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BANANAS

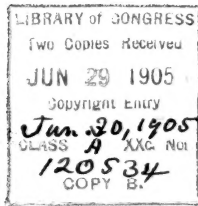
THE GOLDEN TREASURE OF THE
TROPICS

By EDWARD W. ^{Wilkin}PERRY

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NOTE

The chapter given in the following pages is from a work entitled: "TROPICAL AMERICA: ITS PLANTERS AND PLANTATIONS," now in preparation. *Sports Afield* said of the author: "Probably no American is more competent to write of the country life than is this author, who, because of his long-trained habits of observation, careful search for the bottom facts and weighing of details, of deducing therefrom the essentials and presenting them clearly and concisely, has made the best possible use of his time and experience."



THE GOLDEN TREASURE OF THE TROPICS.

NATURE'S INSTITUTION FOR THE PROMOTION OF
LAZINESS. BANANAS: WHAT THEY ARE, HOW
THEY GROW, WHAT THEY COST, AND WHAT THEY
GIVE TO MAN.

Long before the dawn of history in the Old World, mayhap long before that Old World arose from the waters, man lived on the fruit of the *Musas*. There are many who would tell you that the banana is the fruit which tempted Eve, to the downfall of Adam; and that evidence of the truth of this may be found in the fact that, if one will cut across a banana, of the right kind, he may find in its heart the sign of the cross; and in the other fact that men of learning have given to a family of bananas the name of *Musa paradisiaca*, which being interpreted means the fruit of paradise, and to another family they have given the name *Musa sapientum*, which the sapient know means the fruit of knowledge. Less evidence has served well enough to burn heretics at the stake.



HARVESTING BANANAS

Man has carried this gigantic herb to every warm and fertile spot in a belt that girdles the waist of the globe—a girdle that is four thousand miles and more in width. Unfortunately for humanity at large, however profitable the fact may become for the lucky few who grow the fruit, great areas of that belt are high, dry or sterile; others are sandy or rocky deserts, and an immense part of the belt is covered by oceans, so that only a small area is suited to the banana, and of that area only a fraction is so located that banana growing can be made largely profitable. Yet millions uncounted have looked to it for the chief of their diet, as other millions have looked to the cereals. And to this hour puling babes and doddering ancients are fed with the fruit in all its stages and conditions, green or over-ripe, raw or roasted, baked or fried, liquid or dried. At least forty species of the *Musas* are known and described, and of these there are fully eighty-five sub-varieties. The fruit of some of these is of most delicate and agreeable flavor, while that of others is rank and disagreeable.

When in the course of human events it becomes necessary for the single man of the tropics to take unto himself a help meet for him, and to provide for other events likely to come after, he selects some fertile spot, usually on the border of waters over which his canoe may easily carry the bulky harvests he will have; and there he cuts down tree and vine,

bush and bamboo, and lets them lie as they fall in tangled mass. Every day the ardent sun helps the constant wind to shrivel leaf and twig until, one day, the windward edge of that snarl is touched by the torch, and in a moment a blazing hades is where a cool and shady grove will soon rustle in the breeze.

When the last flame has flickered out and the coals lie dead beneath their gray shroud, women paddle to that place with canoes laden with banana sprouts. With machetes they dig little pits amid charred stumps and trunks and branches, and in each hole they set a sprout. Then they go away to wait, and rest; and the sun shines warmly down into that clearing, breezes sift a gray veil of ashes over the wilted suckers that look like black and ragged stakes; and at last come showers which wash them clean.

Those stakes are made up of sheathes of leaves tightly rolled one around another, the inner ones narrow, cream-colored and tender; those nearer the outer sheathes wider and yet wider, until the outermost is reached. This enwraps nearly or quite three-fourths of the stem, and from its edges a multitude of brown and interwoven threads run out, to tie the whole together, as in a net. When the warm rains fall, the tender leaves unroll and spread to their widest, and the sun dries and the wind whips them until soon they are split into narrow ribbons; and a few weeks after that planting a

sea of tattered banners waves and whispers in the breeze—a roof of bright and tender green thickly shading the moist, black ground.

Not before the plant has grown to a height of ten or twenty, and in some places to thirty feet, does the fruit stem begin pushing its way up from the base through the middle of the stalk. In a short time it sends out at the top one or two leaves, smaller than their older fellows, as a signal that flower and fruit will quickly follow. Soon every supporting column of those graceful arches ends in a cone of red that deepens into purple and swells until its outer petals are crowded off by the fatness of the fruits they hide, that these may have air and light. Under those petals the baby bananas are packed close, like fingers tightly gripping the parent stem. These closed ranks, each separate hand or whorl reaching half way around the stalk, grow so quickly that in six or eight weeks the bunch weighs fifty pounds or more.

To most people of northern climes bananas are merely—bananas. For such folks know as little of the many varieties of bananas as they know of the many and varied uses of that fruit. Perchance that is why they fry the common yellow guineo which comes by millions of bunches each year to the United States, and then wonder that folk who have dwelt in the tropics, and who extol cooked bananas, show nevertheless that they cannot like the mushy,



BRINGING OUT THE GOLDEN FRUIT

cloying mess set before them here. He who grows bananas, and she who cooks them for him, select for frying that thick-bodied, hard-fleshed and rather tart fruit which they call plátano, and which is by blundering English-speaking tongues misnamed plantain. And even among the plátanos there is room for choosing, for there are of them several varieties. Best of these is that little one which bears, on the Mosquito Shore whence best bananas come, the Spanish name "miel," or honey, coupled with the Waika word "silpe," or little. The name "maiden" plátano also is given to the "little honey," most fittingly, for it has just enough of piquant tartness to give unfailing relish, yet is tender, plump and mighty comforting withal, upon occasion.

If he is so lucky as to live near a port where steamships land, the planter may sell his plátanos for a cent or even two cents for each finger or fruit; and as the plants may be set only eight or ten feet apart, and each will mature a bunch of thirty to fifty fingers every nine months, it is clear that he who has an acre of plátanos may have a tidy income of food or of cash. Usually the planter prefers to eat this fruit, for which reason people in the North have few opportunities for learning its many and superior virtues. The planter is quite right, for the plátano is the banana most fit to be cooked; and it is by no means bad to eat raw.

Sometimes a planter may leave a bunch of

bananas to ripen on the standing stalk, but that will rarely be, for the fruit so ripened is strong in flavor, dry and too soft to bear transportation; its skin splits, and dust, and ants, bees and other insects gather about the exposed flesh. So in all the banana lands women lug home green bunches and hang them in the house to ripen, where everybody who has the right—and that is every visitor, every member of the family, and every passing acquaintance—may pluck and eat as the fruit turns yellow and becomes tender. Meanwhile many of the fruits will have been taken from the bunch, peeled and broken into bits, to be boiled with beef or pork, or flesh of the deer, peccary or other game, or to be cooked in other ways.

Another sub-variety of plátanos bears, in Mosquitia, the name of "butuco," perhaps from the name of the River Patuca—or may be the river has taken its name from the banana. The butuco is perhaps rather more tart than the miel silpe, and when fried reminds one of fried greening apples, and when stewed has somewhat of the flavor of stewed peaches. In either way it is most agreeable to the taste. There are other plátanos, also, most of them giants among bananas, some kinds being fifteen or more inches long and two or three inches in diameter. These are firm in flesh, resist decay much longer than do the common guineos. and will, therefore, much better bear transportation. They should

become known to the millions of northern lands, for they would afford a vast supply of food much more convenient and palatable than, and equal in value to, potatoes.

Although scarcely a generation has passed since the business of importing bananas to the United States began, millions of people in this country have learned to like the fruit, and are now beginning to understand a little its true value as a staple food. Yet there are many other millions who scarcely see the banana, except perhaps on some holiday, when they buy a few that they may taste the fruit which is so great a rarity to them. In Great Britain the banana is hardly known to most of the forty millions of people there, and in Continental Europe a like condition prevails. These facts are evidence enough that the production of bananas can not easily be overdone.

Reports which cover many years of experience by thousands of planters of all degrees of ability, and of lack of ability, in the West Indies and on the coasts of Central America and of Mexico, show that the average annual yield, the income, the cost and the profits of banana culture were as shown below:

Countries	Yield	Income	Cost	Profits
Costa Rica.....	250.0	\$ 70.67	\$ 28.84	\$ 41.83
Guatemala	267.5	89.54	30.82	58.72
Honduras.....	377.4	82.63	15.79	66.84
Jamaica	289.0	78.82	19.85	58.97
Mexico	290.0	89.00	20.25	68.75
Nicaragua	246.2	62.18	15.89	46.29
Averages	284.8	\$ 78.81	\$ 21.91	\$ 56.90



STARTING FOR MARKET

The averages shown by the last line in the above table are safe guides for any who wish to calculate the probable results of an investment of money or of labor in banana growing.

In the year 1902 the average yield of wheat in the United States equalled 12.79 bushels, or 767.4 pounds. This had a food value equal to nearly one-third that of the average output of bananas from an acre. It is often said that one pound of bananas has as much nutrition as has a pound of beef. The truth is that one pound of beef is worth three and one-third pounds of bananas. Bananas are far enough ahead of the harvests the farmer of the North gets, without making exaggerated claims for the fruit of the tropics.

During the years above mentioned the yield and value of the chief six food crops of the United States, per acre, and their actual food value, in calories or units of energy, as compared with those of bananas, were as shown below :

Varieties of Foods	Values Per Acre	Pounds per Acre	Calories per Acre	In Favor of Bananas
Buckwheat	\$ 9.70	795.96	1,277,516	3,168,484
Corn	9.62	1,723.40	2,817,759	1,628,241
Oats	8.29	870.08	1,566,144	2,879,856
Potatoes	39.45	4,826.40	1,243,788	3,022,212
R e	8.22	744.80	871,416	3,574,584
Wheat	10.11	766.80	1,265,220	3,180,780
Averages	\$ 9.66	1,621.74	1,536,974	2,909,026
BANANAS	78.81	17,100.00	4,446,000	2,909,026

In a report on the constituents and food values of most articles in common use on northern tables,

the United States Department of Agriculture gave, in the year 1903, figures which show that of the eighteen vegetables, of potatoes, and of ten varieties of fruits which make up the chief of our diet, and of bananas, each group has the following elements and food values:

Elements	Vegetables	Potatoes	Fruits	Bananas
Carbohydrates, parts....	8.6	14.7	11.1	14.3
Fats	0.4	0.1	0.4	0.4
Protein.	2.1	1.8	0.6	0.8
Ash	0.9	0.8	0.5	0.6
Water	71.5	62.0	64.3	48.9
Refuse	14.5	20.0	23.1	35.0
Fuel values	215.2	295.0	204.4	260.0

These figures show that while the eighteen fresh vegetables have 11.1 parts of nutritive elements, potatoes 16.6 parts, and the ten varieties of fruits have 12.1 parts, bananas have 15.5 parts. This seems to show, also, that if the fresh vegetables were worth, say \$1.00, a like weight of fruits would be worth \$1.09, of bananas would be worth \$1.40, and of potatoes \$1.49.

Prof. Wynter Blythe, of London, is an analyst who tells us that the relative values of banana meal and of sago, maize and wheat flours are:

Constituents	Banana	Sago	Corn Meal	Wheat Flour
	Per Cent.	Per Cent.	Per Cent.	Per Cent.
Water	8.05	13.00	11.09	15.08
Soluble albumen dextrine	4.45			
Starch	82.57	78.06	85.30	81.60
Albumenoids	2.28	2.5	2.37	2.11
Fat	0.77			
Ash	1.88	0.53	0.43	0.35

Statements made by other analysts seem to war-

rant the deduction that the nutritive value of a ton of potatoes, at one cent per pound, is 19 cents more than that of a ton of bananas at the same price. There is a difference, too, in the cost of production of a ton of potatoes and the cost of raising a ton of bananas. The field for potatoes must be plowed and harrowed in the spring, the seed dropped in furrows, which are then to be covered, after which comes cultivating again and again until the time has come for digging and picking, carting, sacking and hauling, often to a distant market.

Luckily for the millions who have depended so largely on the banana for sustenance, the plant has few, if any, insect enemies and diseases, in which they have great advantage over most crops of northern lands.

So the planter of bananas has each year four and a half times as much palatable food from an acre as the farmer gets from his potatoes: and there is the further difference that the one has bananas at no other cost than that of keeping down bush and grass and vine, that would quickly cover every spot to which the sunshine could penetrate, along the edges of the plantation. For bananas yield year after year without replanting. Each new stalk springs from the foot of its parent, grows to a height of fifteen to thirty-five feet, bears its burden of luscious fruit, and dies; but not before it has sent



SINGLE-RAIL ROAD IN A BANANAO

up from its own root new stalks to fruit and die—and so on through the centuries.

He who would grow bananas for market must plant on the border of navigable waters giving access to some harbor or anchorage where ships may safely lie while receiving the fruit. For it is easily bruised, and wetting by salt water blackens the skins, thus injuring or preventing the sale. Plantations are usually on the banks of rivers or of estuaries, but some are beside railroads, to which the fruit is carried by carts thickly carpeted with banana leaves. A cruder way is to hang a few bunches over the back of a burro or of a mule, which plods along to the shipping place.

It is evident that the entire area which can so be devoted to banana culture must be small, for most Central American and Mexican Rivers are obstructed at their mouths by sandbars, over which ships cannot pass. Bluefields, Nicaragua, has been a most profitable field for banana growing, because it has a river into which sea-going ships can safely enter, and up which such ships may go fifty or sixty miles, and receive their cargoes from landings on the plantations which border the Rio Escondido. Yet millions of bunches of bananas have been shipped from the open coast of Honduras, where the one good harbor is that at Puerto Cortez.

Other millions have been shipped from Port Limón and from Bocas del Toro, in Costa Rica,

whence a few hundred bunches were sent as a beginning to the United States in the year 1883. During the year 1904 the port of Limón itself sent 5,760,000 bunches to the markets of the world. They brought to Costa Rica credit for producing the best bananas known.

To-day millions of bunches are each year sold in the United States and even in Canada, and in 1902 ship-loads were sent from Costa Rica direct to Europe. That little republic alone received not less than \$1,127,400 for bananas sold abroad during the year that ended with September, 1902.

It is safe to assume that more than \$6,000,000 was paid in the year 1902, in Central America alone, to planters of bananas. Nearly all of that was paid by products of American farms, factories and forests. Farmer, manufacturer and miner, lumberman, railroad man and sailor, merchant and broker of this country, are all concerned in and benefited by the work done in shady aisles beneath banana leaves on the banks of tropic rivers.

Bananas reach their best estate on low, deep alluvium like that near the Caribbean coast, or that of southern Mexico, where the temperature never sinks below 60° and is seldom below 80° F. Such low lands may serve the better if flooded two or three times in the year, for the banana drinks much water, and such floods bring silt from the hills, and thus keep the ground fertilized with-

out cost to the owner. In 1897 the banana fields of the Rio Escondido were so deeply flooded that the steamship "Saga" voyaged through the main streets of Rama, fully sixty miles from the mouth of the river, to pick off from their roofs the dwellers in that town. The bananas barely showed their tops above the yellow flood. Along the coast went reports that the plantations were ruined, subscriptions were asked to help the planters; and three months later they were harvesting better crops than in years before. Their plantations had been so enriched that they bore most bountifully.

Bananas may be grown wherever there is some moisture and no near approach to the frost line; but a touch of frost cuts down the banana as a breath from a fiery furnace would blight a tender lily. The city of Tegucigalpa is 3,600 feet above the level of the sea, yet in that town is a field some thirty feet above the current in the swift river which it borders. It is very dry during months of each year, but in that field are plátanos which reach a height of more than twenty feet and bear bunches enough comfortably to support the owner. In narrow cañon and wider valley near that place are many patches of bananas which bring to their planters a sufficient income. And at that altitude the mercury sometimes falls below 65° Fahrenheit.

In the land of bananas, cats, dogs and pigs, mules, horses and cattle, parrots, babies and all other



A PLANTATION MONORAIL.

domestic animals thrive on this perfect nature-food, when they can get it. I have seen an Indian woman pry open with her fingers the jaws of a baby peccary, and with a gruel of green bananas choke the little pig's incessant, rasping cry of "ma, ma!" And the next instant she put that same calabash of gruel to the lips of her own babe of three or four months. I've seen other Indians feed infant tapir, suckling jaguar, naked squabs of parrots and very young monkeys on such pap, which those folk call wabool. With such fruit I, myself, have safely carried abandoned cardinals through from their infant days of scant pin feathers to those of full regimentals of brilliant scarlet with epaulets of jet; and they overflowed with joyful song and saucy happiness as much as they could had worms and bugs been the chief of their diet every day of their lives, instead of the bananas on which they had been largely fed.

Why not, indeed, when cakes and beer, brandy and sugar, pies, puddings and sauce, banana coffee and chocolate, and many another thing good for man to take for his stomach's sake, are made from bananas. So, too, are paper and laces, brushes and cloth, and cordage enough to pull up the earth by its roots, if only we had a place to hook the tackle.

When he has set out an acre or two of bananas, the planter need have no fears for the future. He has ample insurance against such privations as come from illness, accident or old age: and they who by a

little labor pay for such insurance share each day its material benefits. No need for them to die that others may enjoy the blessings of such wise provision; nor need the planter toil with hoe or spade, cultivator or plow. It may be he will slash away with machete such vine or sapling, grass or weed as happens to obstruct his path; but as a whole he interferes as little as possible with the operations of kindly Mother Nature. She is more than ready to do his work: he is willing to let her do it.

He whose acre of bananas has been well planted has on it 225 hills, or 900 stalks. Each stalk will give him a bunch which, on rich, new ground, should weigh 60 pounds, say 54,000 pounds each 12 or 14 months. That is the theory. The fact seems to be that the average yield is really 275 to 300 full bunches to the acre per annum, say a mean of 285 bunches weighing about 17,000 pounds. As has been shown, the average yield reported all along the Caribbean shore and from Jamaica, during a dozen years, equaled 284.8 full bunches an acre per annum.

In the year 1902 the average yield of potatoes in the United States was 80.44 bushels per acre, and the average farm value was 49 cents per bushel, or \$39.45 an acre. In Costa Rica the average price of bananas on the plantation was equal to at least 27 cents a bunch. At that figure 261 bunches would bring \$70.47. In August, 1903, the price was raised to 31 cents a bunch on contracts to run three to five

years; which should give \$84.00 per acre each year. That was a cash difference of \$44.55 in favor of the man whose bananas raised themselves for him. There was another difference in his favor, for his fruit could well be eaten green or ripe, raw or roasted, boiled or fried, with fish, flesh or fowl, or with none of these.

In 1903 advices from plantations covering 550 acres of bananas in the Santa Clara district, in Costa Rica, where wages are one colon, or 47 cents a day, stated that the cost of cultivating, harvesting and delivering the fruit at the railroad was, for the year, \$17.69 per acre, the yield of fruit was only 173 bunches, and the income was \$54.90. Thus those bananas cost 10.2 cents per bunch, and the gross profit was 20.8 cents a bunch, or 200 per cent. As all the fruit is sold five years ahead at those figures, that percentage of profit may well be regarded as a fair return for the investment, combined as it is with an assurance of continued gain. If the yield had equalled the average of 285 bunches per acre, even at like cost per bunch for production, the net income would have been equal to 10 per cent. on \$592.80 per acre.

There are those who insist that the higher results shown in the foregoing may easily be obtained by any one who will give as much thought and labor to growing bananas as are required for the successful raising of corn or of potatoes. It is true that the



AWAITING THE TRAIN

figures on which the averages shown are based were, in many cases, from the experience of native and other planters of little diligence and skill, and that they got smaller results than might easily have been obtained. It may be possible that if one will allow two or three stalks to rise from each stand of bananas, and together mature their fruit, he may get 444 to 780 bunches from an acre each of a few years, and that in such a case he might get \$185 to \$278 for the crop; but it will be clear to all that he who expects to make only 280 bunches per annum from an acre, and get only \$50 to \$60 profit therefrom, will be safer than he who invests his money with the expectation of making greater gains.

As the cost of producing bananas after the first crop from a plantation is confined to cultivating and harvesting, which may be done for \$10 to \$20 per acre yearly, it is scarcely wonderful that Judge O'Hara, late U. S. Consul at Greytown, Nicaragua, a lawyer whose acute mind is trained to sifting evidence, reported to the Department of State at Washington regarding banana-growing on the Atlantic coast of that republic, that:

It seems reasonably certain that bananas on the Bluefields River pay better than many crops in the United States. * * * * These figures would seem to indicate that at the end of a year a planter having 36 acres of bananas under cultivation would have \$3,847.32 left after paying for all necessary labor and provisions—figures apt to bring discontent to an American farmer having but 36 acres

of wheat or corn; and especially so when he compares the price of his land, ranging from \$15 to \$80 per acre, with that of land in eastern Nicaragua, where cultivated lands may be said to have no established market value, few improved plantations having ever been sold.

Such discontent might be aggravated by consideration of the differences which exist between the results obtained from the chief eight crops of the United States and those shown by the foregoing summary of banana farming. These differences are illustrated by the following figures, those for the crops of the North showing the yield and farm values for the 38 years that ended with June, 1903. The last column shows the difference in favor of bananas per acre:

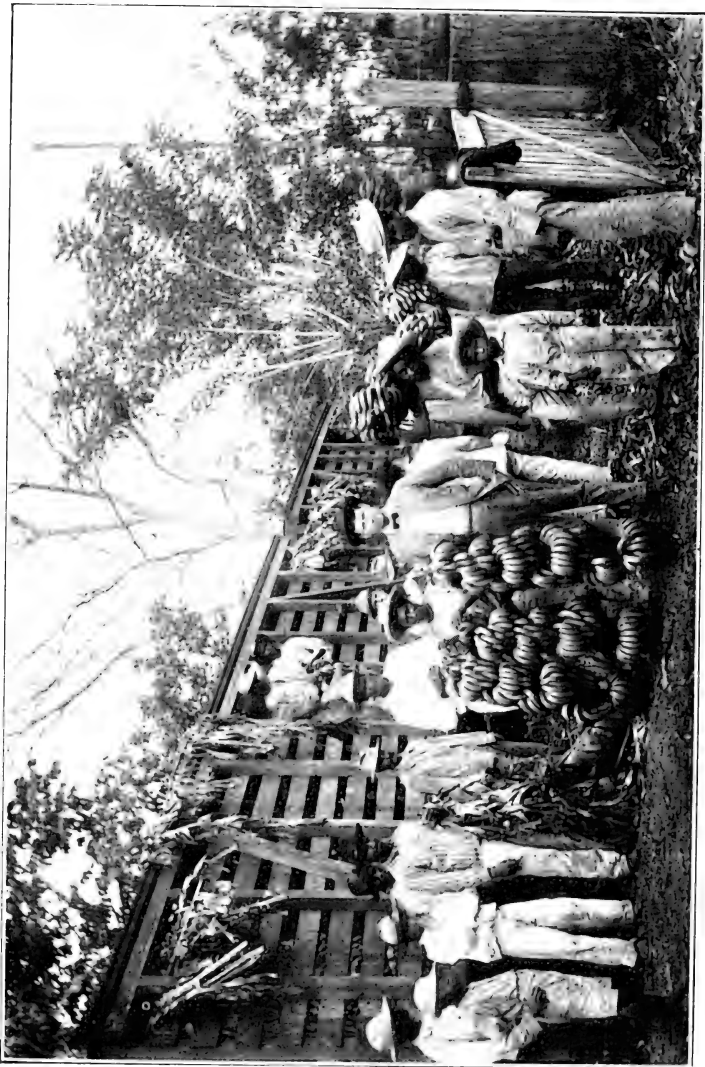
Crops	Yield per Acre	Value per Acre	Difference, favor of Bananas
Barley, bushels.....	13.29	\$ 12.32	\$ 66.49
Buckwheat, "	16.08	9.70	69.11
Corn, "	24.76	9.57	69.24
Oats, "	22.88	8.34	70.47
Rye, "	13.38	8.22	70.59
Wheat, "	12.78	10.06	68.75
Potatoes, "	81.91	41.79	37.02
Hay, tons.....	1.42	11.80	67.01
Averages.....	.....	\$ 9.85	\$ 68.96

From this it appears that the plantation value of the annual crop of an acre of bananas averages seven times as much as the principal crops of the United States give the farmer for his months of toil. What wonder if the dweller in tropical America is content with what a little effort gives, or that years

ago a Consul of the United States complained that: "A large proportion of the fruit-growers were formerly vacqueros in the interior, working on a salary of \$30 to \$40 a year. They are now owners of plantations, and have a steady income of \$30 to \$300 a month. The large amount of money distributed along this coast in exchange for fruit would make any civilized and temperate community prosperous and happy. There would be public and private schools, churches and banks, newspapers and libraries, parks and carriages, and handsome dwellings supplied with every comfort and luxury, surrounded by gardens of flowers, fruits and vegetables natural to this climate of perpetual seedtime and harvest."

Those who have good lands back from navigable water and remote from railroads, are not without hope of profit from bananas; for they may dry the fruit before it has ripened, and from it make a flour that has all the merits of wheat flour, and other good qualities, also; or they may dry it when it has fully ripened, when it will be very useful in making cakes and candy, or may be eaten even as figs are.

In his "Darkest Africa" Stanley endorsed strongly the nutritive value of banana flour, and wondered that the natives seemed not to have discovered what invaluable nourishing and easily digested food they had in the plátano and in the banana. He expressed the conviction that, "If only the virtues of banana



ON THE ROAD FOR MARKET

flour were publicly known, it is not to be doubted but it would be largely consumed in Europe. For infants, persons of delicate digestion, dyspeptics and those suffering from temporary derangement of the stomach, the flour properly prepared would be of universal demand. During my two attacks of gastritis a light gruel of this, mixed with milk, was the only matter that could be digested."

So high an authority as the "Dictionary of Economical Productions of India" says:

The large crop of food produced by bananas and plantains may be preserved for an indefinite period either by drying the fruit or by preparing meal from it. When the nearly ripe fruit is cut into slices and dried in the sun, a certain part of the sugar contained in the fruit crystallizes on the surface and acts as a preservative. The slices thus prepared, if made from the finer varieties, make an excellent dessert preserve, and if from the coarser, may be used for cooking in the ordinary way. They keep well if carefully packed when dry, and ought to form a valuable antiscorbutic for long voyages. The fruit may also be similarly preserved whole by stripping off the skin and drying it in the sun. Plantain meal is prepared by stripping off the husk and reducing it to powder, and finely sifting. It is calculated that the fresh core will yield 40 per cent. of this meal, and that an acre of average quality will yield over a ton.

Plantain meal is of a slightly brownish color, and has an agreeable odor, which becomes more perceptible when warm water is poured upon it, and has a considerable resemblance to that of orris root. When mixed with cold water it forms a feebly tenacious dough, more adhesive than that of oatmeal, but much less so than that of

wheaten flour. When baked on a hot plate this dough forms a cake which is agreeable to the sense of smell, and is by no means unpleasant to the taste. When boiling water is poured over the meal it is changed into a transparent jelly, having an agreeable taste and smell. Boiled with water it forms a thick gelatinous mass, very much like boiled sago in color, but possessing a peculiar pleasant odor.

In a communication to Kew Gardens Louis Asser gives the following list of commercial preparations from the banana and the plátano:

1. Dried slices of the entire fruit (pulp and peel) in the starchy state suitable for the preparation of alcohol or for making into a nourishing bread.
2. Meal in a starchy state from the pulp only for making into a superior kind of bread or porridge.
3. Flakes and meal in a dextrinous state for use in breweries or for making into nourishing soups, puddings, etc.
4. Dried peel and coarse meal prepared from it for feeding cattle and pigs.
5. Banana marmalade.
6. Dried bananas entire without peel put up like dried figs in boxes.
7. Raw alcohol from fresh bananas, and also from dried banana meal.
8. Syrup of bananas for confectionery, for preparations of liquors and for sweetening champagne.
9. Banana meal for the manufacture of glucose.
10. Fibre of banana and plantain prepared from the stems after fruiting, and intended for the manufacture of paper and cordage.

In his report on the starch producing plants, Dr. Shirer says of the plátano of British Guiana:



A BUNCH OF BANANAS



The plantain is so abundant and cheap that it might, if cut and dried in its green state, be exported with advantage. It is in this unripe state that it is so largely used by the peasantry of this Colony as an article of food. When dried and reduced to the state of meal, it cannot like wheat flour be manufactured into macaroni or vermicelli, or, at least, the macaroni made from it falls into powder when put into hot water. Plantain meal is prepared by stripping off the husk of the plantain, slicing the core, and drying it in the sun. When thoroughly dry it is powdered and sifted. It has a fragrant odor, acquired in drying, somewhat resembling fresh hay or tea. It is largely employed as the food of infants and invalids. In respect to nutritiveness it deserves a preference over all the pure starches on account of the protein compounds it contains. The flavor of the meal depends a good deal on the rapidity with which the slices are dried. Above all, the plantain must not be allowed to approach too closely to yellowness or ripeness, otherwise it becomes impossible to dry it. The color of the meal is injured when steel knives are used in husking or slicing, but silver or nickel blades do not injure the color. Full-sized and well-filled bunches give 60 per cent. of core to 40 per cent. of husk and topstem; but in general it would be found that the core did not much exceed 50 per cent. of dry meal, so that from 20 to 25 per cent. of meal is obtained from the plantain, or 5 pounds from the average bunch of 25 pounds; and an acre of plantain walk of average quality, producing during the year 450 such bunches, would yield 2,250 pounds of meal.

In 1891, C. W. Meaden wrote from Trinidad to the following effect in relation to a trial shipment of dried bananas:

The result of drying six bunches, weighing an aver-

age of 52 pounds per ripe bunch, was 97 pounds of dried fruit. There was a loss of two-thirds in peeling and drying. The fruit sold for \$19.40, or 20 cents per pound. Deducting freight charges left \$15.47, or a fraction under 16 cents per pound. This was at the rate of \$2.72 per bunch. The cost was put at 53 cents, which covered purchase of land, clearing woods and draining, planting, weeding and cutting, drying, fuel, boxes and packing; but did not include cost of dryer, as that would be but a fraction on each bunch dried. After deducting the above there was a profit of \$2.19 per bunch.

This experiment will prove of importance to banana growers, as drying bananas seems to open a way no other means offers of utilizing fruit. It overcomes the difficulty of bad roads, long hauls and other drawbacks some planters have to face in marketing bananas.

In this connection it may be interesting to note that, according to the *American Analyst*, February 15th, 1893, the chemical composition of bananas and potatoes is almost identical, as shown by the following comparison:

	Banana	Potato
Water	75.71	75.77
Albumenoids	1.71	1.79
Total carbonaceous matter (non-nitro- genous)	20.13	20.72
Woody fibre.....	1.74	.75
Ash .....	.71	.97

So far as has been shown there is little difference between the actual food values of the seventy-five or more varieties of bananas, which may be divided generally into the plátano, or cooking kinds, and bananas, more commonly eaten uncooked.

Such teachings of science, which have not been disputed by any whose standing would make their opinions worthy of consideration, should settle the question of the exact nutritive value of the golden treasure of the tropics, but that the reader may determine with precision what are the relative energy-giving values per pound of each of 20 well-known foods, compared with bananas, the value of each is shown below :

Articles	Refuse	Water	Calories
Chocolate, with sugar.....	.....	5.90	5,625
Butter .....	.....	11.00	3,410
Cocoanut, prepared, dry.....	.....	3.50	2,865
Cheese, Cheddar.....	.....	27.40	2,075
Cheese, full cream.....	.....	34.20	1,885
Sugar, granulated.....	.....	.....	1,750
Pork, sausage, etc.....	7.78	40.94	1,685
Wheat flour and other cereals.....	.....	11.10	1,636
Maize meal.....	.....	12.50	1,635
Rice .....	.....	12.30	1,620
Peas, dried.....	.....	9.30	1,565
Beans, dried.....	.....	12.60	1,520
Bread, biscuit, cake, etc.....	.....	25.12	1,453
Milk, condensed.....	.....	26.90	1,430
Nuts in common use.....	45.30	5.30	1,312
Mutton and lamb.....	17.03	45.37	1,208
Beef, fresh, salted, and veal.....	13.85	53.34	944
Poultry, all kinds, domestic.....	26.95	42.92	901
Cream .....	.....	74.00	865
Eggs, fresh.....	11.20	65.00	635
Averages.....	7.59	28.13	1,546
Bananas, fresh.....	35.00	48.90	260
Banana products average.....	.....	12.10	1,675

The actual food value of *fresh bananas*, compared with that of 19 fresh vegetables and of 10 fresh fruits most generally used in the United States and in Europe, is:

Constituent El ments	Bananas, Fresh	Other Fruit	Vegetables
Refuse.....	35.0	22.14	14.85
Water.....	48.9	64.33	73.03
Protein.....	.8	.63	2.65
Fats.....	.4	.39	.35
Carbohydrates.....	14.3	11.07	8.86
Ash.....	.5	.4	.86
Units of nutrition.....	260.0	204.40	203.75

Many people have become convinced that they are harmed by the use of coffee, and have tried various substitutes for the berry of Arabia: There is no doubt that free use of coffee, particularly if milk or cream is added, does cause harm; but there is reason for the opinion that some, if not most, substitutes are even more injurious. Those who manufacture some such substitutes boldly assert that their productions are nutritious; but the highest authority in the land, the United States Department of Agriculture, says:

The average of five analyses of cereal coffee is: Water 6.2, protein 13.3, fat 3.4, carbohydrates 72.6, and ash 4.5 per cent. Only a portion of the nutrients, however, enter into the infusion.

The Department then shows that in the decoction there are 98.2 parts water, protein 0.2, carbohydrates 1.4, and ash 0.2 per cent., and that the total number of units of energy in a pound is only 30, which is so little as to be wholly unworthy of consideration. Some at least of such so-called cereal coffees are said to be made of damaged grain, of the refuse from brewers' vats, of bran and other like substances.

soaked with coffee extract or with chicory added. The worthless nature of such mixtures must be apparent to all.

There is cause for congratulation, therefore, in the fact that bananas of the proper states of maturity, properly mixed, dried and roasted, furnish material for a beverage which is *palatable, perfectly harmless, and really nutritious*. The whole may be taken as chocolate is used, and as the Turk takes his pulverized coffee, grounds and all. Many who now habitually use so-called banana coffee are firm in declaring that it is *more palatable than genuine* coffee can be, and has no bad effect. So far, the demand has constantly exceeded the supply.

Candy made from bananas and sugar has sold so readily that the demand has not been fully supplied since such confection was first offered. In fact the inquiry for such products of bananas has become so steady and so strong that those who have for years thoroughly and carefully studied and experimented in this line are now ready to establish mills and carry on the making of banana flour and other products of this fruit, on a scale large enough to pay fair profits.

To humanity at large, these facts seem full of promise; for banana planters in particular they seem to offer unusually strong encouragement. For, if banana flour has 90.07 per cent. of nutrients while sago has only 80.63, wheat flour 83.71, and maize



meal has but 87.67 per cent. of nutrition, as shown by the table on another page, there can be no doubt that the world will readily take all the banana flour, all the dried bananas and all the banana coffee the tropics will be able to furnish. If banana flour can be made and delivered in Europe at a cost of only two or three cents a pound, the demand for this material inevitably must become very great.

For it should not be forgotten that bananas give each year crops which are easily injured by bruising, and are exceedingly heavy, the average annual yield from good lands being nearly or quite eight tons per acre. So tender and so bulky a crop cannot profitably be carried long distances, without means for quick and easy transportation. So long as the fruit shall be sold in its green or crude condition, it must remain unprofitable to plant it far from navigable waters, or from a railroad.

It is true that in the past lack of knowledge of the art of making flour and other dry products of bananas rendered it quite difficult to do so successfully in climates which are both warm and very moist; but there are many elevated and comparatively dry places, near rich and moist lowland, where the fruit may be dried and ground, and thus preserved for shipment long distances. In such places, modern machinery and processes for making such products will probably be set up, and supply the millions with food which is equal to most and better than much

vegetable food now commonly used—and the world will be much better for it, while the planter will gain even more than he now profits.

Housewives who wish for novelties to lend new charm to their tables, to tickle the palate of the epicure, or to coax the reluctant appetite of the invalid will find them in novel dainties made from bananas. Excellent bread is made of the flour. Puddings, fritters and sauce have already been mentioned; bananas glacé are new to most northern folk, and may be made a most delightful addition to our desserts. Dried ripe bananas are superior to figs, for when split into four slices, thickly covered with powdered sugar, and exposed to the sun a while they turn into a jelly-like, delicious confection. Such has been at its best when made in the native home of the fruit, and packed in pretty boxes to be sent to people of taste, in the cold North.

Summing all obtainable evidence worthy of consideration, one is manifestly warranted in saying:

Banana culture is one of the oldest of industries, and has no secrets, no diseases and no enemies with which to contend.

Bananas have been grown through thousands of years by millions of people, and, beginning seven to twelve months after the first planting, yield continuous harvests for years without replanting.

Bananas give, for little labor, one and one-third times as much food as corn produces; two and one-

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third times as much food as oats supply; almost three times as much nutriment per acre as buckwheat furnishes; nearly three times as much food per acre as potatoes give; four times as much nutriment as comes from rye, and almost three times as much food per acre as wheat averages.

Bananas pay their producer nearly three times as much money as potatoes are worth, per acre; bring the planter profits which are three times the farm value of the chief food crops of the United States; paid gains equal to five per cent. per annum on \$1,138 per acre for the last 25 years; and bananas are sold years ahead of production, at prices insuring good profits.

Bananas are by millions of people eaten green or ripe, raw or cooked; are served in all ways in which apples, grains and potatoes are used, and are palatable, healthful and nutritious in every way in which they are prepared.

Bananas make excellent bread, cakes and pies, puddings, confectionery and coffee substitutes; yield brandy, beer and vinegar, sugar, oil and fibers.

Bananas are bought as a luxury by millions who may use them as a staple food; yet bananas may be grown profitably in a small area only, therefore banana culture affords a perfectly safe and gainful use for time and money.

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