

private control, the absence of necessity for immediate income to the Government from such property, and the obligation and position of a Government to safeguard the resources of the country for future needs, all make it desirable that where a Government fortunately is still in possession of its forests the ownership shall be retained and regarded as a trust to be faithfully administered.

Important areas in Panama already have been denuded of the most valuable timber, and in other localities the timber growth is largely of woods of comparatively little value. There is an abundance of evidence that valuable species will grow anywhere in the country. There can be no question that mature forests of the choice cabinet woods in future years will prove to be a certain and important source of revenue to the Government, as well as the basis of an important industry in the country. Therefore, one of the purposes in view in establishing a Forestry Bureau and in seeking to promote the utilization of the existing forests should be the creation of revenues which may be devoted to the planting and care of forests of selected species. Revenues such as the forests of the Philippine Islands are now yielding would enable this to be done upon a scale which eventually would produce large returns to the public Treasury.

There are convincing examples of tree-planting in the Tropics, supporting the foregoing suggestion. In Venezuela the Grand Ferrocarril de Venezuela, from Caracas to Valencia, is owned and operated by a German company, which has maintained a policy of tree-planting along their line. They have put out particularly cedar (Cedrela mexicana), mahogany (Swietenia Macrophylla), amamate (Tecoma Pentaphylla), and cupa (Jacaranda Filicifolia).

The Forester of the Tropical Plant Research Foundation, Prof. D. M. Matthews, a man of long experience in practical forestry in the Philippines and Borneo, has carefully examined these plantations. He finds that they have been thoroughly successful. The cedar plantations at five years of age

are estimated to have a value to the Company amply compensatory for costs, and the management calculated that the trees at maturity will be worth not less than ~~\$200~~ \$80 each. The rate of growth indicates that on a fifty-year rotation mahogany would about equal oak on a one-hundred-year rotation in a northern country. It is stated that the potential value of these German railway plantations is greater than the present value of the railroad properties and concession, although the forests scarcely entered into original calculations of profit.

There are planted forests in Trinidad under English control which present evidence of the practicability of and profit from well considered forest plantations. Also in Brazil the Paulista Railroad has for more than twenty years been putting out Eucalyptus, which is used for railway ties and poles. Their experience has been so satisfactory that they ^{now} have many millions of trees growing along their line.

THE CATTLE INDUSTRY.

Cattle-raising is the most important native industry of Panama, and the largest single source of income to the rural population, if the production of bananas be excepted. Banana production, however, is mainly upon the plantations of the United Fruit Company, a foreign corporation, and therefore is not to be classed as a native industry in the same degree as cattle-raising. The income from cattle practically all goes to Panamanians as returns upon their own capital and labor and is more widely distributed in the country than the income from any other one source.

A National law levies a slaughter tax of \$4 per head upon steers and bulls and \$4.50 per head upon cows, and killing usually is done at the public slaughter houses, but this is not invariably the case, and the law does not require it in all cases. The kill officially reported in the

years 1927 and 1928 was 37,830 and 39,676 head respectively. In addition there were exports of live cattle, principally to the Canal Zone, which took approximately 7,500 head in each year. As it cannot be doubted that there is more or less of unreported slaughter in the sparsely settled parts of the country, it is probable that the total annual kill is not far from 50,000 head. As the bulk of the regular kill is of cattle that have been fattened (on grass) for market, a valuation per head of \$25 to \$30 is thought to be conservative, which would make the value of the annual turn-off, \$1,250,000 to \$1,500,000.

The total number of cattle in the country has been currently estimated at 350,000 head, but some good authorities place it higher, and we think there is good basis for an estimate considerably higher. The average age of the turn-off is said to be four years, and this being so an annual turn-off of 50,000 head is high for a total cattle population of 350,000. In reckoning back from the annual turn-off to estimate the total cattle population the unknown factors are the size of the calf crop and the annual death loss. In making such a calculation based on conditions in the United States the Department of Agriculture of that country figures upon a calf crop of 77 per cent, (77 calves saved for every 100 cows and heifers two years old or older). The death loss for these calves before they reach the yearling age is calculated to be $7\frac{1}{2}$ per cent, after that 2 per cent annually. Upon this basis, a hypothetical herd that will supply 50,000 four year old cattle annually would contain about 360,000 head.

The general understanding, however, is that the number of cattle in the country has been increasing in recent years, which means that the annual turn-off has not represented the entire production. Furthermore, although the cattle of Panama are generally healthy, and the weather conditions are not severe, ~~but~~ it may be doubted whether breeding arrangements are as systematic or the calf crop is quite as large as in the United States.

If the calf crop was smaller or the death loss higher, the herd would have to be larger in order to sustain the annual turn-off of 50,000 head.

Considering that the slaughter does not include the entire gain, it seems that the estimate of 350,000 for the total number in the country is conservative and possibly 100,000 head under the truth.

Outside of bananas no other production of the country makes a showing of cash returns like the foregoing. It is enough to entitle the cattle industry to high consideration, especially as it is an industry which unquestionably has possibilities of further development.

Cattle-raising is suited to the savannah country extending from the Pacific coast west of the Canal for approximately 300 miles, to the highlands of Chiriqui Province, including not only the plains but the mountain slopes and valleys. The region is well watered by mountain streams and the cattle are shifted alternately between the plains in the rainy season and the valleys and lowlands in the dry season. As stated elsewhere, this is the region of oldest continued ^{white} settlement in Panama, and it is probable that its suitability for cattle-raising was one of the chief reasons for its choice by the early Spanish settlers.

Old Conflict Between Agriculture and Cattle-Raising. (C)

Apparently in recent years something of a conflict has developed here between the cattle-raisers and the agriculturists over the old question which is familiar in every country that has made the change from pastoral to farming conditions, viz: the question whether the owners should fence their cattle in to restrain their wanderings or the farmers should erect fences to protect their own crops. We shall not discuss the issue further than to refer to the generally accepted principle that the policy which will contribute most to the general production of wealth and the general public welfare should be adopted. It would be unwise and unjustifiable to favor an industry having small possi-

bilities of future development at the expense of an industry having larger possibilities of development. Where land is well suited to cultivation and the population is present to till it, larger values can be produced by growing crops than by grazing and the predominant interest is agriculture. On the other hand, where population does not exist to carry on cultivation, or natural conditions limit the development of agriculture, and the largest values may be had from cattle production, it would be a mistake to handicap the latter industry in a futile effort to develop the former.

It is sometimes said that cattle-raising is a primitive industry, and that it should give way to an intensive use of the land which will support a larger population and a higher state of civilization, thus permitting a development in the interest of the nation.

It is true that cattle-raising is one of the early occupations of mankind. Practically all countries ^{were} first-of-all cattle countries and through progressive development, increase of population and more intensive use of the land have gradually developed agriculture to a predominant position. Moreover, development does not stop with Agriculture, for as the Arts and Sciences have advanced, Manufactures and Commerce rise in importance, opening new possibilities for diversified activities and improved living conditions for the population.

However, cattle countries do not evolve into agricultural countries over night, any more than does the subsequent evolution occur in this speedy manner. The evolution of a country's industries is a gradual process which comes about naturally and is based primarily upon an increasing population. More people are required to cultivate crops than to look after cattle, but the increase of population in the interior of Panama is very slow, and as yet there is little evidence of increasing agricultural production. So long as the country has much land and little population it is sound policy for the

population to follow the occupation which makes the most of the natural resources. Cattle as yet represent a larger yield from the land in proportion to the amount of labor employed than any other product. When land-cultivation yields larger net returns than cattle-raising the transition from the former to the latter will take place naturally, as witness the disappearance of the ranch properties in the plains region of the United States.

It may be doubted that general agriculture, as practised by small farmers in the temperate zones, will have rapid development in Panama. Agriculture in all countries is tending to large-scale production, largely by the aid of machinery, and requiring important amounts of capital. This seems to be even more true of production in the Tropics, where sanitation and other protection for health are essential to an increasing population. Moreover, the evolution of a marketing system must keep pace with increasing production. On the whole, it seems much too early to propose any policy which would handicap the principal industry of the country on the ground that it is a primitive industry and no longer suited to rural conditions in Panama.

Good Prospects for the Cattle Industry (C)

At this time the cattle industry over the world is more prosperous than almost any other industry based upon land. The supply of cattle on the whole is under rather than above current and prospect requirements, which gives assurance of fair prices for some years to come. In fact, cattle today are higher in world markets relatively than any strictly tropical product or almost any other agricultural product.

So long as Panama is covered by forests to the present extent, the grazing area will be limited and cattle production will be limited, but all of the available grazing land should be utilized, and efforts should be made

to improve the grade of the cattle and shorten the period of production from birth to maturity, thus obtaining a larger annual turn-off to the same aggregate of cattle population. In the countries where the best breeding and feeding standards obtain, the bulk of the cattle go to market at the age of approximately two years or younger. This means that the turn-off is made faster and is larger in proportion to the cattle population. It is perhaps possible by better breeding and feeding to have the cattle of Panama weigh as much as two year olds as they now weight as four year olds; anyway, that has been done in other countries. Doubtless a cattle ration can be devised, composed of products grown in the country which added to grass will hasten maturity and increase the weight.

Copra cake, a by-product of the coconut oil industry, is exported in large quantities from the Philippine Islands to the United States and Europe for cattle feed, and highly valued for that purpose. Panama as yet has no coconut oil industry, but doubtless will have in time, and this will be a valuable adjunct to the cattle industry. Cattle, like human beings, relish a variety of food and grow and thrive better for having it. The molasses which is a residue of the sugar industry is another element in cattle feed much used in the United States. In Germany a cake made from the pressed meal of palm kernals, a product of the African Tropics, is very popular for cattle feed.

Tame grasses have been introduced for pastures by proprietors who are land-owners and the varieties tried have done well. They are

- (a) Para grass introduced from Brazil and used in the lowlands or swampy countries;
- (b) Guinea grass;
- (c) Indiana grass.

The last two names are most common; they do well on the higher lands and also on the less fertile soils. They are coarser than the Para grass, but upon a long period of feeding yield better cattle weight. The three are

planted grasses and do not grow wild.

Next to the small area of planted grasses exist great expanses of "sabanas" occupied by ~~all~~ varieties of natural grasses. The approximate ratio as to area is 7 for planted grasses and 100 for "sabanas."

Another condition affecting Panama cattle is entitled to consideration and that is the loss of weight due to the ticks and other insects which worry them and sap their vitality. It is common opinion that nothing can be done about them, but that used to be said of the same pest in the southern states of the United States. Systematic attempts at eradication were begun in the United States in 1906, at which time 985 counties in 15 states were placed under quarantine. Up to December 31, 1928, 787 of these counties had been freed from quarantine and 198 remained under quarantine. Thus the campaign of eradication is effective in 78 per cent of the territory originally quarantined and without question will be made completely effective before many years.

The ever increasing number of ships passing through the Canal will afford an important market for high class beef and also the means of transporting any surplus to foreign markets. The Canal Zone, however, is the first market to be captured. ^{The producers} /Panama/ should have it completely, for their competitors, principally ⁱⁿ New Zealand and Argentina, are long distances away and under a heavy handicap in freight charges. The way to capture the Zone market is by producing quality beef.

Organization of the Cattle Industry (C)

The extent of the cattle industry is indicated by the estimate currently accepted of 350,000 head as the aggregate of holdings.

The present structure of the cattle industry may be said to include three elements:

L. The rural element occupying the open lands and hills of the southern slope of the Continental Divide. This element does the largest share of the cattle-breeding, and to such an extent that the statement is made that their

cattle constitute the only wealth liberally distributed throughout the country.

2. A more progressive element of the population living in the towns of the interior, who own the greater area of land adaptable for pasturage. They engage in breeding but produce only a small proportion of the feeders. They buy from the rural element, first named, the latter's production of lean cattle or feeders and finish these for market on good pastures. They further supply the meats for consumption in the small markets of the interior, which they generally operate or control.

3. The large-scale slaughterers who undertake the marketing of beef in the cities of Panama and Colon and the supply of fatsteers to the Canal Zone. They absorb the balance of finished steers in the hands of the second class referred to. Some of the members of group 3 also engage in breeding and feeding, and individually are the largest breeders, but their combined breeding herds do not exceed 15 per cent of the total number of cattle of the country, nor do they as breeders supply in excess of 30 per cent of the total kill for Panama, Colon and the Canal Zone. They have an organization called the Ganaderia Nacional, by which they regulate the daily kill and the movement of cattle to the Panama City market from the interior.

Another function undertaken by group 3 is that of supplying credit to the producers throughout the interior. This is a situation into which both parties practically have been forced through lack of other sources of credit. The only persons who can lend with safety to the small and scattered producers are the persons accustomed to buy their cattle and who thus know them personally and have information about their resources and personal relationships. The situation is similar to that in other countries where small producers of farm products obtain credit from merchants throughout the crop season and turn over the crops, when gathered, in liquidation. Experience in the United States has shown that nobody but the local merchant, who knows the borrowers personally, and who obtains a profit on the

goods sold in addition to interest on the money loaned, will take the risks of this class of credit.

It follows inevitably, elsewhere as well as here, that the small group which provides credit for the growers and handles the marketing of practically the entire product, is called a "trust" and accused of fixing prices to suit itself. It is not denied that cooperation exists through the Canaderia Nacional in regulating the supply on the Panama market, but it is affirmed that in other respects the members compete actively, and that they operate independently in financing the producers.

Through the volume of cattle shipments which they control this group has been able to maintain the leading shipping service between Panama City and the harbors along the western coast. This may be said to be an additional source of profit, but the Compania de Navegacion Nacional, which they have controlled, is now being liquidated and apparently has not had a very profitable history. Schooners carry on active competition for the carrying business.

Concluding, we may say that the backbone of the cattle industry is represented by the rural natives. The element under No. 3 provides for the large scale slaughtering and marketing, and can handle for export if necessary.

The cattle districts which are tapped for the supply of the markets, are practically all of the country except Darien and the Atlantic coast, and reach from the town of Chepo, east of Panama City, westward into the Province of Chiriqui, bordering on Costa Rica.

The harbors serving cattle transport are practically all those on the Pacific side, west of the Canal.

They serve the district described, up to the Continental Divide.
and Darien
The Atlantic side territory/supply practically no cattle for the markets

being wooded country, except for the banana developments.

Cattle Markets. (C)

The market outlets for the cattle industry are (1) the two cities of Panama and Colon, and (2) the Canal Zone commissaries, which supply the Canal Zone population and the ships passing through the Canal.

The Canal Zone owns its own pastures and a herd of about 16,000 head of cattle. It imports dressed beef from the Argentine, New Zealand and Australia and live cattle from Panama and sometimes from Colombia. The latest figures, covering the last two years, show the Zone purchases divided in proportions as follows:

Panama Cattle - - - - -	-76 per cent
Argentine dressed beef - - - -	4.5 "
New Zealand dressed beef - - -	19.5 "
Total - - -	100.

The Zone kill averages annually about 10,000 head.

The imports from Argentine are generally of superior quality but the Panamanian cattle are improving, as the result of efforts of leaders in the industry. New Zealand is a low bidder, and occasionally is called upon to make up a shortage, delivery being quicker than from Argentine.

Market Facilities (C)

Practically the only market for the producers is that of Panama City. The cattle from the producing region heretofore described are transported there and thence ^{the} domestic consumption of Panama and Colon and the export to the Canal Zone is supplied.

At present the municipality of Panama has a slaughter house, also the city of Colon. Commenting particularly upon the one in Panama it is as primitive as any old-fashioned killing house, with no cold storage facilities or provision for the utilization of by-products. The waste of the latter amounts at a conservative estimate to several dollars per

head of cattle. The axiom long established elsewhere, that the profits of the slaughtering industry are in the by-products, is disregarded here.

The most surprising neglect in this climate is the complete absence of refrigeration, which among other serious disadvantages has the effect of restricting killing operations to a few hours per day, thus adding to the costs.

There is no provision in the Republic for cold storage on a large scale. As a result no extensive slaughtering at the end of the wet season can be effect^{ed} and cattle reserved for slaughter throughout the dry season must be left in the pastures on the hoof, subject to the consequent loss of weight.

It appears highly important that a modern slaughter-house with a cold storage plant shall be constructed. Such modern equipment would afford numerous and important economies, with the^{result that} higher prices could be paid for cattle on the hoof and the returns of the cattle industry at large would be increased.

The Canal Zone Government owns and operates a modern slaughtering and cold storage plant at Colon, hence buys Panama cattle on the hoof, but frequently gives the preference to purchases of dressed beef. Panama dealers cannot sell dressed beef to the Zone authorities, for one reason, because beef dressed and handled in the Panama slaughter house is unacceptable on sanitary grounds, and for another reason, because they are at a disadvantage in respect to costs in their competition with Argentina, Australia and New Zealand. During our stay in Panama we have been told of the loss of an important contract to New Zealand which might have been saved if the services of a modern abattoir had been available here.

The beef industry also suffers injury by reason of the inadequate facilities possessed by the retail distributors. The public markets are

not provided with cold storage. Therefore, the daily hours for selling beef are restricted to the morning period up to one o'clock p.m. Such a restriction as to the time of selling must have also a restrictive influence on the quantity sold, for the public cannot completely accommodate itself to such regulations.

The establishment of modern retail markets, either through improvements of the existing public markets or the founding of new ones upon private initiative would tend to enlarge domestic consumption of beef and in this way to improve the position of the cattle industry.

Price Movement of Beef. (C)

It is well known that prices of beef of good quality have advanced notably in United States markets in the last two years, also in European markets and elsewhere. Apparently they have not advanced as much in Panama. The largest single customer of the cattle industry here is the buyer for the Canal Zone and as appears above the larger part of the Zone consumption is supplied by Panama. The proportion supplied by Panama has steadily increased, as the beef has been brought up gradually nearer to the ^{of quality} standard/set by the authorities. Canal Zone/ Nevertheless, much room for further improvement exists. It would be very helpful if the Government would take steps to aid in stocking the herds with high class bulls, at the same time getting rid of those of low grade.

A close comparison between prices realized for cattle on the hoof in the Panama market and in world markets cannot be made, because a close comparison of grades is impossible, but prices paid by the Zone and also in the Panama market seem low in comparison. In 1922 the price on the hoof was 5 cents per lb., dropped to 4.5 in 1926 and has advanced since to 5.3 3/4. less than a or ~~3/4 of a~~ cent from the low point. This is less than the rise on any grade in other markets. The rise which has been obtained has been due to

larger sales to the Zone and some exports to the west coast of Colombia. It is only fair to Panama producers that consumers shall be informed of the fact that prices have been advancing all over the world, and that a corresponding advance is due in the Panamamarket.

It is in the interest of the country that the industry shall have fair prices, judged by the world level. In the present state of the cattle industry abroad there is a good prospect for its development in Panama to larger proportions than it ever has known in the past.

As this is written (June, 1929) we take the following from a report of the Kansas City beef cattle market:

A considerable number of steers sold at \$14 to \$14.50, with next best kind at \$13 to \$14 and very ordinary at \$12 to \$13. Some 1,350 lb. steers sold at \$13.90, and some 1,445 lb. at \$13.75.

Top for odd lots of cows was \$12, the greater part of the supply selling from \$10 to \$11 and commoner kinds \$9 to \$10, with canners and cutters going at \$6 to \$8.

Top for fed heifers was \$14.15, a half dozen or more bunches selling at \$14. Large numbers sold at \$12 to \$13 and up to \$13.75. Very few brought less than \$11.

Abattoir Needed. (C)

A modern abattoir in Panama City with ample cold storage facilities is an imperative need of the cattle industry. How it shall be provided and operated is not for us to determine, but the management of such an establishment requires both high technical skill and a high order of business ability. Such an establishment will necessarily represent a large investment of capital and unless handled by persons who understand the business heavy losses may occur. In our opinion the best results will be obtained under private ownership and management, but if it is thought advisable that the public shall be represented in the control this may be accomplished by having some person of known integrity and business experience represent the Government upon the Board of Directors as an observer of operations.

Certainly a way should be found by which cooperation may be had between the group now called the "trust", the independent cattle interests and the Government, in the provision of facilities which are necessary both to the industry and to the public.

It would be desirable to have the cattle industry interested so far as possible by ownership of the stock, distributed among all classes of producers. Furthermore, the facilities of the enterprise should be at the service of anybody, producer or trader, who will bring cattle for slaughter, subject to a reasonable charge for the service, the customer being free to dispose of the carcasses as he may please. This would go far to prevent an arbitrary exercise of power on the part of the operating corporation over the price of cattle or beef.

Finally, the Panama market should be absolutely open and free for any person to buy or sell cattle on hoof or beef in the carcass and to export either to the Zone or to any foreign market. The market is not likely to go far wrong, or to stay wrong, if this freedom of trade is maintained.

The fundamental thing is that modern facilities for the slaughter of cattle and the storage of beef should be provided. The country is suffering a continual and serious wastage of values at present. It is to be considered that the persons who supply the capital for such an enterprise will have a constant incentive to build up the cattle industry and increase its production, for the profits upon abattoir operations will depend in large measure upon having a full volume of business. They will find it to their interest to offer inducements to growers to increase the supply of cattle in the country and at the same time to make beef a popular article of diet.

The Slaughter Taxes. (C)

The taxes levied upon the industry by the national and municipal governments undoubtedly are high as compared with taxation of the cattle industry in other countries and in comparison with the taxation of other kinds of property in Panama.

The National tax levied upon cattle slaughtering is B 4.00 per head upon steers and B 4.50 upon cows, the higher rate for cows being intended to encourage their retention for breeding purposes. The aggregate revenue collected from this tax in the fiscal year ended June 30, 1928 was B231,249.46, which ^{may be} compared with B 353,197.16, the total tax on all real estate in the country.

In addition to the above,
the municipality collects a tax for its own treasury of B 2.50 per head on cattle slaughtered, there is a corral tax of 10 cents per head and a scale tax of 50 cents per head, besides which transportation across the city to the abattoir costs about 45 cents per head. Thus the sum of ^{public} market-
ing charges after a steer arrives in Panama is B 7.55, and of course this must be paid ultimately by either producers or consumers or shared between them. When to this is added a wastage of several dollars per head through failure to realize upon the possible by-products of a carcass, it is evident that the industry is seriously handicapped.

We are aware that the National Treasury is not in position to relinquish any revenues at present, but we cannot forbear saying that as a productive industry cattle-raising is very heavily burdened and should be treated with favor as soon as relief can be afforded.

The Credit Situation (C)

In our description of the structure of the cattle industry the point was brought out that the third group of the three named, commonly known as the "Trust," controls more than it owns because of its side activity of supply-

ing credit to cattle producers. This service takes the form in some cases of providing credit by endorsing notes of cattle-owners to local banks, thus avoiding ~~thereby~~ an increase of direct loans.

It is evident that this is a primitive credit system, better than none, but it should be improved as soon as possible. One legislative act may be named probably as helpful in giving the cattle industry a sound credit basis. A general law is needed providing for the pledge of cattle for the payment of debt by the execution of what is known in the English-speaking countries as a "chattel mortgage." As all lawyers and persons familiar with business in such countries know, it is an instrument similar in form and effect to a real estate mortgage, giving security on the chattel wherever it may be, and if accompanied by a brand will serve as the basis of credit on cattle. A law already exists permitting the pledge of cattle to the Banca Nacional as security for loans, but apparently it has been used little, if at all. There is no reason why the opportunity to use such security should not be afforded to other banks and private lenders. It would not make credit immediately available for every owner of cattle, for credit depends upon various factors, including moral responsibility, but it would open the way to the use of credit in the cattle business. With adequate knowledge of all conditions the banks would lend money to good borrowers on chattel security.

In the midwestern states of the United States cattle loan companies have been organized, operating in the principal cattle markets, whose business it is to lend money on chattel mortgages to farmers and cattle-feeders who wish to finance purchases of cattle. These companies in turn pledge the promissory notes and mortgages which they receive to banks, with the additional security of their own endorsement. Their profit is in the difference between the rate of interest which they pay and the rate which they receive, less the costs of doing the business. Cattle-loan companies in Panama

organized by well known and responsible people could make loans to cattle-owners whom they know to be worthy, and borrow for the purpose at the commercial banks of Panama City, thus making a profit themselves and rendering a credit service. Gradually the cattle industry can develop an organization and a body of available credit. This would give a degree of independence to the cattle raisers which they have not had in the past.

As already stated the backbone of the cattle industry is the rural natives. They are a numerous class in the population of the country, living upon meagre returns from their industry. If the returns of the industry can be increased the living conditions of these people and their families will be improved, and it is conceivable that by the time the children of today come to middle life their own children may live in very different surroundings. The problem is to raise the efficiency of the industry.

In a number of countries much has been accomplished for small farmers and stockholders by means of cooperative associations in which they talk over their common problems and act together in various ways. For the present, probably, the rural population of Panama is not sufficiently experienced in business affairs for such associations to be practicable, but that may be a development in the future. Every movement of such kind must be a spontaneous one, arising from an appreciation of common interest and an impulse to work together.

In cooperation with the larger cattle interests of the country the Department of Agriculture might well disseminate information as ^{to} world conditions in the cattle industry, the improved outlook at the present time, together with instructions for the improvement of breeding, feeding and marketing. Such efforts could be started on an inexpensive scale, and if effective they would be of benefit to all connected with the industry.

In conclusion, we would sum up by saying that the cattle industry

in Panama, is a natural one/ well suited to the present development of a large part of the country, and not an impediment to the development of agriculture or fruit culture as population increases. It is experiencing prosperity in other countries, and expansion is possible here, and it is strictly a Panamanian industry, with ownership widely distributed. For all these reasons it is deserving of sympathetic consideration. It especially needs better slaughter facilities as soon as possible, and an improvement of credit facilities as fast as the cattle-growers are prepared to make use of them.

GENERAL AGRICULTURAL DEVELOPMENT. (B)

Panama has little development of Agriculture as known in the temperate zones, although at different altitudes nearly all of the vegetables and cereals will grow. There are practically no field crops under cultivation; indeed, it is seldom that ground is plowed or that any implement or tool except the machete is used, either to stir the soil or remove the competing vegetation. When the ground is overrun with native grass or weeds the usual custom is to abandon it for new clearings. This apparent indifference to production may be attributed to two reasons: (1) Tropical plants and fruits which grow without cultivation supply foodstuffs so plentifully that the necessity to cultivate plants as in the temperate zones has not existed, and the natives are uninformed in what elsewhere is called agriculture; (2) without roads there has been no way of getting products any distance to a market. Finally, it is to be considered that the dry season of about four months practically without rainfall, and the wet season of about eight months with rain every day, obviously call for a different class of plants from that of the temperate zones.

Nevertheless, several of the leading agricultural products of the

temperate latitudes are grown in Panama to an extent sufficient to show that they can be produced to meet any increase of domestic needs. Corn, beans, and rice are among these common articles of food. The use of corn for the manufacture of whiskey is not unknown, and there are small distilleries for this purpose. It is not used to fatten cattle, as grass is considered cheaper than any other feed, and all that is required. Rice is a native product of the Tropics and ^{has been grown for a long time} on the lowlands of Panama. It always has been one of the staple articles of food, but apparently its production has declined in recent years, and ^{it} is now imported in considerable quantities. One explanation is that prices have been low and labor has been attracted to other employments. Rice is produced at very low labor cost in Asia, also in California by the use of machinery. Panama does not have the machinery, nor does it have cheap labor, measured by the Asiatic standard. It does, however, have good rice-growing lands. Nearly all of the provinces have more or less land suitable for rice cultivation. It is possible that the California method of production might be successfully introduced in the lowlands. Anyway, rice culture is one of the alternative employments for capital and labor, dependent upon the returns which may be had in comparison with other possibilities. The fact that less rice is grown than formerly undoubtedly is due to the fact that better-paying demands for labor have been developing -- such as banana production, road-building, etc.

It is known that the cotton plant originated in the Tropics, the variety cultivated as an annual in the sub-tropics being a development. A cotton shrub grows wild in Panama, and it is said that the fibre has been used for coarse clothing, but the cotton cloth of commerce is too cheap for even the Indians to utilize this material.

Tobacco is another important agricultural product which is grown in both temperate and tropical zones. It is produced in several provinces of

Panama in a small way, and the quality is said to be such as to give assurance that with proper cultivation and curing it would be a marketable product. There is no production for a market -- not even the domestic market, which is supplied by importations.

Suitable soil for tobacco and cotton growing undoubtedly exists in Panama, and eventually these products may be cultivated. However, there will be need for informed selection of the best adapted varieties of the plants and soils. Both are highly specialized crops, particularly tobacco, and require much labor per acre and skilled in production. The labor conditions, both as to quality and quantity, are unfavorable to early development of these products.

We discuss the cattle industry at length elsewhere. Pigs and poultry are produced for family consumption, and may be produced to satisfy all city and Zone requirements if farmers can be induced to do so. At the moment we are leaving strictly tropical products out of the account and giving attention only to the development of production to take the place of importations.

Chiriqui Province. (C)

Chiriqui is the most promising agricultural section of the country, because of its comparative freedom from jungle conditions, the variety of production to which it is suited, and the fact that it now has the best transportation facilities and the best start in settlement and production.

As to the general characteristics of Chiriqui Province, we can do no better than to quote the following paragraphs from an American writer of note who is familiar with the best farming regions of his own country. We would be glad to give more of his article if we could spare the space:

"There is nowhere in the world richer land than that of the Republic of Panama, and the Pacific section of the Province of Chiriqui surpasses all other parts in fertility of soil, salubrity of climate, scenic beauty, and conditions adapted to agricultural

pursuits. The section about David is an ideal farming country. From the coast the land gradually rises to the mountains, about 40 miles inland. Stretches of monte alternate with large tracts of gently rolling llano, reminding one of the famous "blue-grass" country in the neighborhood of Lexington, Ky., and covered with a thick mat of similar grass. Frequent streams and clumps of woodland lend diversity to the landscape, which has an ever-present background of mountain peaks whose heads penetrate the clouds. Finer land for cattle-raising it would be impossible to imagine. The llano furnish ample range of the best kind, and rich potreros, filled with heavier growth, are fenced in upon the bottom lands.

* * * * *

Throughout this section the top soil is six feet or more in depth and of marvelous fertility. This extreme richness accounts for the fact that cultivation is entirely neglected. The natives cut down the monte and burn it where it lies. The ground is then ready for planting. The surface is scratched with a machete and seed dropped in. The crop is then allowed to take care of itself. There is no plowing or rooting, no weeding or pruning, and despite this haphazard method the resultant crops are such as few parts of the earth can produce under intense cultivation. Sugar cane has been harvested continuously for fifteen years from the same field without replanting, and the yield weighs 18 pounds and sometimes more to the stalk. There are patches in Chiriqui where Kaffir corn has been grown continuously for twenty years without attention, and fine potatoes are gathered from ground sown fourteen years ago*.

Chiriqui is not a newly discovered country, but one that heretofore has been outside of the lines of travel. The region of the Pacific coast from Panama City to Costa Rica was explored and to some extent occupied by Spanish settlers before there were any settlements in Virginia or New England. Our attention has been directed to a list of the principal exports of Chiriqui in the year 1853, as officially reported by the British Consul located at Panama. It shows something as to the variety of products at that time, and we reproduce it herewith:

* Forbes Lindsay in Bulletin of the Pan American Union, 1912.

7,500	Swine at \$10.00 - - - - -	\$ 75,000
12,000	hundredweights rice at \$4.00 - -	48,000
12,000	" corn at \$2.50 - -	30,000
10,000	hens at \$5.00 a dozen - - - - -	4,166
4,500	heads of cattle at \$12.00 - - - -	54,000
300	hundredweights sarsaparilla at \$30.	9,000
300	beams of nispero at \$5.00 - - - - -	1,500
	Pearls of every size - - - - -	2,000
200,000	Mother-of-pearl shells at \$3. per thousand-`	600
500	planks of cedron at \$10. - - - - -	5,000
	Brown sugar - - - - -	1,000
700	hundredweights tobacco at \$16 - - -	1,120
30,000	pips of cedron at \$1. per 100 - - -	300
500	turkeys at \$2. - - - - -	1,000
1	hundredweight of vanilla - - - - -	500
800	gallons cocoanut oil - - - - -	100
Total - - - - -		\$ 233,286

All of these commodities are still produced in Chiriqui, but cattle have become more important, rice and swine probably less so, although it is difficult to see why this should be the case, particularly as to swine.

Coffee is not mentioned in the list, nor are bananas or cacao, now the most important products after cattle. The production of sugar has increased. These products are discussed in further detail among tropical products.

The uplands of Chiriqui are well suited to settlement by colonists from the temperate zone, the climate being agreeable and healthful and the conditions favorable to the growth of all the fruits, vegetables and other plants familiar to them in ^{the} countries from whence they have come.

This region has received an important number of settlers from the United States, Germany and other foreign countries, who are principally interested in coffee-growing. An atmosphere of optimism pervades the region.

Opportunities of the Panama Market. (C)

Probably there are few of the natural products of the temperate zone which Panama could advantageously produce for export, but the cities of Panama and Colon and the communities of the Zone and the demands of passing ships

create a market for fresh foodstuffs of immediate and growing importance.

A glance at the following ~~selected~~ groups of articles imported into the Republic of Panama during the last six months of 1927 (*) will readily suggest something of the extent of the market within the Republic which might be met at least in part by home production:

	<u>Value in Balboas.</u>
Prepared meats - - - - -	131,761
Edible fats, including butter - - -	209,648
Vegetable oils - - - - -	80,314
Milk - - - - -	167,504
Cheese - - - - -	35,492
Fish and fish products - - - - -	73,516
Eggs - - - - -	106,456
Potatoes - - - - -	65,862
Other fresh vegetables - - - - -	37,370
Dried beans - - - - -	34,849
Other dried vegetables - - - - -	16,817
Fruits, fresh and dried - - - - -	58,013
Rice - - - - -	281,926
Other food products (omitting several groups) - -	141,400
Forage (alfalfa, hay, etc) - - - -	31,416
Tobacco, leaf and manufactured - - -	105,983
Lumber and cabinet woods - - - -	94,433

The largest item in the above list is rice. Beans are in the same category. Evidently most of the items listed could be economically produced in Panama.

The list does not include importations directly into the Canal Zone and not passing through Panama territory. Some idea of the Zone market may be had from the following list of groups of purchases made by the Canal Zone commissaries during the three fiscal years ended June 30, 1928. (**)

(*) Extracted from Direccion General de Estadistica, Boletin No. 65.

(**) Report of Governor of the Panama Canal ^{Zone}, 1928, page 40.

	1926	1927	1928
Groceries - -	\$1,428,138.67	\$1,672,887.79	\$2,043,878.68
Cold Storage -	1,498,313.07	1,470,016.76	2,261,445.55
Tobacco - - -	382,528.94	398,654.36	616,687.05
Cattle and hogs -	550,711.25	445,852.08	394,417.07
Milk and Cream -	101,499.55	158,293.55	125,643.57
Eggs - - - -	237,233.74	230,689.73	235,389.43
Butter - - - -	237,872.22	326,082.08	261,035.06
Raw material - -	283,142.81	325,821.11	646,415.98
Dressed beef - -	-----	224,234.83	152,049.94
Total, including items not listed above - - - -	6,567,946.18	7,356,407.48	9,334,407.43

Obviously a large portion of these supplies would not be produced in Panama, but it will be seen that milk, cream, eggs, butter and dressed beef totalled \$847,117, and every dollar's worth of these might have been produced in the country. Of the cattle, a part of the purchases came from Panama, but of the hogs practically none, although a portion of the cattle, hogs and milk came from the farming operations of the Canal authorities.

Of the above 1928 purchases, x seventy-three per cent came from the United States, thirteen per cent from Europe and the Orient, five per cent from Central and South America, three per cent from the Canal Zone "cattle industry," one per cent from "Panama Canal," and five per cent from "local."

This "local" is constantly increasing with the growth of traffic through the Canal. The increasing traffic calls for a larger Canal personnel, and the increasing number of ships must be supplied with food products.

Now that improving communication is making the potentially productive areas of the country accessible, there should be no serious difficulty in stimulating agricultural production to supply the demand for perishable food products, both in the Republic and in the Canal Zone. The requisites are, first, the production of / these foods

on a sufficiently large and constant scale and ^{with} uniform quality to make the supply dependable; for some articles this may make necessary the improvement of the quality, in some instances by the introduction and propagation of new and better sorts; and second an intelligent propaganda directed to the local population and the owners and suppliers of ships, and aimed to demonstrate the merits, relative cheapness and uses of the tropical foods, more particularly the fruits, and of all the fresh food supplies that are available.

Citrus fruits, mangoes, avocados, papayas, pineapples, berries, and vegetables should have an increasing demand. Such less perishable products as rice, beans, corn and sugar certainly can be economically increased to fully meet the needs of the domestic demand. Beyond this point it is doubtful if their production should be extended.

The Dairy Industry (C)

The dairy industry is a branch of Agriculture which has had encouraging development in the neighborhood of the cities in the last few years, for the purpose of providing a healthful supply of milk for those communities. This is to be credited in large part we believe to the Health Office (Oficina de Sanidad) in the city of Panama, an office which represents an effective form of cooperation between the Canal Zone efforts for sanitation and those of the Panamanian authorities.

The progress is shown by the following figures: In 1919, number of milk cows in dairies supply Panama City 985; as of December 31, 1928, number 2,276; in 1919 number of dairies following modern methods in feeding and milking 2; today 27.

In 1919 there was no pasteurization of milk, while today all milk is pasteurized and sold in sanitary bottles.

At present 24 out of the 27 dairies are united in a central association,