — that containing a certain proportion of lime or marl being preferable.†

In planting, either of two systems may be adopted:—

1—(a) Planting at stake (seeds), or (b) planting from nurseries (plants).

Planting at Stake:—In this case the best and largest seeds in a pod are taken and two or three are planted at each stake, the soil being first softened and broken up by a hoe.

After being sown, the seeds require both shade and protection till they have germinated, which they generally do in a week or ten days. When the young plants are from four to six months old, the strongest only is retained, the others being carefully removed to give it full scope to grow.

Planting by stake is only adopted in fresh good land, and where seeds are abundant.

In addition to selecting the best and largest seeds (leaving out the end ones) it is advisable for this purpose to wash the pulp and cover thoroughly with wood-ashes, as a protection against ants and predatory vermin.

* Dampier, in writing of the Island of Tobago, in the Bay of Panama, says : “Among the Cocoa trees grows the mammet, a straight tree without knot or branch, 70 feet in height, and with a tufted and interlaced head. This seems to serve as a parasol to the Cocoa tree, which is injured by the burning rays of the sun.” Mr. Hart says : “For shade in the lower lying lands in Trinidad, the tree generally used is the ‘Bocare’ or *Erythrina velutina*, which affords a deep shade. For the higher lands, the ‘Anauca’ or *Erythrina umbrosa* is used. The latter grows to a much greater height than the ‘Bocare,’ and does not afford so dense a shade.”

† Mr. Hart, F.L.S., says : “The seed possesses but a short life if exposed to dry air ; if kept in a moist situation fermentation quickly sets in, and the seed becomes useless. It is thus very difficult to transport Cacao seed to distant countries, unless placed under conditions favourable to germination. Cocoa may be sent in ripe pods for short journeys not exceeding 8 or 10 days.”

Planting from Nurseries:—Where planting at stake is not practicable, it is advisable to establish, beforehand, nurseries raised from seed of the best varieties, so as to have plants ready for putting out with the first rains. If the number be small it would be better to raise the plants in bambu pots, as well for convenience of transport as for protection to the young plants in the process of transplanting.*

Cacao trees in good situations begin to bear in about the third or fourth year. Individual trees will, however, sometimes show fruit when only two years old, but it is much better for the trees themselves that they should be stripped and not allowed to bear till at least the fourth or fifth year. A Cacao plantation should be in fair bearing from the sixth to the ninth years, and at its prime about the twelfth year.

Gathering Crop:—Although Cacao is in bearing more or less all the year round, the chief crop seasons are in May and June, and again in October and November—these are known in Venezuela, where the famous Caracas Cacao is grown, as the St. John's and Christmas crops, respectively.

* Mr. Hart says : "With those who prefer raising plants in boxes, the best method would be to procure well-rotted and sifted coco-nut refuse, and to sow seeds about $\frac{3}{4}$ -inch below the surface, the boxes being about six inches in depth, and well-drained. A suitable substitute for Coco (Coker)-nut refuse may be found in well decomposed leaf-mould. Immediately the plants have developed their first pair of leaves, they may be potted or transferred to nursery beds, in both cases shading them until well established. If transferred to beds, especial care must be taken not to plant too low in the ground, * * * covered with about one inch of soil."

Gathering crop is done as follows :—A number of men, each supplied with a long bambu rod surmounted by a Cacao hook and a cutlass, go carefully over the plantation and pick out all the ripe pods.

These are known by their colour, or better still, by tapping them. If ripe they give a hollow sound, as the seeds are then loose and detached from the outer shell. In gathering the higher pods the Cacao hook is used, but the lower ones are taken off with a cutlass. The Cacao hook is constructed so that it will sever the pod either by a thrust or by a draw.

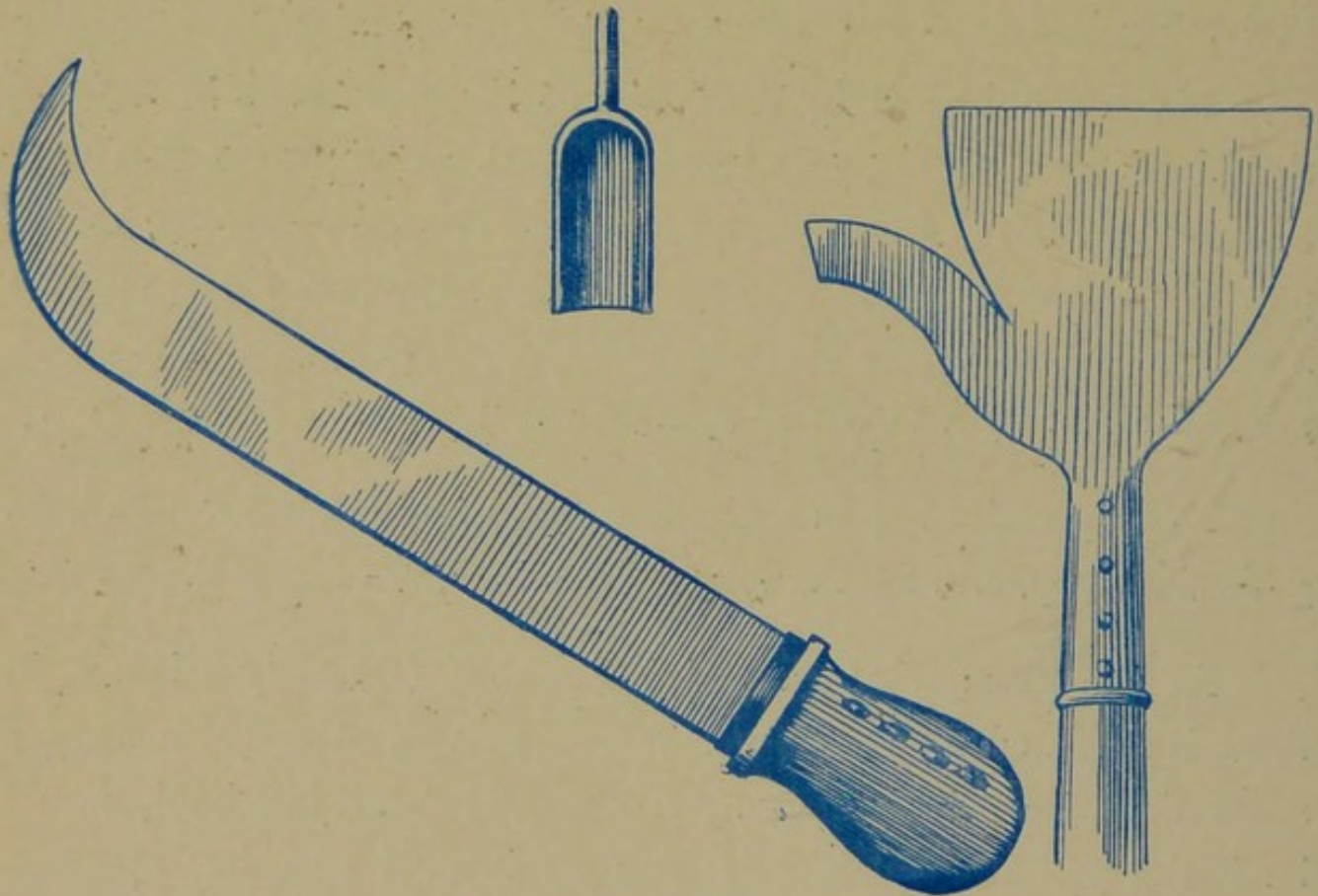
Few operations upon a Cacao estate require greater care than gathering crop, and for the following reasons :—

At the place where a pod is attached (formerly a leaf axil) there is a soft cushion or “eye,” from which all subsequent flowers and fruits arise. If this “eye” be damaged—as it inevitably would be if the pod were ruthlessly torn off instead of being cut—the tree, as far as this point is concerned, becomes sterile. Hence, if a succession of these “eyes” are thus treated, the tree would speedily become practically valueless.

When the pods have been gathered and left in small heaps near the trees, they are collected by women into larger heaps, and left till the next day.

The larger heaps are generally placed near a clear, open space, where the processes of “breaking” and “drawing” can be con

veniently carried out. It is advisable, however, not to use the same spot too often, as the empty pods accumulate and prove an impediment to the cultivation.



Implements used for severing the Fruit from the Tree, and cutting open the Pod.

A party, consisting of a man with a cutlass and two or three women with wooden spoons or scalpels, are told off to a number of heaps, and by each one they spread plantain leaves on the ground to receive the seeds. Then, while the man breaks the pods with his cutlass, the women remove the beans with the wooden spoons, clean them of the fibrous tissue by which they are attached, and throw them in a large heap.

All black, unripe, or damaged beans are placed on one side.



SEPARATING THE COCOA BEANS FROM THE PODS.
TRINIDAD 1894.



When this process is completed, the fresh seeds are ready to be conveyed or "crooked" to the Cacao house, and placed in the "sweating" house.

This process is one upon which, in a great measure, the commercial value of Cocoa depends. The first impulse of a grower would be to remove the pulp between the seeds by washing, and dry the beans as quickly as possible. This, however, would not result in a good quality of Cocoa. The pulp must be removed, but washing is not the best process.

The fresh bean will be found to be somewhat bitter in taste, and of a pale crimson colour; both taste and colour have to be altered before the bean is fit for the market.

The best means for this purpose is evidently the one now generally adopted in all good Cacao-growing countries, namely, "sweating," or fermenting the beans. This, for the most part, gets rid of the pulp, softens the bitterness of the fresh beans, and gives them, when cured, that rich mahogany tint so much sought for by chocolate makers.

The sweating process may briefly be described as follows:—The beans brought from the field are placed either in barrels, oblong boxes, or in a close room, where they are packed closely together, covered with plantain leaves, and left hermetically sealed for a period extending from four to seven days. The exact number of days will depend on the variety of the bean or quality of Cacao desired. While thus shut up, a process of fermentation, set up by the saccharine matter in the pulp, takes place, which raises the

temperature of the mass to about 140° Fah.* During fermentation carbonic acid is given off, and some water. In wet weather care is taken that the temperature of the mass does not rise too high, as if it should the beans would blacken. It is often necessary, under these circumstances, to open the Cacao, and carefully stir it before it is returned, to complete the fermenting process.†

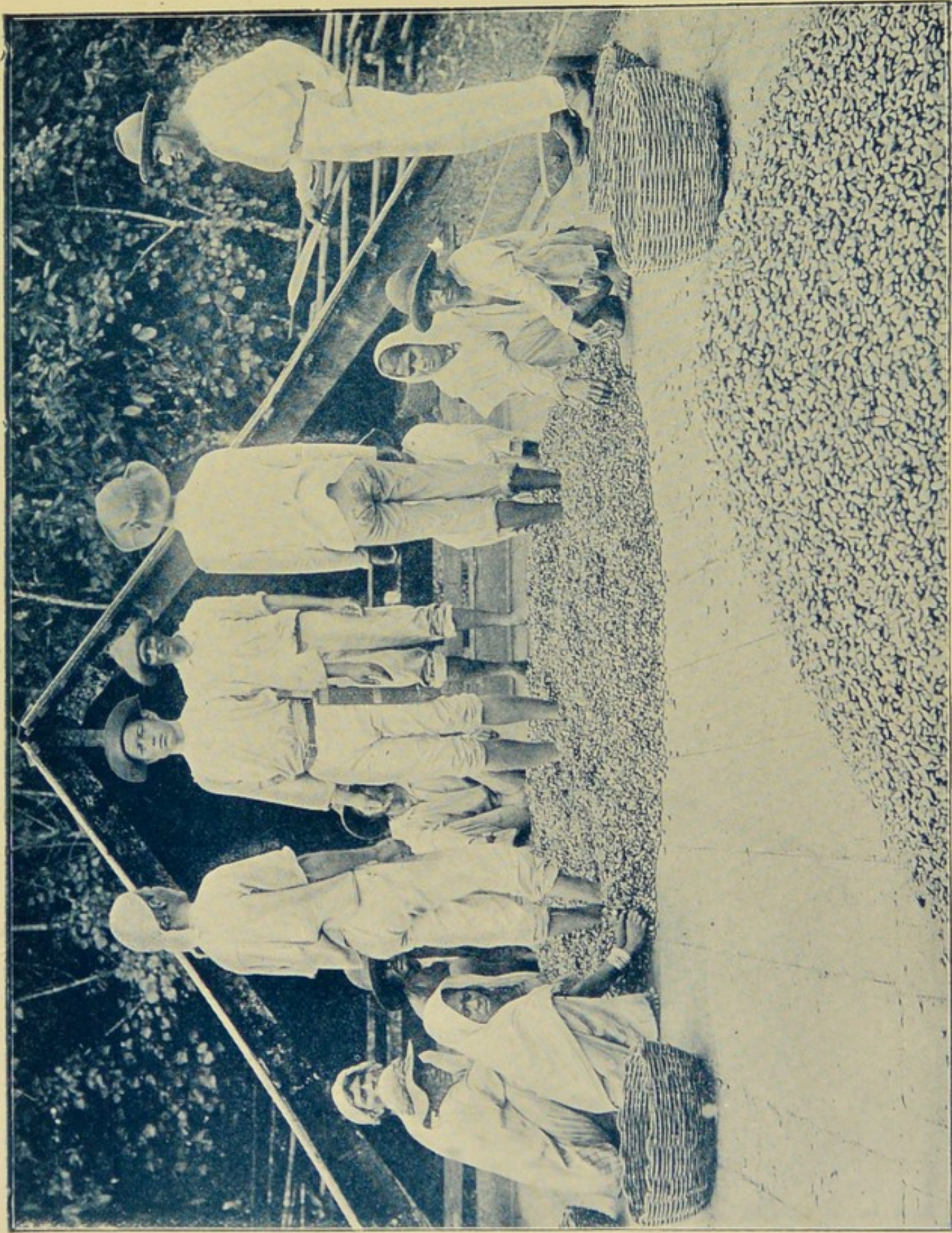
For a plantation, say, above 10 acres, it would be more convenient and satisfactory to have a small building for the purpose attached to the Cacao house, called a "sweating house."

This house would be somewhat as follows: An oblong room on the basement story, or mounted on pillars, with boarded sides carefully fitted, so as to be perfectly air-tight. The only opening would be by a door, which should also fit as tightly as possible. For keeping crops gathered at different times distinct, it is advisable to have a division in the middle. The floor should be double, and constructed of rather close parallel bars, so as to allow water, but no beans, to fall through into a space below.

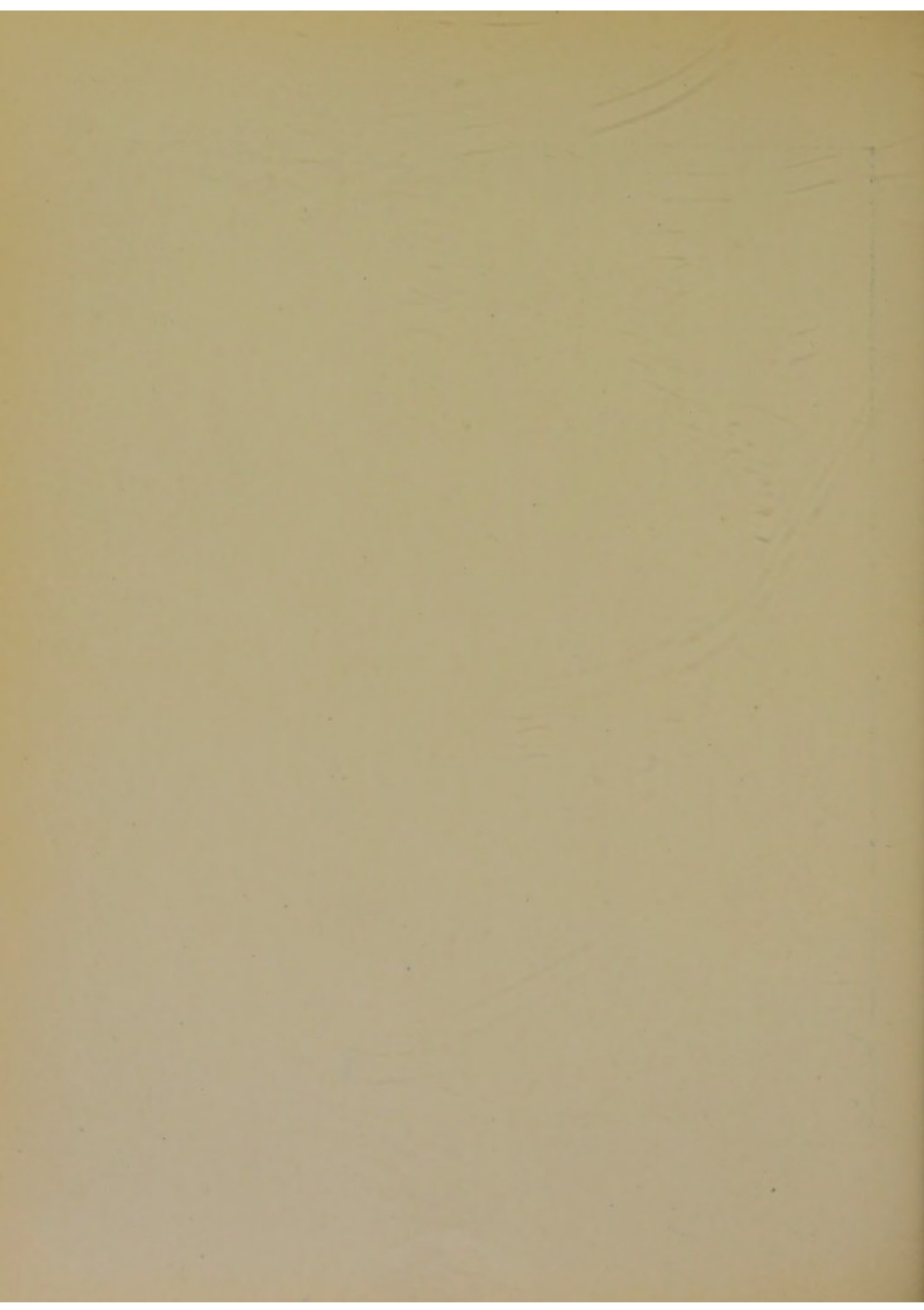
When the formerly pale crimson colour has given place to a brownish tint, the Cocoa is turned out and spread on the "tray" or "barbecue." It is first of all carefully picked over by women, who separate the beans from "trash" or any foreign substances. This done, the beans are covered with red earth, and left

* Dr. Chittenden, in his "Prize Essay," says: "115° to 120° is the requisite temperature."

† Dr. Chittenden tells us that fermentation is "essentially alcoholic," and that, "acting on the bean, both through the pores of the pellicule and through the opening of the top, known as the 'Hile,' vaporises the aqueous elements, and develops the fatty substance which absorbs and retains the aroma of the Cacao." J. Hinchley Hart adds: "The prime object, therefore, appears to be to change the inside portions of the bean by absorbing into it products obtained from the fermenting pulp."



DANCING CACOA : *i.e.* SEPARATING THE PULP FROM THE BEAN.
TERRACOTA 1904



for another day to complete the process of fermentation. A number of women are then employed for one or two hours in rubbing them with their hands, and cleaning them as thoroughly as possible from all mucilaginous and gummy matters.

The red earth, by its absorbent qualities, assists in ridding the beans of the mucilage, and gives them a deep red colour; it is also supposed to give them better keeping qualities. A large proportion of Trinidad Cacao is cleaned without the use of red earth, but the process is much more tedious and the beans are not so good in colour and general appearance. In Jamaica, a large quantity of red earth for the purpose can be obtained from what are called the "Red Hills," St. Andrews. When the cleaning and rubbing process has been completed, the beans are spread out on a tray to dry.

While drying they are carefully turned, so as to expose them completely to the influence of the sun; but in case of rain they are immediately covered by the sliding roof of the Cacao house. During the hottest part of the day, when the thermometer stands over 90° in the shade, it is considered undesirable to expose the beans too much to the sun, as thereby they become "parched" or shrivelled. The Cacao house is therefore generally shut on hot days for three or four hours, and the Cacao exposed only when the temperature is low.

The process of turning and drying is continued from day to day until the Cacao is thoroughly cured.*

* A machine for drying by means of hot-water pipes is quickly taking the place of the above system, which is entirely dependent on fine weather and sunshine. The hot-water pipes are arranged in a long square iron box, and over these the beans travel slowly forward on a band of wire netting, being at the same time stirred by a series of arms, which turn them as they move along. The exact heat and length of time required is thus systematically measured, and an even drying of each Cocoa bean ensured.

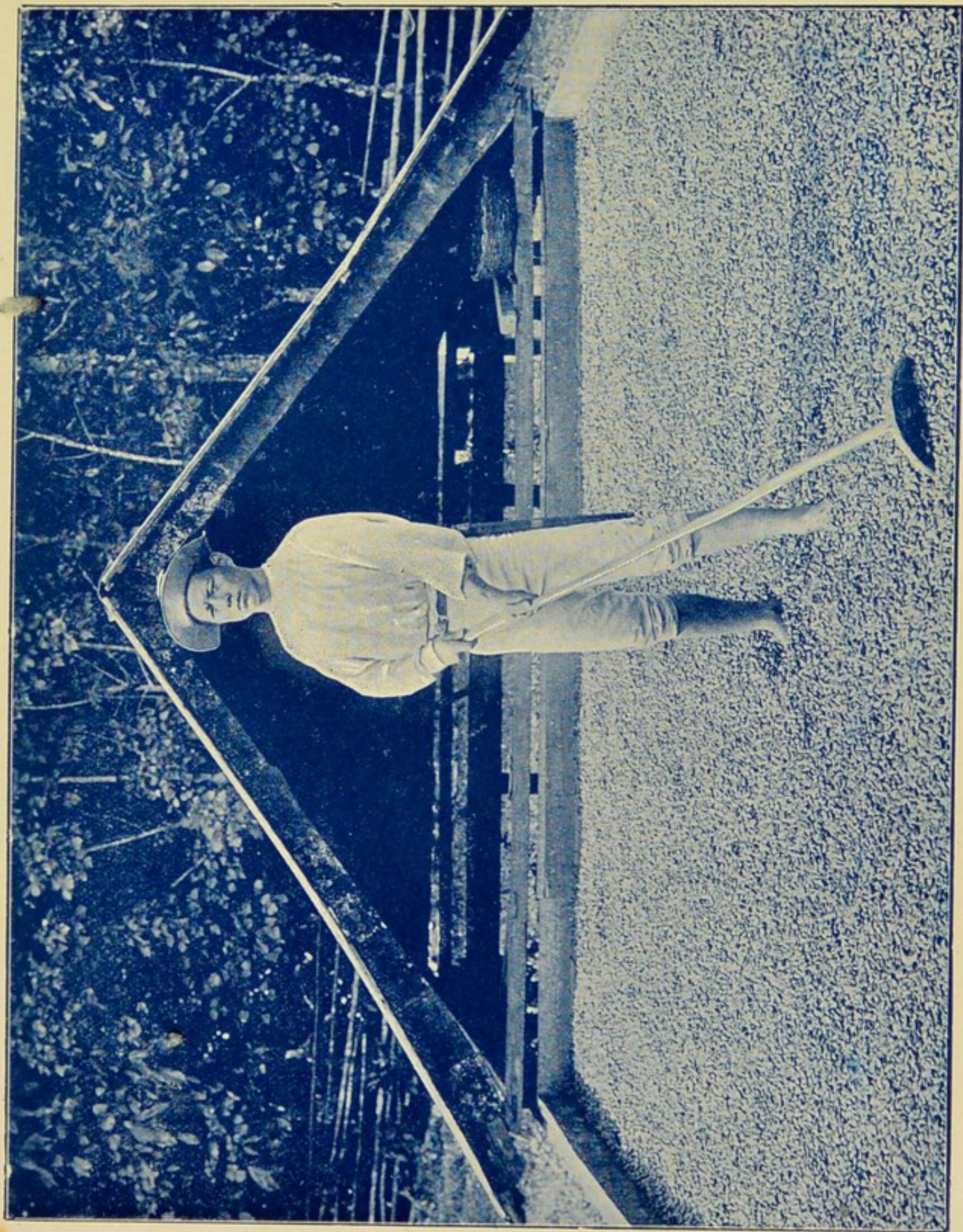
The experience of the planter alone can tell whether the Cacao is thoroughly dry.

If well cured it should have the outer skin hard, crisp, and separating easily from the bean below. The latter should be firm, bright, and breaking easily on pressure into the familiar Cacao nibs of commerce.

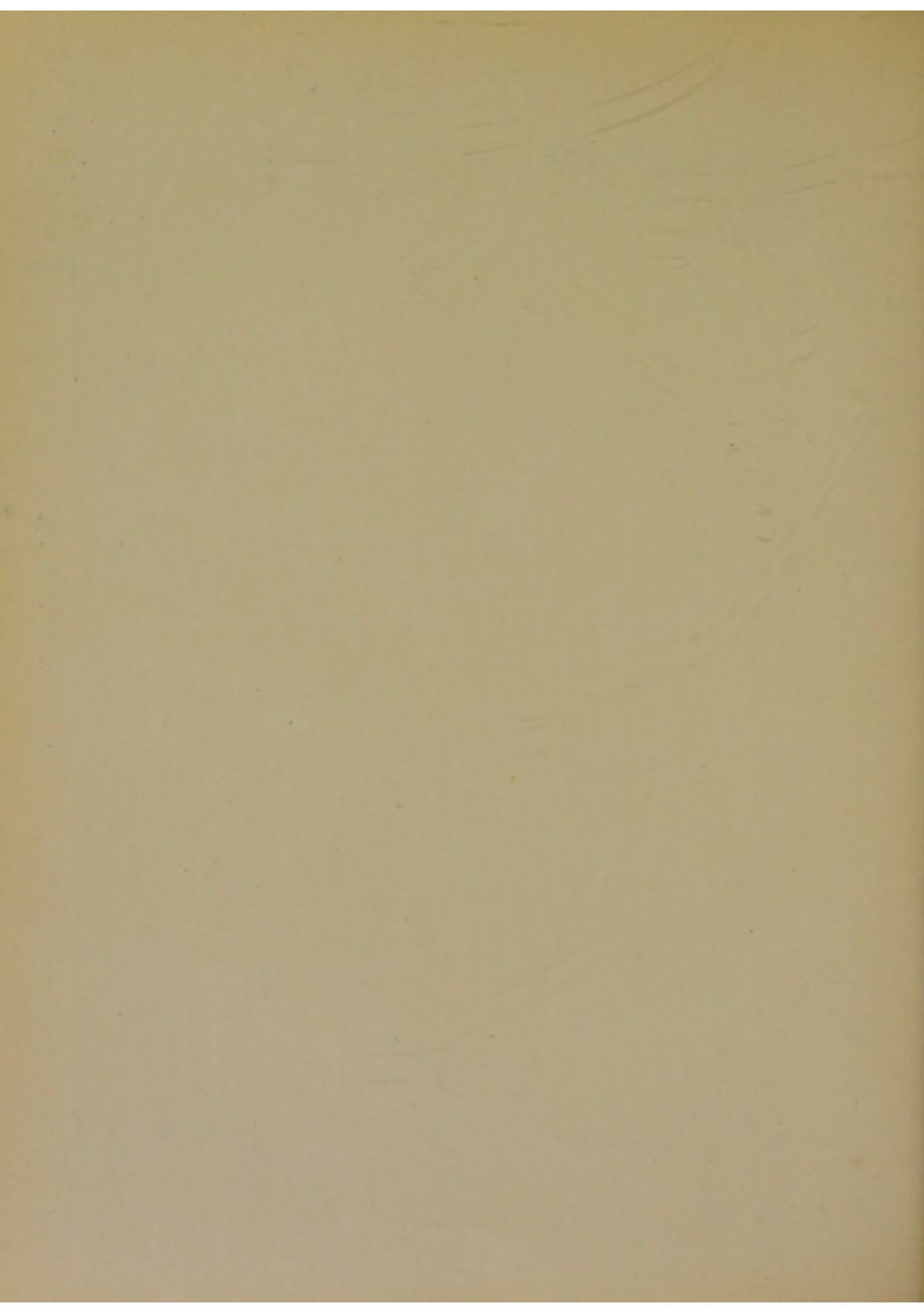
It will be noticed that, so far, no washing of the Cacao beans has taken place. The process of cleaning is accomplished solely by the alternating operations of rubbing and drying with, as already mentioned in some instances, the aid of red "clay" or earth.

A healthy Cacao tree in good soil yields from fifty to several hundred pods per annum. The average for well-cultivated trees, at seven years old, should be between eighty and one hundred pods per annum. As it generally takes about eleven pods to yield one pound of cured Cacao, the above would indicate that a good mature Cacao tree, under favourable circumstances, might yield, on an average, not less than seven pounds of cured Cacao. The average yield per tree (at all stages) on an estate of, say, 300 acres, would probably not exceed some two or three pounds per tree, or (taking 230 trees per acre) a return of 4 cwt. to 6 cwt. of cured Cacao per acre.

Before closing this chapter it may be well clearly to distinguish the *Theobroma Cacao*, of which we are treating, from the Coker Nut Palm (*Cocos Nucifera*), which grows to the height of 100 feet, and produces the large Coker Nut with its hard white lining and the sweet milky juice inside.



DRYING COCOA. TRINIDAD, 1894.



Also from the Coca plant (*Erythroxylon coca*), a small shrub growing and largely cultivated in Peru and Bolivia, and also in Jamaica and St. Lucia. From the leaves of the last is extracted the important product Cocaine, which has acquired a place in the first rank of alkaloids of medicinal value.

There are also several species of Cocoa all distinct from our cultivated *Theobroma Cacao* and its varieties, viz.: *Theobroma bicolor*, *T. Guianensis*, *T. Sylvestris*, *J. Ovatifolia*, *T. Augustifolia*, all natives of tropical regions, extending from Mexico to Brazil.

A fruit grows on the Seychelles Islands called "Coco de Mer." It is a double cocoa-nut, weighing about $\frac{1}{4}$ cwt. and grows on a tree which attains the height of 80 or 100 feet. The leaves are proportionately large, averaging eight to twenty feet in length, and ten to twelve in breadth. It is not known to be of any commercial value, although General Gordon held the strange belief that it was the "Forbidden Fruit" in the garden of Eden, and that the rivers of the Seychelles corresponded with those mentioned in Genesis.



CHAPTER II.

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HISTORY OF THE USE OF COCOA.



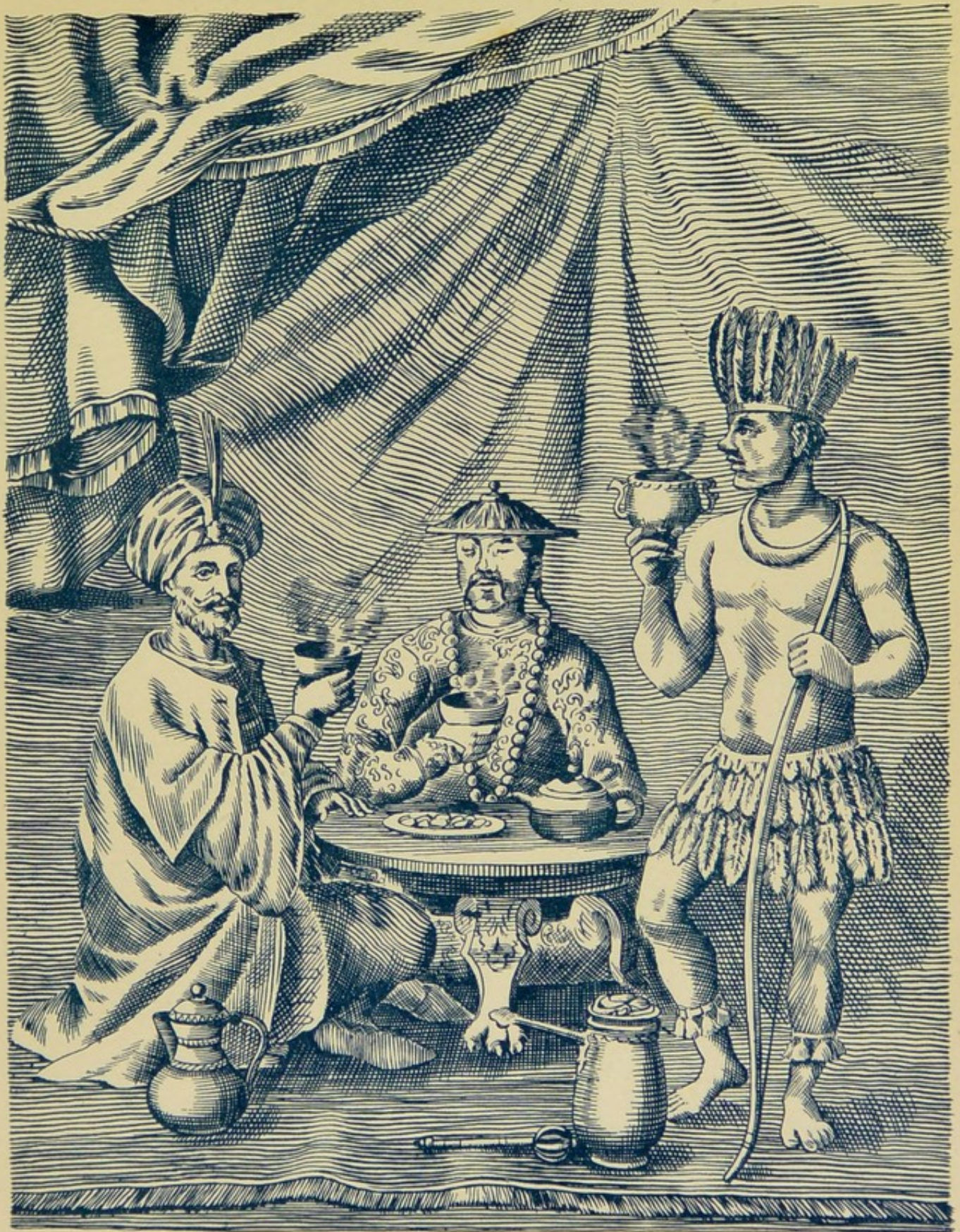
Preesnts of Cocoa and Other Fruits
Brought to Benzonius.

DE BRY'S "HISTORY OF AMERICA."
FRANKFORT: 1600.

LOOKING at the early works on the use of Cocoa, we find them very quaint and speculative as to its medicinal value, and its effect upon the constitution.

In an extract from the "Harleian Miscellany," Vol. 8 (1673), we find, "The grand Concern of England explained, in

several proposals offered for the consideration of Parliament by a Lover of his Country." No. 6 reads: "The sixth thing proposed is the prohibition of brandy, rum, coffee, chocolate and tea, and the suppressing of coffee-houses; these hinder greatly the consumption of barley, malt and wheat, the



Reproduction of an old Plate (1688) from DUFUR'S "TREATISES ON COFFEE TEA, AND CHOCOLATE."

product of our land" (what a delicious bit for the Protectionists of our day). "There is so vast a quantity of brandy, rum, coffee, tea and Spanish Chocolate every year imported into England, that there is expended by the subjects yearly in these drinks above £400,000. In short, brandy burns the hearts of His Majesty's subjects, and for coffee, tea and chocolate, I know no good they do."

As early as 1624, Joan Fran Rauch wrote a treatise condemnatory of the use of Cocoa as a violent inflamer of the passions, and enlarged on the necessity of forbidding the monks to drink it; and adds, "that if such an interdiction had existed that scandal with which that holy order had been branded might have proved groundless."

"This 'Disputatio medico diætetica de aëre et esculentis, de necnon potû,' Vienna 1624, is a *rara avis* among collectors. Its attack on the monks, as well as on Chocolate, was said to be the cause of its scarcity."*

We have a curious collection of the opinions of theologians upon the question of "Fasting from Chocolate in Lent," in a volume published in Italian by Daniel Concuna, Venice, 1748. He says: "Among the first Probabitist Theologians who undertook to write entire Treatises, and to collect all the possible reasons as to whether the Indian beverage (Chocolate) could agree with European fasting, was Father Tommaso Hurtado. He employed the whole of the tenth Treatise of the 2nd Volume of the 'Moral Resolutions,' printed in 1651, and added thereto an appendix of more chapters.

* D'Israeli's "Curiosities of Literature."

“Father Diana found reason for acquitting the consciences of those who in time of fasting should drink Chocolate. Father Hurtado, more courageous withal, and more benign than Diana, does not speak of this Treatise in order to investigate the law ; the nature of fasting admits drinking without eating. * * * Therefore consumers are, without the help of casuists, troubled themselves and afflicted when in Lent they empty Chocolate cups. * * * Excited on the one hand by the pungent cravings of the throat to moisten it, reprov'd on the other by breaking their fast, they experience grave remorse of conscience, and, with consciences agitated and torn with drinking the sweet beverage, they sin. * * * Under the guidance of these skilful Theologians, the remorse aroused by natural and Divine light being blunted, Christians drink joyfully.”

The Treatise closes by saying : “ For all agree that he will break his fast who eats any portion of Chocolate, which dissolved and well mixed with warm water is not prejudicial to keeping a fast.

“ This is a sufficiently marvellous pre-supposition. He who eats four ounces of exquisite sturgeon roasted breaks his fast ; if he has it dissolved and prepared in an extract of thick broth he does not sin.”

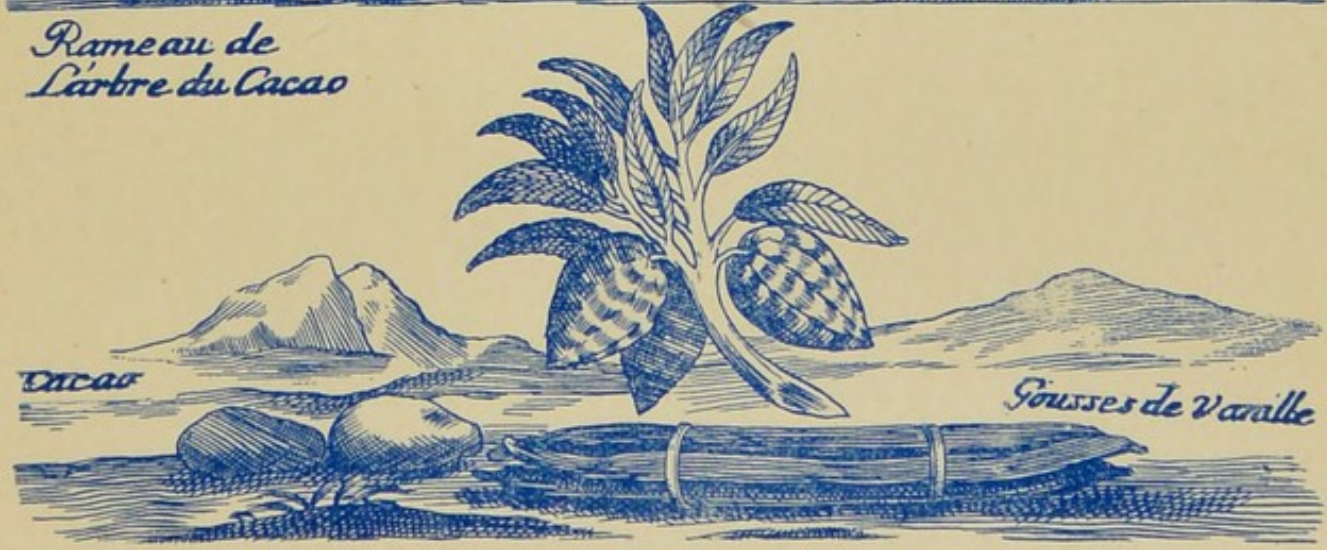
When we realise how ignorance and prejudice go hand in hand, we need not be surprised to find the *Spectator*, April 29th, 1712, placing Chocolate in a list of dangerous things to be avoided : “ I shall also advise my fair readers to be in a particular manner careful how they meddle with romances, Chocolates,

Folio
305

American avec
sa Choco
latiere
et son
Gobelet

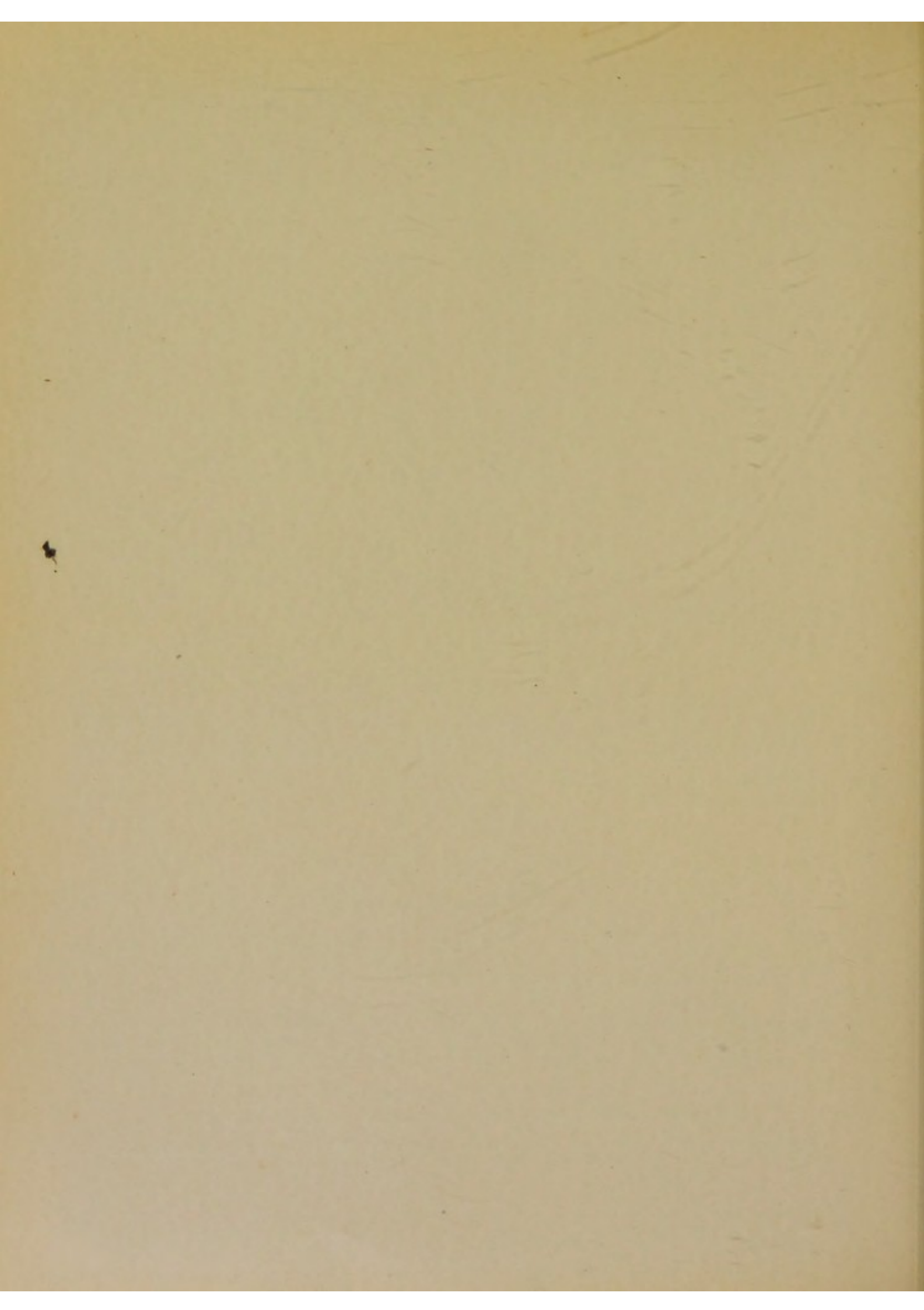


Rameau de
L'arbre du Cacao



Fructe' Nouveau & Curieux du Chocolate
Composé Par Philippe Sylvestre Dufour &

Copy of an engraving, from a rare work by Philippe Sylvestre Dufour, showing a native with his chocolate pot and drinking cup, and the "molinnet," or stirrer, in his hand



novels, and the like inflamers, which I look upon as very dangerous to be made use of during this great carnival (the month of May)."

Dr. Duncan, of the Faculty of Montpelier, London, six years earlier (1706), said : "Coffee, Chocolate and Tea were at the first used only as medicines while they continued unpleasant, but since they were made delicious with sugar, they are become poison. * * * If pleasure did not deserve it as a passport, that would be stopp'd at the gate of the House where the Soul dwells."

Almost contemporary with Rauch's treatise, was a book written by Antoino Colmenero de Ledesma, Medicin and Chirurgien, de la Ville de Ecija, de l'Andalouzie, 1631; which was translated from the Spanish into French by Renè Moreau, in 1671; into Latin by Marco Aurelio Severino, in 1644; and put into English by Don Diego de Vades-forte, London, 1640.

Willem Bontekoe, a Dutch author and traveller, wrote sundry short treatises on Cocoa and Chocolate about 1679. De Chélus, 1719, wrote a "Histoire Naturelle du Cacao et de Sucre."

Another French work, "On the Quality and Nature of Chocolate," by Philippe Sylvestre Dufour, in 1688, from which we copy some of the very interesting engravings, is translated into English from the last edition of the French, by R. Brookes, M.D., 1730.

Early travellers to the newly discovered world have left us a fund of curious and interesting information respecting the use of Cocoa among the native races.

Josephus Acosta (1604), writing of its use in Mexico and Peru, says : " The chief use of this Cocoa is in a drincke which they call Chocholaté, whereof they make great account, foolishly and without reason ; for it is loathsome to such as are not acquainted with it, having a skumme or frothe that is very unpleasant to taste, if they be not well conceited thereof. Yet it is a drincke very much esteemed among the Indians, whereof they feast noble men as they passe through their country. The Spaniards, both men and women, that are accustomed to the country are very greedy of this Chocholaté. They say they make diverse sortes of it, some hote, some colde, and put therein much of that Chili ; yea, they make paste thereof, the which they say is good for the stomacke, and against the catarre."

A quarto of 39 pages, of very early date, " printed at London for Christopher Wilkinson, at the Black Boy over against St. Dunstan's Church, in Fleet Street, condemns Chocolate on account of the sugar with which it is mixed " : " As for the great quantity of sugar which is commonly put in (Chocolate), it may destroy the native and genuine temper of the Chocolate, sugar being such a corrosive salt, and such an hypocritical enemy of the body. Simeon Pauli (a learned Dane) thinks sugar to be one cause of our English consumption, and Dr. Willis blames it as one of our universal scurvies ; therefore when Chocolate produces any ill effect, they may be often imputed to the great superfluity of its sugar."

On the other hand, the writer says : " All the American Travellers have written such panegyricks, that I should degrade this royal liquor if I should offer any ; yet several of these curious

Travellers and physicians do agree in this, that the cocoa-nut has a wonderful faculty of quenching thirst, allaying hectic heats, of nourishing and fattening the body." Mr. Hughes informs us that he lived at sea for some months on nothing but Chocolate, and that he grew very fat in Jamaica by virtue of the cocoa-nut; as he judges it most proper for lean, weak and consumptive complexions.

According to Bancroft's "Native Races of the Pacific States," the Aztecs "dug up the bones of giants at the foot of the mountains, and collected by their dwarfish successors, ground to powder, mixed with Cocoa, and drunk as a cure for diarrhœa and dysentery;" and the same author tells us that "Scalding hot Cocoa mixed with chile is the favorite stimulant, of which large quantities are imbibed, until the perspiration starts from every pore."

In Gage's "New Survey of the West Indies," London, 1648, we have a curious account of the use of Cocoa in the Indies, and the part taken by the Missions of the "Friars and Jesuites" in introducing it into Europe. He says: "The Indian Fryer being well sett out with high commendations, and fairly painted with flattering eulogies, presents these his patents (with a little wedge of gold, a box of pearls, some rubies or diamonds * * * with some boxes of curious Chocolate, &c.), to the Pope; who, for his first reward, gives him his Toe and Pantofle to kiss * * * and judging him worthy of the best of the Indian wealth, and his soul, peradventure, fit for the title of a saint * * * Then would he act a Medas and Crœsus, fancying the trees to be hung with clusters of Nutmegs bigger than the clusters of the grapes of Canaan, the

fields to be planted with sugar canes, which should so sweeten the chocolate, that it should farre exceed the milk and honey of the Land of Promise."

High living was the order of the day in the city of Mexico, where, he says, "We found that two or three hours after a good meal of three or four dishes of mutton, veal, or beef, kid, turkeys, or other fowles, our stomackes would bee ready to faint, and so wee were fain to support them with a cup of Chokolatte, &c., which was allowed in great abundance."

He speaks of Chiapa, southward from Mexico, as being "the most remarkable place in the way. * * * Here are also two cloisters of nuns which are talked of far and near, not for their religious practices, but for their skill in making drinkes which are used in those parts, the one called Chokolatte, another Atolle. Chokolatte is (also) made up in boxes and sent not only to Mexico, but much of it yearly transported into Spain."

Gage made himself at home with these dignitaries of the Church, who, though they feasted right sumptuously at times, had their second meal in the day of bread and water: "The gentlemen of Chiapa are a by-word all about that country, of great birth, pharisticke pride, joyned with simplicity, ignorance, and penury. One hundred fighting soldiers would easily lay low these Chiapa Dons, and gain the whole city, which lyeth so open to the fields that the mules and asses come in and graze. * * * The women of that city, it seems, pretend much weakness and squeamishness of stomack, which they say is so great, that they are not able to continue in church while the mass is briefly hurried over, much lesse while a solemn, high mass is sung and a



PREPARING AND COOKING COCOA.
OGELBY'S "AMERICA" 1671.



sermon preached, unles they drinke a cup of hot Chokolatte, and eat a bit of sweetmeats to strengthen their stomackes. For this purpose it was much used by them to make their maids bring them to church, in the middle of mass or sermon, a cup of Chokolatte, which could not be done to all without a great confusion and interrupting both masse and sermon. The Bishop, perceiving this abuse, and having given faire warning for the omitting of it, but all without amendment, thought fit to fix in writing upon the church dores an excommunication against all such as should presume at the time of service to eate or drinke within the church. This excommunication was taken by all, but especially by the gentlewomen, much to heart, who protested, if they might not eate or drinke in the church they could not continue in it to hear what otherwise they were bound unto.

* * * But none of these reasons would move the Bishop.

* * * The women seeing him so hard to be entreated, began to slight him with scornefull and reproachfull words; others sleighted his excommunication, drinking in iniquity in the church, as the fish doth water, which caused one day such an uproar in the Cathedrall that many swords were drawne against the Priests, who attempted to take away from the maids the cups of Chokolatte which they brought unto their mistresses, who, at last seeing that neither faire or foule means would prevail with the Bishop, resolved to forsake the Cathedrall; and so from that time most of the city betooke themselves to the Cloister Churches, where by the Nuns and Fryers they were not troubled. * * *

“The Bishop fell dangerously sick, * * * Physicians were sent for far and neere, who all with a joynt opinion agreed that the Bishop was poisoned.

“ A gentlewoman, with whom I was well acquainted, was commonly censured to have prescribed such a cup of Chocolate to be ministered by the Page, which poisoned him who so rigorously had forbidden Chocolate to be drunk in the Church. My self heard this gentlewoman say that the women had no reason to grieve for him, and that she judged, he being such an enemy to Chocolate in the Church, that which he had drunk in his house had not agreed with his body. And it became afterwards a Proverbe in that country, ‘Beware of the Chocolate of Chiapa.’

“ The gentlewoman that was suspected of the death of the Bishop had often used to send me boxes of Chocolate, which I willingly received of her, judging it to be a kind of gratuity for the paines I took in teaching her son Latin ; untill one day she sent unto mee a faire plantin, wrapped up in a handkerchief buried in sweet jassimines and roses; and looking further upon it, I found worked upon it with a knife the fashion of a heart with two blind Cupid’s arrows sticking in it, discovering unto my heart the thoughts of the poisoner that sent it. I thought it a good warning to be wary of receiving such presents, or Chocolate, from such hands, and so returned unto her again her plantin with this short rhyme cut out with a knife upon the skinne, ‘Fruta tan fria, amor no cria,’ as much as to say, ‘Fruit so cold, takes no hold.’

“ I remembered the Bishop’s Chocolate and so was wary, and staid not long after in that poisoning and wicked city, which truly deserves no better relation than what I have given of the simple Dons and the Chocolate-confectioning Dorenas.”

No doubt, the Priests were blameworthy in bartering the priestly powers of the Confessional for the earthly wealth





INDIANS WORSHIPPING A COLUMN SET UP BY LANDANNIERO, AND BRINGING OFFERINGS OF COCOA AND OTHER FRUITS.
DE BRÿ'S "HISTORY OF AMERICA," FRANKFORT: A.D. 1600.

and luxuries of the country, which would in some measure re-act in making them disguise their office.

Gage tells us, "That upon saint days the owner of the saint makes a great feast, the Priest being presented for his mass and sermon, besides a turkey and three or four fowls, with as much Cocoa as will serve him to make Chocolate for the whole octave. These feasts bring yet unto the Saints more profit than hitherto hath been spoken of; for the Indians have been taught that upon such days they ought to offer up somewhat unto the Saints, and therefore they prepare either money, Cocoa or fruits, which they lay before the image of the saint whilst the mass is celebrating, so that the Priest hath a plentiful harvest in Lent for his pains in hearing their confessions."

According to tradition, Xmucané invented nine drinks, the fourth of which was composed of ground maize and Cocoa, and was designed especially for public festivals. For the fifth the butter was extracted from Cocoa and mixed with maize. The sixth was prepared from raw maize, ground, the fermented liquor of which, mixed with Cocoa, drunk by the Itzas, was called Zaca.

Bernal Diaz del Castillo, whose work on the Conquest of Mexico was completed in 1568, also alluded to a fermented liquor made from Cocoa and used by Montezuma: "After the hot dishes (300 in number) had been removed from Montezuma's dinner-table, every now and then was handed to him a golden pitcher filled with a kind of liquor made from the Cocoa, which is of a very exciting nature. The beverage was also presented to the monarch by women, with the greatest veneration.

“Montezuma took great delight in the entertainment, and ordered the broken victuals and pitchers of Cocoa liquor to be distributed among these performers” (jesters, &c.).

Our knowledge of Cocoa as an article of diet dates from the discovery of the Western world in 1494, by Columbus, who, we are told, took home with him samples of the article ; and from the subjugation of Mexico by Cortés in 1521. History informs us that the Spaniards were the first who tasted Chocolate, which was part of their spoil in the conquest of Mexico. Bernardo de Castile, who accompanied Cortés, describing one of Montezuma’s banquets, says : “They brought in among the dishes above fifty great jars made of ‘Cacao,’ with its froth, and drank it,” similar jars being served to the guards and attendants “to the number of 2,000 at least.”



Copy of an engraving from Dufour's book.

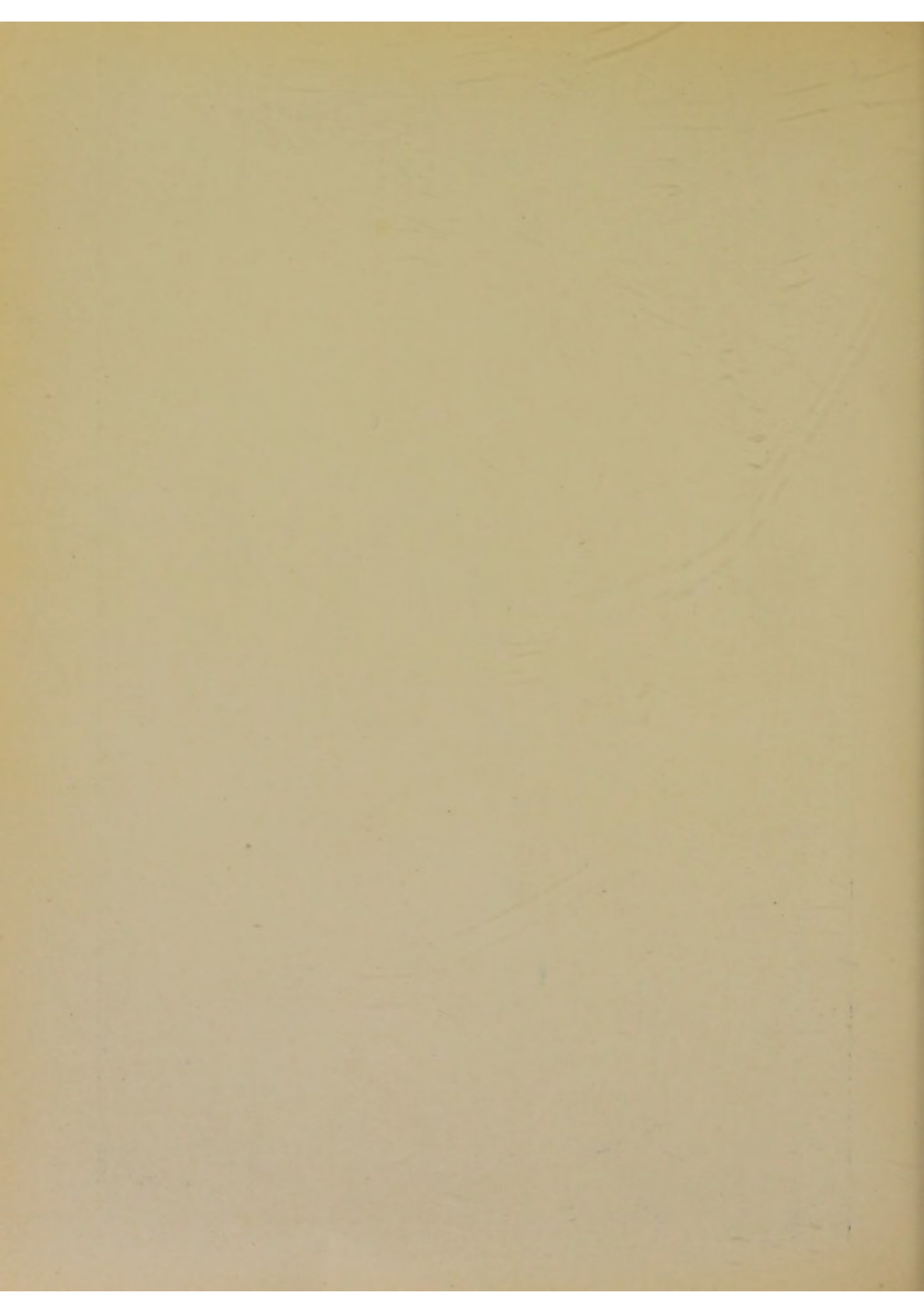
Prescott, in his “History of the Conquest of Peru,” says that “The emperor took no other beverage than the Chocolatl, a potation of Chocolate flavoured with vanilla and other spices, and so prepared



MUTE CZUMA

Rex ultimus Mexicanorum

THE EMPEROR MONTEZUMA, IN HIS YOUTH, ATTIIRED IN WAR DRESS.
FROM A RARE ANTIQUE SPANISH PRINT



as to be reduced to a froth of the consistency of honey, which gradually dissolved in the mouth, and was taken cold. This beverage, if so it could be called, was served in golden goblets, with spoons of the same metal, or of tortoiseshell finely wrought." Antonio de Herrera, in his "History of the West Indies," vol. ii., page 425, writes that "One of Montezuma's storehouses contained 40,000 loads of Cocoa * * The Cocoa was in wicker baskets, which six men could not grasp." This vast store of Cocoa was tribute paid to Montezuma by the provinces which were subject to him.

As Montezuma was the greatest patron of the cultivation of Cocoa, he merits more than a passing notice. The dazzling treasures of gold, silver, and jewels, "from the river of Emeralds," and vast stores of wealth, tempted the cupidity of Cortés and his mercenaries to plunder and destroy the power of a prince who swayed the sceptre with such wisdom that he was held in greater reverence and awe than any other prince of his lineage, or, indeed, any that ever sat on a throne in the western world. "With him may be said to have terminated the royal line of the Aztecs, and the glory to have passed away from the empire, which under him had reached the zenith of its prosperity."*

We cannot now fully estimate the extent and beauty of Montezuma's glorious capital, with its great causeway extending for miles through the heart of the city, and intersected by broad canals and bounded on each side by temples, terraces, and gardens, so that a spectator standing at one end of it might look into the deep vista which melted in the transparent atmosphere of the blue mountains in the distance.

* Hist. de Tlascala, Prescott's "Mexico."

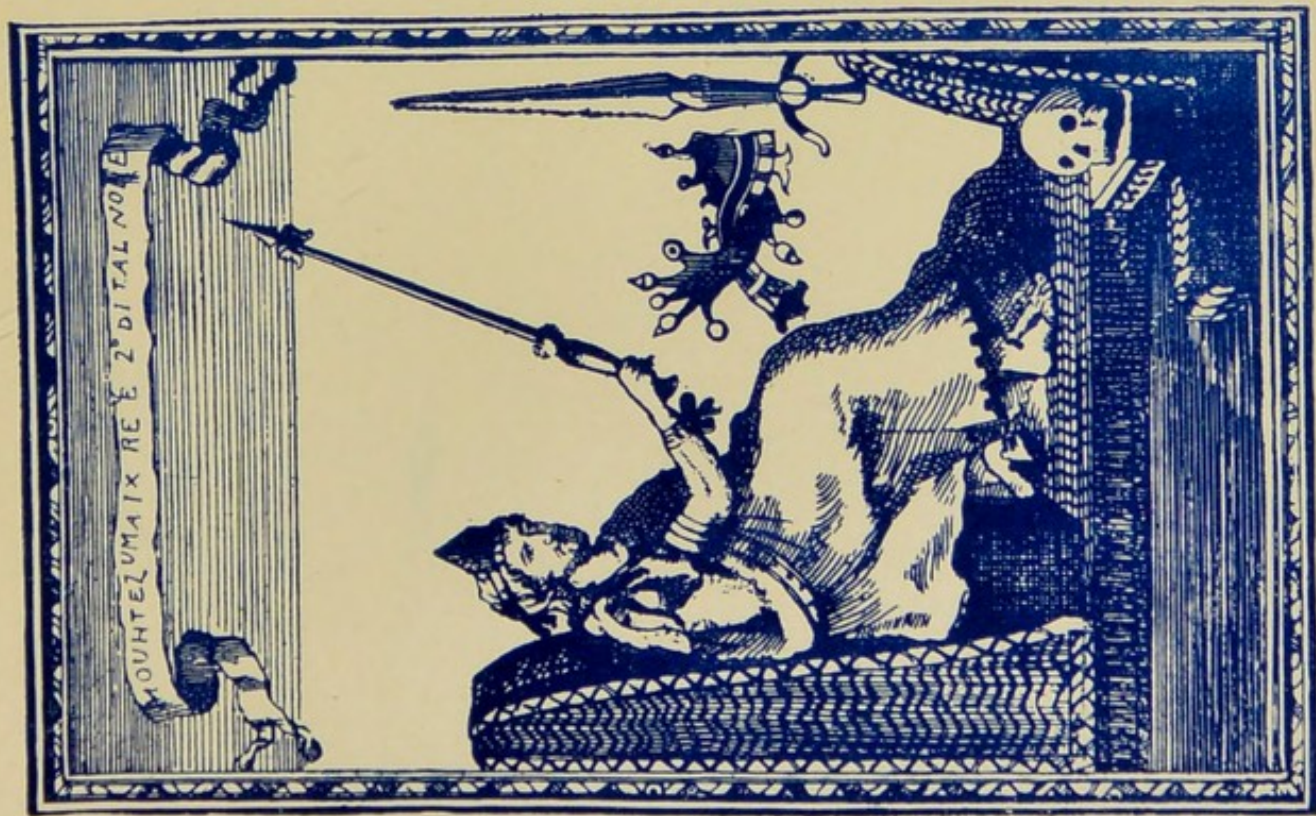
But it is more difficult to realise the brutality and treachery of Cortés in seizing and holding captive the generous and noble Emperor who had treated him with all the honours of a trusted guest. While still in captivity the people welcomed his brother Cuitlahua as the representative of their sovereign, and he led them on to victory against the Spaniards, expelling them after a desperate struggle from the city. It was after the death of Montezuma—while in captivity—and of Cuitlahua, that Quauhtimoc was crowned Emperor of the Aztecs. This last monarch of the royal line was nephew to Montezuma and married his beautiful daughter Tecuichpo

He defended his capital with the utmost bravery, again and again defeating the Spaniards, and refusing to capitulate at the last, even at the greatest extremity. When captured, Cortés put him to the torture to discover his hidden treasure, but, as the historian relates, “The hero who had braved death in its most awful forms was not to be intimidated by bodily suffering.” He thus put to shame his cruel conqueror, but so insatiable was the tyrant for vengeance that he soon afterwards had his victim executed on a false charge of conspiracy, although, according to the account given us by Bernal Diaz, who was present on the occasion, he declared his innocence, adding, “The execution was most unjust, and was thought wrong by all of us.” Prescott pays him a splendid tribute in these words: “Such was the sad end of Guatemozin (Quauhtimoc), the last Emperor of the Aztecs * * *

Among all the names of barbarian princes there are few entitled to a higher place on the roll of fame than that of Guatemozin. He was young, and his public career was not long, but it was glorious. * * * No one can refuse his admiration to the intrepid spirit which could prolong a defence of his city while one stone was left upon another, and our sympathies for the time are

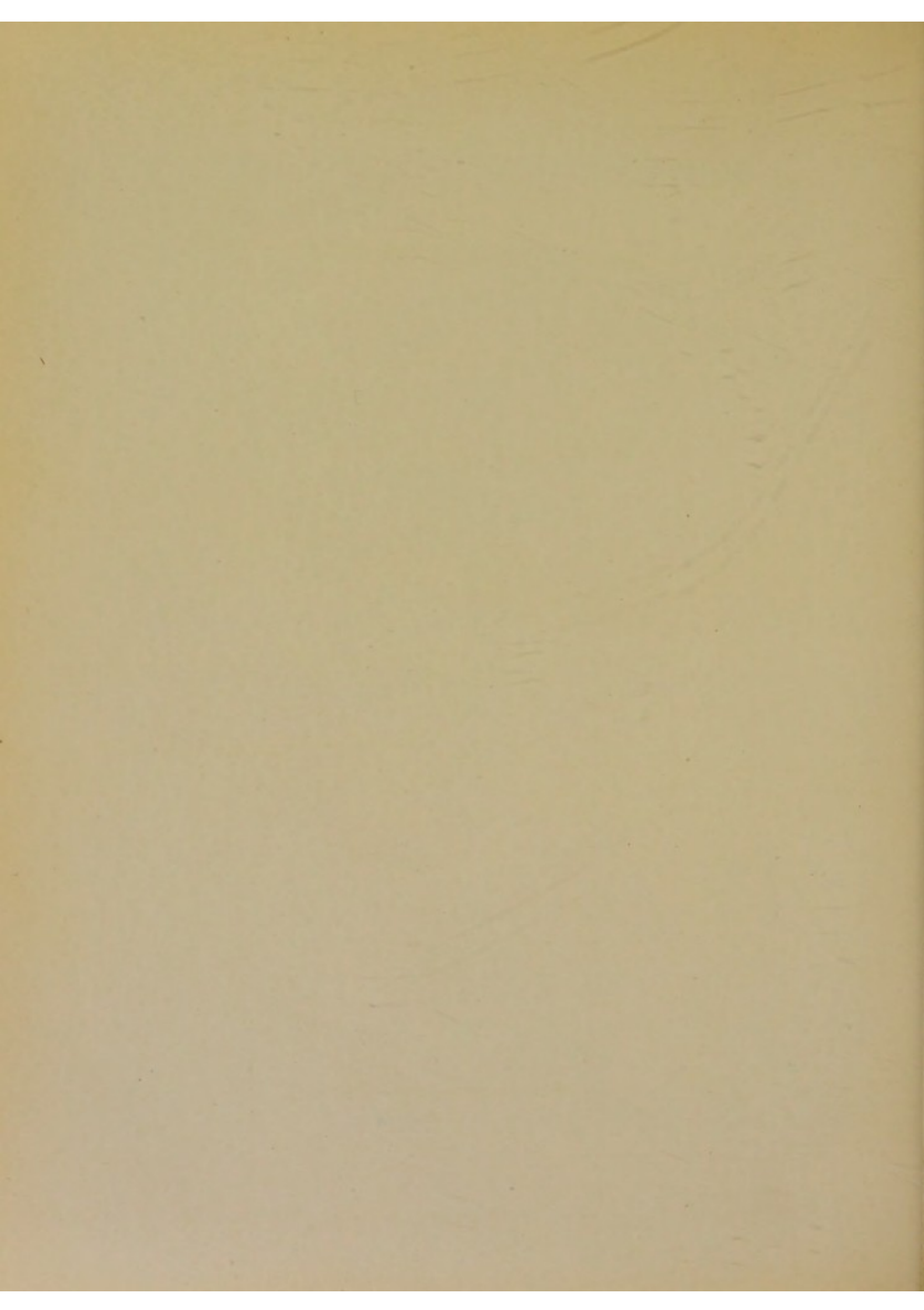


QUAHTIMOC, THE LAST EMPEROR OF THE ROYAL LINE.



MONTZUMA II. ON HIS THRONE.

These two Photographic Prints are taken from "Anglio's Mexican Antiquities." They were copied from originals of great antiquity in the custody of Don Carlos Siguenza—the Giro del Mondo (Napoli 1699—1700) of Dr. Genelli Careri.



inevitably thrown more into the scale of the rude chieftain, thus battling for his country's freedom, than into that of his civilized antagonist."

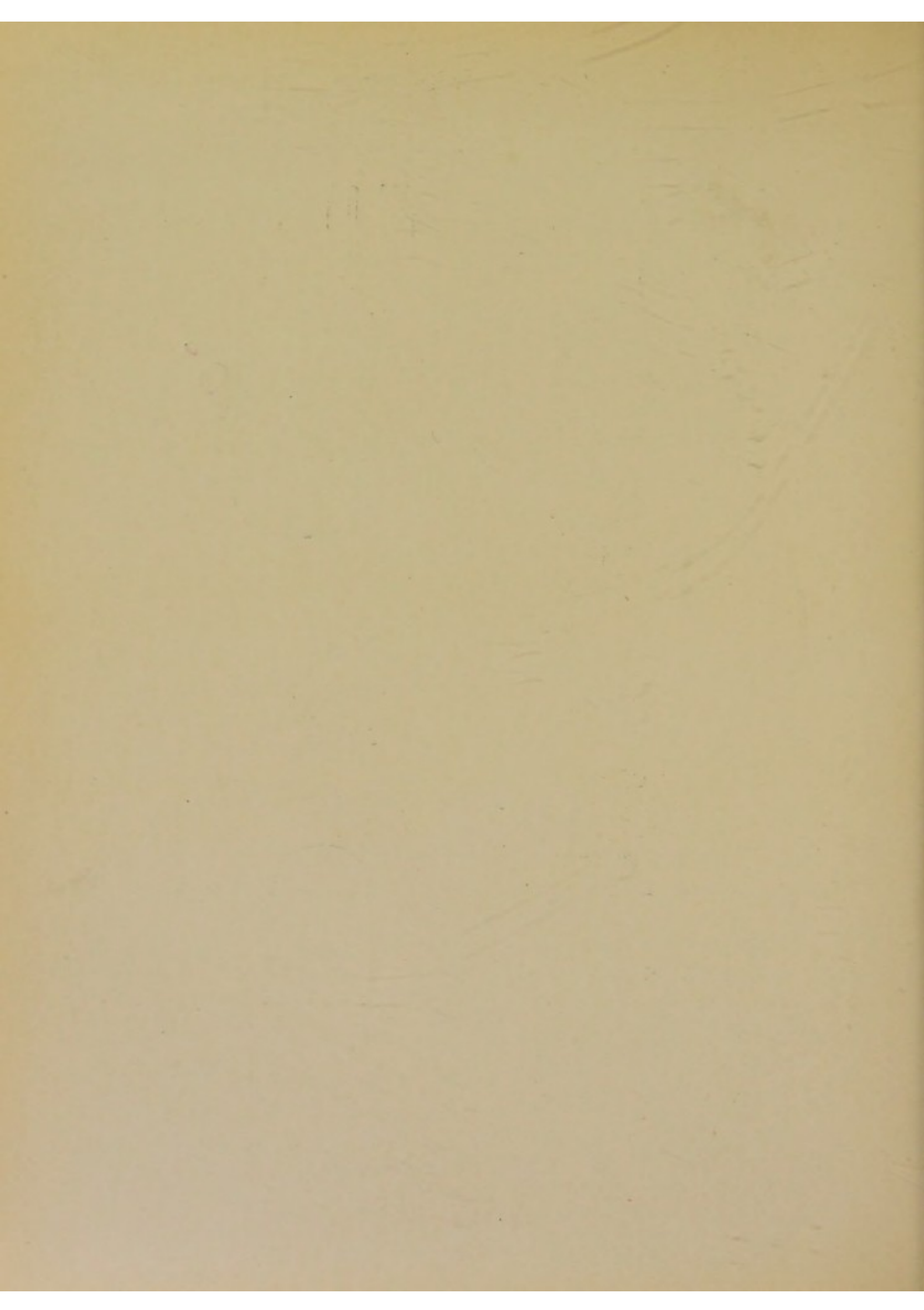
Guatemozin's beautiful wife, the Princess Tecuichpo, the daughter of Montezuma, lived long enough after his death to give her hand to four Castilians, all of noble descent, and her husband Don Thoan Cano speaks of her as "most gracious and winning in her deportment," and as "having contributed greatly, by her example, to the tranquillity of her conquered country."

We find that the Cocoa seeds were extensively used by the Mexicans for currency. Peter Martyr gave them on this account the name *Amygdalæ pecuniariæ*, and exclaims: "Blessed money! which exempts its possessors from avarice, since it cannot be hoarded nor hidden under ground."

Joseph Acosta, "the great Jesuit," in his "Historie of the East and West Indies," translated and published 1604, in London, says: "The Indians used no gold nor silver to trafficke or buy withall * * * and unto this day this custom continues amongst the Indians, as in the province of Mexico in steede of money they use Cocoa (which is a small fruite), and therewith buy what they will."

Thomas Candish, who was the second of the Circumnavigators, in an account of a voyage begun July 1st, 1586, relates that: "Here were laid up (*i.e.*, at Agatulco, two leagues from the river Copalita), four hundred bags of Cacaos, every bag being worth ten crowns.

"These Cacaos serve amongst them both for meat and money, * * * instead of ready money, 150 of them (the seeds) being as good as a Real of Plate" (about 6d.).



The Xicara, which they name Tecomates, are made from the long or pear-shaped calabash, are often tastefully carved, and are generally used for Coffee and Chocolate ; but as their bottoms are round, little carved stands are made to receive them. The Indians of Nicaragua make similar cups from a variety of Coconut peculiar to that vicinity, which are celebrated throughout their country for their beauty of shape and ornament.



(From Squier's " Nicaragua.")

Bancroft, in his " Native Races of the Pacific States," says : " Although no regular coined money was used by the Aztecs, yet several more or less convenient substitutes furnished a medium of circulation. Chief among these were nibs of the Cacao, * * * this money, known as patlachté, passed current anywhere, and payments were made of it by count up to eight thousand, which constituted a xiquipilli. Another circulating medium was gold dust, kept in translucent quills, that the quality might be readily seen."

In another place he tells us, " Chocolate and other drinks prepared from Cocoa were universal favourites among the Maya Nations, and were prepared from the wild and cultivated varieties." Oviedo states that at Nicaragua " none but the rich and noble could afford to drink it, as it was literally drinking money."

“Cocoa passed current as money among all nations ; thus a rabbit in Nicaragua sold for ten Cocoa nibs, and one hundred of these seeds would buy a tolerably good slave.” Antonio de Herrera, in his “History of the West Indies,” writes : “They were wont to reckon their Cocoa by coultes, xequipiles, and loads, a coulte being 400 nuts, a xequipile 20 coultes, that is 8,000 nuts, and a load three xequipiles, being 24,000 nuts,” and speaks of some plunder being seized by Alonzo de Ojeda from Montezuma : “He went thither with fifty persons, who brought away loads of it. The Cocoa was in wicker baskets as big as wine fats, which six men could not grasp, being plaistered both within and without, these baskets being used like bins for Indian wheat and other grain. Six hundred loads were taken away that night, and only six baskets emptied.”

Torquemada has extracted the particulars of the yearly expenditure of the palace from the royal account book, which came into Prescott's possession.

The following are *some* of the items. A fanega, it may be explained, is about 100 pounds :—

4,900,300 fanegas of maize.

2,744,000 „ „ Cocoa.

Items of the tribute furnished by different cities—

20 Chests of ground Chocolate.

80 Loads of red Chocolate.

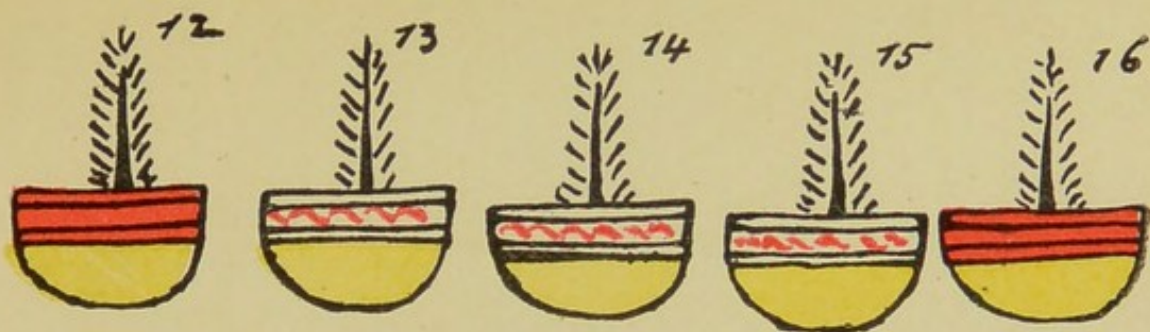
800 Xicaras—(out of which they drink Chocolate).

200 Loads of Chocolate.

20 Bags Gold Dust.

20 Lip Jewels of clear amber, ornamented with gold, &c., &c.

It may be as well to explain here that the word “Chocolate” is of Mexican origin, being derived from “chocolatl.” Murray, in



Four Hundred Ticaras Plate XXV

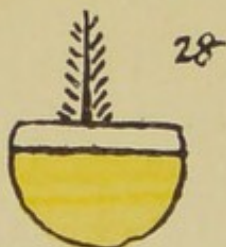
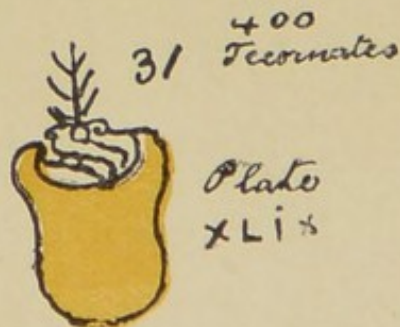
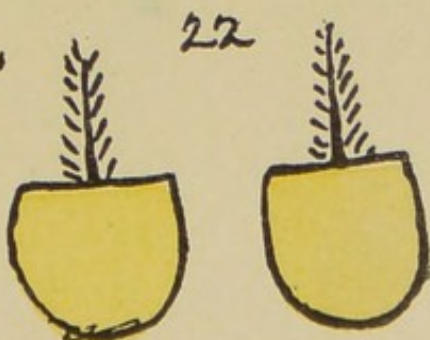


Plate
XXXIX

Four Hundred Ticaras

800 Ticaras
or
tecomates

Plate
XLI



400
Tecomates
Plate
XLIX

his "Dictionary of the English Language," says that this has no connexion whatever with the Mexican word "cacauatl" (or "cacavaquahuitl"), "cacao," or its modern corruption "Cocoa," but is, so far as is known, a radical word of the language.

Thomas Gage, in his "New Survey of the West Indies" (1648), informs us, "The name is compounded from *atte*, as some say, or as others, *atle*, which in the Mexican language signifieth 'water,' and from the sound which the water (wherein is put the Chocolate) makes, as *choco, choco, choco*, when it is stirred in a cup by an instrument called a 'molinet' or 'molinillo,' until it bubble and rise unto a froath."



Chocolate Stirrer (Molinet), copied from an old book published in the 17th century.

The same writer remarks: "Our English and Hollanders make little use of it when they take a prize at sea, as not knowing the secret virtue and quality of it for the good of the stomach, of whom I have heard the Spaniards say that when we have taken a good prize, a ship laden with Cocoa, in anger and wrath we have hurled overboard this good commodity, not regarding the worth of it." For many years the cultivation of the Cocoa tree was confined to the Spanish, who, in South America and some of the West India Islands, carried on the cultivation to a large extent. From their first settlement in Trinidad, we are told that "it seems probable the Spaniards cultivated the tree, and thoroughly understood its value, the prepared article being always much esteemed in the then opulent mother country."

From Spain the monks introduced the use of Chocolate into France, in 1661. Our earliest record of the use of Chocolate in England is said to be furnished by an advertisement which appeared in the *Public Advertiser*, or *Adviser*, according to one authority, of Tuesday, June 16, to Tuesday, June 22, 1657, informing the public that "in Bishopsgate Street, in Queen's Head Alley, at a Frenchman's house, is an excellent West India drink called Chocolate to be sold, where you may have it ready at any time, and also unmade at reasonable rates."

D'Israeli, in his "Curiosities of Literature," speaking of the introduction of tea, coffee and chocolate into Europe, says: "Chocolate the Spaniards brought from Mexico, where it was denominated *chocolatl*. It was a coarse mixture of ground Cacao and Indian corn with *rocou*; but the Spaniards, liking its nourishment, improved it into a richer compound with sugar, vanilla and other aromatics. We had Chocolate houses in London long after coffee-houses; they seemed to have associated something more elegant and refined in their new term when the other had become common."

Silbermann, of Strasburg, printed a book on Chocolate, in which he tells his readers: "After the Restoration there were shops in London for the sale of Chocolate at 10s. or 15s. per lb. O.Zinda's Chocolate house was full of aristocratic customers. Comedies, satirical essays, the memoirs and private letters of that age frequently mention it. The habit of using Chocolate was deemed a token of elegant and fashionable taste, * * * while the charms of this beverage in the reigns of Queen Anne

and George I. were so highly esteemed by courtiers, by lords and ladies and fine gentlemen in the polite world, the learned physicians extolled its medicinal virtues." In the "Voyage of Don Gonzales to England and Scotland," in 1733, he says: "Others that are not members of either House (of Parliament) are found in the Chocolate-Houses near the Court, or in the Park."

The celebrated Tory "Chocolate House" of Queen Anne's reign was converted into a club, probably before 1746, and became the head-quarters of the Jacobite party. It came to be as generally understood that Literature had fixed her social head-quarters here, as that politics reigned supreme at "The Cocoa Tree." This was one of the clubs to which Lord Byron belonged, and it was at Garrick's funeral that it received the name of the Literary Club.

Cocoa was much esteemed as a beverage in this country during the reign of Charles II., and at that period Dr. Stubbe published a book entitled "The Indian Nectar, or a Discourse concerning Chocolate, &c.," in which the author gives a history of that article, with many curious notions respecting its "secret virtue," and recommends his readers to buy it of one Mortimer, "an honest though poor man," who lived in East Smithfield, and sold the best kind at 6s. 8d. per lb., and commoner sorts at about half the price. It was not until the close of the sixteenth century that Cocoa or Chocolate was generally used in this country, and when we take into account the indifferent means for preparation and the adulterated condition of the article, we can hardly be surprised that it did not come into general favour with the public.

Prior to 1831, the home consumption of Cocoa amounted to less than 400,000 lbs. per annum, but sixty years has wrought a marvellous change, which may best be indicated by the following figures :—

CLEARANCES OF RAW COCOA FOR CONSUMPTION IN GREAT BRITAIN AND IRELAND.

			Home Consumption.		Navy.	
1822	523,279 lbs.	...	283,599 lbs.	...	239,680 lbs.
1825	723,141 "	...	319,941 "	...	403,200 "
1830	976,115 "	...	393,715 "	...	582,400 "
1835	1,173,795 "	...		...
1840	2,041,678 "	...		...
1850	3,080,647 "	...		...
1860	3,230,978 "	...		...
1865	4,006,345 "	...		...
1870	6,943,109 "	...		...
1880	10,566,159 "	...		...
1885	14,595,168 "	...		...
1890	20,224,175 "	...		...
1891	21,601,825 "	...		...
1892	20,795,798 "	...		...
1893	20,874,995 "	...		...
1894	22,440,820 "	...		...

It is difficult to obtain returns of the consumption of Cocoa in Great Britain and Ireland prior to 1822, and a curious feature of those returns up to 1830 is that the home consumption and that of His Majesty's Navy show that the proportion absorbed by the Navy was larger than that for home consumption.

Guayaquil was the largest producing country in the world, as it is now, its exports averaging twelve million pounds per annum between 1834-6; Spain at this time was the principal consuming country in the world, taking by far the greater proportion of these exports, while England depended chiefly upon its own possessions in the British West Indies and British Guiana. These imports averaged between 1833-36 1,350,000 lbs., the chief proportion of which came from Trinidad.

Of the Cocoa now imported into England, close on one-third is cleared by the house of Cadbury, Bournville, an account of whose factory we give in another chapter.

The consumption of Cocoa was quite nominal in the earlier part of the century, 1s. 6d. per pound being levied for duty up to 1820, and every pound of Chocolate had to be wrapped in papers supplied by the revenue officer; but when we look back to the duties levied and regulations for sale of an earlier date, we may well wonder that it survived the difficulties with which it had to contend. The duty since June, 1853, has been 2d. per lb. on all "importations of Chocolate or Cocoa-paste," while the duty on raw Cocoa has been 1d. per lb.

In proceedings in Parliament, July 9th, 1784, Mr. Gilbert brought up the report of the Committee of Ways and Means, relative to Coffee and Cocoa. The report was read, viz.: "That 6d. per lb. be charged on all Cocoa-nuts the growth of any of the British Colonies. That 1s. 6d. be charged on the growth of any other place."

The following enactments are likewise of interest:—

10 George III., c. 10. Houses of manufacturing and sale are to be entered on pain of forfeiting £200 and goods, &c.

19 George III. The said houses shall be marked over the doors with the words 'dealer in Cocoa-nuts, Chocolate, &c., on pain of £200. Any dealer buying these commodities of any person not having his shop so marked shall forfeit £100

He shall also produce at the place and time of entry the Chocolate, which shall be tied up with thread in papers of 1 lb., $\frac{1}{2}$ lb., or $\frac{1}{4}$ lb. each, and neither more nor less, which shall be stamped or marked by the officers.

10 George I., c. 10. The counterfeiting of the stamp, or the knowingly selling of any Chocolate, or the fixing of any paper with a stamp on such Chocolate as has not been entered, and on which the duties have not been paid, means the penalty of £500, and of commitment to the next county gaol for twelve months. Officers shall enter at all hours by day warehouses, shops, &c., the owner assisting to weigh, &c.

11 George I., c. 30, sec. 9. Every person who shall keep a shop and have in his custody above 6 lb. Cocoa or Chocolate shall be deemed a dealer in the said commodity.

11 George I., c. 30. Notice shall be given by those who make Chocolate for private families, and not for sale, three days before it is begun to be made, specifying the quantity, &c., and within three days after it is finished, the person for whom it is made shall enter the whole quantity on oath, and have it duly stamped.

20 George III., c. 35. No person shall trade in Chocolate without an annual license, for which he shall pay (by Geo. III., c. 69) 5s. 6d., under penalty of £20.

43 George III., c. 69, Schedule A. The duty imposed for every pound weight of Cocoa, the growth or produce of any British colony or plantation, was 1s. 10d., but if imported by the East

India Company, 2s., and for all other Cocoa-nuts imported into Great Britain, 3s. No Chocolate ready made, or Cocoa paste, shall be imported on pain of forfeiting the same and double value, and also the bags, casks and other package.*

The history of the use of Cocoa has now been traced from its first discovery by Columbus in 1494 to the present time. The gradual development of systematic means of planting, growing and curing the Cocoa bean, the greater facilities for export, the vastly improved methods of preparation with powerful and scientifically arranged machinery, lower duties, and stricter laws against adulteration, are all aiding to raise it in public estimation, so that notwithstanding all the prejudices, superstitions and difficulties that have had to be overcome, Cocoa is fast becoming a formidable rival to tea and coffee as a beverage.

* RATES OF DUTY ON COCOA.

EXCISE.		CUSTOMS.	
British Possessions.		Foreign Countries.	On Entry for Home Consumption.
1803 } 1804 }	1s. 10d. per lb. ...	5s. 10d. per lb. ...	2½d. per lb.
1805 } 1818 }	1s. 10d. per lb. ...	3s. 0d. per lb. ...	from 2½d. to 4¾d. per lb.
1819 } 1825 }	1s. 0d. per lb. ...	2s. 6d. per lb. ...	no Customs from 1820.

Excise duties were transferred to Customs from 5th April, 1825.

British Possessions in America.		British Possessions within the Limit of the East India Company's Charter.		Foreign Countries.
1826, to 4th July,	6d. per lb.	9d. per lb. 1s. 3d. per lb.
1826, from 5th July to 1831	4d. per lb.	9d. per lb. 1s. 3d. per lb.
British Possessions.		Foreign.		
1832	..... 2d. per lb.	.....	..... 6d. per lb.
1844	..... 1d. per lb.	.....	..... 4d. per lb.
1845 } 1852 }	..... 1d. per lb.	.....	..... 2d. and 5 per cent. per lb.

1853, British and Foreign 1d. per lb., to the year 1894.

CHAPTER III.

—:o:—

MANUFACTURE.

“The giddy motion of the whirling mill
In fumes of burning Chocolate shall glow
And tremble at the sea that froths below.”

Pope



IF Pope was slightly misty in his ideas of the manufacture of Chocolate, there is less excuse for those who pretend to teach the present generation. For example, the lady who prepared “The Child’s Guide to Knowledge” (1879), questions her pupils, thus :

“Q. What is chocolate ?

“A. A kind of cake or hard paste which is made of the pulp of the Cocoa or Chocolate seed, gently roasted, and mixed with sugar, &c.

“Q. How is it formed into paste and cakes ?

“A. By the help of water, and whilst hot, is put into tin moulds.”

The development of our manufactures is an interesting study, for we are apt to forget, in this age of luxuries, the years of toil and thought that it has taken to perfect them.

We have to look back to the original home of the Cocoa plant for our first glimpses of its preparation as food, and to the time of our early travellers for its introduction into Europe.

Daniel Concuna writes on "The Origin of Chocolate in the Indies, and its Introduction into Europe," Venice, 1748 (translated from the Italian): "The glory of so pleasant a discovery belongs to the province of Chiapa; its history, however, does not tell us the year of the invention, but from what can be gathered from various authors, it took place about the middle of the 16th century."

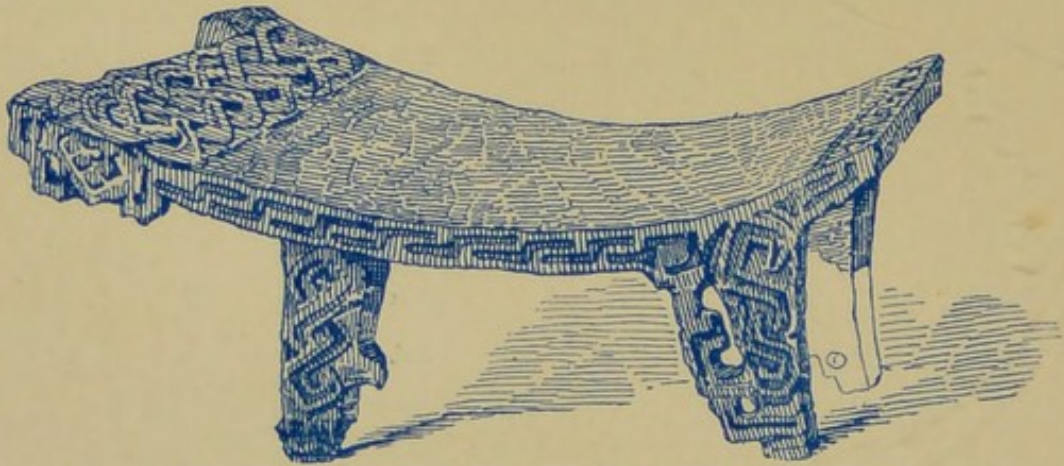
The usual rough-and-ready plan of manufacture in those early days is described by Mr. Hughes in the *American Physician* (1672): "In Jamaica there is a sort of Chocolate made up of only the paste of the Cacao itself, in rowls or lumps of a pound or two, the better for keeping good. And it may be had here in England, neat and good, of merchants and seamen that travel to those parts and bring it over."

The mode of preparation was as follows:—

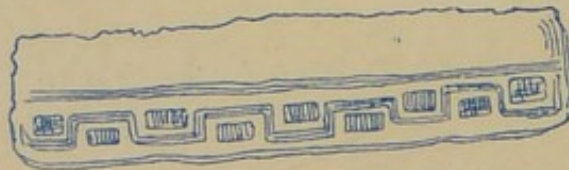
"For this purpose they have a broad, smooth stone, well polished or glazed, very hard, and being made fit in all respects for their use, they grinde the Cacaos thereon very small, and when they have so done, they have another broad stone ready, under which they keep a gentle fire.

"A more speedy way for the making up of the Cacao into Chocolate is this: They have a mill made in the form of some kinde of mault-mills, whose stones are firm and hard, which work

by turning, and upon this mill are ground the Cacaos grossly, and then between other stones they work that which is ground yet smaller ; or else, by beating it up in a mortar, bring it into the usual form."



Ancient Metlatl or Grinding Stone. (Squier's "Nicaragua.")



Grecques with which above is ornamented. (Squier's "Nicaragua.")

We can form some idea of how Cocoa was prepared and ground on these stones by the old engravings here reproduced ; the first taken from Squier's "Nicaragua ;" the second showing us practically the same process of grinding Cocoa as that adopted by the Portuguese on its first introduction into Europe.

The methods will strike the reader as very primitive and not very cleanly, but the natives no doubt made the best of their means to prevent the delicate preparation mingling with mother earth.

The following engraving is taken from an old book entitled "Le Bon Usage Du Thé, Du Caffé, et Du Chocolat pour la Preservation et pour la Guerison des Maladies, par Monsieur de Blegny, Conseiller, Medecin, Artiste ordinaire du Roy, à Lyon, 1687" :—



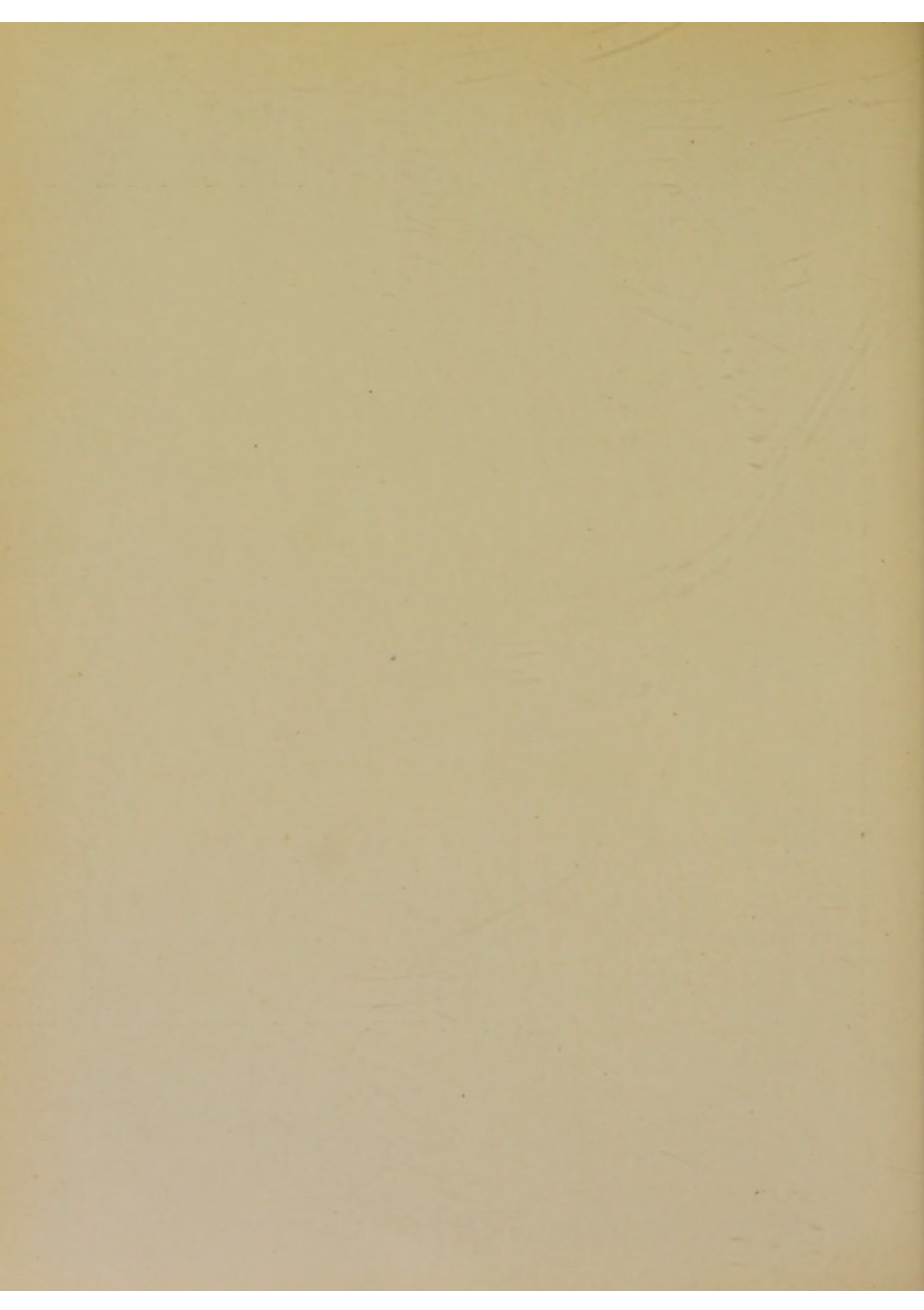
R. Brookes, M D., 1730, in his "Natural History of Chocolate," tells us: "There are also imported from America

Cacao-Kernel-Cakes of about a pound weight each. * * *
 The Indians, from whom we borrow it, are not very nice in doing it ; they roast the kernels in earthen pots, then free them from their skins, and afterwards crush and grind them between two stones, and so form cakes of it with their hands” ; and further on, in speaking of the Spaniards’ mode of preparation, says : “ They put them (the kernels) into a large mortar to reduce them to a gross powder, which they afterwards grind upon a stone. They make choice of a stone which naturally resists the fire * * *
 from 16 to 18 inches broad, and about 27 or 30 long and 3 in thickness, and hollowed in the middle about 1 inch and a half deep. * * * Under they place a pan of coals to heat the stone so that the heat * * * makes it easy for the iron roller to make it so fine as to leave neither lump nor the least hardness.”

Willoughby, in his “Travels in Spain” (1664), writes : “ They first toast the berries to get off the husk, then pound the kernels to powder, and to every 3½ lbs. of powder they add 2 lbs. sugar, 12 Vanillos, a little Guiny pepper (which is used by the Spaniards only), and a little Acchiote to give a colour. They melt the sugar, and then mingle all together, and work it up either in rolls or leaves.” Another writer says : “ The usual proportion at Madrid to a hundred kernels of Cocoa, to add two grains of Chile pepper, a handful of anise, as many flowers—called by the natives *vinacaxtlides* or little ears—six white roses in powder, a pod of campeche, two drachms of cinnamon, a dozen almonds, and as many hazel-nuts, with achiote enough to give it a reddish tincture ; the sugar and vanilla are mixed at discretion, as also the musk and ambergris. They frequently work this paste with orange water, which they think gives it a greater consistence and firmness.”



WOMEN GRINDING CHOCOLATE,
From Squier's 'NICARAGUA.'



In a quarto published for Christopher Wilkinson at the Black Boy, over against St. Dunstan's Church, in Fleet Street, on "the Natural History of Chocolate," it is stated: "The ingredients may be varied according to the constitutions of those that drink it; in cold constitutions Jamaica pepper, cinnamon, nutmegs, cloves, &c., may be mixed with the cocoa-nut; some add musk and odoriferous aromattick oils. In hot consumptive tempers you may mix almonds, pistachios, &c., sometimes china and arsa; and sometimes steel and rhubarb may be added for young green ladies."

Spain and Portugal were the first countries to introduce the native process of manufacture into Europe, which was naturally very rough, and consequently produced very poor results, but to France belongs the credit of developing a better system of roasting, grinding, and mixing Cocoa for the manufacture of Chocolate. Under the improved method the Chocolate was moulded into hard cakes or tablets, which was the only form in which Cocoa was known for many years. Germany, at the present time, produces machinery on the most approved and scientific principles, and English manufacturers have lost no time in applying them to satisfy the demand for the highest class of Cocoa and Chocolate.

For the modern system of manufacture we cannot do better than transport our readers to Bournville, "the Worcestershire Eden" as it has been aptly termed, for the surroundings of the place have a charm of their own that banishes the thought of smoke and machinery, and gives quite a zest for the inspection of this happy and busy scene of labour. Bournville is certainly a

model factory, both for its size and its completeness, and because it contains the most modern improvements in the application of machinery for the manufacture of Cocoa and Chocolate.

Five tall chimneys, and some acres of warehouses and workshops, divided by streets connected by bridges, and intersected by railway lines, give some idea of the extent of the works, but for all this our first impression on being taken through the porter's lodge is that of entering into a garden with a welcome of the sweet breath of flowers and the song of birds. We have to pass by the girls' garden and play-ground, which is well planted and bordered on three sides by trees and shrubs, while the plantations of Bournbrook Hall give the substantially country surroundings to which we have referred. One of the sights of Bournville is the girls in their white costumes, after dinner, sitting reading under the trees, or enjoying in other ways a breath of fresh air.

The name "Bournville" was suggested by the contiguity of the pretty streamlet known as the "Bourn," which meanders through the estate and forms the northern boundary of the factory. This rippling rivulet adds to the attractiveness of the locality, and is regarded with no little satisfaction by the disciples of Izaak Walton, who recognise in the pretty trout stream qualities which serve to gladden the heart of the angler. Among those engaged at the works are lovers of the enthralling pastime, and we were informed that recently trout of very respectable dimensions had been landed from the Bourn.

On ground contiguous to the factory, and bordering on the road which runs on the southern side of the works, Messrs. Cadbury have built a number of semi-detached villa residences,

which are inhabited by their most prominent hands — workmen who have shown by their general demeanour such diligence and assiduity in business as make them worthy the consideration their employers have evinced for their interests. These villas are model residences, let at a comparatively small rental; they are well built of brick, in two colours, fitted internally with taste, and each would easily bring a rent of £40 per annum in the suburbs of the metropolis. The occupants of these residences pay 5s. to 6s. per week. To each house is apportioned a front and back garden, and the tenants are enabled to grow their own vegetables and fruit, and decorate the front parterres with flowers.

Like many of our largest manufacturers, Messrs. Cadbury commenced business with a very small staff of workpeople compared with the number of hands at present employed by them. About thirty years ago under twenty employés comprised the working establishment, while now they employ about 2,000 men, boys and girls.

Owing to the comparatively isolated position of the works, ample provision has to be made for all requirements as regards cooking. Spacious dining rooms have been provided on the premises for both men and women. Gas stoves and cooking apparatus have been erected, and hot dinners can be procured in a very few minutes. So complete are the arrangements in this respect that there is little delay in serving all from the kitchen, which is constructed between the men's and women's dining rooms, which are kept quite distinct. These surroundings have an importance beyond the comfort of the employés, for in

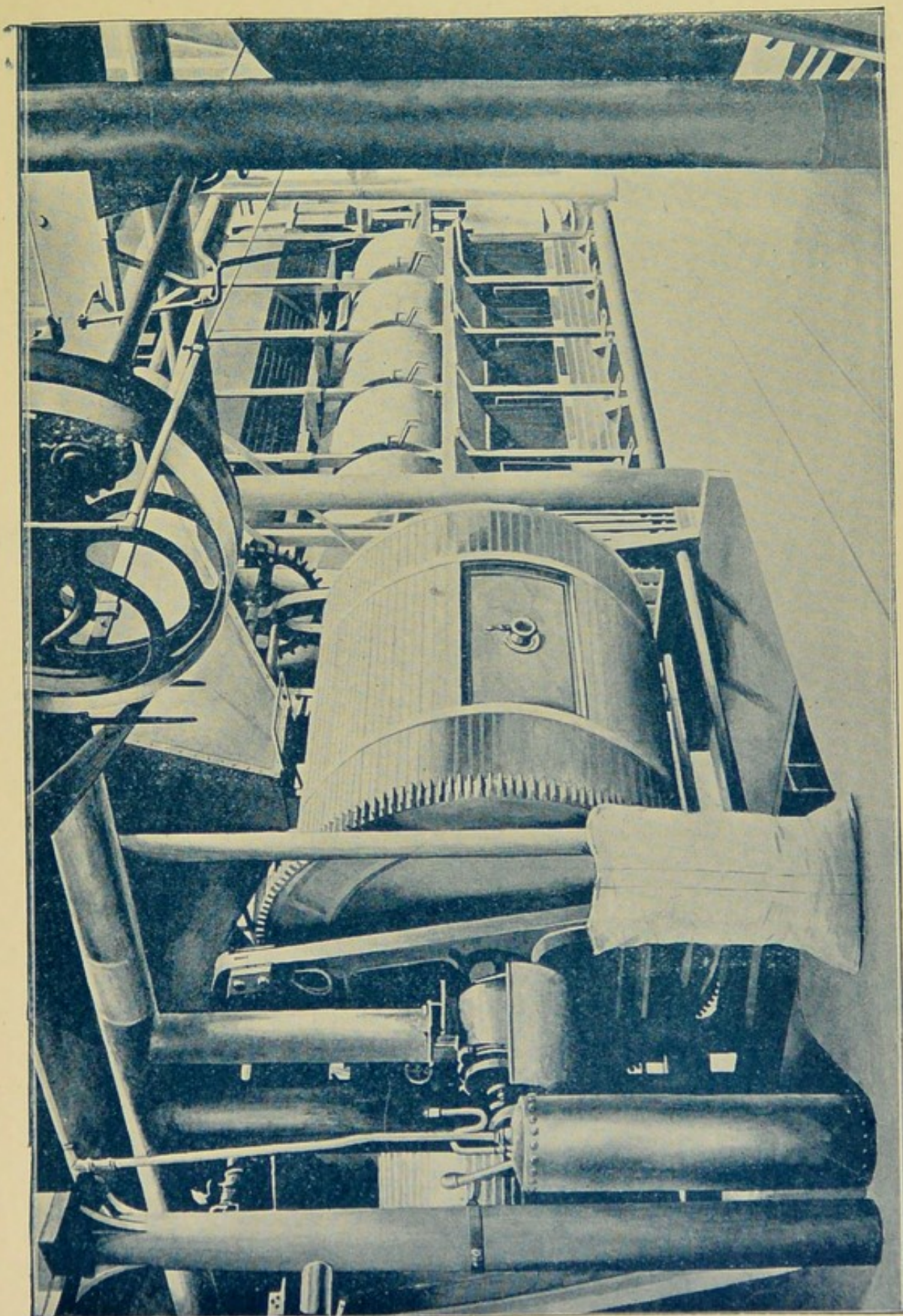
the production of food it is impossible to devote too much attention to the health of those employed, and to every agent that promotes tidiness and cleanliness.

The manufacture of Cocoa and Chocolate requires great experience, skill, and special knowledge. In detailing the processes it will be convenient to divide them into two branches, viz. : the production of Cocoa Essence and the manufacture of Sweet Chocolate.

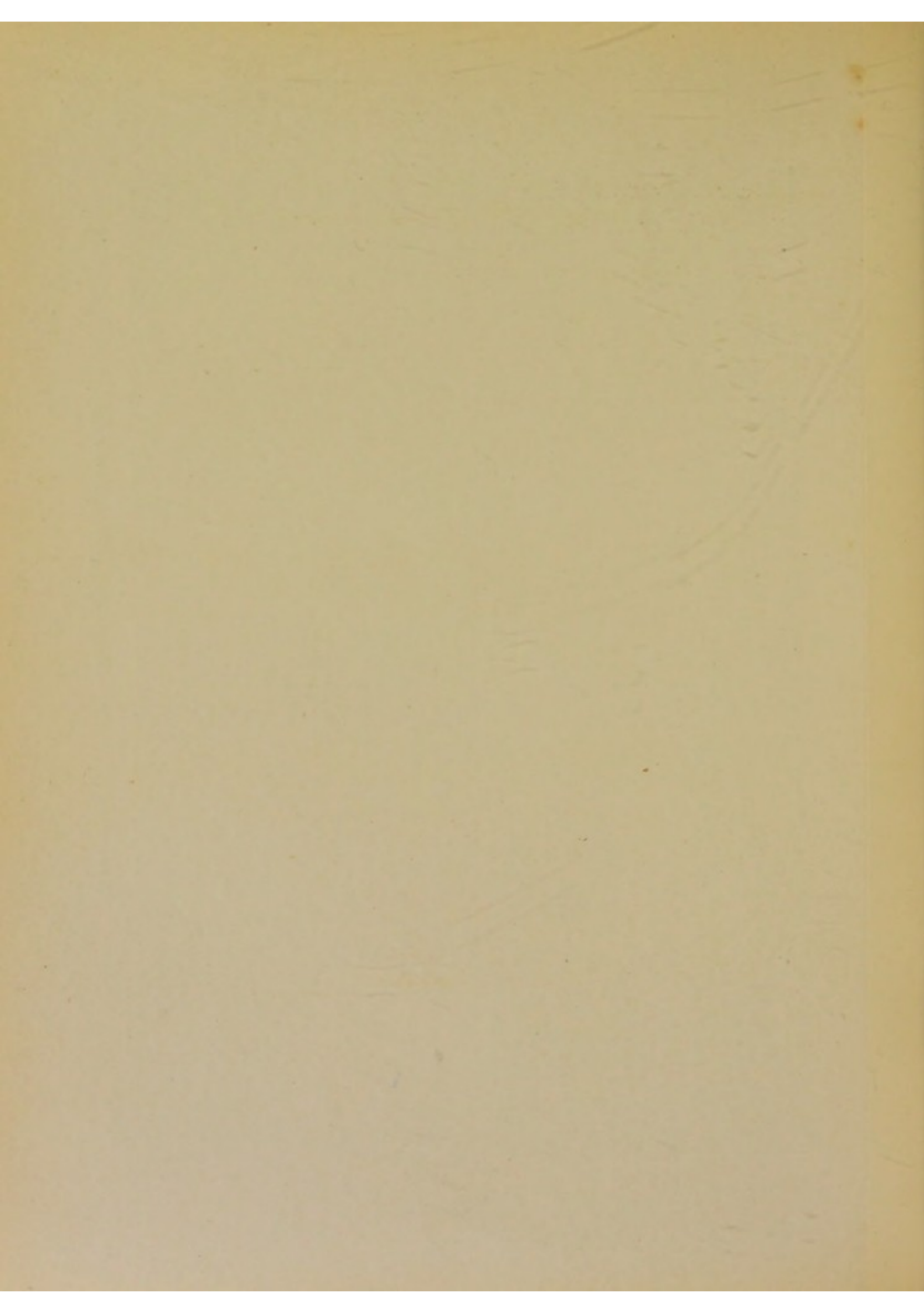
Cocoa Essence, which is the specialty of this firm, is unrivalled as a nutritive beverage, and therefore the most important for consideration. The best Cocoa contains about 50 per cent. of natural oil or butter, and this has been found to be far too large a proportion for ordinary digestions. Dr. Muter remarks that "the only objection which can and does exist to its use in a state of purity is the excessive proportion of fat, which renders it too rich for most digestions, and gives, unfortunately, a colourable excuse for its adulteration."

By means of elaborate machinery the removal of two-thirds of the butter is accomplished, the result being an impalpable powder easily miscible in boiling water.

As the visitor leaves the office of the principals and enters the factory, the fragrance of the Cocoa-berry salutes the olfactories most agreeably. The hum of machinery denotes that the hands are busily engaged, and as we pass into the factory an earnestness of purpose is manifested by the work-people, who are intent upon their various pursuits. The utmost order and regularity are pre-



ONE OF THE ONE-TON STEAM ROASTERS AT CADBURY'S WORKS,



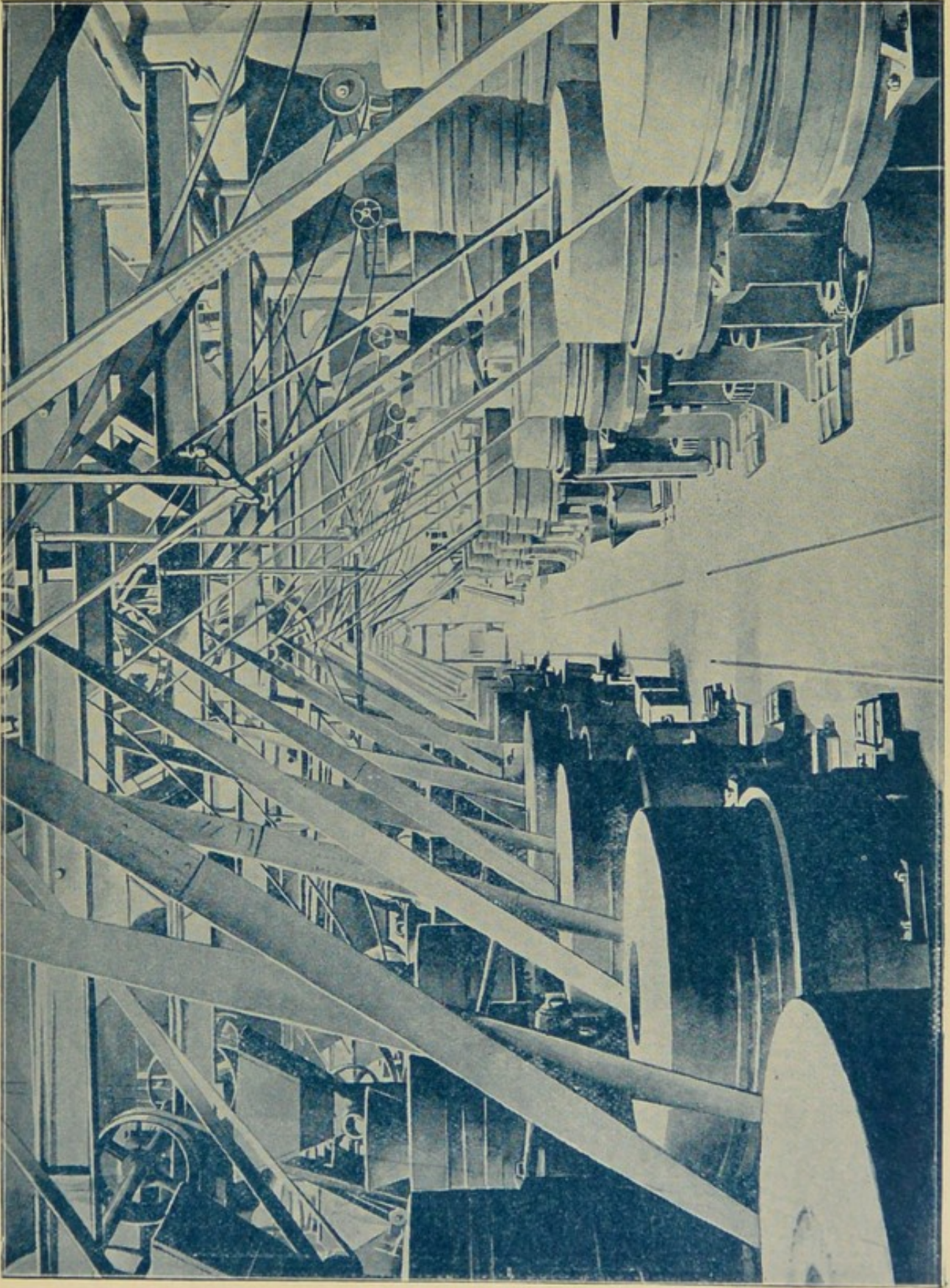
served in all the departments, and every employé appears to discharge his or her duty with that ease and readiness which is the result of experience and training.

The Cocoa arrives in sacks weighing from one to two cwt., and as it varies considerably in kind and quality it has to be stacked in large piles, ready to undergo the first process of sifting and picking, so that no unsound berry or any foreign material is passed into the roasting room. The sieves used for this process are long barrels on a slight incline, which slowly revolve and sort the nuts into various sizes, while at the same time removing dust or smaller matter that may come with them. By an automatic process the nuts are carried into the hoppers of the roasters, which are each capable of roasting one ton at a time. These rotate slowly, and the roasting is done by high-pressure steam, which is much cleaner and more economical than the old-fashioned plan of roasting by coke or gas.

So important is this process that very careful attention is necessary, and experienced workmen, whose judgment is almost unerring, are entrusted to superintend it. It is requisite for those who have charge of this department to determine the precise period at which the nuts are sufficiently roasted, for the quality and rich aromatic flavour of the Cocoa depends greatly upon this. A miscalculation in time would tend to spoil the Cocoa, but mishaps rarely happen, and so practised are the hands responsible for the roasting that the work is, as a rule, admirably done, and the flavour of the nut is invariably preserved. After being passed through a cooling chamber, the fresh air speedily reduces the temperature, when the nuts are ready to be what is technically

termed "broken down." The now crisp roasted nuts trave on to a hopper and are afterwards raised by an elevator, and passed through a machine which gently cracks them, disengaging the hard thin skin, which by this means can be separated from the nutritive portion of the nut, viz., the rich glossy kernel, known in the market as Cocoa-nibs. The separation is effected by a winnowing machine. From the outlet of the cracking machine the husk and nut are carried to a point over the winnower, and as the cracked nuts fall, the powerful blast of this machine blows away the husks, and the latter fall into a receptacle in the form of nibs, which are afterwards sorted by a diviseur. The husk or shell is sent off to Ireland and elsewhere to be used as a light, but by no means unpalatable, table decoction, under the designation of "miserables." In the year 1770 a law was enacted that "Cocoa-nut shells or husks may be seized and destroyed; and the officer who seizes them rewarded with any sum not exceeding 20s. per cwt."

The mill room, into which we now pass, is a very spacious and well-arranged apartment, in which numerous machines are employed in the manufacture of Cocoa and Chocolate, the most approved modern mechanical appliances having been introduced. In this room three long lines of millstones are at work crushing the nibs, which are fed into a hopper, whence they pass between granite millstones. The nibs are hard and brittle before being crushed, but after a few minutes' grinding, the oil they contain is disengaged by the heat, and it flows from the stones as a creamy fluid, but when cold solidifies into a hard, brittle cake. From this fluid the Cocoa-butter is extracted by means of a



GRINDING MILLS AT CADBURY'S WORKS.

certain process—a speciality of the firm—and the substance is left perfectly dry. This is speedily reduced to an impalpable powder, and the well-known and absolutely pure Cocoa Essence, for which the firm is so celebrated, is complete.

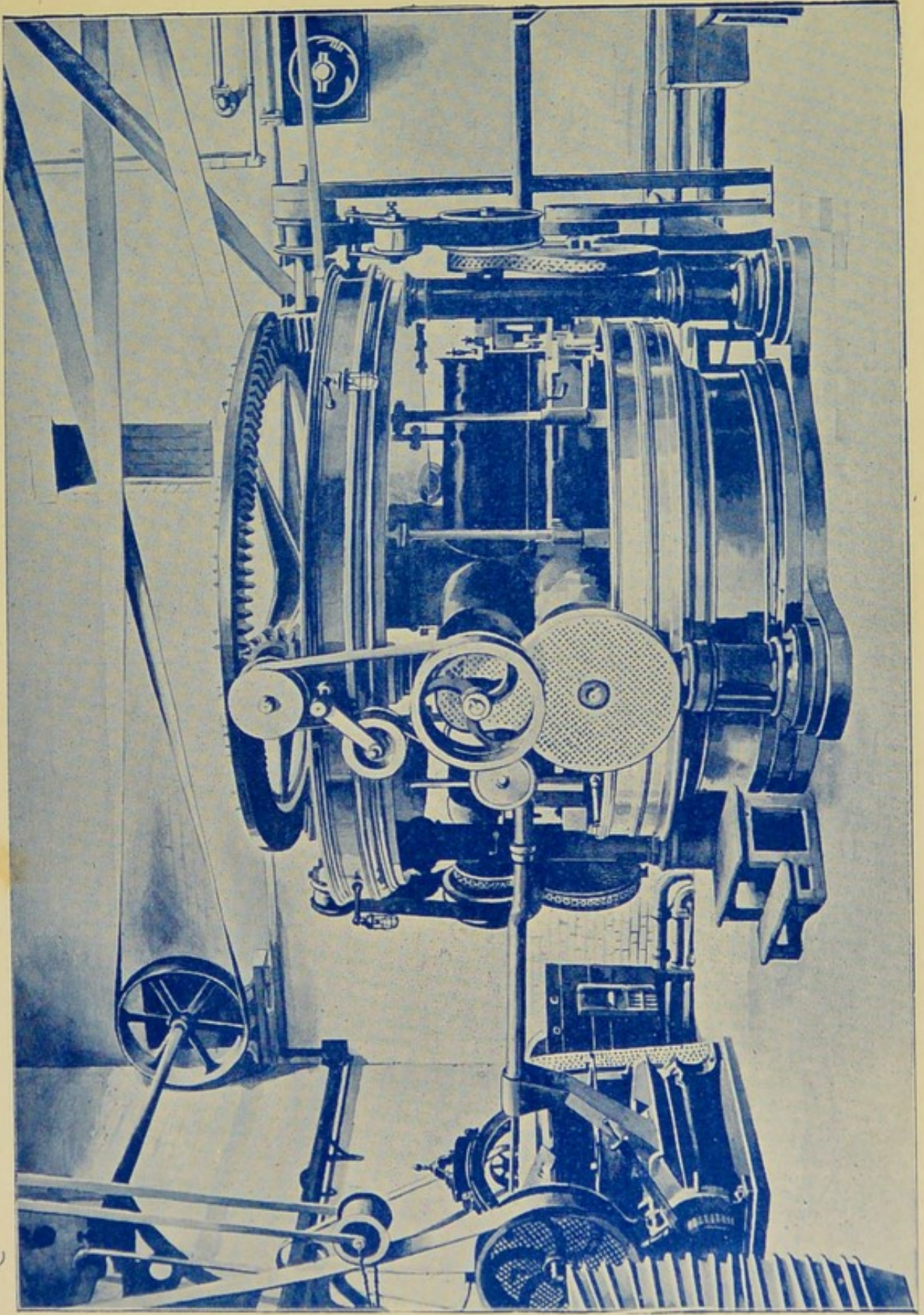
Many millions of mill-board boxes, to contain the Cocoa Essence, have to be made yearly, and it may therefore be readily supposed that the box-making department is one of considerable importance. The demand being so enormous, the firm employ elaborately-constructed machinery to meet their requirements. One machine cuts the board into the required shape, while another glues the parts together and perfects the packet-shell, the output averaging about 5,000 daily from each of the seven machines. They work with perfect regularity, and demonstrate the state of perfection to which labour-saving inventions have been brought. The boxes are removed by means of a hollow band, and forwarded to the packing-room, where numbers of busy hands are filling, wrapping, and labelling the packets.

We now come to the second branch of manufacture, which is of considerable commercial importance, and very extensive. Sweet Chocolate, for eating and drinking, forms the most delicious of all confections or beverages, and Cocoa prepared in this way is another of the specialties of the firm. To the manufacture of the numerous varieties this last section of the factory is devoted. The pure Cocoa is, in the first place, incorporated with white sugar in what is called a "Melangeur." This mixing machine consists of a round, granite, revolving slab, forming a pan, the sides being of steel. Into this receptacle the Cocoa and sugar are poured, and two sets of heavy, stationary, granite

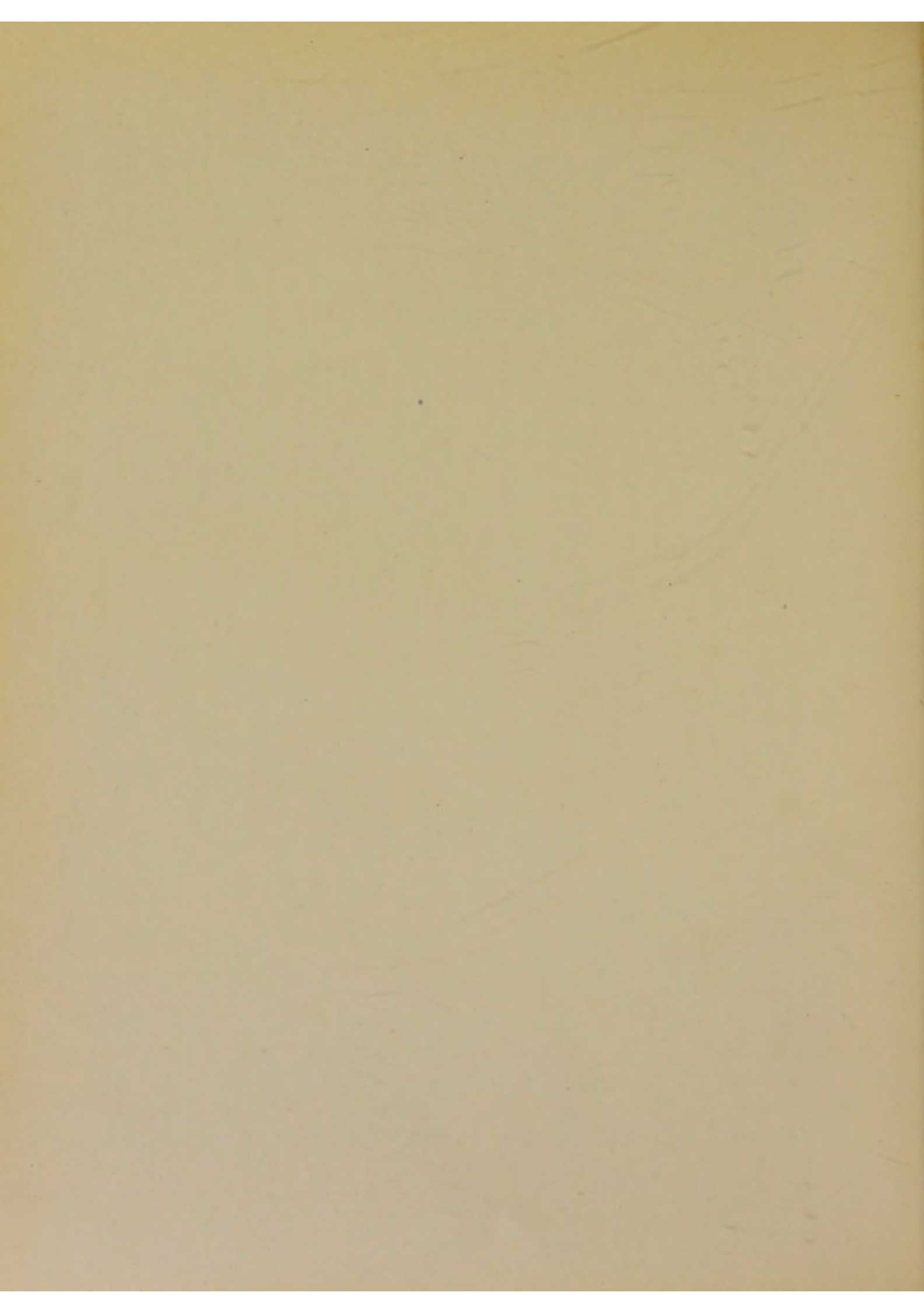
rollers bruise the thick mass, which is reduced to the consistency of dough. A double knife, the action of which is similar to that of a screw-propeller, continually revolves just above the rotary stone slab, and distributes the Chocolate as it passes. There are several of these machines at work, and our attention is particularly directed to one of an improved design and great magnitude, which mixes and grinds the Chocolate, and then automatically passes it on to heavy, granite cylinders, which systematically and gradually reduce the Chocolate to a given degree of fineness, the operation being effected with remarkable exactitude.

The "Mexican" Chocolate made by the firm has been compared to the famous Chocolate that Prescott describes as forming part of Montezuma's repast—"In golden goblets flavoured with vanilla, and so prepared as to be reduced to a froth of the consistency of honey, which gradually dissolved in the mouth."

In this establishment the charm said to be inseparable from variety is not lacking. The crême moulding-room presents a scene that is unlike any previously witnessed. The work upon which the young women in this room are engaged is of a delicate and light description, particularly suitable for female hands. In this portion of the factory the delicious Chocolate creams, which we need not describe because they are so well known, are poured rapidly into moulds of various patterns and designs, into which the workers dexterously pour the liquid cream, each hole absorbing the allotted quantity. The young women engaged in this work are remarkably expert and skilful, as they



LARGE MELANGEUR, WITH EIGHT GRANITE ROLLS, AT CADBURY'S WORKS.



manage to fill each mould with just sufficient of the cream and no more, thereby preventing waste of time, if not of material. The creams soon solidify, and when cool they are extracted from the moulds, and are taken to another department and coated with Chocolate.

The room which we next enter is very extensive and commodious, being 240 feet long by 60 feet wide. Every business convenience is afforded in this noble workroom, and the young women, with ample space at their command, suffer under none of those disabilities which invariably arise when the area is insufficient and the apartment is "cribb'd, cabin'd, and confin'd." A large number of young women are engaged in this and other rooms, of slightly less proportions, boxing, labelling, and making fancy boxes to contain Chocolate creams and numerous confections composed of the delicious preparations so well known and highly appreciated.

Not only is it essential that the sense of taste should be gratified by the manufacture of toothsome compounds, but the eye must be pleased. Many varieties of fancy boxes made in these rooms are admirable examples of art workmanship. The designs and pictures on some of the best packages are chaste and elegant, while in the vast assortment of decorative embellishments every taste and fancy may be gratified. At Christmastide boxes and creams are in universal request. Passing around this department an interesting and diversified scene presents itself. Young women are busy at work at their tables or counters, some being engaged in cutting out and stamping the cardboard, and others in fitting the boxes together on blocks, wrapping the edges with gold or

gelatine paper, and fixing on the top those pictorial, artistic gems which are so attractive. Many others are employed ornamenting and finishing, with exceedingly good taste and evident skill, the different sorts of boxes required for the various goods manufactured at the works. The hands have ample material at their disposal to render their work effective, and every novelty likely to please the public is promptly introduced. Some of the latest and most artistic ornamentations well deserve a frame.

In other rooms numerous mechanical appliances are used for cutting cardboard, paper, etc., and the number of fancy boxes turned out weekly is enormous. In another part of this section young women are busy packing creams in boxes, and wrapping Chocolate cakes in tinfoil and papers of various colours. Many thousands of completely-finished boxes and packets of every description containing Chocolate creams, plain Chocolates, and in fact, almost every variety of the firm's manufacture, including the specialties already mentioned, are ready for packing and transit to all parts of the world, to supply the home, foreign and colonial markets.

The saw-mills and wood box-making department are distinct portions of the establishment, and the visitor, on entering these extensive workshops, would imagine that another industry, entirely removed from the manufacture of Cocoa and Chocolate, was being pursued. In this building there is a buzz and whirl, caused by the circular saws by which spruce planks are reduced to the required length and thickness for box-making, and most efficient planing machines render the surface of the wood as smooth as glass. The boards are transferred by a lift across the road to larger

premises, where a number of hands are employed to nail the pieces together by ingeniously-contrived machines, which punch in three nails by one process, and through the remarkable activity of the workers, a box is nailed together almost before you can see how it is done.

The tinman's shop is next in rotation. Ingenious tools and appliances of modern design and construction have been introduced, and the tinwork, which is considerable in so vast an establishment, is executed with skill and despatch by first-class workmen. Many thousands of tin boxes for packing the Cocoa Essence are turned out every day, moulds for the Chocolates are made and stamped, with zinc linings for export cases, etc. ; also general repairs incidental to the works, which come within the province of the tin-worker, are done in this department, which is fitted with every requisite contrivance for economising labour and securing satisfactory results.

We may state here that the most excellent system of payment is adopted, "by results." At this factory almost all the employés are engaged in what is known as piece-work, which is satisfactory alike to the firm and to the hands. The system has, we understand, worked well, and the work-people, both male and female, are well satisfied with the manner in which they are treated, and we were gratified to be assured more than once how fortunate it was deemed to be employed at Bournville. This good feeling between employers and employed is of almost inestimable value, both socially and commercially.

It would be foreign to our purpose to describe fully all the interesting details of such an establishment, but we may remark in closing, that if all manufacturers would make the interests and happiness of their employés a part of their business it would add to their prosperity, and do something to solve the important problem of labour by cementing the friendship of masters and work-people.



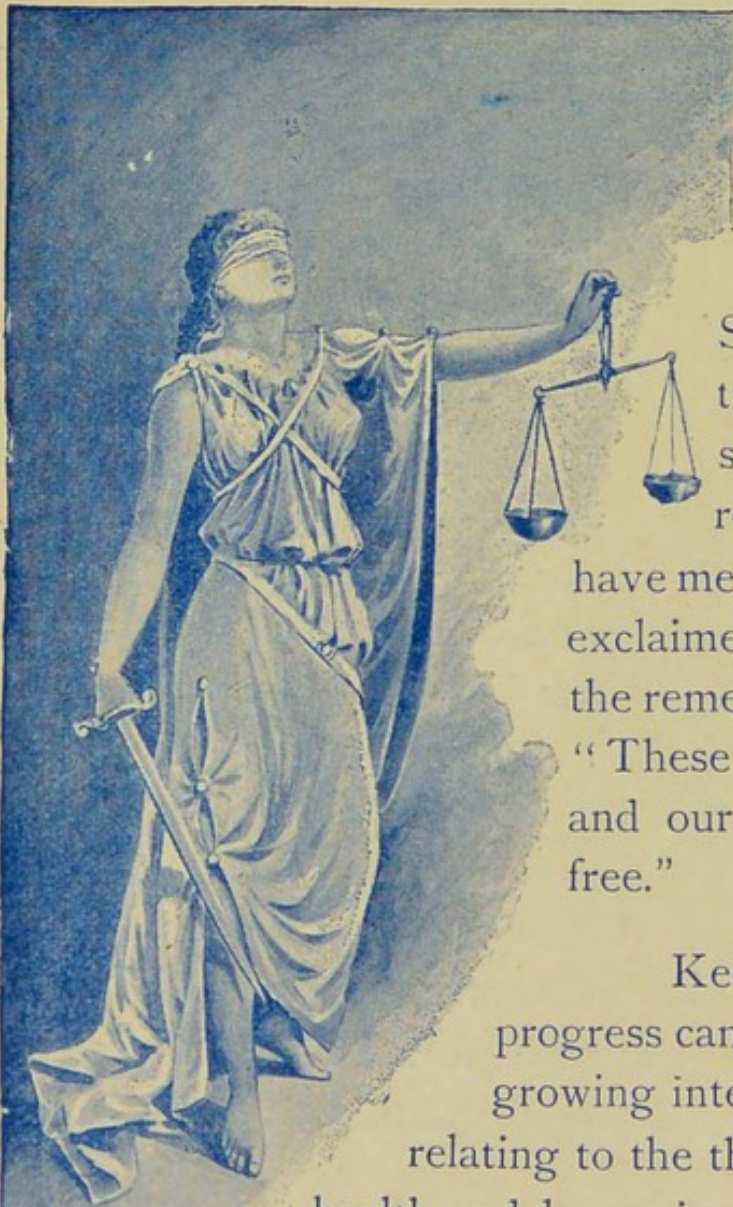
CHAPTER IV.

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VALUE OF COCOA AS FOOD, AND ITS ADULTERATIONS.

“’Tis not enough to help the feeble up,
But to support him after.”

TIMON OF ATHENS.—*Act 1, Scene 1.*



IN a passage from one of Froude's charming "Short Studies," he says: "Observe the practical issue of religious corruption. Show me a people whose trade is dishonest, and I will show you a people whose religion is a sham." "We have men that steal money," Erasmus exclaimed, writing doubtless with the remembrance of a stomach-ache. "These wretches steal our money and our lives too, and get off scot-free."

Keen observers of the national progress cannot have failed to notice the growing interest taken in all questions relating to the three essentials conducive to health and longevity, viz., wholesome food, pure water, and fresh air. In these progressive times there is a spirit of inquiry and investigation manifested, and the consumer is no longer content to take things as they

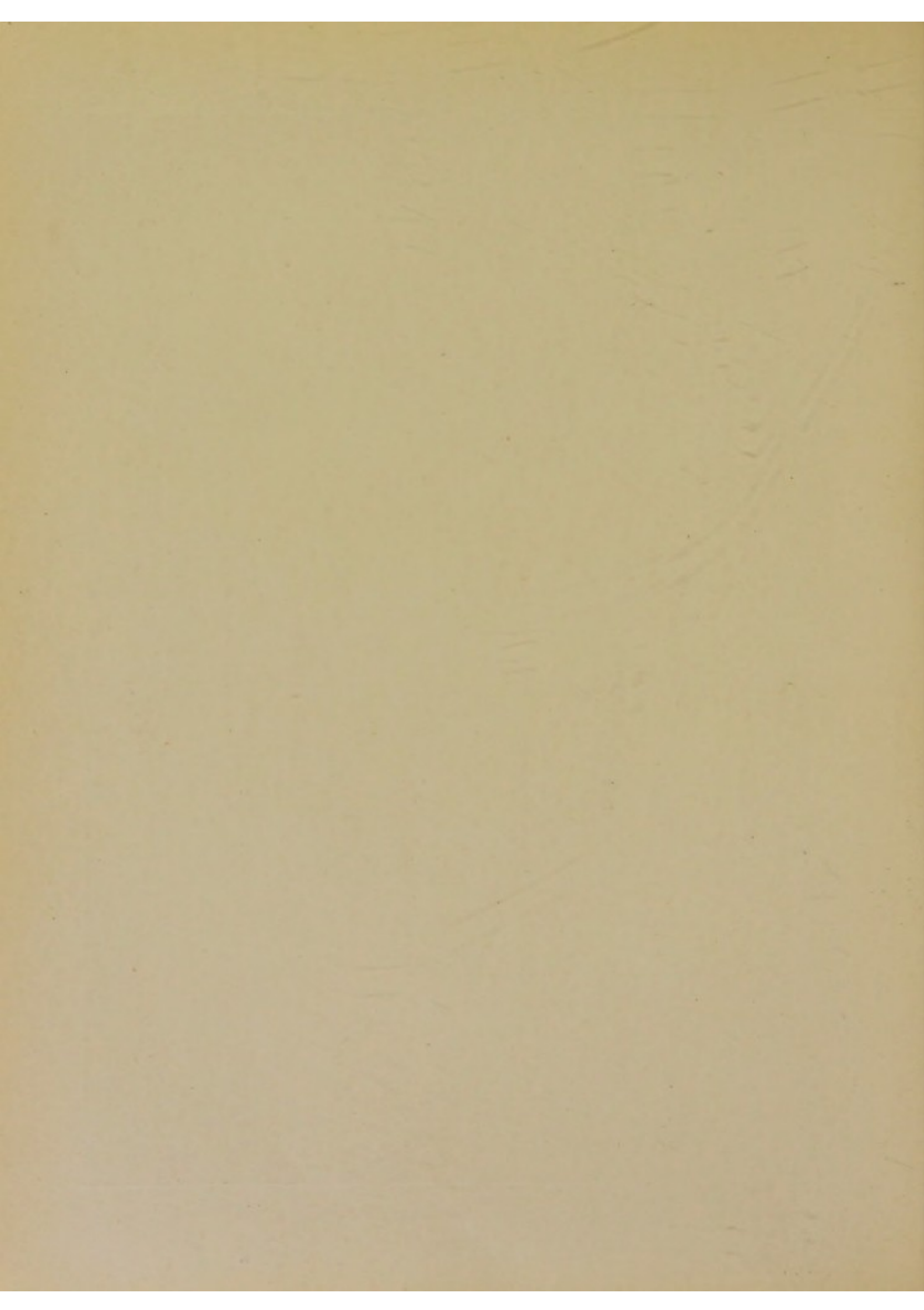
are, but, on the contrary, being of an "inquiring mind," is desirous to ascertain, for his own satisfaction and benefit, "What to eat, drink, and avoid." It is well known that adulteration was, in past days, carried on to a very considerable extent, and although very much has been done to mitigate the evil, "the selling of an inferior or debased substance under the name of a superior or genuine article" still continues, both as regards food and drink. In a Statute, 10 George III., c 10, it is enacted that, "If any article made to resemble cocoa shall be found in the possession of any dealer, under the name of American Cocoa or English Cocoa, or any other name of Cocoa, it shall be forfeited and the dealer shall forfeit £100."

So far back as 1640, in "A curious Treatise of the Nature and Quality of Chocolate," by Antonio Colmenero, which was translated from the Spanish into English, there are some remarkable statements as to the value of chocolate, but the writer recognises the mischief that adulteration had already done. He says: "Those who mix Maize in the Chocolate, do very ill; because these grains do beget a very melancholy humour; and those which mix it in this confection, do it only for their profit;" but over thirty years later (1671) Ogelby tells us: "The Spaniards, to make Chocolate, mix Maize either whole or ground." Maize constituted the principal diet of the Indian races of South America, and the interesting engraving, taken from De Bry's History, intimates that they flourished upon it.

The Analytical Sanitary Commission, published in the *Lancet* in 1851, reports upon samples of 68 different kinds of Cocoa, bearing a variety of names. Although 56 of the samples were called



INDIANS EATING BOILED GRAINS OF MAIZE.
DE BRY'S "AMERICA." FRANKFORT: 1600



“Cocoa,” and not Chocolate, there were only eight samples free from adulteration. This adulteration amounted to 65 per cent. in some of the “Soluble Cocoas,” and in one of the most extensive manufactures in England the quantity of Potato Starch came to 50 per cent. of the article, without reckoning the dose of sugar. It was found by the Analytical Commission that the majority of the 68 samples were coloured with mineral or earthy pigments. Specimens, indeed, of Cocoa thus treated with red lead are exposed in the Museum at South Kensington, under the authority of the British Government.

It is refreshing to record that in the early days of Cocoa drinking in England, Churchman’s Chocolate obtained a name and fame for being a pure preparation of Cocoa. Churchman obtained Letters Patent for his “new invention, which is now sold at 4s. 9d. per lb. N.B.—The curious may be supplied with his superfine Chocolate, that exceeds the finest sold by other makers, plain at 6s., with vanillos at 7s. To be sold for ready money only at Mr. Churchman’s Chocolate warehouse, at Mr. John Young’s, in St. Paul’s Churchyard, London, A.D. 1732.”

All foods are classified under two types or divisions—namely, the nitrogenous, or tissue-forming, and the calorificent, or heat-creating. By the term “nitrogenous” is meant all foods, whether derived from the animal or vegetable kingdom, which contain nitrogen as one of the elements of their composition, in addition to carbon, hydrogen and oxygen. These foods are also called tissue-formers, and the measure of their flesh-forming value is the quantity of nitrogen they contain. The reason of this is found in the fact that all the tissues of the body, fat excepted, contain nitrogen, and those wherein the nutritive changes are most active, such as muscle and nerve, contain the largest amount of nitrogen.

The following table of the Chemical constituents of Cocoa was given in a paper read before the Society of Arts, by John Holm, F.R.G.S., in 1874, and contains all analyses of any importance made up to that time :—

ANALYSES OF COCOA.

	Lampadius.	Payen.	Johnson.	Playfair and Lankester.	Miller.	Mitscherlich.	Muter.	Average of several other analyses.	
Fat (Cocoa Butter) ...	53'10	52'00	51'00	50'00	56'00	45'00 49'00	42'67	50'00	
{ Albuminoid Substances	18'70	} 20'00	...	...	17'00	13'00 18'00	...	...
{ Albumin ... ..	...		...	20'00	...	...	...	} 18'00
{ Fibrin ... ..	...		...	...	...	...	...
{ Gluten ... ..	...		20'00	...	...	...	12'21	
Extractive Matter ...	...	...	...	...	...	...	...	...
Sugar ... ..	...	...	...	...	...	0'60 ...	...	...
Starch	10'91	10'00	} 22'00	7'00	} 22'00	14'00 18'00	19'03	10'00	
Gum	7'75	...		6'00		6'40	8'00
{ Lignine... ..	0'90
{ Cellulose ... ..	...	2'00	...	...	...	6'08 ...	5'95	...
{ Woody Fibre ... ..	...	...	...	4'00	...	...	...	...
Colouring Matter ...	2'01	traces	...	2'00	...	3'05 5'00	3'96	2'60	
Water	5'20	10'00	5'00	5'00	...	5'06 6'30	5'98	6'00	
Theobromine ... ..	...	2'00	2'00	2'00	1'50	1'02 1'50	0'90	1'50
Salts ... ..	...	4'00	...	4'00	...	...	...	...
Ash ... ..	...	...	...	...	...	3'05 ...	2'90	3'60
{ Humic Acid ... ..	...	...	...	...	...	...	...	...
{ Parts unaccounted for	1'43	...	...	...	3'50	9'14 ...	...	0'30
Total	100'00	100'00	100'00	100'00	100'00	100'00 ...	100'00	100'00	

The active principle of Cocoa is Theobromine, of which active principle we find, according to Drs. Playfair and Lankester—

Tea contains	3 per cent.	Theine.
Coffee ,,	1 $\frac{3}{4}$,,	Caffein.
Cocoa ,,	2 ,,	Theobromine.

Cocoa also contains a volatile oil, which gives its delicious aroma, and, no doubt, essentially adds to its refreshing and exhilarating character as a beverage.

Mr. Holm makes the following observations :—

“ It is a table which is not very flattering to chemical science, the analyses being of the most contradictory character, and containing discrepancies which cannot be at all reconciled with each other. I should judge that the analysis prepared by Drs. Playfair and Lankester is the most correct.” We thus see that, taking the important constituents, Cocoa contains :—

	Parts.
Cocoa Butter	50
Albuminoid substances	20
Starch, Sugar, &c.	13
Salts	4
Theobromine	2
Other constituents	11
	100

Taking these in the order of their importance, we first notice the fat, or Cocoa-butter, forms about half the substance of the nibs. It is a hard, fatty substance, and when clarified, is of a pale yellow colour. Its melting point is about 100° Fah., which being the heat of the body, renders it of great value for therapeutical purposes. The fat only becomes rancid when subjected to heat or light, and especially to the direct rays of the sun. It is hardly necessary to point out how valuable this quality renders this portion of the bean for surgical and other purposes. The albuminoid constituents form about 20 per cent. of the nib. These are classed amongst the nitrogenous principles of food, and their presence renders Cocoa one of the richest flesh-formers

Cocoa is said to yield thirteen times the nutriment of Tea for the same value, and four-and-a-half times as much as Coffee.

Brillat-Savarin, the author of the "Physiologie du Goût," remarks: "The persons who habitually take Chocolate are those who enjoy the most equable and constant health, and are least liable to a multitude of illnesses which spoil the enjoyment of life."

Mr. O. L. Symonds, in his work on the Commercial Products of the Vegetable Kingdom, says: "Cocoa is of domestic drinks the most alimentary; it is without any exception the cheapest food that we can conceive, as it may be literally termed meat and drink, and were our half-starved artizans and over-worked factory children induced to drink it, instead of the innutritious beverage called tea, its nutritive qualities would soon develop themselves in their improved looks and more robust condition." The heads of the Naval and Military Departments in England have been so impressed with the superior nutritive properties of Cocoa that it is served out twice or three times a week to regiments of the line, and daily to the seamen on board Her Majesty's ships.

The importance of these facts in connection with the use of Cocoa will at once be apparent when we compare the analysis of Cocoa nibs, which contain all the natural butter, with Cocoa essence, from which about two-thirds has been removed. It is also interesting to note that Cocoa compares very favourably with pure, dried milk:—

				Flesh	Formers.	
Dr. Johnson's Analysis	{	Cocoa Nibs	23	}	Out of every	100 parts.
		Dried Milk	35			
COCOA ESSENCE	...	...	34 $\frac{3}{4}$	
Best French Chocolates	...	...	11	

Mr. Faussett, M.B., F.R.C.S.I., in a paper read before the Surgical Society of Ireland, May, 1877, draws the attention of the Faculty to this subject, in connection with the feeding of infants :—

“Without presuming to pass any judgment on the many artificial substitutes which on alleged chemical and scientific principles have from time to time been pressed forward under the notice of the Profession and the public to take the place of mother’s milk, I beg to call attention to a very cheap and simple article which is always easily procurable—viz., Cocoa, and which, *when pure and deprived of an excess of fatty matter*, may safely be relied on, as Cocoa in the natural state abounds in a number of valuable nutritious principles ; in fact, in every material necessary for the growth, the development, and sustenance of the body.” After giving some remarkable cases of children being restored from “the last stage of extreme exhaustion” by its use, and “continued through the whole period of infancy” with the effect of their becoming fine, healthy children, he concludes by saying :—“I beg, therefore, respectfully to commend Cocoa, as an article of infant’s food, to the notice of my professional brethren, especially those who, holding office under the Poor-laws, have such large and extensive opportunities of testing its value. That it is as nutritious for old as well as young we have an interesting proof in the fact that “the first Englishman born in Jamaica, Colonel Montague James, who lived to the age of 104, took scarcely any food but Cocoa or Chocolate for the last 30 years of his life.”

For athletes, and all who study the development of the muscular tissues of the body, its use is most beneficial. Professor

Cavill, in his celebrated swim from Southampton to Portsmouth, and his nearly successful attempt to swim across the English Channel, considered it to be the most concentrated and sustaining food he could use for that trying test of his staying power. Several other instances could be given of the same character.

Dr. John Muter, Ph.D., F.C.S., in an article on Prepared Cocoa, says :—

“The only objection which can and does exist to its use in a state of purity is the excessive proportion of fat, which renders it too rich for most digestions, and gives unfortunately a colourable excuse for its admixture with starch. There are two classes of prepared Cocoa: (1) That in which the reduction of the fat is secured by adding starch and sugar; and (2) That where the fat is partially removed and the remainder of the bean is served to the public unmixed.

“On looking at the composition of Cocoa, the great fallacy of countenancing the addition of starch is at once apparent. The only possible excuse is the dilution of the fat, but then, at the same time, the nutritious gluten and stimulating theobromine are equally reduced in value. On the other hand, given the removal of a portion of the fat, the other constituents are not only kept intact, but positively concentrated in a high degree.”

Fine Cocoa, carefully prepared and combined with sugar, is probably the most delicious and delicate of all confections, and if free from the husk or shell, which is often used in the lower qualities of chocolate, is certainly one of the most nutritious articles of food.



Pure decorticated Cocoa, with 1-5th inch power, and A eye-piece. Starch cells—inner membrane—portions of embryo.



Cocoa adulterated with common Arrowroot, containing Potato Starch, as seen by 1-5th inch power and A eye-piece

The important question of adulteration may be divided under two heads—viz., those additions that are fraudulent but not injurious, and those additions that are both fraudulent and injurious to health.

Of this latter class of adulteration, Dr. Hassall's book on "Food and its Adulterations," written many years ago, disposed, as it resulted in public opinion being awakened to such frauds, and in a searching investigation on the part of the Government. The Adulteration Act of Parliament (1873) made it necessary for the manufacturer to state on every packet that the article is sold as a mixture, and that all additions are in no way injurious to health.

We are glad to believe that Venetian-red, umber, peroxide of iron, and even brick-dust, are adulterations of the past.

We have, therefore, to deal with the more difficult definitions of adulterations that are not necessarily injurious to health, but that reduce the value of Cocoa as food. We have already shown that Cocoa is rich in nitrogenous elements, and therefore of such inestimable importance as a builder-up and strengthener of the human frame that we need be very jealous of all devices used by manufacturers to reduce its value. There are a certain class of additions to Cocoa that can only come under the head of fraudulent adulterations when they are mixed in extravagant quantities; we allude more particularly to farinaceous substances, such as arrowroot, sago, potato-starch, &c.

There can be no objection to such additions so long as they are stated, and the mixture not sold as Cocoa. It is hardly fair,

however, to term such articles Chocolate, or Chocolate powder (certainly not Cocoa) when the proportion of Cocoa does not amount to one-tenth part of the whole.

We have samples of such articles before us that have been palmed on to the public as "Soluble Cocoa." We cannot admit under any circumstance that the addition of starch improves the quality. It may be that some prefer their Cocoa thick, but while the addition of farinaceous substances are made to absorb the excess of butter and to make it "soluble," it must not be forgotten that it takes the form of an emulsion, and therefore cannot be so wholesome as food.

We now come to the still more difficult and subtle question of the addition of alkali in the preparation of pure Cocoa, partly deprived of its natural butter, such addition being altogether unnecessary, as Cocoa can be obtained in three distinct forms, all absolutely free from any admixture.

First, as Cocoa Nibs.—The natural broken segments of the roasted Cocoa bean after the shell has been removed. This is prepared for the table as an infusion—like tea or coffee—but requires some time to simmer before the full alkaline strength is extracted. In this case the albuminous portion of the nibs and the butter are wasted.

Second, as Consolidated Nibs.—Cocoa nibs ground between heated stones, from which the Cocoa flows in the consistency of cream, and, when cool, hardens into a brittle cake of Cocoa; this contains all the Cocoa Butter. It is specially recommended for some constitutions, but is too rich for most, and is not easily prepared for the table.

Third, as Cocoa Essence.—This is the same article as the second, with about sixty per cent. of the natural butter in Cocoa removed, consequently the proportion of albuminous and stimulating elements are greatly increased.

It is made instantly by pouring boiling water upon it in the cup, and thus forms a light beverage, with all the strength and flesh-forming constituents of Cocoa.

The excuses for adding alkali are that “it makes the Cocoa more soluble.” This is—chemically—impossible, as can easily be proved by allowing the liquor to stand until cold, when it will be found that all the albuminous part of the Cocoa has sunk to the bottom of the cup, while the fatty portion is floating on the surface.

Also “that the addition of alkali improves the quality.” The test for this would be to ask a doctor which he would recommend for a child that had lost its natural supply of mother’s milk—pure Cocoa or alkalized Cocoa? Cocoa with butter in its natural state or with the butter saponified in the form of an emulsion?

The true reason for the addition of alkali is apparent to the initiated. It gives a deceptive value to the Cocoa by darkening its colour in the cup. The addition of fixed alkalies is easily detected by analysis, and when volatile alkalies are used, such as ammonia, their traces can be easily detected by the saponification of the butter and the various scents and flavourings used to cover the offensive smell and taste.

Dr. Paul Zipperer classifies the processes used for the preparation of Cocoa, deprived of a portion of its butter, as follows :—

1. By steam pressure.
2. By fixed alkalies. The Dutch method.

3. By volatile alkalies, viz., carbonate of ammonia and caustic ammonia. The German method. Under this process, the Cocoa being roasted and pulverised, and the oil extracted by pressure, it is treated with a solution of carbonate of ammonia, and, finally, dried up to the complete volatilisation of the ammonia.

It is contended as an excuse for the adulteration of Cocoa with alkali that Cocoa contains a small percentage of alkali in its natural state, and that, therefore, it may still be called "perfectly pure" after more alkali is added. Allowing that some alkalies, carefully treated and added in small quantities, may not materially injure Cocoa as food, it is still a dangerous experiment. The same reasoning would apply to coffee prepared with finings. Raw coffee actually *loses* a large proportion of its saccharine element by roasting. Mr. Allen, in his work on Organic Analysis, gives the amount of saccharine in raw East India coffee at 8.90, while after roasting it only contains 0.41, so that a much stronger plea could be maintained for the manufacturer to add saccharine to his coffee than for the Cocoa manufacturer to add alkali to his Cocoa and call it "perfectly pure." The strong reason for objecting to all such additions, without clearly stating the fact on each packet, is that the public should be protected, and when they ask for pure Coffee or pure Cocoa that they should know that they get what they ask for.

Dr. Crespi, in a recent article, says :—

“Unfortunately we have of late years seen the country flooded with foreign Cocoas, pure in great measure—that is, innocent of starch and sugar—but contaminated with an admixture of alkali. The exact percentage of these additions and the steps in the process are not, however, perfectly clear. The object of this adulteration is this : Cocoa does not give an infusion or decoction, but mixed with water is practically an emulsion ; it is suspended, not dissolved. Now the addition of an alkali gives rise to a soap, in plain English, much as when common soap—a compound of oil and alkalies—is mixed with water ; but this alkalisied Cocoa has an appearance of strength which it does not possess, and the ignorant consumer hastily assumes that he is getting far more for his money and being supplied with a much better article, so that he cheerfully pays a higher price for his medicated beverage. But we are not so much concerned with the actual injury done by the adulteration of Cocoa with alkalies as with the principle. The recent great improvements in the preparation of Cocoa, as we have said above, by removing the superabundant oil, have so much increased the digestibility of this nutritious beverage that the last excuse for the addition of alkalies and starch is gone, and the presence of the former, besides being deleterious to some constitutions, cannot answer any purpose except giving an appearance of fictitious strength.”

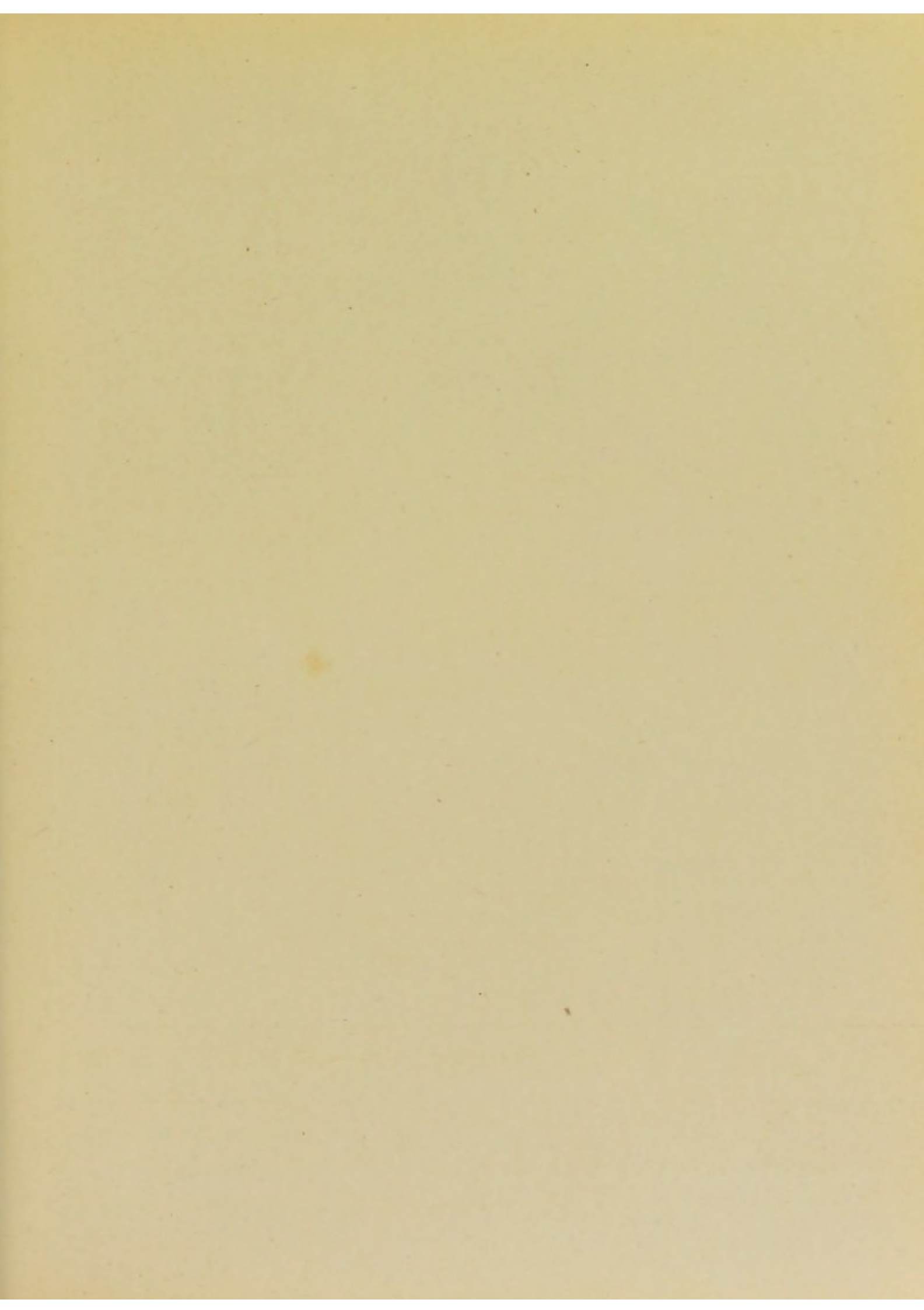
It may be as well also to add the opinion of Dr. Sidney Ringer, Professor of Medicine at the University College, London, and Physician to the College Hospital ; perhaps the greatest English authority on the action of drugs.

He states, in his "Handbook of Therapeutics," that "the sustained administration of alkalies and their carbonates renders the blood poorer in solid and in red corpuscles and impairs the nutrition of the body." Of ammonia, carbonate of ammonia, and spirits of ammonia, he says: "These preparations have many properties in common with the alkaline potash and soda group. They possess a strong alkaline reaction, are freely soluble in water, have a high diffusion power, and dissolve the animal textures."

One word with respect to the names "Cocoa" and "Chocolate." Cacao, or Cocoa, is the commercial name by which the plant and the fruit are known all over the world; therefore it directly applies to pure preparation of the fruit. When mixed with sugar or any other substance it cannot logically retain its original name, and the public have accepted this reasoning by asking for "Chocolate" when they require sweetened Cocoa. It would save much confusion if this rule were accepted and acted upon by manufacturers, or even enforced by Act of Parliament.

Much more might be written on the subject of adulteration, and we trust it will still claim the careful attention of those interested in the supply of pure and wholesome food.







VANILLA AROMATICA.

1, Branch with flowers. 2, Branch with fruit. 3, Section of fruit showing the three placentæ and indefinite seeds

VANILLA AROMATICA.

—:0:—

VANILLA is so intimately connected with the manufacture of Chocolate, that our treatise is hardly complete without some allusion to it in this place.

The name is derived from Vaynilla, which, in Spanish, signifies a little knife, or scissors case, and in this connection refers to the shape of the pod.

Its natural habitat is the mountainous parts of Brazil. It is now cultivated in large quantities in other parts of the tropical world, the principal sources of supply being the French Colony of Réunion, Mauritius, and Seychelles, Bourbon, the West Indies, Java, Japan, and Madagascar, and within the past few years Ceylon and India. Mexico, whence the principal supply used to flow, has almost ceased to grow Vanilla, owing to the comparatively low prices now obtained for it.

There are many species of this lovely and fragrant plant, which belongs to the genera of Orchidaceous plants; but they differ in some respects from orchids generally, as the stem will grow to the height of from twenty to thirty feet. In climbing up the trees, the rootlets which they put forth as holdfasts are capable of absorbing nutriment for the plant when other modes of supply are cut off.

The places chosen for a plantation are shaded and warm ravines in high, damp forests, advantage being taken of trees with a soft bark, into which the roots may easily penetrate.

It is interesting, in connection with our subject, to hear from one who has cultivated the plant that he has seen it growing freely round the stem of the Cocoa tree like a hop.

Vanilla aromatica and *V. planifolia* are the species from which the best kind of Vanilla is grown for commerce. The leaves are thick and fleshy, as are also the flowers, which are of a whitish-green colour.

The sweet perfume of its fruit is perceptible at a great distance, and attracts numbers of brilliantly coloured birds, that dispute for the seeds when the fruit opens.

The Chica Vanilla of Panama is yielded by another orchid, a species of *sobralia*. The expressed juice of *V. claviculata*, a native of mountainous woods in the West Indies, is applied to fresh wounds, and is hence called by the French in St. Domingo *Liane à blessures*. There is a species known as *zizpic* in Yucatan, which is a great ornament of the *cenotes*, or subterranean water caverns of the country. These singular caverns are sometimes entirely subterranean, and are then, of course, without vegetation; frequently, however, they are more or less open at the top, when they are often of surpassing beauty, on account of the luxuriant development of vegetable life which they contain. To these *cenotes* the few ferns of Yucatan are almost confined, and it is here that Vanilla attains perfection. The pods are occasionally taken to market at Valladolid, where they may be bought at an almost nominal price.

Vanilla was not known in Europe until after the discovery of America, and little or nothing was known of the plant that produced it until 1703, when it was described by Plumier.

De Menonville, who travelled to Guaxaca in 1777, thus describes his discovery of Vanilla in that district. After various hindrances and disappointments, he says:—"At length an Indian, with a hoe in his hand, made his appearance. 'Brother,' said I, holding out a dollar, 'show me some Vanilla and this is yours.' He coolly bade me follow him, and advancing a few steps through the underwood into a thicket, in which were a number of trees, he immediately climbed up one, threw down to me two pods of Vanilla perfectly ripe, and pointed out to me a branch on which several others were hanging yet green, together with two faded flowers. The form of the leaves, the fruit, the peculiar smell of the plant—everything convinced me it was the real Vanilla, in everything corresponding with such as I had seen at Vera Cruz. All the trees of this little copse were covered with it. I saw a quantity of green fruit, but collected no more than six specimens of these, and four large pods which were ripe. I caused the Indian afterwards to part from the root some of the scions which had sprung up. These I tied well together, wrapping up the whole in the leaves of an arum, which at their base are 3 feet wide. After thus packing a faggot, which weighed upwards of thirty pounds, I placed it in my large sack, which I fastened on my horse. I was so well satisfied with my Indian that, besides what I promised him, I gave him two reals in addition. For his part, unwilling to be outdone in generosity, he ran to his hut and brought me three other pods of Vanilla."

The Duke of Marlborough introduced the plant into this country in 1800, and presently it made its way to the Continent, where it is grown and made to bear abundance of fruit.

At Liége it is grown on a small scale, and a plant cultivated at Paris in 1840 attained the height of three yards, and yielded 117 pods, which ripened in twelve months. Fine examples may be seen in the tropical and economic houses at Kew. Mr. Ewing and Mr. E. Bennett grew the Vanilla with considerable success at Osberton; the latter gathered no less than 300 ripe pods off a single plant in one season. He considers a temperature of from 50 to 70 degrees to be most suitable for it. He found it necessary to effect fertilization by artificial means, the stigma being prevented from receiving the pollen of its own flower by the interposition of an organ called the *retinaculum*.

This process, which in these climates is obliged to be performed artificially, is done naturally by insects in countries where the plants were originally found in their wild state.

The fruit of the plant is a long bean or pod, growing from four to twelve inches in length, and containing an immense number of small black granules, surrounded by a thick balsamous substance, which contains a peculiar volatile oil, and a considerable quantity of benzoic acid.

These give the delicious flavour and aroma, which prove so powerful and penetrating that a few ounces will flavour one hundred-weight of Chocolate.

Vanilla acts as a slight stimulant to the system, and the fact of its possessing benzoic acid is one that should not be lost sight of. It is said to be used by the Spanish physicians in America as an antidote to poisons, and to the bite of venomous creatures.

The harvest in Mauritius begins in July, and as late as December in South America, the fruits being gathered when yellow. After slight fermentation they are laid in the sun to dry, and when about half-dried, the pods are rubbed with mahogany-nut oil, and after again being exposed to the sun are oiled a second time.

In another mode of preparation, the fruit for the market is allowed to dry until the pods have lost their yellowish green colour. Straw mats, covered with woollen blankets, are then laid on the ground, and when these are warm, the fruits are spread on them and exposed to the sun. After a time they are wrapped in blankets, and placed in boxes covered with cloth, after which they are again exposed. In about twelve hours, the fruits should become a dark coffee-colour, but if they do not the process is repeated.

About fifty pods are then tied tightly together in a bundle, at each end, and once round the centre, with a species of grass, and packed in tins, which are hermetically sealed for export.

After some months, the pods become encrusted with an efflorescence of white crystals, which possess properties similar to those in benzoic acid; they form very beautiful objects when seen through a microscope with polarized light.

There are various plans used for drying and preparing the pods. All the care and success during the early cultivation may easily be lost through want of knowledge or watchfulness in these matters. We therefore refer the reader to extracts from a paper addressed to the Colonial Secretary, by the Assistant Director of the Royal Botanical Gardens, Mauritius, which gives a most exhaustive account of the planting, watering, ripening, harvesting, curing, and preparation for the market. (*See Appendix.*)

The South American wild Vanilla, or Vanillon, as it is generally called, is the variety *V. sylvestris*, and is a much larger and coarser variety than those grown for commerce. In some parts of Brazil the women entwine this species of Vanilla bean in their hair—a weakness for fragrance that is common all the world over, although in this case it hardly fits in with our ideas of good taste.

A great variety of spices are used for the flavouring of Chocolate, but Vanilla still holds the palm. In Brooke's translation from the French, 1730, he tells us :—"The Spaniards try'd to make it (Cocoa) more agreeable by the addition of sugar, some Oriental spices and things that grow there, which it will be needless to mention—there is none continued down to us but Vanilla; in like manner that Cinnamon is the only spice which has had general approbation, and remains in the composition of Chocolate."

The old French writer is very strong in his denunciation of Vanilla, as he goes on to say :—"Whereas Chocolate season'd

with Vanilla, and other hot and biting ingredients, cannot but be pernicious, especially in summer, to young people, and to dry constitutions."

The French still name Chocolate prepared without Vanilla "Chocolat Santé," but we have fortunately lived down this prejudice, and Vanilla reigns supreme among all ingredients used to flavour Chocolate.

It has already been intimated, with respect to the growth of Vanilla in Mexico, that prices have fallen so considerably that it barely pays to grow the crop in that country. Many years ago prices ranged as high as 120/- per pound on the market; the highest price now does not realise one-fourth that sum. This is due to the introduction of a beautiful crystalline substance called Vanilline, which coincides in almost every particular with the active principles contained in Vanilla.

The distinctive aroma is so nearly the same that when incorporated with Chocolate it is difficult to distinguish with which it has been flavoured. It would, however, be going too far to assert that it is equal in aromatic and fruity flavour to Vanilla.

One ounce of Vanilline crystals is about equal in flavouring power to one pound of good Vanilla beans; the market value is therefore about in the proportion of sixteen to one.

Vanilline, of which the chemical formula is $C_8 H_8 O_3$, is prepared from Coniferine, which is to be found in considerable quantities in the plants of the numerous family of the Conifers.

Coniferine was discovered by Hartig in 1861 in the sap of the *Larix Europea*; later on, its presence was recognised in all species of pines and firs.

In 1874 Messrs. Haarman and Tiemann showed that the Coniferine, under the influence of oxydizing agents properly chosen, could be made to produce Vanilline, which is no other than the aromatic principle of the Vanilla pod. This discovery has given a certain industrial importance to Coniferine, and it has already been collected by hundreds of kilogrammes in the forests of North Germany.

The first consignments of Vanilline were between 1874 and 1878, and were prepared by a patent process—that is to say, by the oxidization of the Coniferine. This is only to be found in the descending sap of the pines, so in the spring incisions were made at the base of the trees, and the sap which flows from them was collected; it was then filtered and exposed to the air, when it soon became solid. In this state it constitutes the Coniferine, which could be preserved indefinitely and made use of when required for its transformation into Vanilline.

The more modern and advantageous plan is to fell the tree, cut off the branches, and strip them of their bark. The sap is then collected by scraping the trunk with a sharp instrument—an iron scraper or a knife—and the liquid, as it oozes out is absorbed by a coarse sponge, and then squeezed into a tin bucket. If too long a time elapses between these two processes the evaporation is rapid enough to solidify the juice and then it cannot be collected

The sap presents the appearance of a white, milky, opaque liquid, and in its normal state contains a particular sugar, albumen, and Coniferine. In order to prevent fermentation it ought, after five or six hours at the most, to be boiled in a furnace from ten to fifteen minutes, so as to congeal the albumen it contains. The boiling liquid is filtered through a coarse flannel or baize bag, and the filtered product is then evaporated to the one-fifth part of the original quantity. It is then allowed to cool gently in a shady place for one night, when it deposits very small white crystals of Vanilline. In order to collect them the liquid is thrown upon a linen cloth, and when the crystals are sufficiently drained they are pressed in order to squeeze out the brown syrup which colours them and prevents them from drying.

The Vanilline obtained by this method is identical with the crystals already described as forming on the Vanilla pod, the chemical constitution of the one being identical with that of the others, as is also their physical properties.





APPENDIX.

EXTRACTS from a paper addressed to the Colonial Secretary by Mr. N. Cantley, Assistant Director of the Royal Botanical Gardens, Mauritius, and supplied by Messrs. Brookes and Green, Brokers, Mincing Lane, London :—

July 23, 1874.

SIR,

I have the honour to lay before you the following details respecting the cultivation of the Vanilla plant (*V. planifolia*) as practised by the principal growers in this Colony, viz. :—

PREPARING THE GROUND FOR PLANTING.

The plant will grow tolerably well in any porous soil, still it has been found by practical growers that a composition consisting of equal parts of well-decomposed leaves, loam, sand, and charcoal, is best suited to the wants of the plant, and when this can be obtained trenches should be made the entire length of the ground intended for the plantation, 18 inches wide, 2 feet deep, and 8 feet apart, and filled previous to planting with the composition just alluded to. Some growers put only a small quantity of the composition into the trenches the first season, or sufficient to give the plant a start, adding the remainder year by year, by way of surface dressing, but this is objectionable in countries subjected to heavy periodical rains, as the trenches often stand full of water during such rains, greatly to the injury of the plants; it is, therefore, safer to fill the trenches the first year, or when the plants are planted.

SHADE.

The Vanilla, like the rest of the orchidaceal, delight in shade, a fact which at once suggests that it ought to be planted among trees sufficiently large to screen it from the direct rays of the sun, but where such trees are not available young trees

must be planted ; and now arises the question, what will grow quickest in order that the Vanilla may be planted as soon as possible ? The plants most commonly used for this purpose in Mauritius are the *Lilas de l'Tude* of the Creoles, *Melia Azadarech*, and *Tecoma Lencoxylon*, and are planted 8 feet apart, as permanent plants, but when these are only a few inches high when planted it is evident that a period of at least three years must elapse before any considerable amount of shade can be expected from them, and this would delay the planting of the Vanilla an equal length of time had not the planters access to another plant, the *Pignon de l'Tude* of the Creoles (*Tatropha curcus*), which is of extremely rapid growth, but of no permanent nature ; it is easily increased by cuttings of the branches, which are generally cut in lengths of 2 feet, and planted, 18 inches apart, in line with the *Lila* and *Tecoma* plants previously mentioned, and as they will very soon produce leaves, some growers plant the Vanilla at the same time, and train it under the shade of *Pignon de l'Tude*.

It is better to wait until the *Pignon de l'Tude* be sufficiently strong to allow of the trellis-work being erected. Where dead palm-leaves are plentiful some growers screen the whole plantation at the first outset, and plant the Vanilla at once, but it is not often that leaves are to be had in sufficient quantity to allow of this being done, and, again, it is ten to one if the first strong wind does not destroy the whole construction.

PLANTING.

The usual method of planting Vanilla is by cuttings of the stems of strong, healthy plants, and if cut in lengths of 3 feet, they will generally produce fruit 18 months after planting. Plantations are generally made during the months of October and November, in Mauritius, or at the commencement of the hot season, when the sap, after a season of comparative rest, is being stimulated by the increasing heat into renewed action. As the rapidity of growth greatly depends on the number of roots, care must be taken that three joints (nodes) of the cutting be placed on the ground, in an oblique direction, and from these joints a plentiful supply of roots will be given out, which must be treated as hereafter stated.

TRAINING, OR ARTIFICIAL SUPPORT.

The rapidity with which the Vanilla plant grows when its roots have free action in a suitable soil is really amazing ; there is therefore no question that, if

some system of artificial training be not resorted to, it must very soon outgrow the plants which are intended to shade it. Few trees can keep pace with the Vanilla plant; and even were it otherwise, it would not be advisable to let the plant grow straight up, because they would very soon get out of reach in this position, so that a ladder would have to be used in gathering the pods, fertilizing, &c., but, on the other hand, the plants ought to be allowed to run straight up until they arrive at about 6 feet in height, as it is well known that the more perpendicular the plant the quicker it will grow. But to prevent this taking place, poles of about 7 feet in length are driven into the ground, perpendicularly, about 8 feet apart, and when well firmed, horizontal bars are attached to them, one foot apart. As soon as the Vanilla has reached the top of this construction it is trained along the horizontal bars and thus prevented from getting too much sun.

WATERING.

The quantity of water required is greatly modified by the state of the weather and kind of soil in which the plants are growing; but if planted in the composition previously recommended, a good watering twice a week in the hot season, and once a week in the cold season, will be generally found sufficient, but should never be given until the ground be found thoroughly dry, as nothing will kill the plants sooner than stagnant water at their roots.

MANURING AND SURFACE DRESSING.

Of the various manures applied to the Vanilla, nothing has been found to suit the plants better than vegetable mould, especially when mixed with a little charcoal or wood ashes, and the plants will be greatly benefited by a surface dressing of this manure in the second year of the plantation, at which date, should any of the roots be found to have penetrated the natural soil lying between the trenches it should be turned over with a digging fork, adding at the same time a liberal quantity of manure, but should the roots be found not to have reached such soil, it will be sufficient to remove the surface to a depth of about 2 inches, and 2 feet in width on each side of the Vanilla stems, and replace with manure.

FERTILIZATION.

Self-fertilization in the Vanilla, especially in *V. planifolia*, is of rare occurrence to any useful extent, owing to the intervention of the reticulum, which is a portion

of the inner face of the style, which makes artificial fertilization an indispensable process, and which simply consists in removing the pollen from the anthers of the flower and applying it to the stigma with a small camel-hair brush ; this is best done about mid-day during bright sunny weather.

A brush is used in England, but the anther itself may be applied. Some growers look after fertilization in the cool of the morning ; if this be preferred, a dry morning should be chosen.

DURATION OF THE PERIOD OF RIPENING.

The duration of the period of ripening from time of fertilization is generally about nine months, when the pods become of a yellowish-green colour, and the valves show a tendency to open (dehisce) at the lower extremity, which is a sure sign of ripeness.

HARVESTING THE PODS.

Most of the pods are harvested in Mauritius during the month of July ; but as the plants come into flower very irregularly, all the pods cannot be harvested at the same time, so that those found unripe at the first gathering must be waited for until they show the usual signs of ripeness ; for if gathered sooner they will shrivel during the process of drying, and fetch but a small price in the market. Should any of the pods, however, be left on the plant until the valves have opened (if more than half-an-inch they are useless), they should be at once removed, the opening part tied up, and plunged for a moment in boiling water, and afterwards put through the usual process of drying with the other pods.

DRYING AND PREPARING THE PODS.

The drying and preparing of the pods is undoubtedly a most difficult item in Vanilla cultivation, and if not thoroughly understood, all previous labour with the plant will be lost.

The different methods of preparation, as practised in Mauritius, are more or less as follows. A large oven (similar to that in which ordinary bread is baked), with two valves on the top, and a thermometer fixed in the ironwork in front, is heated by the application of fire beneath until the thermometer indicates a heat of 40 degrees Centigrade, or 104 degrees Fahrenheit. The fire is then withdrawn, and pods, in quantity of about 60 or 70 lbs. together, are well wrapped in banana leaves,

which are again covered with a woollen cloth, and placed in the oven, where they are allowed to remain until the mercury of the thermometer falls to about 90 degrees Fahrenheit, after which they are removed and placed in a wooden box to sweat, and cooled gradually; when nearly cold they are exposed to the sun on boards covered with blankets, on which, when warmed by the sun, the pods are spread.

Some growers, instead of letting the pod be exposed to the direct rays of the sun, cover them with a black woollen cloth, which by absorbing a great amount of heat from the sun, as well as moisture from the pod, modifies the process of drying, and imparts to the fruits a superior flavor and colour than they otherwise would have; after being thus exposed for two or three days, they ought to be of a dark brown, or coffee colour; they are next laid on perforated shelves in an airy room, where they are allowed to remain for one month, or until dry, when they will be found to have shrunk to one-fourth of their natural size, and of a blackish hue with a somewhat silvery appearance.

PREPARING THE PODS FOR MARKET.

In preparing the pods for market those of a size are carefully selected, and tied in bundles of fifties. Good marketable pods are about 8 inches long, and 50 of those will generally weigh three-quarters of a pound; the smaller pods half-a-pound. After being thus arranged they are packed in tins, about 12 or 16 lbs. each, and sent to the London market.



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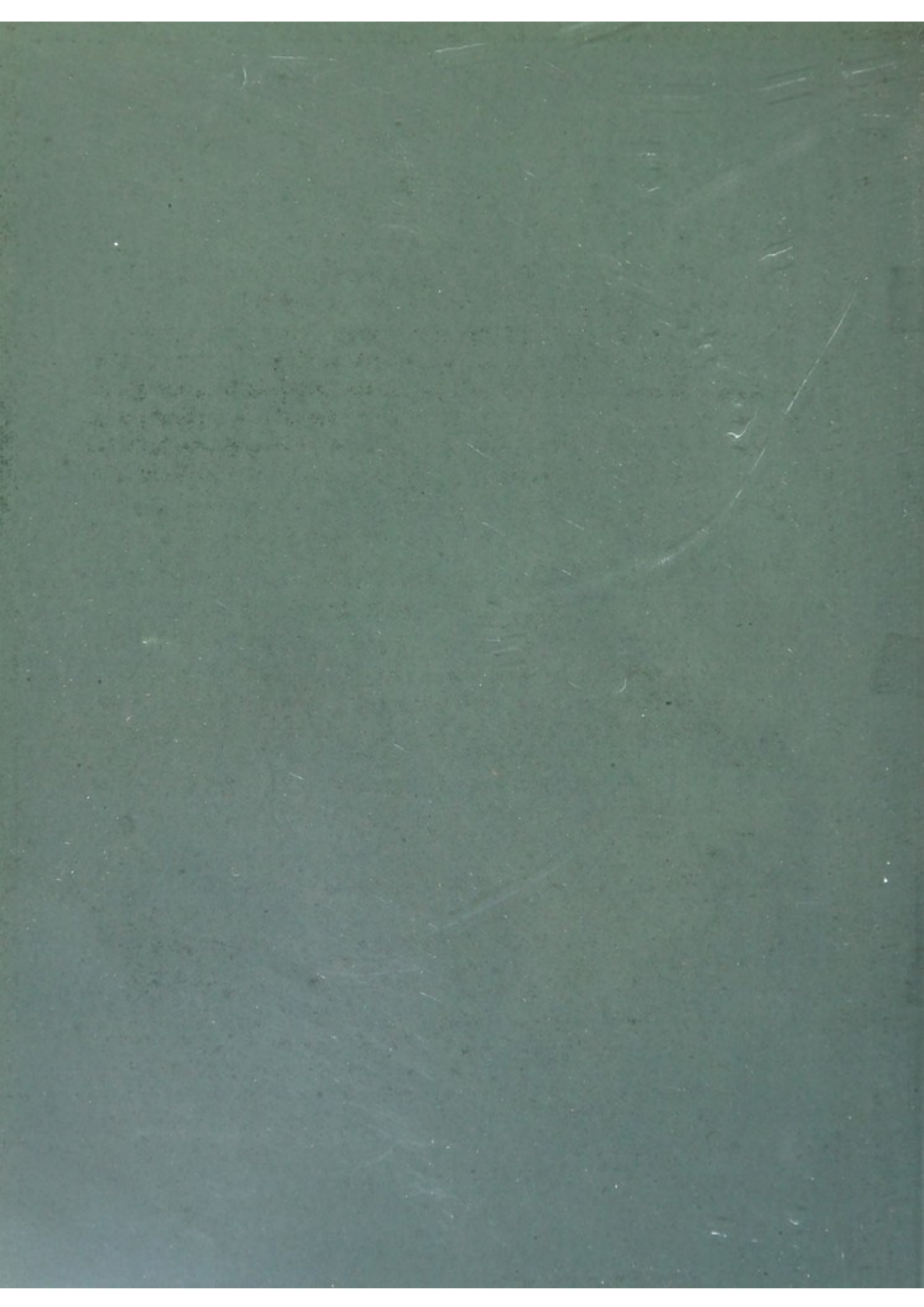
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