

it mainly to undue optimism as to prospective revenues and lack of information as to the ratio of current expenditures to current revenues; also to failure of the National Assembly to perform its constitutional function of fixing a proper limit upon expenditures.

In the biennial fiscal period beginning July 1, 1921 and ending June 30, 1923, the aggregate revenues were B10,458,758.45; in the corresponding period 1923-1925, they were B12,204,552.37; in the corresponding period 1925-1927, they were B14,114,993.64, and in the eighteen months July 1, 1927 to December 31, 1928 (three-fourths of the current period) they were B11,937,159.74, or at the rate of nearly B16,000,000.00 for the full fiscal period. With revenues increasing at this rate, it was of course entirely possible to have conducted the Government without creating a deficit, but apparently the idea was prevalent that the budget estimates, made up at the beginning of the fiscal periods on the basis of past revenues, did not represent the amount of funds actually available, and need not be taken as restricting expenditures. Once this view becomes general, expenditures will run loose.

The Constitution and Fiscal Code of Panama years ago established a procedure for the preparation and enactment of a Budget, before the beginning of each fiscal period, which should govern the expenditures of all branches of the Government during the ensuing period. The original draft of the Budget was to be prepared by the Secretary of Hacienda y Tesoro upon the

basis of revenue receipts during the preceding fiscal period and an estimate of prospective expenditures based upon advices received from the several Secretaries of State Departments. The draft so prepared was to be reviewed by the Cabinet-Council and as adopted by the Council submitted by the Executive Power to the National Assembly within the first ten days of its regular biennial session. So urgent was the consideration of the Budget conceived to be that under the Fiscal Code the members of the Assembly were authorized to draw only one-half their salaries until the Budget was disposed of.

The Constitution, with a view to unforeseen and extraordinary needs, provides that at a time when the Assembly is not in session if it shall be necessary to make an expenditure which is held to be indispensable, and for which no item of appropriation has been provided, or if provided is insufficient, a supplemental or extraordinary credit may be granted by the Cabinet Council upon its collective responsibility. The Fiscal Code clearly sets forth that these credits are to be considered only for exceptional needs. It is prohibited to open such administrative credits for ordinary purposes.

If the letter of spirit of the Constitution and Fiscal Code had been observed the existing deficit could not have occurred. Supplemental credits, instead of being resorted to for unusual and extraordinary purposes only, have become a regular feature of the financial administration. This is evident from the following table, showing the Budget appropriations and actual expenditures of each of the five Departments in the last three fiscal periods, including only eighteen months of the period of 1927-1929:

SUMMARY STATEMENT SHOWING COMPARISON OF BUDGET APPROPRIATIONS  
WITH AMOUNTS EXPENDED IN THE FIVE MAJOR DEPARTMENTS.

DEPARTMENT	Budget 1923 - 1925	(2)EXPENDED	BUDGET 1925 - 1927	(2)EXPENDED	BUDGET 1927 - 1929	(2)EXPENDED
Government and Justice	\$3,190,000.00	B3,485,982.30	B3,581,734.00	B4,478,582.74	B3,949,932.00	B3,959,232.15
Foreign Relations	415,870.00	534,968.74	709,190.00	935,851.62	612,046.81	641,083.11
Treasury Dept.(1)	1,290,155.35	1,394,093.46	1,159,068.67	1,534,285.36	1,603,034.08	1,494,503.20
Public Instruction	2,233,462.60	2,568,062.53	2,840,950.00	3,614,863.83	3,050,500.00	3,081,581.55
Agriculture and Public Works	2,089,489.67	2,487,881.74	2,377,927.15	3,024,318.52	2,541,441.08	2,343,712.75
Totals - - - -	B9,218,977.62	B10,470,988.77	B10,668,869.82	B13,587,902.07	B11,756,953.97	B11,520,112.76(3)

(1) Does not include public debt service.

(2) The figures in these columns were furnished from the books of the fiscal agent showing the accounts of the individual partidas. They include obligations incurred in the biennium but not actually paid until subsequent fiscal periods.

(3) Twenty months from July 1, 1927 to February 28, 1929.

It will be seen that every Department exceeded its Budget appropriations in each of these periods, excepting the last, as to which, however, the Budget figures are for twenty-four months and the expenditure figures for only twenty months, the time which had elapsed when this examination was made. The total expenditures for twenty months are but slightly less than the appropriations for the full period.

Notwithstanding the large excess of expenditures over the budget appropriations in 1923-25, the growth of revenues was such that no actual deficiency of funds occurred in that period, but since then a deficit has been accruing, ~~not only~~ ~~as regards available funds~~ although revenues have continued to largely exceed the budget estimates.

The Constitution requires that the supplementary credits granted by the Cabinet Council shall be subsequently ratified by the Assembly, and so far as we know this has been done, but surely the granting of supplementary credits upon this scale, and particularly where they result in Treasury deficits is not contemplated by the Constitution or Fiscal Code of Panama.

The Constitution provides that when for any reason the Budget Act shall not be passed by the Assembly, the preceding Budget Act shall automatically continue in force. It has become a common practice to rely upon this provision. For four of the biennial fiscal periods of the last ten years the Assembly has failed to pass the Budget. We cannot regard this as a proper discharge of the responsibility which the Constitution places upon the Assembly in connection with the making of the Budget and the supervision of the National expenditures.

The failure of the Assembly to act upon the Budget may be partly due to the change of the fiscal period, from a beginning on January 1, to the present beginning on July 1. We have not been able to learn why this was done, and know of no good reason for it. The regular sessions of the

Assembly are held every two years, beginning on the first day of September of the even-numbered year. Formerly the fiscal period began on the first day of the January following, which afforded the Assembly no more than reasonable time for action upon the Budget. Now the fiscal period begins nearly ten months after the sitting of the Assembly and the data upon which the Budget is based is not as recent as it should be. The effect may be to encourage the members of the Assembly to throw the responsibility of budget-making to a greater extent upon the Executive branch of the Government. This is evidently contrary to the intent of the Constitution, and while it is proper that the Executive branch should divide the responsibility, sound public policy requires that the Assembly should perform the part assigned to it by the Constitution. We think the beginning of the Fiscal Period should be changed back from July 1 to January 1.

Failure on the part of any branch or Department of the Government to comply fully with the requirements of law tends to induce laxity elsewhere in the public administration, until gradually, if no notice is taken of it, indifference and neglect may become general. In time, precedent comes to have the force of law. This is the only way we can account for the manner in which the financial affairs of Panama have fallen into the state of confusion which exists.

In order to safeguard the Treasury against expenditures in excess of the Budget appropriations the latter should be apportioned at the beginning of the fiscal period in monthly installments, to suit, as nearly as may be calculated, the course of expenditures, and completely covering the period. No orders for supplies should be given or contracts entered upon without the 'vise' of the central accounting office, confirming legality and correspondence to the Budget program. Having given its 'vise', the central accounting office should forthwith record every such order or contract as an

encumbrance upon the appropriation against which it will be ultimately charged. This system will hold expenditures within the appropriations as agreed upon by the Cabinet Council and National Assembly.

Existing regulations provide for the apportionment of appropriations throughout the fiscal period and for the visé of orders and contracts by the Fiscal Agent, but the regulations have not been observed.

Provision for supplementary credits to cover really extraordinary needs may be, and should be, made, but in all cases they should be within the amount of available funds. The Fiscal Code provides that before any appropriations are made, 5 per cent of the estimated revenues shall be set aside to cover such supplementary or extraordinary credits. This is prudent procedure, and if followed, it is scarcely possible that a deficit ever will occur. In the event of such an emergency, money should be borrowed temporarily, in a duly authorized manner, to cover it, rather than have the Treasury fail to meet obligations promptly.

The number of employees on all payrolls of the National Government increased from 3586 in 1923 to 4031 in 1925, 5149 in 1927 and 5209 in 1929. It will be seen that the increase in the last biennial period has been comparatively small, and that the largest increase has been in the Department of Public Instruction, which is due to the expansion of the school system. The increase in the aggregate sums carried by the payrolls has been due in part to the increase in the number of employees and in part to pay increases. In view of the extension of Government services an increase of the personnel may be assumed to be unavoidable, but there are reasons for thinking that on the whole more persons are on the payrolls than are needed. This seems to be generally conceded, but we have met with the opinion that serious hardships would be inflicted by a reduction of the number to actual requirements. Possibly cases of individual hardships might occur, but on the whole it cannot be doubted that even the wage-earning element in the country will be benefited by a business-like administration of public affairs. In the first place it is manifestly impossible for the Government to continue upon a scale of expenditures in excess of its resources, and, in the second place, every dollar which it expends in an unproductive manner reduces its ability to spend a dollar in some way that will produce benefits to the country as well as wages or salaries to employees. A large amount of labor is now being employed in road-building by the use of borrowed money. It would be better to employ labor for road-building or other development work than on needless office work, and furthermore the nation must preserve its credit by keeping its finances in sound condition.

The Government of Panama is not the only Government that might be named as having more employees on its payrolls than are actually needed. This is true of most Governments, but in the case of Panama there are so many needs for money for worthy purposes that there is special reason for careful supervision of expenditures. We think there is no escape from the conclusion that

a searching examination of payrolls and all other channels of expenditure should be made with the purpose, first, of bringing expenses well within revenues and, second, of paying off the existing floating debt, thereby placing the finances on a sound basis.

We do not feel justified under present conditions in recommending any increase of taxation for the purpose of balancing the Budget and clearing up the floating debt, and would be still less inclined to approve of loans for so doing. We think all of this can be and should be accomplished by cutting down expenses. When the country's finances are again in order it may be advisable to consider new taxes or loans for purposes related to the development of the country or otherwise promising substantial benefits. The borrowing and tax-paying/<sup>resources</sup> should be reserved for such purposes and for safeguarding the present public debt.

There is good reason, however, for believing that revenue collections under the present tax laws may be substantially increased by improvements in administrative methods, while at the same time the costs of administration are reduced. In the Fiscal Section of this Report a review is given in considerable detail of the several departmental offices and services, with comments and recommendations that are prompted by experience with governmental methods elsewhere, and which it is hoped may be helpful. More knowledge of the staff, of the amount of work passing over each desk, and of the difference between working conditions in Panama and elsewhere would be required to warrant us in making specific recommendations as to the force required in each office, and we think that more definite conclusions should be left to the responsible officials of the Executive Departments.

In view of the large increase in the personnel and general expenses of the Government since 1928, and taking account of the important increase of revenues since then, together with the results of our investigation, we are convinced that it is possible to bring the ordinary running expenditures of the Government down below the level of current revenues without impairing or curtailing the public



service in any respect. Nevertheless, we do not hesitate to say that if curtailment somewhere shall be found to be necessary in order to accomplish that end, it should be promptly effected. There should be no temporising with a deficit, in the vague hope that revenues may increase to cover it. It is probable that just such delusive expectations are responsible for the present situation.

We do not wish to assume to say just how a necessary reduction in government services should be distributed among the various services. It is natural, and in itself laudable, that the head of each service shall want to extend and improve it as rapidly as possible, and it may easily happen that unless effective restraint is exercised somewhere, the aggregate effect of their efforts may be an excess of expenditures. Time is a necessary factor in the development of a country from the stage of Panama in 1903 to that of 1929 and that which is yet desired, and there is such a thing as trying to increase governmental service too fast for the available financial resources.

The important thing is to first eliminate unnecessary expenses from the Budget. It would be a deplorable mistake to curtail necessary expenditures for schools or the public health, or the public safety or the administration of justice or the proper performances of any of the primary governmental functions, while unnecessary expenditures were continuing.

Although we are impressed that the present laws and regulations governing the making of the Budget and the maintenance of an accounting system would give satisfactory results if fully observed, the manner in which they have been disregarded leads us to think that they should be strengthened in some respects, even to the extent of certain changes in the Constitution, if necessary. The Constitution provides that the Assembly shall "make appropriations for the expenses of the administration, on the basis of the estimates presented by the Executive Power, conforming or not to said estimates." We interpret this to mean that the Assembly shall exercise its judgment upon the particular items of the Budget as submitted by the President, but we do not believe that it was intended to give the Assembly an absolutely free hand in making appropriations, without regard to the estimates of available funds. However.

if there is room for a difference of opinion on this point we think the Constitution should contain a definite inhibition upon appropriations in excess of estimated revenues, such estimate to be based upon the actual revenues of the preceding period. We also suggest that while the Assembly should have the power now given to lower appropriations as proposed by the President it should not have the power to increase them. These two provisions would require the two branches of the Government to come to agreement upon appropriations, and at an aggregate sum within a reasonable anticipation of revenues.

We submit as Appendices of this Report, drafts of two proposed acts, one for an organic Budget Law and the other for a reorganization of the Accounting System and the establishment of an office the incumbent of which would be known as the Comptroller-General of the Republic. The intention of the first is to make more explicit the procedure in the preparation and establishment of the Budget, and of the latter is to make more explicit the requirements of the Accounting System and enlarge and define more clearly the authority of the official at the head of the System, now known as the Fiscal Agent.

We are aware that objection may be raised to an enlargement of the power of this official, but we believe the objection is based upon a misapprehension. It is not proposed to give him any authority for independent use. He must act with the approval of the President in matters which are within the authority of the President and strictly in conformity with the law in matters wherein procedure is explicitly determined by law. It should not be within the authority of anybody to make disbursements in excess of appropriations, or to create obligations of the Treasury without having the approval of the chief accounting officers as to --- conformity with the law. There should be an appeal to the courts upon a question of legality, and if the Comptroller General should be contumacious he should be subject to removal in due course, but subject to these conditions his authority as an executive should be complete. The President is the Chief Executive, but the President cannot be burdened with the mass of details which must be reviewed in keeping the Government's accounts in balance. There is no reason why an appeal should be allowed to him in matters of

routine regulated by law. In such cases responsibility should be definitely fixed in the Comptroller General.

Although the ends sought to be attained by the proposed acts may be accomplished through the authority of the Executive Power, acting in pursuance of law 30 to 1918, and this course may be advisable temporarily, we believe that it will be desirable to have the National Assembly in due time give its cooperation in thus establishing the permanent policy of the Nation..

We prefer not to separate the suggestions and recommendations of the Economic Section, which are largely of a general and conditional character, from the discussion which accompanies them, and therefore have not attempted to summarize them. The recommendations of the Fiscal Section are summarized at the close of that section.

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ECONOMIC SECTION

THE REPUBLIC OF PANAMA

ECONOMIC SECTION

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GEOGRAPHY, TOPOGRAPHY, NATURAL RESOURCES  
and ECONOMIC POSSIBILITIES

Geography and Topography.

The Republic of Panama has a unique geographical position, occupying the Isthmus connecting North and South America. It extends lengthwise nearly east and west with a coastline of 477 miles on the Caribbean Sea and a more irregular one of 767 miles on the Pacific Ocean. On the eastward it joins Colombia and on the westward Costa Rica. Its maximum width is about 120 miles, but it narrows down at two points to less than fifty miles and over the greater part of its length is less than 100 miles wide.

The country is hilly and mountainous in rather irregular formation, but a practically continuous range divides the country lengthwise, with, on the whole, the greater area on the Pacific side. Throughout most of its length the continental divide reaches an elevation of less than 1,000 feet, and there are a number of passes where roads would be practicable. However, little communication between the two sides occurs except by the Panama Railroad and the Panama Canal. The highest mountains, which reach about 11,000 feet, are near the boundary of Costa Rica. Numerous streams, some of them large rivers, particularly in the rainy season, have their sources in the mountains on each side and afford drainage for the greater part of the country, although there are lowlands near the coasts and along the rivers. The mountains are depressed to the lowest elevation where the Canal crosses, which is at approximately the narrowest section of the

Isthmus, as though Nature had done her best to make the conditions favorable for the great engineering feat. The lift of the Canal to the summit level is eighty-five feet and the railroad track at its highest point is 271 feet above the sea level.

#### The Climate.

The climate is that of the tropics, modified by altitude and the sea breezes which play over all parts of the country. Although the sun is hot, the temperature in the shade does not rise as high as it frequently does in the temperate zones and the nights invariably are comfortable, with cool breezes. Inasmuch as the extent to which altitude and proximity to the sea control temperatures in the tropical regions is not generally appreciated by persons who have not learned it from their own experience, we quote the following extract from the article upon Latin America in the Encyclopedia Americana. After referring to the temperatures which prevail in certain localities of South America, it says:

"The fact thus illustrated is, simply, that regions sufficiently elevated to receive quite directly the cool and saturated ocean breezes have, even in these latitudes near the Tropic of Capricorn, a climate not given to extremes but favorable to man and vegetation alike. \* \* \* The highest temperature (in the shade) observed at the equator near the Pacific or Atlantic coasts, either at sea or where the ocean influence controls -- 85° or scarcely more than 86° F. -- must be called quite moderate. In the corresponding regions north of the equator, near the Tropic of Cancer, we appreciate, or resent, most promptly the development of intolerable degrees of heat in regions that are enclosed and far from the sea. \* \* \* Panama, occupying the narrow space between two oceanic elbows, has, as shown by observations in a sheltered building near the center of the capital during the year, an equatorially limited range of temperatures -- from 76° to 86° F. But places shut in, even parts of the city of Panama itself, because they lie nearly at sea level, may have 100° F. thrust upon them when the air-currents from ocean to ocean are interrupted temporarily.

Here again in Panama (and this is not less true of the Central American states) we find that even a moderate

elevation mitigates the tropically oppressive conditions that are notorious in the lowlands. The importance of this consideration becomes apparent when we reflect that in much more than one-half of the entire land-area in the New World between the Tropics of Cancer and Capricorn nature assigns the control of temperatures to mere altitude or to the almost equally permanent influence of oceanic and aerial currents."

Herewith are given authentic figures for the temperature range, rainfall, etc. In notes prepared by Mr. James Zatek, of the United States Department of Agriculture, now in charge of the scientific laboratory on Barro-Colorado Island, Gatun Lake. The altitude here is only about 100 feet, but the distance between the oceans is only 48 miles.

**"Rainfall.** The automatic recording rain gauge indicates each time there is a rainfall of at least 0.01", and hence it is easy to know not only how much rain fell during the day, but also exactly when it rained and the amount every five minutes.

The following tables for the six months of July to December, 1928, show that during these 184 days there were only eight of them with a rainfall of 0.40" or more during the period from 6.00 a.m. to noon. From noon till 6.00 p.m. 37 days had a similar rainfall, or on an average of one day in five:-

<u>Rainfall July to December, 1928</u>								
<u>Rains 0.40" or more.</u>								
<u>Month.</u>	<u>No. of rainy days.</u>	<u>Total Rain-fall.</u>	<u>12 pm. to 6 am.</u>	<u>6 am. to 12 M.</u>	<u>12 M. to 6 pm.</u>	<u>6 pm. to 12 pm.</u>	<u>No. of days.</u>	<u>Amount Inches.</u>
July	18	9.61	2	1	4	1	8	8.07
August	27	16.67	4	1	5	3	13	16.67
September	26	8.11	1	1	10	1	13	8.11
October	28	11.93	0	0	10	0	10	9.27
November	29	18.71	2	2	7	1	12	16.28
December	<u>21</u>	<u>11.58</u>	<u>1</u>	<u>3</u>	<u>1</u>	<u>4</u>	<u>9</u>	<u>10.21</u>
Totals	149	76.61	10	8	37	10	65	63.65

Although we had 149 days out of the 184, with a rainfall totaling 76.61", there were only 65 days that had a rainfall of 0.40" or more, and these 65 days had a total of 63.65" of rain. This is 83 per cent of the total for the half year. This leaves but 12.96" for the other 84 days. It is evident that the daily rainfall during these 84 days is at most not enough to interfere with field work in the forest, excepting perhaps for short periods of five or ten minutes.

The following table gives the rainfall for the past three years, by months:

January	Monthly Rainfall		
	1926	1927	1928
January	1.06	3.03	1.75
February	2.93	1.44	.47
March	.52	1.27	2.23
April	.27	7.61	1.66
May	8.50	19 .02	9.39
June	17.58	14.55	9.42
July	15.02	13.46	9.61
August	12.15	12.41	16.67
September	12.07	10.73	8.11
October	13.90	9.74	11.93
November	22.00	16.34	18.71
December	12.22	6.76	11.58
Totals	118.22	116.36	101.53

The dry season usually starts the latter part of December and continues to April. It may start sooner or later, and may end likewise, and it may be short or long, but it is not wholly devoid of rain.

Temperature. The temperature charts that accompany this report are taken from the thermograph records, the instrument being located under the Frank M. Chapman house. This building is 18' x 24' and is elevated about 7' off the ground. There is free circulation of air beneath this house, and during the daytime well protected from the sun. The highest and lowest daily temperatures were as follows: July 86.5 and 72, August 87 and 72, September 85 and 72, October 84 and 71, November 83 and 71, December 83 and 71, all temperatures Fahrenheit. The charts give the maximum and minimum monthly means. The mean temperature was not calculated but will be found to be from one to three degrees lower than the average of the daily extremes.

The temperature starts to rise from about 8.00 a.m., reaching the peak from noon to about 2.00 p.m., after which it begins to drop. July was the warmest of these six months.

Relative Humidity. The hydrograph in the instrument shelter showed variations from 65% to 99%. The maximum high is practically uniform from about 4 p.m. to about 6.00 a.m., after which it begins to drop quite rapidly, registering lowest at or about noon. The evenings are cool and comfortable and the nights, notwithstanding the high humidity, are conducive to refreshing sleep."

Barro-Colorado Island is about fifteen miles from the Caribbean coast.

At Colon, on the coast, the rainfall averages about 140 inches per year, as a result of the moisture-laden trade winds off the sea coming in contact with the land, while at Panama City, at the Pacific end of the Canal, the rainfall is only about 60 inches.



### The Population.

An official census taken in 1921 gives the total population of the country by provinces, and also of the provincial capitals, as follows:

<u>Province</u>		<u>Capital City</u>	
Panama - - - - -	103,876	Panama - - - - -	59,458
Veraguas - - - - -	82,162	Santiago - - - - -	1,617
Chiriqui - - - - -	76,434	David - - - - -	5,598
Cocle - - - - -	42,219	Penonome - - - - -	2,075
Colon - - - - -	41,206	Colon - - - - -	31,203
Los Santos - - - - -	34,638	Las Tablas - - - - -	2,635
Herrera - - - - -	28,984	Chitre - - - - -	2,937
Bocas del Toro - - - - -	22,239	Bocas del Toro - - - - -	3,018
Darien - - - - -	10,728	La Palma - - - - -	810
Total - - - - -	442,486	Total - - - - -	109,351

The three leading cities, Panama City, Colon and David, give evidence of substantial growth since this census was taken, and it is probable that the population of the country now approximates 500,000.

According to the census of 1921 the social classification of the population was as follows:

Whites - - - - -	52,069
Negroes - - - - -	85,970
Indians - - - - -	33,425
Oriental - - - - -	3,061
Mestizos (Mixed bloods) - - - - -	267,961
	<hr/>
	442,486

Of the above figures, about 60,000 represent resident foreigners, largely West Indian negroes. The element of African blood was first introduced into the country in colonial times, when negro slavery was a prevailing regime in the western hemisphere, but was largely increased during the Canal-building periods by immigration from Jamaica, attracted by high wages on the Canal. Many remained after the completion of the Canal, finding employment in the cities and the Zone. The greater

portion of those employed in the Zone live in the adjacent Panama Cities.

The mass of the rural population is based upon the aboriginal stock, with the mixture which has resulted from the immigration of other races.

The native white population for the most part is descended from the old Spanish families who came into the country in colonial times. These families settled mainly in Panama City, when it was the principal city of the Spanish colonies of South and Central America, and at the ports of Porto Bello and Nombre de Dios on the Atlantic side, but a considerable number located in the open country west of Panama City on the Pacific side, a healthful region suited to cattle-raising, fruit-growing and to some extent general agriculture. Mining for gold also accounted for considerable activity in the Province of Veraguas in an early day. Several of the cities of this region, among them Santiago, Aguadulce, Chitre, and Nata were founded in the first quarter of the sixteenth century, not long after Balboa crossed the Isthmus, and have been important factors in the life of the country to this day. Including the province of Panama, five-sixths of the population of the Republic today is in this region, stretching along the Pacific slope to the Costa Rican boundary. East of the Canal and outside of the neighborhood of Panama City and Colon there is little but Indian population and this is true also of the Atlantic slope west of the Canal, excepting the cities of Bocas del Toro and Almirante, near the Costa Rican border, and the region thereabout, where the United Fruit Company has extensive plantations.

The negro population is generally preferred by employers for outdoor labor at or near the sea level, because it is inured to labor and the climate. In 1926 a law was passed prohibiting the immigration of Chinese, Japanese, Dravidians, Syrians, Turks, East Indians, Hindu-Arians and West Indian negroes, whose original language is not Spanish. The scarcity of

labor in the country caused an amendment to be made to this law in 1927, providing that West Indians might be admitted in case proof was offered that:

(a) there are not enough laborers in the Republic qualified to carry out the undertaking or work contemplated; (b) that such works are of public utility or of an agricultural character; and (c) that the pay offered the immigrants is not lower than the established rate of pay for the native or foreign resident laborer.

Still another provision has been added to the law, applying to all aliens and permitting the admission of a limited number in the discretion of the authorities. These provisions are intended to give some elasticity to the law, but not to alter the general policy, which is prompted by opposition to continuing race mixtures.

#### The Soils Of Panama

Notwithstanding the mountainous character of the country, there is comparatively little land which may be characterized as waste or of no value. Vegetation of some kind grows nearly everywhere and the greater part of the country is covered by a forest growth. As a result of these conditions the soil is generally rich in plant food, and capable of producing a strong growth of any kind of plant life that is adapted to the climatic conditions. Undoubtedly Panama is capable of providing sustenance for a population of millions. If it had a population per square mile proportionate to that of Cuba it would have 2,500,000 people; if proportionate to Porto Rico, 13,500,000; if proportionate to Japan, 12,500,000. It may be added that these three countries are mountainous, with important areas of untillable land, and that in the case of Japan only 17 per cent of the area is cultivated, <sup>even</sup> with the highly intensive methods of that country.

Mr. H. H. Bennett, chief expert upon soils of the Department of Commerce of the United States, was sent to Panama a few years ago to look

over the possibilities of rubber production. Although his examination was with special reference to rubber, he visited nearly all of the provinces, and his experience would enable him to readily take account of the chief characteristics of the country. He was quite willing to contribute to this survey a brief description of the soils, based upon his observation and we give it herewith:

Statement by Mr. Bennett.

On the basis of the limited studies that have been made of the soils of Panama, it appears that the principal upland types in the region east and north of the province of Chiriqui consist largely of clay soil. In spots this is stony and shallow, such conditions being encountered chiefly on the steeper slopes and sharp crests of the high elevations. Most of this clay is red in color and has a depth of three feet or more to bed rock or soft rotten rock. As a rule, there is not much change in color from the surface downward, except that of a slightly more brownish cast in the upper six to ten inches, due to the presence of a fairly good supply of humus. These soils are formed of products resulting from the decay of the underlying rocks, chiefly igneous rocks resembling the tough trap rock of the Palisades along the Hudson River. Such residual material, mixed with the decaying remains of plants and leaf debris, and containing inconceivable number of bacteria and other life forms, constitutes soil.

Although having a high content of clay, the clay lands, with the exception of the sabana types, are considerably less stiff than the general run of clay soils in the United States. This is due to the processes of weathering under a wet tropical climate, which bring about a condition of flocculation that gives a large amount of pore space, desirable friability, good drainage and resistance to erosion. But for the extreme hilly topography, these red clays would support a good type of agriculture. In plant food content, they correspond fairly closely to many of the good agricultural soils of the United States. A large variety of crops are successfully grown on these soils by the native Panamanians, who generally make small clearings and give but little attention to their fields.

Without soil and topographic surveys it is impossible to point out the principal areas of clay lands smooth enough for cultivation, but they are represented by a rather large body of clay land extending from the head waters of Rio Coccoli in the southeastern part of the Canal Zone across the boundary in the Province of Panama, into the Republic of Panama, through the villages of Arraijan and San Jose and westward. Such areas can be plowed without much danger of excessive washing, and unquestionably could be successfully used for corn, a large number of vegetables and fruits and possibly also for cacao.

The more hilly areas are all good tree and grass lands. Guinea grass gives excellent results on these soils, particularly where the rainfall is as high as that of the Pacific side of the Canal Zone. That such lands could be extensively used for cattle has been proved by results obtained in the pastures of the Panama Canal within the limits of the Canal Zone.

Scattered throughout these uplands are many small areas of unfavorable, shallow, droughty, stony land, as well as some medium-sized bodies of very stiff, heavy clay, unsuitable for crops other than grass. On the other hand, there are some fair-sized bodies of shale soil, such as that along the upper part of the Tuyra River in southeastern Panama. A considerable part of these shale lands contain enough lime to make them quite productive. The chief difficulty with them is that they are of an erosive nature and generally of hilly topography. The better areas could doubtless be used for sugar cane, cacao, and bananas. Occasional patches of exceptional good limestone soil are met with, as in the vicinity of Alhajuela on the Chagres River. Such soil will grow almost anything adapted to the climate.

~~It is not known to what extent land of this kind occurs.~~

The sabana soils, such as those seen in the vicinity of old Panama and La Chorrera, to the west of the Pacific end of the Canal Zone, have a prevaillingly flat or undulating surface. They would be admirably suited to agriculture but for the fact that the soil consists of stiff clay which becomes exceedingly hard and dry shortly after the close of the rainy season. Without irrigation, these sabana types are best suited to grass, and even this quickly parches in the dry season. With irrigation, there seems to be no reason why the smooth areas could not be made to produce good yields of rice, since there is a good supply of plant food. In some places the sabanas have been badly cut to pieces by erosion, making them useless except for grass. The absence of trees on these sabana lands appears to be due to the peculiar character of the soil -- its tendency to dry out and harden during the dry season.

The best part of Panama with respect to upland soils is found in the province of Chiriqui. On the smoother portions of the uplands of this region, there is considerable soil which contains a large percentage of volcanic ash material -- weathered ejects from the regional volcanoes. Since its deposition, this gritty, volcanic material has accumulated much organic matter and has decomposed to such an extent that the resultant soils are friable, easy to cultivate and productive. As in the highlands of Costa Rica, these deep rich soils are used to some extent for coffee. They also give good results with corn, sugar cane, and vegetables.

Answering the specific inquiry in regard to coffee lands, it is entirely possible that other areas than those of the province of Chiriqui might be utilized for this crop, if transportation were favorable. I see no reason, for example, why coffee could not be grown on the hills of the upper Tuyra River. A general sort of idea prevails to the effect that the volcanic ash lands, such as those of Costa Rica and portions of the province of Chiriqui in Panama, are the ideal coffee soils.

These are ideal coffee soils, but they are not the only ones. Some of the best coffee of Colombia is grown on soil which contains little or no volcanic ash material; that is, on well drained clay lands, such as can be found in various parts of Panama. Coffee requires well-drained land of not too stiff a nature, having a good content of humus. Such land does occur in places outside the Province of Chiriqui.

Many parts of Panama, such as the region of the upper Chucumaque and Bayano River regions, have not been thoroughly explored, and no one knows precisely what the soil conditions are. Until the country has been adequately surveyed, at least in a reconnaissance way, it is entirely impossible to appraise the full agricultural possibilities of the nation. While it is known that a very large proportion of the terrain is exceedingly hilly and mountainous, localized studies have shown that there are important scattered bodies of very good agricultural soil from one end of the country to the other. Many of these tracts are isolated, and accordingly could not be profitably utilized until better transportation facilities are provided. Many other tracts, ~~on the other hand~~, lie adjacent to streams by which produce can be rather easily carried out to water transportation.

Throughout all of this great area, the country is thoroughly ramified by drainage lines, some of which are bordered with broad strips of alluvium. Along those streams having low valleys, such as the sabana and the lower Tuyra and Churumaque Rivers, the greater part of the alluvial plains consists of swampy land, and would require drainage in order to be used for crops. If these lands could be cheaply drained, they doubtless would produce splendid yields of rice. Along most of the streams, however, a considerable part of the bottom land has good drainage and is very well suited to the production of corn, rice, cacao, vegetables and fruits. The lower, wetter portions of these, possibly could be successfully employed in the production of rice with rather inexpensive drainage systems. The Changuinola River is an example of one of the larger streams along which occurs broad areas of well drained, highly productive alluvial soil. Much of the land along this stream, and some of the other streams in the north-western part of the country, have been very successfully used for bananas. Plantings of cacao trees on the alluvial soils have made a promising growth. It has been estimated that approximately 70 per cent of the broad strips of bottom land along the Changuinola and Sixaola Rivers is well drained soil of excellent productivity. Probably there is considerable good alluvium also along the Bayano River, above that part of the stream affected by tides, and there may be numerous other valuable areas occurring in sufficient extent for important agricultural operations.

There is not much land in the country which is not suited to grass. Guinea grass gives splendid results, even on the shallow, stony, steep slopes. Para grass is another excellent grazing plant which thrives on most of the wet soils. Molasses grass is still another nutritious grass that spreads rapidly from plantings, and affords the very best kind of grazing for cattle. It seems, therefore, that the country is capable of sustaining a very important live stock industry. Probably market outlets could be found for a largely increased production of cattle, chiefly down the west coast of South America.

Numerous areas will produce good crops of coffee, corn, sugar cane, cacao, papaya, and various vegetables and fruits. Bananas give particularly good results on the better drained alluvial areas, so long as the plantings are not attacked by the Panama disease. The possibility of timber-growing seems to be very good also. As I see it, the government of Panama should begin to plant some of the more valuable tropical trees, in an experimental way at least. There is no doubt but that balsa (a valuable wood -- the lightest wood known) would grow admirably in many localities. I have seen some beautiful planted forests in western Ecuador growing under conditions much like those found in parts of Panama. Other trees of promising possibilities under experimental planting would be Spanish cedar, mahogany and teak.

#### A Survey of the Natural Resources.

The variety of soils suggests the advisability of making a survey for the purpose of determining the various plants to which the soils of different localities may be most successfully devoted. Modern agriculture is relying to a far greater extent than in the past upon science to guide its operations. It is well known that the adaptation of crops to soils, climate variations and other natural conditions results in increased production with the same application of labor. It means taking advantage of natural conditions instead of disregarding them and possibly working against them.

A general reconnaissance of the soils of Cuba with special reference to sugar production has been made in recent years, the expense of which has been borne by an association of sugar companies. The Association maintains an extensive research organization for the purpose of studying all the problems related to the production of sugar, and of course a study of the soils and treatments best suited to ~~sachref~~ them is an important activity. The soil survey was carried out by experts supplied by the Bureau of Soils of the Department of Agriculture of the United States Government and the Tropical Plant Research Foundation of Washington, D.C.

Following the publication of the Soil Survey of Cuba in 1928, correspondence occurred between officials of the Government of Panama and the

Tropical Plant Research Foundation, in regard to a survey of the natural resources of Panama. We understand that a bill was passed by the Assembly of Panama at its 1928 session which authorizes a comprehensive survey of the natural resources of the country.

An extensive survey of the kind proposed may be accomplished gradually over a term of years, hence need not be excessively burdensome to the Treasury. The main thing is to adopt a plan which can be consistently carried out, step by step, under competent guidance, and to make a beginning upon it.

We are of the opinion that the plan should include not only a study of the soils, but of the forest and mineral resources, of all natural products and the problems related to each.

The Tropical Plant Research Foundation, of Washington, to which reference has been made, is a non-profit-making organization, affiliated with the National Research Council of the United States, and supported for scientific and beneficent purposes. It employs a staff of scientific students and workers and by reason of the high type of its personnel and the character of the work it is doing is entitled to confidence. A communication from the Foundation, dated January 18, 1929, discussing a proposal for a Survey of Panama, suggests a policy which is briefly embodied in the following paragraph:

"Taking into consideration the present conditions in Panama, the need for economic development, and the character of the country, we would propose making at this time a reconnaissance survey of areas in Panama most promising for development, planning the work so that it maybe extended from year to year as opportunity permits, to form in the end a complete survey of the country. We recommend that at the beginning of the enterprise consideration be given primarily to the production of important export commodities, particularly woods, bananas, coconuts, cacao and coffee. The last four at present constitute the principal exports of Panama, and the country possesses important resources in hardwoods which might be made a source of revenue if properly handled."



We believe that a policy such as indicated in the above paragraph will be an advantageous one for Panama to adopt. It is certain that if an individual or corporation should come into possession of a large estate containing natural resources of various kinds, about which little definite or tangible information existed -- although enough to give assurance of large values -- the first thing such an owner would do would be to set about obtaining accurate information concerning all features of the property. Such an owner would not want to dispose of any of the estate without having full information upon the values.

We are aware of the necessity confronting the Government to reduce current outlays and balance the budget, and since we are advising this policy, are far from wanting to give any advice inconsistent therewith. We believe, however, that a systematic and reliable survey of the natural resources and the establishment of a methodical policy in regard to them is a matter of great importance. It is to be regarded as providing the fundamental basis of economic development, and although the need for economy is urgent, we can think of no more convincing reason for the practice of rigid economy in all branches of the public administration than is afforded by the purpose to carry on a constructive program of this kind.

#### MINERAL RESOURCES.

There is much evidence indicating that Panama possesses mineral resources of real importance, but no mineral properties are established on a regular <sup>producing</sup> basis. Columbus on his fourth voyage to America, in 1502, explored the Caribbean coast of the country and in his writings recorded that the inhabitants of what is now the Province of Veraguas had gold and pearls in abundance. The mines of Veraguas are said to have been worked down to the time of the revolution against the Spanish sovereignty,