

which will shortly open a plant at about B50,000 cost for the treatment of their milk.

The monthly output of milk supplied to the City of Panama in 1919 was 8,280 gallons, and at the close of 1928 was 33,240 gallons.

The price of milk per $1\frac{1}{2}$ gallon in 1919 was 35 to 40 cents, and today is $17\frac{1}{2}$ to 20 cents.

At present there are in existence in Panama City four modern plants of about B 20,000 cost producing sanitary ice cream.

The combined efforts of Panama and the Oficina de Sanidad have increased the number of cows and the production of milk and reduced the price of milk to the populace. The price would appear still too high, as the poorer classes should have the benefit of milk, so necessary for the preservation of health, especially for children, in the Tropics. Increasing production and further improvement of methods should further decrease prices, which would result in still greater production, enlargement of the industry, employment of more labor and more general consumption of one of the most healthful food products.

The dairymen have been taught that most of the native cows are unprofitable, and they are gradually discarded. In the last ten years a number of animals of the dairy breeds have been imported from the North, also pure bred bulls, and the grade of stock has been materially improved.

Undoubtedly the statement is justified that material improvement in the dairy industry around the city of Panama has been effected. It would seem that the field of this cooperation between the Oficina de Sanidad and Panamanian authorities should be enlarged to include other parts of the country. Their supervision and persuasion should be extended for the encouragement of larger milk production. Moreover, practically all butter consumed in the country is imported, and a great part of the cheese consumed

New Zealand,
is also imported from the United States, Europe and nearby ~~Latin American~~
countries.

The good road connections now had with the Sabana country, between San Carlos and Santiago, suggests whether dairying could not be pushed into that part of the country. Milk is reported as scarce and high priced in the country towns, with a considerable consumption of imported condensed milk.

The good cooperation between the Panamanian authorities and the Oficina de Sanidad has included testing the cattle for tuberculosis, elimination of the tubercular animals, supervision by competent individuals and finally promotion of the cooperative idea amongst the dairymen.

It would seem to be very desirable that these efforts on the part of the Panamanian authorities and the combined efforts so far as they can be enlisted should be extended to a larger territory, to include the testing, elimination, supervision and promotion in a larger field, thus creating a butter and cheese industry which will completely supply the wants not only of Panama City but the Zone, also lead to a larger consumption of these products by the rural population.

Promoting Agricultural Development

Agricultural development cannot be expected to be rapid without an increase of the population by immigration, not only to supplement the working force but to provide the initiative, knowledge of modern agriculture and leadership which is wanting in the present occupants of the land. The latter know agriculture only as a means of getting a bare livelihood from the soil, not in the sense of a business, producing for a market. It cannot be expected that the present generation of adults will change its ways or methods very much, but the generation following will make progress, particularly if it can have the benefit of practical object lessons in farm operations.

Such object lessons are best afforded by immigrant farmers of the successful class, but the Department of Agriculture of the Panama Government is operating several small demonstration farms which seem to serve the purpose very well. One in Chiriqui employs and gives instruction to about 100 students in a nine months' term, under three teachers. We are informed that upon this farm the students do 60 to 70 per cent of the work, and that about one-half of the maintenance cost is covered by the farm operations and the remainder by an appropriation.

The practical value of such instruction is best judged by the subsequent activities of students and the interest which the demonstration crops excite in the neighborhood, but we believe that a moderate expenditure in this manner under skilled instructors should be maintained as a means of disseminating knowledge of approved practices and of the work of experiment stations in other countries.

The Government of the Canal Zone maintains an experimental station in charge of a competent agronomist, for the introduction of valuable plants grown in other tropical countries and for observation of the work of experiment stations in such countries. The report of the Governor of the Canal Zone for the year ended June 30, 1928, shows that 879 additions were made to the list of plants at the station during that year, many of them plants entirely new to the Isthmus. The work of this station may be of great value to Panama.

TROPICAL PRODUCTS

Increasing Importance in World Trade.

Panama lies within ten degrees of the equator and will readily grow any of the tropical products. The best known of these products, notably bananas, coconuts, pineapples, cacao, coffee, rubber, and others, are indigenous to it, and it is in these that the largest possibilities of production for export in the future exist. The world is not yet drawing upon the Tropics for foodstuffs in anything like the quantities that it may be expected to take when it comes to know them better. Most of them are new to the masses of people outside of the Tropics, or scarcely known

As other foodstuffs increase in price under the demands of a

growing population, as transportation facilities are improved and the diet of all peoples becomes more varied under improving economic conditions, it may be expected that the food products of the Tropics will be wanted in steadily increasing quantities. The expansion of the consumption of bananas illustrates not only how rapidly the consumption of particular food products may increase, but how the demand may be promoted by the efforts of strong companies to produce and transport with the greatest economy, and to develop markets by means of aggressive selling organizations.

Indeed, the banana is by no means the only tropical product the consumption of which has been rapidly increasing. Rubber, cacao, coconuts, coconut oil and various nuts and fruits producing edible oils are conspicuous examples of tropical products which are meeting with increasing demands.

We wish to give attention not only to the present economic development of Panama, but to this growing demand for the products which Panama is capable of producing and upon which the future development of the country must chiefly depend.

THE BANANA INDUSTRY

Leading in value among the present exports of Panama and affording a striking illustration of the increasing importance of tropical products is the banana. The banana business has had its development almost wholly since 1870, mainly since 1900, and has been growing in the last ten years more rapidly than in any earlier decade. Its history is worth telling to show how a great industry may be created from nothing, introducing to the world a new and wholesome article of food, affording employment for thousands of wage-earners, improving the living conditions of thousands of families, supporting railroads and steamship lines and creating mutually helpful relations between countries which scarcely had any relations before.

In 1866 Carl August Frank, a German steward on one of the Pacific Mail steamships, brought a small quantity of bananas to New Orleans from

Aspinwall (now Colon). Two brothers joined him and the firm of Frank Brothers was formed to grow, buy and sell bananas, and gradually their business grew to moderate size, until work on the Canal was begun by the French company in 1881, when the high wages paid on the Canal put an end to banana planting.

In 1870 Captain Lorenzo D. Baker, a New England sailing master, owner of a schooner of 85 tons capacity, took to/ from Jamaica a number of bunches of bananas, and having the good fortune to dispose of them advantageously went back after a cargo of coconuts and bananas, and continued in the trade carrying merchandise out and bananas on his own account on the return trip. Sometimes his voyages yielded encouraging results and sometimes they did not. On the whole he ~~had~~ lost money, but **did not lose** faith in bananas as the basis of a business. He had sold the fruit in Boston through a commission house in which was Andrew W. Preston, afterward, as President of the United Fruit Company to his death, one of the most eminent business men of the United States. Mr. Preston, Captain Baker and eight other men formed the Boston Fruit Company, to put the banana business on a better footing. Each agreed to put in \$2,000, also that for five years they would allow all the profits to remain in the business. At the end of the five years they had no profits and had lost their capital, but their confidence was stronger than ever and they proceeded to raise \$100,000 with which to go on.

In 1888 they bought their first steamship of 700 tons, and after that quickly acquired a fleet of small steamers, most of them operated under long term charters, and extended their marketing operations to New York, Philadelphia and Baltimore. They had been gradually learning the business, which included a great deal about the handling of the fruit to insure delivery in proper condition, about obtaining a regular supply of the right quality, and about methods of distribution. The banana stands transportation well,

nevertheless, it is, a perishable product and must be delivered to consumer within a definite period from the time it is picked, and the picking must be regulated with reference to that delivery period. The sailing vessel was too slow and uncertain, hence was discarded for the steamship. Furthermore, the Company was too much dependent upon Jamaica as a source of supply, for a bad storm might cut short a year's crop and leave the now costly overhead organization with little to do until another crop was raised.

Meantime, since 1871, a young man named Minor C. Keith, had been doing development work in Central America. First he built railroads, then planted bananas to make freight for the railroads, then bought ships to carry the bananas to the United States. He got his first banana roots from Frank at Aspinwall, and was the first person to ship bananas from Costa Rica, Nicaragua, Honduras and Colombia. As the business grew, the Boston Fruit Company and the Keith companies found that they had to take account of each other. If both companies landed shiploads of bananas at any port on the same day the market was overloaded and the results were disastrous. They got together like practical men in 1899 and formed the United Fruit Company. Of course, by this time a large demand for bananas had been developed and there was plenty of competition in the business. The records show that up to 1899 114 banana companies had been organized and entered business, but only 22 had survived, among whom the Boston Fruit Company and the Keith companies were the most important. The new corporation was able to raise more capital, plan its operations more economically and the volume of business has grown surely and steadily since.

The Company's total annual report and balance sheet, as of December 31, 1928, shows gross assets of \$225,432,616.16, and a profit for the fiscal year ended at that date of \$20,606,393.16. Its banana shipments

during the year from all tropical divisions aggregated 56,519,819 stems, its production of cacao to 11,479,895 pounds, and its production of sugar to 969,456 bags. It owned 72 ships of 335,802 gross tons, and was operating 25 chartered ships of 36,325 gross tons. Its appropriations for capital expenditures in the year 1929 aggregated \$18,674,870.59. It paid out approximately \$24,000,000 in wages to the nationals of the tropical countries in which its plantations are located and approximately as much more in the purchase of fruit raised by private growers. The balance sheet shows "loans to planters \$3,250,095.38," A large part of its fruit supply is obtained from individual planters, with whom it enters into firm arrangements, and whom it frequently assists by loans, as this sum indicates.

The United States and Canada are the best markets for bananas, probably because they have been cultivated more intensively than any other. The United Fruit Company, however, has now has a marketing organization which covers the whole of Europe, excepting Russia, and the total imports of bananas by European countries is now approximately one-half the imports of the United States.

generally in the Tropics,
It is significant that although the banana is grown/for local consumption, the Caribbean region
~~generally in the Tropics;~~ no other region approaches/in volume of production.
Neither Asia nor Africa shares in the banana trade of Europe.

business
The banana/has been developed by high class business ability in command of large capital, and by effective organization of production, transportation and distribution. The demand for the fruit has been created by capable merchandising and efficient service, in which the United Fruit Company has been a leader. Continuity of supply is assured by production in numerous countries, which gives protection against interruption by the devastating storms which occur in some of the countries of Caribbean region, although happily Panama is free of them. The crop is matured at different times, so that

fresh bananas are coming to the market in every month of the year. In the early years of the business the fruit could not be shipped in the summer because it would spoil or in the winter because it would freeze, but the seasons are no longer a factor. The fruit moves in a constant, well-regulated stream from the plantations to the fruit stalls of all countries where the organization extends -- by rail to a ship planned and loaded to keep the cargo well ventilated and at the right temperature; the handling is done systematically and carefully to avoid breaking the skin, and economically by means of automatic conveyors; the ships move on schedule time to a half dozen or more of the ports of the United States where railway facilities afford ready service to large sections of the country, and ^{shipments} move out in solid trains of 50 to 100 cars each, to interior distributing centers, cars being refrigerated in summer and heated in winter. The fruit is inspected and watched at every step of its way from the plantation to the local distributor. A similar system governs distribution to other countries, and this is the service which has created the market for bananas.

Mr. Samuel Crowther in his interesting book, (*) refers to the effects of the system of transportation which has been created for bananas, as follows:

"The economic interdependence of the United States and the Caribbean as brought about by the banana trade depends upon the ability of a consumer in the United States to buy a good banana anywhere for not more than a nickel. The whole vast organization of the United Fruit Company is devoted to doing that one thing. If it could not do that one thing then it would fall.

Thus it comes about that the keeper of a fruit stand in Seattle is an integral part of the political economy of the Caribbean. If he offers poor bananas or is frequently out of bananas when they are asked for, his customers will quickly lose the habit of buying bananas. On this homely fact rests a great international structure. The treaties, the conventions, the conferences of statesmen and the paraphernalia of international comity in the Caribbean are only aids to the man in Seattle getting a good banana. The means therefore by which this man gets a good banana are of high economic import for it

(*) "The Romance and Rise of the American Tropics," Samuel Crowther; Doubleday, Doran & Company, Inc., Publishers, 1929.

must always be remembered that he gets a banana not by accident but through a co-ordination of agricultural production and transportation which is so extensive and has so many consequences that one is apt to forget the simple reason for its being.

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The bulk of the transportation system of Central America rests on the banana, for without it many of the railroads would hardly be able to exist and there could be no regular steamship sailings. Thus in a very large measure the coffee trade depends on the banana trade. In a way the banana is to Central America what coal is to Great Britain. It provides the shipping and the trade grows out of the shipping.

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The United Fruit Company has bound the two regions by making them interdependent. The banana has become an essential food supply of the United States. The raising of the banana has become an essential industry in all but one of the Central American states. The provision of frequent and regular transportation between the Caribbean ports and the Atlantic seaboard in order to keep a steady flow of bananas northward has put the United States in the most favourable position to supply the Central American states with the goods which they must import -- for otherwise the banana ships would have to make their voyages to the southward in ballast. Thus the regions have become complementary and in addition this trade -- in the manner in which it is conducted -- has added tremendously to the wealth of the southern countries. It added more than the dollars and cents figures indicate, for the addition has come at what might be called the point of marginal wealth."

The United Fruit Company is in the jungle with the executive ability and capital to master difficulties which at first seemed almost insurmountable. Its banana plantations are in the lowlands, where not even the natives would live formerly. The company goes everywhere with a competent medical staff and has conquered the conditions which were a menace to health. It was organized a year after Dr. Walter Reed and his associates in Cuba made the epochal discovery that yellow fever was only transmitted by the bite of a mosquito, and immediately made use of that knowledge for the protection of its employees in all its tropical divisions. The activities of its medical department extend over more than 2,000,000 acres of its own land, in widely separated tropical localities, and the services of the department and of the hospital are available for all residents of the districts where it has stations, whether employees or not. The employees

are furnished with clean, simple cottages, with board floors raised from the ground to permit a circulation of air underneath, and the villages are sewered, drained and supplied with safe water and proper sanitary conveniences. The Company's expenditures upon medical service and sanitation in the thirty years it has been in business have aggregated \$13,000,000, or an average of more than \$430,000 per year.

These expenditures for the health and comfort of its employes, ~~which prompted no doubt in part by humane consideration,~~ are in pursuance of a broad and intelligent business policy -- the same policy which determines the maintenance of a capable research staff to study all the diseases and pests which affect the banana plant, and all other conditions bearing upon the industry.

The Business is Competitive.

In this account of the operations and development of the United Fruit Company we do not wish to convey the idea that it is the only organization that has contributed to the development of the banana industry, for this is not the case. Many individuals and firms and companies have been engaged in the business. The United Fruit Company, however, has been so conspicuously identified continuously with the development of the industry and so large a factor in it, that that development is most readily summarized by describing the growth of the Company. Our main purpose is not simply to describe what has been done, but to emphasize this development as an illustration of what is coming to the Tropics by the growing demands for many of their products.

There is no reason to doubt that the banana business is on a permanent basis and will continue to expand, with Panama and the Caribbean area maintaining their importance. The banana has achieved popularity on its merits. It is a palatable and healthful fruit of high food value, commended by the highest scientific authority. Moreover, the banana plant produces more food

per acre of land than any other known plant, which is enough to assure it a permanent place in the food supplies of the world.

Banana Production in Panama.

Another justification for the foregoing sketch of the United Fruit Company is the fact that it is the most important industrial organization operating in the Republic of Panama, and its operations in the country are likely to be far more extensive and varied in the future than they have been heretofore.

Bananas are far ahead of any other product of Panama in value of output. ^{of the fruit} Total of exports/in the latest year for which official figures are available, the fiscal year 1927, were \$2,818,160. This sum does not include the value of production in the Canal Zone. The United Fruit Company is the principal producer and handler.

Several years ago about 55,000 hectares of land were acquired near Puerto Armuelles, in Chiriqui, and work has been actively carried on in the development of plantations there. The property is being drained and in part will be irrigated. Expenditures upon it have been in the neighborhood of \$5,000,000, banana shipments were begun in January, 1929, and it is calculated that by the end of 1929 they will be proceeding at the rate of 35,000 to 40,000 bunches per week.

In the province of Los Santos, near Tonosi, the Company has another development in prospect, having acquired about 37,000 hectares of land for the purpose.

On the other hand, the Company's production has been largely decreased in Bocas del Toro in recent years by the spread of the banana disease. Its lands in that province are being planted to cacao trees which are now coming into production. This shift from bananas to cacao is indicative of an expansion of the Company's operations which seems to be reasonably probable

in the future. The Company has had enough to do in the past in mastering the details of the banana business and in providing the capital to meet the needs of that business alone, but the banana disease and the inevitable soil exhaustion resulting from continued banana production point to the need for crop diversification. The enormous fruit yield of the banana plant necessarily cannot be maintained indefinitely without fertilization, rich though the soils may be originally. Objection has been made by some critics to the banana industry on the ground that it rapidly impoverishes the soil. The argument is not good, because all plant growth of necessity extracts nutritive elements of the soil, and those elements are worthless except as they are converted into marketable products. To say that the banana extracts them more rapidly than any other plant is praise for the banana. The problem is not to discard the banana, but to find means of replenishing the elements withdrawn from the soil.

The banana plant takes nothing from the soil which cannot be replaced. The land needs a rest or change to a different crop, and a chance to recover from the drain to which the banana has subjected it. The Fruit Company has a large investment in the property, not only in the land itself but in buildings and improvements of various kinds, and as the yield of bananas declines, either from disease or loss of fertility, it evidently has an incentive to use the land for a different crop. This it is now doing, and its last report shows plantings in cacao of 23,711 acres in Panama and 22,093 acres in Costa Rica, besides an aggregate in all countries of 7,727 acres in coconuts and 9,172 acres in miscellaneous products, not including 117,272 acres in pastures.

In conclusion, the United Fruit Company is in Panama and other countries of the American Tropics with a strong and competent organization, including a research staff which is studying all the possibilities of these countries, and when account is taken of what it has accomplished in the past there is reason for expecting much in the future from its constantly expanding activities.

SUGAR

Sugar results from the action of sunshine upon certain plants and naturally originated as a commercial product in the Tropics, where the power of the sun is most effective. Until the early part of the 19th Century all of the sugar of commerce came from the Tropics, Europe receiving its supplies mainly from the West Indies. German and French chemists discovered that it could be produced from beets, and during the continental blockades which were maintained by Great Britain against Napoleon in its wars with him, the latter gave considerable aid to the establishment of beet sugar production. The disposition of governments to favor home supplies of food, as a precaution against having supplies cut off in time of war, had much to do with the extension of the beet sugar industry in Europe, for although the sugar content of beets has been much improved by cultivation, sugar cannot be produced as economically by this means as by the sugar cane of the Tropics.

If all the world was under one government and it was wise enough to have every commodity produced where it could be produced at the best advantage, it would have the tropical countries produce all the sugar and trade it to the temperate zones for true temperate zone products, but as it is, the tropical countries are all producing more sugar than they want for themselves, and the temperate zone countries are trying to supply themselves with beet sugar. As a result of this situation the price of sugar at present is very greatly depressed. Before the war the world's production of sugar was about equally divided between cane and beet, but during the war the European production from beets was reduced more than one-half and the cane sugar production of the Tropics naturally increased to take its place. European production has now recovered to the pre-war rate, but total production from beets is considerably less than production from cane.

Sugar has been produced in Panama, as in all the countries surrounding the Caribbean, since early colonial times. Previous to the European war,

production in Panama was on a very small scale and that by crude methods, with low-grade sugar, molasses, and rum the principal products. The high prices occasioned by the war, stimulated production in Panama as elsewhere, and caused an increase above the quantity required for home consumption. This proved to be unfortunate, because the domestic industry does not operate upon a scale enabling it to compete in foreign markets or even to meet foreign competition in the home market. As a result of overproduction prices fell to unremunerative figures.

Domestic consumption is a little above 100,000 quintals per year, but some of this supply comes in from the Zone commissaries. The high point of domestic production was reached in 1925, low prices having brought about a reduction since. The two leading producers have had an output of about 28,000 quintals each in the past season, and the remaining mills, in the aggregate, perhaps as much.

The industry has been protected since 1916 by an import duty, now five cents per pound, of which one quarter cent goes to the Government to help support the activities of the Department of Agriculture.

That Panama has soil and climate suited to the production of sugar cane cannot be questioned. The cane does remarkably well, considering how little is done to keep the plant free of disease. Replanting takes place once in eight or ten years. Sugar production, however, is now carried on in Cuba and other countries by means of large capital investments and methods which make the costs much lower than at present are possible in Panama. Now that beet sugar is back to pre-war production in Europe, a serious state of overproduction exists the world over, and few anywhere, even among the low-cost producers, are able to make profits. Under these conditions the industry in Panama could not exist but for the protective tariff, and at present there is no object in increasing production beyond domestic needs and possibly such quantities as may be sold in the Canal Zone.

In the past, the refining process has not been carried to the degree necessary to make the Panama product competitive with foreign sugar on a quality basis, but recently the quality has been improved. The Coca-cola and Orange Crush Companies and other manufacturing consumers in Panama are now using the home sugar, and there is a prospect that it will be used to some extent in the Zone. The Zone authorities have indicated a willingness to use it, even at a price somewhat above the cost of competing imports, provided the quality is made acceptable to consumers.

The Government has shown an interest in maintaining the industry by lending the use of tractors and also by importing fertilizers for sale to the growers. The area of land worked by tractors has increased from sixteen hectares in 1927 to fifty-seven hectares in 1928 and 110 hectares in 1929. The first introduction of fertilizer by the Government was two tons in 1927, followed by twenty-eight tons in 1928 and 200 tons in 1929. The results both of the tractor operations and application of fertilizer are said to have been very convincing, and it is thought that a general increase of efficiency will result. Higher yields of cane per acre will mean lower costs to the producers, and thus place the industry on a more satisfactory basis.

The consumption of sugar tends to increase in all countries and doubtless would be much larger in many countries but for the heavy taxes, partly for revenue and partly for protection, which are laid upon it. Among European countries excise taxes on sugar range from .91 cents per pound in Austria to 9.5 cents in Italy and the latter country also maintains an import duty of 2.16 cents per lb. A calculation based on the sugar consumption of the United States and eleven of the principal consuming countries of Europe (excluding Belgium, Holland and Switzerland) indicates an aggregate wholesale cost, before import or excise taxes, of about \$685,000,000, to which \$450,000,000 is added by these sugar taxes, making a total of \$1,135,000,000,

before the costs of retail distribution and retailers' profits are incurred. Consumption per capita ranges from about ten pounds per year in Italy, where the tax is highest, to 110 ^{pounds} in the United States.

COFFEE

Increasing Production in Panama.

Coffee runs a race with sugar for first place among the products of the Tropics, but unlike sugar it has no competition in the temperate zones. Furthermore, it is one of the products in which the producers of the western hemisphere are ^{still} ~~far~~ ahead of competitors of Asia and Africa.

Coffee has been grown in a small way in Panama for a long time, but, as with cacao, ~~this~~ country has been scarcely mentioned in world statistics. Within the last five years, however, an active interest has developed, and an important amount of tree-planting has been done in the districts of Boquete and Volcan, in the western part of Chiriqui Province. Boquete is the oldest district. The altitude of these coffee plantations is 2,000 to 4,000 feet. The berry produced is that which is generally called "hard coffee," of peculiar and delicious aroma, fully equal in quality to the produce of neighboring countries.

Coffee has been produced also for a long time in the Sante Fe district of Veraguas, Herrera, Los Santos, and other localities, but has figured very slightly in the country's exports. On the contrary, most of the coffee consumed in the cities and in the Zone has been imported.

In Boquete, so far, about one-half of the estimated available land is under cultivation for coffee and about 2,500,000 coffee trees are in production. The 1928 crop was light, making about 10,000 quintals or sacks of 100 lbs., and it is expected that the crop will be increased within three years to about 30,000 quintals. The 1929 crop is at present estimated at 20,000 quintals. At about \$0.20 per lb., price received ^{by} growers, these

crop figures signify for Boquete an aggregate income of B200,000 to B600,000.

About 20 per cent of the Boquete product is said to be exported, moving directly through Puerto Armuelles to foreign markets. It is said that the prices for export would be higher if better grading and a trade name were established.

Apparently better grading could be established in larger and more modern plants called "beneficios," for the treatment of the berries. At present the crop is handled by numerous smaller beneficios, of a capacity of about 150 quintals, which operate at a charge of about B1 per quintal. Larger beneficios of a capacity of at least 500 quintals, requiring a capital of about B25,000, are favored, as a means of securing better treatment, more uniform and select grading, and the establishment of a good trade name. The Chiriqui railroad affords direct connection with Puerto Armuelles, a deep harbor where shipments direct to New York, London or Hamburg may be effected.

The new region of El Volcan is not yet in large production, as few trees have reached three years of age. A California corporation, named the Chiriqui Commercial Company, has invested approximately \$200,000 in trees and improvements at ^{El}Volcan upon land purchased about five years ago, and will come into sizeable production in 1930. Another important new development in Volcan is that of the Chiriqui Coffee Estates, Inc., not yet in production.

The labor problem looms up with all of the new-comers who are planning for expansion and is commonly mentioned in response to any inquiry for their views. Some of them are contemplating attempts at colonization from Spain or the Canary Islands.

The following memoranda embody the recommendations of different parties who have been asked to name what the Government might do to aid the new coffee industry in getting on its feet. We give them as worthy of consideration:

Suggestions Regarding the Coffee Industry.

1. Title guarantee office, where a newcomer may have his title examined and guaranteed against lawsuits.

2. A statement by the Government as to exemption from Export tax on coffee for say the next four years.
3. An assurance that lands devoted to coffee will not be taxed more than a nominal sum as Real Estate. (NB.-Land planted to sugar cane pays no taxes at all)
4. Plant quarantine -- especially prohibiting importation of empty coffee bags second-hand from other coffee countries, or seed except through the Department of Agriculture.
5. A Foreign expert, thoroughly conversant with the Spanish language, but without any personal interest in the local industry, to be employed by the Government for a period of five years. This expert to give free advice to every coffee grower, keep a census of same, and whether his advice be required or not, visit every farm at least once a year. This man should know not only the cultivation of coffee, but its curing and grading, and must be authorized to take drastic steps to eradicate any disease, which may make its appearance.
6. A main hard-surface road to rail-head should not only be properly built but so maintained. Telegraph and telephone should be within reasonable distance.
7. A town should be established in the Volcan District with proper authorities -- alcalde, police, post office, etc. The nucleus of this town should be Spanish colonization -- two main streets could be started at once, lots of five-acres marked off, a small cottage set on each, and settlers of the labouring class imported to take them up. The labor question is very serious and will be worse unless immediate action is taken to get more families in the Volcan district.
8. Schools and a District Medical Officer are necessary. The school holidays time should be set to coincide with the coffee crop.
9. There should be an assurance that no hindrance will be placed in the way to securing permission for hydro-electric power for coffee machinery and lights on the farms, and if any fee is to be paid for such plants the charge should be nominal. Hydro-electric and coffee machinery should be exempt of duty; new coffee bags should also come into the country free.
10. The Banco Nacional should plan to assist coffee-growers with reasonable credits, and particularly proprietors who already have made substantial investments and are in need of additional capital to complete their equipment for production.

Coffee is a crop which can be produced by small, individual operations, as distinguished from the large corporate undertakings in bananas. Moreover, land may be utilized which is too rough for field crops. There is need,

however, for expert advice, particularly in a region where the development is comparatively new and many of the growers are inexperienced.

Coffee trees cannot be neglected if the best results are to be secured. The bushes should be protected against the competition of weeds and brush, and be treated to an intelligent system of pruning. In ^{America} Central and the northern countries of South America coffee is grown under the shade of larger trees, and the provision of shade is a proper subject of expert advice. Methods of curing and preparing for market are of much importance. Also there are diseases and insect pests which require skilled attention. The Department of Agriculture should be prepared to render assistance in these matters, for many individual producers will not have this knowledge, and it can be more economically obtained for the entire industry than by each grower separately. Of course, the industry as a whole should pay proper taxes to the Treasury, light at first and never oppressive.

Coffee in Neighboring Countries.

Coffee long has been the chief money crop of the neighboring countries of Central and South America, and they have been increasing their production recently to an extent which has contributed very greatly to their prosperity. The value of the Coffee exports of these countries in the last three years for which figures can be had, is shown by the following table, and it is interesting to observe the proportion which Coffee bears to the total exports of all kinds:

Value of Coffee Exports in United States Money.

	1913	1926	1927	Total Exports 1927
Nicaragua	\$ 5,004,436	\$ 8,100,397	\$ 4,081,605	\$ 9,026,000
Costa Rica	3,710,000	10,623,969	10,611,179	18,058,000
Salvador	*7,329,000	23,361,000	12,618,701	**14,152,000
Colombia	18,270,000	81,981,000	68,786,858	109,986,000
Venezuela	14,936,000	19,108,135	19,998,193	**76,155,000
Guatemala	12,254,723	23,338,511	28,568,562	**33,951,000

* 1912.

** Including bullion and coin.

When it is considered that coffee as yet scarcely figures in the foreign trade of Panama, and that imports^{of it}/exceed exports in value, one can appreciate how great a change in the economic situation of the country would result from a coffee production corresponding to that of Costa Rica or Salvador. With a soil and climate similar to that of these countries one one side and Colombia on the other, there is no reason why this may not be brought about.

The World Situation in Coffee.

Present prices for coffee are quite satisfactory, but an element of uncertainty exists in the system of price-control maintained by Brazil through what is known as the "Coffee Institute," an organization supported by the National Government and by the State of Sao Paulo, with the cooperation of similar organizations in other states. This system of control is of such importance to coffee producers everywhere that any discussion of the outlook for coffee would be incomplete without reference to it.

Brazil is by far the most important producing country, and coffee plays so large a part in the economic life of the country that ability to meet the payments for accustomed importations of foreign goods and for interest charges on foreign loans is mainly dependent upon the crop and the price. Of course, all internal business is likewise involved. The coffee crop is subject to violent fluctuations in quantity, which have produced violent fluctuations in price, and on account of the disturbances resulting the Government has undertaken to lend its credit in the years of big crops, for the purpose of having the surplus taken off the market and stored until a short crop would give opportunity for selling it at a fair price, thus stabilizing the market in seasons both of excess and deficit.

The coffee crop year ends June 30, at which time the new crop in Brazil is ready for picking and the crop of the previous year is fully

harvested and its size known. For example, the statistical crop of 1928-29 is the crop which was harvested in the crop year beginning July 1, 1928. The following table shows the increase of production since the decade 1870-1880, with the figures for Brazil shown separately and production of all other countries consolidated. The first figures represent average production in the ten years ended with June 30, 1880, ⁱⁿ the second period the average of five years ended June 30, 1905, and the following figures are for the single crops designated:

World Coffee Production

(In thousands of bags of 132 lbs. each)			
<u>July 1 - June 30.</u>	<u>Brazil</u>	<u>Other Countries</u>	<u>Total</u>
1870/71 - 1879/80	2,785	3,925	7,710
1920/21	12,496	5,787	20,283
1927/28	16,420	8,003	24,423
1928/29	13,621	8,660	22,281
1929/30 (Est.)	20,500	9,000	29,500

This table is not sufficiently complete to show the fluctuation of production, although the last three crops illustrate it for Brazil. The first big expansion in Brazil came in the eighties and was so rapid to 1901 that a state of overproduction resulted, and in 1902 the Government made its first attempt at stabilization. It repeated the effort in 1906, 1917 and 1921, gaining experience and meeting with an encouraging degree of success.

An explanation of its success is found in three circumstances, to wit: (1) Big crops usually have been followed by small crops, thus enabling the valorization purchases to be unloaded; (2) world consumption was constantly increasing, and (3) while price stabilization stimulated tree-plantings, many of the older plantations have been failing in production, the yield per tree declining. This declining yield is shown by the following table:

<u>The State of Sao Paulo</u>			
	<u>Number of</u>	<u>Production, Bags of</u>	<u>Production per</u>
	<u>trees bearing.</u>	<u>132 lbs.</u>	<u>tree. (Pounds)</u>
1900	660,000,000	8,933,000	1.79
1910	697,000,000	8,458,000	1.60
1920	844,000,000	10,246,000	1.60
1923	949,000,000	10,347,000	1.44

Of course, all coffee-producing countries have had free benefit of the valorization system maintained by Brazil. The following table shows the percentage of world exports of coffee supplied by each of the producing countries in the two five year periods named:

<u>1909-1913</u>	<u>Per cent of Exports</u>		<u>1919-23</u>	<u>Per cent</u>
	<u>Per cent</u>			
Brazil	69.7		Brazil	62.4
Venezuela	4.6		Colombia	9.1
Colombia	4.3		Dutch East Indies	5.3
Guatemala	3.7		Venezuela	4.4
Haiti	2.7		Guatemala	3.5
Salvador	2.6		Salvador	3.0
Dutch East Indies	2.2		Haiti	2.6
Mexico	2.0		Africa	2.0
Porto Rico	1.8		Mexico	1.4
Costa Rico	1.2		Costa Rica	1.2
Africa	1.0		Nicaragua	.9
Nicaragua	.9		Porto Rico	.9
All Others	<u>3.3</u>		All Others	<u>3.3</u>
	100.0			100.0

Note: The per cent column represents an annual average for the periods indicated.

It will be seen that Brazil's percentage dropped from nearly 70 to less than 63, mainly by the rise of Colombia and the Dutch East Indies, but in recent years Brazil has made a gain to above 70 per cent.

In the last three years developments have indicated that the stimulus to tree-planting might run to excess. The world crop of 1927-28 was a record one, but handled by the "Coffee Institute" successfully. A succession of such crops, however, without a breathing spell to enable the surpluses to be worked off, would create a problem, for even a Government cannot go on taking care of surpluses indefinitely. Until the last two years consumption apparently was close up to production.

The Institute of Defense of Coffee uses two methods of influencing the market. It limits the quantity of coffee which may be sent daily to the ports for export and it supports the price by buying futures on the Santos Exchange, ^{or} "Bolsa." It also maintains a number of warehouses in the coffee

growing districts where the planter can send his harvested crop to await shipment. The railroads are controlled by the Government, and shipments to the ports can only be made in the order in which they are delivered at the warehouses, and by permission of the Institute. Meanwhile, arrangements are provided under which the planter may borrow on his warehouse receipts up to approximately 60 per cent of the value of the coffee.

It is to be said that Brazil is showing no weakness in control of the coffee market and there is a strong presumption that she will maintain that control for some time to come, as it is probable that there may be resort to further measures of control over domestic production. Brazil's enormous share in the world crop makes possible a high degree of control over the total supply.

The Mild Coffees.

In general terms the coffees of the world are divided into two classes: The Brazil Coffees and "Mild" coffees, the latter including the production of all other countries.

These two groups of coffee are further subdivided and classified either by the names of localities in which they are grown or by the characteristics of the coffee bean. Thus among the "mild coffees" the best known are the Colombian washed, Paracaibo coffee, Salvadorean, Guatemalan, Mexican coffees, etc. Each of these "mild" coffees has its own characteristics due to differences in altitude, soil, climate, methods of cultivation and preparation. These characteristics are extremely important for blending purposes, and most coffees are blended before being offered to consumers.

The "mild" coffees always have commanded a better price than the best of the Brazils, due largely to the fact that most of the Brazilian coffees, (also those of Arabia and Java) are simply dried and mechanically cleaned of pulp, and consequently are more impure than the "washed coffee," which comes to the market with the pulp entirely removed.