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About the Institute
The Hunt Institute for Botanical Documentation, a research division of Carnegie Mellon University, specializes in the history of botany and all aspects of plant science and serves the international scientific community through research and documentation. To this end, the Institute acquires and maintains authoritative collections of books, plant images, manuscripts, portraits and data files, and provides publications and other modes of information service. The Institute meets the reference needs of botanists, biologists, historians, conservationists, librarians, bibliographers and the public at large, especially those concerned with any aspect of the North American flora.

Hunt Institute was dedicated in 1961 as the Rachel McMasters Miller Hunt Botanical Library, an international center for bibliographical research and service in the interests of botany and horticulture, as well as a center for the study of all aspects of the history of the plant sciences. By 1971 the Library's activities had so diversified that the name was changed to Hunt Institute for Botanical Documentation. Growth in collections and research projects led to the establishment of four programmatic departments: Archives, Art, Bibliography and the Library.

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UNITED STATES DEPARTMENT OF AGRICULTURE

Office of the Secretary

GENERAL COOPERATIVE AGREEMENT

FOR

INVESTIGATIONAL WORK WITH RUBBER PLANTS IN LATIN AMERICA

This general cooperative agreement made and entered into this 31st day of December, one thousand nine hundred and forty, by and between The United Fruit Company, a corporation organized and existing under the laws of the State of Delaware, and having its principal place of business at Boston, Massachusetts, hereinafter called the Cooperator, and the United States of America, by the Acting Secretary of Agriculture of the said United States, hereinafter called the Government.

WHEREAS, the establishment of a plantation rubber industry in the Western Hemisphere is recognized as mutually advantageous to all countries therein, and

WHEREAS, it is the desire and to the interest of the parties to this agreement that sources of crude rubber be developed in the Western Hemisphere, and whereas, it is recognized by both parties that such development must be based on the use of superior strains of rubber trees if the industry is to be self-sustaining in competition with oriental-producing areas; that such strains must possess superiority, not only in yield but also in resistance to South American leaf disease; that this disease is a paramount factor in the selection of superior strains, and

WHEREAS, for many years the Cooperator has conducted investigations of tropical crops, which offered promise of diversifying the agriculture, increasing the income, and promoting the welfare of the peoples of Latin America, especially the pioneering work of the Cooperator in making widely scattered test plantings of Hevea rubber which demonstrate the adaptability of this tree to the diverse soil and climatic conditions, and

WHEREAS, the Government is now authorized by Act of Congress

to conduct investigations essential for the establishment of a rubber plantation industry in the Western Hemisphere, and as the existing rubber plantings and other facilities of the Cooperator constitute an invaluable foundation for, and continuing asset to such studies, joint informal discussions and planning have pointed to the desirability of a cooperative investigation by the parties to this agreement for their mutual benefit and for the benefit of the people of the United States and of Latin America.

NOW, THEREFORE, THIS AGREEMENT WITNESSETH:

(A) The parties hereto do hereby agree with respect to investigational work and the use of certain of the Cooperator's lands and facilities for establishment of experiment stations, as follows:

1. The Government shall establish an Hevea rubber experiment station, or stations, on suitable selected areas of land owned or leased from others by the Cooperator, and which said Cooperator agrees to permit use of for this purpose. Problems for cooperative investigations may include (a) tests of new strains, or clones, for resistance to disease and determination of their productivity; (b) propagation of superior strains on seedling stocks from seed produced in Cooperator's test plantings, and distribution of such superior strains to the Cooperator and to other cooperating agencies and governments in Latin America; (c) test tapping of Cooperator's trees, and conducting of other field and laboratory investigations, the results of which will be made available for the advancement of the industry.

2. The Government shall supply an investigator, or superintendent, and/or the necessary rubber specialists with headquarters at such station, or stations, as may be established, whose duties shall be to direct nursery propagation work and the investigations herein contemplated.

3. The Government shall hire such overseers of labor, all common labor, and furnish experimental equipment, chemicals, and general supplies as may be necessary to carry on the work properly.

4. The Government shall maintain all buildings, fences, and other permanent fixtures in proper repair, and shall also repair or allow equitable compensation for all loss, damage, or breakage to farm implements and

other facilities belonging to the Cooperator and furnished without rental under this agreement, the usual wear and tear from ordinary use excepted.

5. The Government shall provide at its expense any additional laboratory, office space, or housing required for its employees at any station, or stations, furnished by the Cooperator, and equip said buildings and lands with any necessary facilities.

6. The Cooperator shall permit the Government free use of any existing office, residential, laboratory, or service buildings, or space therein, as well as packing sheds and other facilities as may be available, excepting such repairs or replacements as hereinabove specified; provided, however, that such usage by the Government shall not interfere with the normal operations of the Cooperator.

7. The Cooperator shall permit representatives of the Government assigned to said station, or stations, the use of water, electricity, and commissary, as may be available and owned or operated by it, at the same rates as charged by the Cooperator to its own employees, or under such scale or charges as may be mutually agreed upon.

8. The Cooperator shall grant to professional employees of the Government and their families who are engaged in work covered by this cooperative agreement, a reduction equivalent to 25 percent of the minimum first-class fare on the steamships of the Cooperator; provided, however, that an official list of such employees shall first be supplied and certified by the Government.

(B) The parties hereto do hereby agree with respect to Cooperative field-test, or commercial demonstrational plantings, requested by and to be located on lands of the Cooperator, as follows:

1. The Government shall give to the Cooperator, f.o.b., its nursery or experiment station, or stations, known superior strains of the Hevea rubber tree obtained from other cooperators, or collected on surveys, or bred and selected at its experiment stations, which after test by the Government are

found to be superior; such releases to be at as early date and in such quantity as may be possible with the facilities available for propagation, and in view of the equitable demands or requirements of other cooperating agencies.

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6. The Cooperator shall not redistribute to other agencies or Governments any superior strains of Hevea rubber given by the Government under this agreement, except to those agencies or Governments in the Western Hemisphere willing to reciprocate by furnishing such similar material as they may have in their possession, and that this restriction shall be passed on to any agency or government

receiving material, or material propagated therefrom, from controverting the purpose of this restriction.

(C) The parties hereto do hereby mutually agree, as follows:

1. That, exclusive of salaries of the Government scientists and overseers, obligations of the Government under this agreement shall not be in excess of Fifteen Thousand ($15,000) Dollars in any one fiscal year. The total value of land and facilities of the Cooperator utilized in the work covered by this agreement is of very great financial consideration, and is not herein estimated.

2. That this agreement shall take effect on the date on which made and entered into, as shown in the first paragraph on page one, and expire on the thirtieth day of June, one thousand nine hundred and forty-one, but the same may be renewed from year to year thereafter, not extending, however, beyond the thirtieth day of June, one thousand nine hundred and forty-three, at the option of the Government, which option shall be expressed in writing by the Government at least one month before the date upon which this agreement would otherwise expire.

3. That upon termination of this agreement the Government shall have the right to remove from the land, hereinbefore referred to, all the buildings, equipment, fixtures, and other articles and material belonging to it, excepting, however, all permanent fencing and rubber plantings.

4. That this agreement shall supersede and nullify all commitments and temporary agreements previously entered into by correspondence between Dr. Mark Baldwin, leader of the Government rubber survey party in Honduras, and Mr. J. F. Aycock, Manager of the Tela Railroad Company, a subsidiary company of the Cooperator.

5. That this agreement shall not be assigned in whole or in part; that no member of Congress or Resident Commissioner of the United States, after his

election or appointment, and either before or after he has qualified, and no officer, agent, or employee of the Government shall be admitted to any share or part of this contract or agreement, or to any benefit to arise therefrom.

IN WITNESS WHEREOF, the parties hereto have executed this Agreement on the day, month, and year first above written.

THE UNITED FRUIT COMPANY

By L. W. Udell - Treasurer
Cooperator

UNITED STATES OF AMERICA

March 3, 1941.

By Grover B. Hill
Acting Secretary of Agriculture.

I, Harold V. Symonds, certify that I am the Assistant Secretary of the corporation named as Cooperator herein; that L. W. Udell who signed this agreement on behalf of the Cooperator was then Treasurer of said corporation; that said agreement was duly signed for and in behalf of said corporation by authority of its governing body, and is within the scope of its corporate powers.

Harold V. Symonds (Corporate Seal)

OPPORTUNITIES FOR HEVEA RUBBER PLANTATIONS IN LATIN AMERICA

E. L. Demmon,[1/] Director
Southern Forest Experiment Station
New Orleans, La.

At present the United States finds itself entirely dependent on foreign sources for rubber, adequate supplies of which are essential for many domestic purposes, and particularly important at this time for the national defense. A major use of rubber has been in the manufacture of tires for automobiles, trucks, and airplanes, but it has many other uses which make it the most nearly indispensable raw material not produced in the United States. For more than 25 years past the United States has annually imported more than 50 percent of the entire world production of rubber, and in 1940 these imports reached almost 60 percent. The Office of Production Management in Washington, in placing rubber under priorities control, has ordered a cut in rubber consumption beginning July 1, 1941, to a rate of about 600,000 tons annually; the rubber thus saved will go into stock piles for use in the defense program.

Natural rubber is chiefly the product of the tree known as Hevea brasiliensis, which in respect to quality and quantity of its yields is the most important rubber-yielding plant known to science. It is commonly referred to simply as Hevea, although there are many other species of the same genus. The tree is a native of the Amazon Valley in South America, but is now widely cultivated in the Far East, mostly in the Malay Peninsula and in the Netherlands East Indies; other countries in the Asiatic tropics contribute to the world supply to a lesser extent, and relatively small quantities come from the African and American tropics, produced from Hevea and other rubber-yielding plants. Most of America's rubber comes from approximately halfway around the world, requiring 6 to 7 weeks by slow freighter for the ocean journey. This supply might be cut off or controlled by hostile nations in time of war. Access to it can be hampered also by a shortage of shipping facilities; such obstacles are already being met.

Prices also are subject in some degree to foreign control, since production comes principally from British and Dutch sources. Although the early British attempts to control rubber production and prices in 1922-28, under the Stephenson Restriction Act, were a failure, the International Rubber Regulation Agreement, operative from June 1934 through 1943 and including the producers of about 98 percent of the world's rubber supply, has been fairly successful. Rubber production, consumption, and value statistics for the period 1900 to 1940 are given in the following table.

1/ Formerly forester for the Goodyear Tire & Rubber Co., at its Sumatra Plantations (1916-1923), and special investigator for Firestone Tire & Rubber Co., in Central America (1924).

Rubber production, U. S. consumption, and prices, 1900-1940[1]

Period	Average annual production[2]						United States consumption		Average[4] value
	Far East	Amazon Valley	Mexican guayule	Other America	Africa	World total	Net imports[3]	Proportion of world production	
	Thousands of long tons							Percent	Cents per lb.
1900-04	.8	29.1		1.4	15.4	46.8	22.8	48.7	58.4
1905-09	4.8	36.0	3.6	5.3	18.3	68.1	31.3	46.0	74.0
1910-14	38.0	36.8	5.0	13.0	16.2	109.1	50.8	46.6	76.1
1915-19	205.9	30.8	1.1	10.0	8.6	256.5	155.5	60.6	50.1
1920-24	347.2	10.0	.8	4.1	4.8	376.9	269.3	71.5	25.2
1925-29	618.0	24.1	3.5	2.1	7.1	654.8	425.0	64.9	36.4
1930-34	825.7	10.3	.3	.3	2.8	839.3	433.0	51.6	7.5
1935	855.0	11.3	.5	.6	5.0	872.4	455.8	52.5	11.4
1936	833.7	14.2	1.2	1.2	6.1	856.4	475.6	55.0	14.9
1937	1,108.7	15.6	2.7	.5	7.9	1,135.4	592.5	52.3	18.5
1938	864.1	14.3	2.5	.6	7.9	889.4	406.3	45.9	14.1
1939	972.1	13.9	2.2	.9	15.7	1,004.9	486.5	48.6	16.0
1940	1,352.9	17.6	4.0	-	17.3	1,391.8	811.2	58.3	17.4

1/ Data from statistics gathered by the Bureau of Foreign and Domestic Commerce, U. S. Department of Commerce.
2/ Based on rubber shipments (net exports).
3/ Gross imports less reexports (includes latex and guayule).
4/ Highest average annual price from 1900 to 1940 was $1.03, in 1910; lowest was 3-1/2 cents, in 1932; prices of Standard Ribbed Smoked Sheets on the New York market during the first half of 1941 ranged from 19-1/8 to 24-7/8 cents per lb.

Synthetic rubber is a possible substitute in the event of a shortage, and its production will undoubtedly increase as a result of the ever-increasing use of rubber. Yet synthetic rubber costs considerably more to produce than the natural substance. Its manufacture involves the erection of costly plants; the time required for construction and placing the plants in operation is also an important factor. Output of synthetic rubber in the United States in 1940 was less than 10,000 tons. Synthetic rubbers offer no marked advantages over natural rubber in their mechanical properties, but some are superior in a few respects, such as resistance to sunlight, gasoline, and oils; for most purposes, natural rubber is preferable to the synthetic product. Costs of synthetic rubber on a large-scale production basis may average as low as 25 cents per pound. Costs of production from the more efficient Hevea plantations may average under 10 cents per pound. Reclaimed rubber also can be looked to for part of the rubber needs of the United States.

Another possible source of rubber is guayule (Parthenium argentatum), a desert shrub that is native to Mexico and has been cultivated on a limited scale in the southwestern part of the United States. Best results are obtained from guayule as a 4- to 7-year crop, the entire plant being used for rubber extraction and the land replanted. Guayule rubber contains 16 to 20 percent resins

and sells at a discount of about 20 percent in comparison with Hevea rubber. After deresination, however, it can be used instead of Hevea rubber for most purposes. On a 4-year crop cycle guayule can be produced for 20 to 30 cents per pound and probably would be cheaper than most types of synthetic rubber.

Almost 98 percent of America's present rubber supplies come from the Far East. Prior to 1914, however, the center of world rubber production was the Amazon Valley. The change in the center of world production of rubber from South America to the East Indies came as the result of English ingenuity. Back in 1876, an Englishman, Henry A. Wickham, brought 70,000 Hevea rubber seeds from Brazil to England. Seedlings were grown from them in the Royal Botanical Gardens at Kew, near London, and the 2,700 that developed were shipped to Ceylon, whence they were distributed throughout the East, thus beginning the plantation rubber industry. By 1910 there were 1 million acres under cultivation in the Far East and this has expanded to almost 9 million acres at the present time, three-fourths of this area being in British Malaya and the Netherlands East Indies.

The situation just described presents the Latin American countries with an opportunity to regain or newly assume prominent roles as producers of rubber. Although the Hevea tree is indigenous to the Amazon Valley, there are many millions of acres of land throughout tropical Latin America where soil, climate, and other factors are in the main suitable to its growth and development. Labor in tropical America is not so abundant or so cheap as in the Far East, where it can be had for 20 to 35 cents per day. Another major handicap to be overcome is the South American leaf-disease problem, a formidable obstacle to the establishment of successful plantations in the American tropics.

Today, more than ever before, closer relations between the Americas are essential to promote hemisphere defense and good will. The United States needs rubber; the republics to the South need an increased and stable purchasing power to create a permanent foundation for better trade relations, and to provide a higher standard of living for their citizens. Where all parties stand to benefit, we may anticipate a coordinated effort to take advantage of such opportunities; this is in fact now coming to pass.

On June 22, 1940, the President of the United States signed a deficiency appropriation act which included $500,000 "to enable the Secretary of Agriculture to conduct investigations directed towards the development of rubber production in the Western Hemisphere, including production, breeding, and disease research; surveys of potential rubber-producing areas; establishment and operation of experiment and demonstration stations in suitable locations; acquisition of land for such purposes; construction of necessary buildings," etc. A 3-year plan of action was set up and immediately put into effect, and surveys have been conducted in the 15 Latin American countries involved. In addition to the preliminary surveys, experimental nurseries and plantings have been established in several localities, to carry out the objectives outlined by the Congress. The details of the program, however, will not be covered in this discussion.

Many factors will influence the success of Hevea culture in Latin America. The Hevea tree, which is native only to the Amazon Basin, can undoubtedly be grown in many parts of Latin American territory which lie within 18 to 20 degrees from the Equator. Of course, soil, topography,

rainfall and other conditions must be favorable. Hevea seems to thrive best on deep, fertile, well-drained soils, on relatively level sites (measures to conserve soil and prevent excessive erosion must be taken on rolling lands), at elevations below about 2,000 feet, with ample rainfall (70 to 80 inches or more annually, well distributed throughout the year, with no long dry season, and with a high percentage of dry mornings), and away from the paths of tropical storms. Furthermore, if the plantation is to be economically successful the cost of production must compare favorably with that of plantation rubber in the Far East. This means that high-yielding stock must be utilized, the trees must be sufficiently resistant to overcome ravages of the South American leaf disease, and the plantation development and rubber harvesting techniques must be so efficient that labor-cost differentials favoring the Far East can be offset.

Following the rubber boom in the early part of this century, with the attendant high prices paid for the crude product, numerous attempts were made to cultivate Hevea and other rubber-bearing plants, notably Castilloa (Castilla sp.), in practically every country in tropical America. But with the falling off in rubber prices when the Far Eastern Hevea plantations came into production, further attempts to develop rubber plantations in the American tropics practically ceased, and the previous plantings were allowed to revert to jungle. Investigations of the rubber-producing capacity of two of these abandoned Hevea plantations, made by the author in Nicaragua and Costa Rica in 1924, indicated yields comparing favorably with those obtained in the Far East. An experimental tapping of Hevea trees in Haiti by a representative of the United States Department of Agriculture in 1924-25 also gave favorable comparisons with Far Eastern plantations.

When supplies and prices of plantation rubber in British Far Eastern territory were brought under control by the Stephenson Plan in 1922, American rubber pioneers, led by Harvey S. Firestone, stimulated renewed interest in having America's rubber needs produced in lands closer to home. As an outcome of this interest, the Departments of Commerce and Agriculture cooperated on a series of rubber surveys between 1923 and 1927 to investigate the rubber-producing possibilities of tropical America, as well as of other parts of the world. Independent surveys were made by some of the large United States rubber companies, and new plantations on a limited scale were launched in Liberia by Firestone (1927) and in the Philippines by Goodyear (1928). In 1927, Henry Ford negotiated a 2,500,000-acre government concession on the Tapajos River, in the State of Para, Brazil, part of which was exchanged in 1933 for another concession of 700,000 acres not far distant, where conditions for rubber-plantation development were deemed more favorable. Here several thousand acres are being planted to Hevea, using bud-grafted material from high-yielding stock obtained from the Far East. In 1935, the Goodyear Company acquired a 2,500-acre concession near Gatun, Panama, and in the following year 1,000 acres in Costa Rica. In both countries plantations have been established, using high-yielding stock obtained from the company holdings in the Philippines, in an effort to develop a very productive and disease-resistant tree. The Goodyear Company is cooperating with the governments concerned in employing the citizens of these countries to the greatest practicable extent in their operations. The company has delivered to their respective agricultural departments, each year for several years, a number of seeds and trees for their use and distribution to the native farmers who may be interested. As these Hevea trials develop, further expansion may be anticipated, these plantings serving as a nucleus for additional plantings both by the company and by local native growers.

Under plantation conditions Hevea trees, which are usually set out with a density of about 200 per acre, can be tapped for rubber beginning at 5 to 7 years of age. In the Far East, present yields average around 400 pounds of dry rubber per acre per year. By cross-breeding and the use of budding stock from high-yielding trees it has been possible to increase yields to 1,200 and more pounds per acre annually.

By utilizing and developing sources of disease-resistant and highly productive planting stock, training local labor in efficient practices, and stimulating small landowners to develop their own planting, there is good reason to believe that many parts of Latin America can compete successfully with the Far East as a source of natural rubber. Certainly, with the potential growing areas located in close proximity to the centers of the world's principal rubber-utilization industries, Latin American production would seem to offer decided advantages to both the Americas.

The United States, as the principal consumer of rubber, should lend encouragement to such efforts, not only better to assure continuous supplies of this essential peacetime and wartime raw material, but also to establish an added safeguard against unstable and rapidly fluctuating prices. Furthermore, the United States now, more than ever before, needs outlets for its surplus agricultural and manufactured products. The successful establishment of a Hevea plantation industry in tropical America appears feasible and basically sound, besides offering an outstanding opportunity for further cementing trade relations between the United States and its Latin American neighbors to the South.

Resumen

El caucho, materia prima que encuentra tan diversos usos para fines domésticos y que es de singular importancia para la defensa nacional, es el material más indispensable que los Estados Unidos no produce dentro de sus límites. La magnitud de tales importaciones se comprende por el hecho de que durante los últimos 25 años compañías norteamericanas han adquirido más del 50% de la producción mundial de goma.

El Hevea brasiliensis, árbol nativo del valle del Amazonas en Sur America suministra la mayor parte de la producción mundial de caucho. Antes del 1914 el valle del Amazonas era el centro de la producción mundial, pero el Lejano Oriente, principiando en 1876 con semillas obtenidas del Brazil, ha levantado plantaciones que alcanzan en la actualidad alrededor de 3,500,000 hectáreas. Casi el 98% de nuestro abastecimiento viene del Lejano Oriente en un viaje de 6 a 7 semanas en lentos buques de carga los cuales podían ser entorpecidos seriamente en tiempos de guerras. Además producir goma sintética cuesta más que la goma natural y en el presente la capacidad de las factorías es extremadamente limitada.

Estas circunstancias le ofrecen a los países latinoamericanos una oportunidad de reconquistar una posición prominente en la producción de goma. Investigaciones hechas por el gobierno norteamericano y por compañías privadas han demostrado que la goma puede producirse satisfactoriamente en muchas partes de los trópicos americanos. Desarrollando y utilizando material altamente productivo y resistente a enfermedades, adiestrando obreros locales eficientemente y estimulando a pequeños terratenientes a desarrollar sus propias plantaciones hay razón para creer que America puede competir ventajosamente con el Lejano Oriente. Para mantener un mejor balance comercial y por muchas otras razones, sería conveniente para ambas Americas desarrollar la producción de la goma en el Hemisferio Occidental.

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receiving material, or material propagated therefrom, from controverting the purpose of this restriction.

(C) The parties hereto do hereby mutually agree, as follows:

1. That, exclusive of salaries of the Government scientists and overseers, obligations of the Government under this agreement shall not be in excess of Fifteen Thousand ($15,000) Dollars in any one fiscal year. The total value of land and facilities of the Cooperator utilized in the work covered by this agreement is of very great financial consideration, and is not herein estimated.

2. That this agreement shall take effect on the date on which made and entered into, as shown in the first paragraph on page one, and expire on the thirtieth day of June, one thousand nine hundred and forty-one, but the same may be renewed from year to year thereafter, not extending, however, beyond the thirtieth day of June, one thousand nine hundred and forty-three, at the option of the Government, which option shall be expressed in writing by the Government at least one month before the date upon which this agreement would otherwise expire.

3. That upon termination of this agreement theGovernment shall have the right to remove from the land, hereinbefore referred to, all the buildings, equipment, fixtures, and other articles and material belonging to it, excepting, however, all permanent fencing and rubber plantings.

4. That this agreement shall supersede and nullify all commitments and temporary agreements previously entered into by correspondence between Dr. Mark Baldwin, leader of the Government rubber survey party in Honduras, and Mr. J. F. Aycock, Manager of the Tela Railroad Company, a subsidiary company of the Cooperator.

5. That this agreement shall not be assigned in whole or in part; that no member of Congress or Resident Commissioner of the United States, after his

election or appointment, and either before or after he has qualified, and no officer, agent, or employee of the Government shall be admitted to any share or part of this contract or agreement, or to any benefit to arise therefrom.

IN WITNESS WHEREOF, the parties hereto have executed this agreement on the day, month, and year first above written.

THE UNITED FRUIT COMPANY

By_____
Cooperator

UNITED STATES OF AMERICA

By_____
Acting Secretary of Agriculture.

I, , certify that I am the Secretary of the corporation named as Cooperator herein; that

who signed this agreement on behalf of the Cooperator was then of said corporation; that said agreement was duly signed for and in behalf of said corporation by authority of its governing body, and is within the scope of its corporate powers.

_____(Corporate Seal)

UNITED STATES DEPARTMENT OF AGRICULTURE

Office of the Secretary

COOPERATIVE AGREEMENT

FOR PLANTATION RUBBER INVESTIGATIONS IN HONDURAS

THIS COOPERATIVE AGREEMENT made and entered into this day of December, one thousand nine hundred and forty, by and between the Ministerio de Fomento, Agricultura y Trabajo of the Republic of Honduras and the United States of America, by the Acting Secretary of the Department of Agriculture of the said United States.

W I T N E S S E T H :

WHEREAS, the establishment of a rubber plantation industry in the Western Hemisphere is recognized as mutually advantageous to all countries therein, and

WHEREAS, it is the interest and desire of the parties to this agreement that a source of crude rubber be developed in Honduras, and whereas, it is recognized by both parties that such development must be based on the use of superior strains of rubber-producing trees if the industry is to be self-sustaining in competition with oriental areas; that such strains must possess superiority, not only in yield but also in resistance to the South American leaf disease; that in view of the past efforts and progress achieved in promoting new agricultural enterprises by the Ministerio de Fomento, Agricultura y Trabajo, it is the desire of the parties to this agreement to cooperate by conducting investigational work on the methods of growing rubber, the production of valuable strains of rubber, disease control, possible use of inter-crops, and other problems involved in the successful establishment of commercial rubber culture, for the benefit of the people of Honduras and of the United States of America.

NOW, THEREFORE, the parties to this agreement do hereby separately outline their interests in this cooperative project, and designate the facilities, services, and other contributions which they agree to make available toward achievement of their mutual objective.

I. The Ministerio de Fomento, Agricultura Y Trabajo de Honduras is seeking uses for the great areas of rich undeveloped land and abandoned banana farms on which both individual growers and plantation companies may produce a profitable export crop, such as rubber, and increase the income and foreign trade of the people of Honduras. Therefore, said Ministerio does hereby agree:

(a) To consult the local representatives of the Department of Agriculture of the United States, and select jointly three to five suitable areas of land whose owners are interested and are financially able to make demonstration plantings of rubber, which would be of the greatest educational value in establishing centers for the development of rubber production in Honduras; the location of such areas shall be determined by the amount of adjacent lands suitable for successful rubber cultivation, and the number and size of such initial plantings of any improved strain shall be limited to the amount of available planting material and in consideration of the equitable demands of other cooperating countries.

(b) To assign agronomists or other trained representatives of the Honduras Government, as may be required from time to time, to cooperate with representatives of the Department of Agriculture of the United States in directing and educating the cooperative growers in planting, multiplication, cultivation, thinning, tapping, preparing the rubber for market, and other essential operations necessary for securing the proper maintenance and productivity of the plantings.

(c) To formulate necessary quarantine and other regulations designed to prevent the indiscriminate introduction into Honduras of rubber-propagating materials, including seeds, trees, and budwood from other countries, excepting such shipments as are duly certified to be free from noxious insects and contagious diseases.

(d) To permit the Department of Agriculture of the United States to import into, and/or export from, Honduras all planting material (seeds, stumps, or budwood) or rubber-producing plants, which said Department of Agriculture of the United States may require for the investigations herein contemplated or desire to ship elsewhere, provided, however that all such shipments, imports, or exports shall be certified by a duly qualified official of said Department to be free from noxious insects and contagious diseases.

(e) To permit importation into Honduras free of duties or other fees all material or property of the Government of the United States which may be required for the construction, operation, and maintenance of its experiment station, substations, and nurseries, and also to allow this exemption on the personal property of employees of said station, or other representatives of the United States when they enter the ports of Honduras for work covered by this cooperative agreement, provided, however, that the director of said station shall certify that such personal property of said employees is not imported for resale.

(f) To prohibit the redistribution of any strains of the rubber tree furnished it by the said Department of Agriculture of the United States to cooperators, companies, or other governments, except to those agencies and governments in the Western Hemisphere which are willing to reciprocate by furnishing such similar material as they may have in their possession; and that this restriction shall be passed on to any other agency or government receiving material to prevent controverting the purpose of this restriction.

II. The Department of Agriculture of the United States, under the authority and appropriation of funds granted it by the Congress of the said United States for investigation of sources of crude rubber in the Western Hemisphere, does hereby agree:

(a) To establish in Honduras a rubber-propagation and experiment station from which high-yielding strains may be distributed to cooperators in Honduras and other potential rubber-producing countries in Latin America.

(b) To conduct laboratory and field investigations, and to make the results available for the benefit of the industry in Honduras and throughout Latin America. Problems for investigation may include tests of high-yielding strains of the Hevea rubber tree from any source for their performance on local soils, artificial pollination for breeding of improved strains, methods of land clearing, planting, use of inter-planted crops, ground covers, and other investigations for the advancement of the industry.

(c) To provide at its expense any necessary laboratory and office space and housing for employees

at the aforementioned experiment station, and to equip said buildings and lands with all facilities required for the propagation of rubber and the investigation of problems of plantation rubber production in Honduras.

(d) To supply a station superintendent and such other investigators and rubber specialists as may be necessary to conduct the investigations herein contemplated, together with such overseers of labor as may be necessary to carry on the work properly.

(e) To welcome and provide free of charge necessary office space at such station for two sceintists who, at its option the Ministerio de Fomento, Agricultura y Trabajo may delegate to said station to conduct, on the basis of strict equality, cooperative investigations with the specialists of the Department of Agriculture of the United States, or for the purpose of becoming informed on the techniques of the rubber industry. The salaries, living accomodations, transportation, and other expenses of such scientists shall be furnished by the Ministerio de Fomento, Agricultura y Trabajo.

(f) To furnish planting material and supervise, in cooperation with the Honduras representatives, the establishment of practical field plantings to demonstrate all phases of plantation rubber production.

(g) To furnish to the Ministerio de Fomento, Agricultura y Trabajo free of charge f.o.b. at its station in Honduras or elsewhere, stocks of superior strains of the rubber tree now in its possession, and any additional superior strains collected on surveys or bred at its experiment station in Honduras and elsewhere, which after test by it are found to be superior; such distributions to be at as early a date and in such quantity as may be possible with the facilities available for propagation and in view of the equitable demands or requirements of other cooperating agencies.

III. The cooperating parties do hereby mutually agree:

(a) That, exclusive of salaries of scientists and overseers of the Department of Agriculture of the United States, obligations of the said Department under this cooperative agreement shall not exceed Thirty Thousand ($30,000) Dollars the first year, nor more than Fifteen Thousand ($15,000) Dollars in any one fiscal year thereafter. The total value of land, facilities, and services furnished by the Ministerio de Fomento, Agricultura y Trabajo are of a very great tangible and intangible consideration, and are not hereby estimated.

(b) That this agreement shall take effect on the date on which made and entered into, as shown in the first paragraph on page one, and expire on the thirtieth day of June, nineteen hundred and forty-one, but the same may be renewed from year to year thereafter, not extending, however, beyond the thirtieth day of June, nineteen hundred and forty-three, at the option of the Department of Agriculture of the United States, which option shall be expressed in writing by the Said Department of Agriculture of the United States at least one month before the date upon which this agreement would otherwise expire.

(c) That this agreement shall not be assigned in whole or in part; that no member or delegate to Congress of the United States or Resident Commissioner thereof, after his election or appointment, and either before or after he has qualified, and no officer, agent, or employee of the Government of the United States shall be admitted to any share or part of this agreement, or to any benefit to arise therefrom.

IN WITNESS WHEREOF, the parties hereto have executed this cooperative agreement on the day, month, and year first above written.

Ministerior de Fomento, Agricultura
u Trabajo
of the Republic of Honduras.

By_____
Ministro

United States of America

By_____
Acting Secretary of Agriculture

Rubber

ESTABLECIMIENTO DE UN JARDIN PARA LA MULTIPLICACION DE YEMAS PARA INJERTAR

UBICACION

La ubicación del jardín para la multiplicación de yemas para injertar a menudo depende del método de hacer las plantaciones; es decir, ya haciendo el injerto en el vivero, transplantándose después las plantitas injertadas al campo (1), ya haciendo el injerto en el campo mismo sobre las plantitas nacidas de semillas que fueron sembradas en sus sitios permanentes en la plantación (2). Usándose el método No. 1, el jardín para la multiplicación de las yemas deberá estar cerca del vivero que contenga las plantitas que se van a injertar; y, usándose el método No. 2, el jardín puede situarse en el campo mismo de la plantación, resultando ser después una parte de ésta. En este último caso, los intervalos de siembra se hacen de tal manera que el jardín pueda ser transformado en plantación permanente, así evitando la necesidad de hacer un vivero intermedio.

PREPARACION DEL TERRENO

Deberá limpiarse bien el terreno y quemarse o quitarse toda la basura. Levántese un cerco alrededor del terreno para evitar las molestias de los animales. Los intervalos entre las excavaciones para los tocones dependerán del método que se use; si se escogiera el método No. 1, de multiplicar las yemas en un vivero, las excavaciones deberán colocarse con una separación de metro y medio (medida de centro a centro), una de otra, o en filas, con un intervalo de un metro de fila a fila, y con intervalos de dos metros entre las excavaciones en cada fila, para así permitir el cultivo con maquinaria. El jardín que se haga de acuerdo con el método No. 2, eso es, directamente en el campo de la plantación, deberá tener tal intervalo de planta a planta para que, al transplantar algunas de éstas a las plantaciones, las plantas que queden formen también una plantación con el mismo intervalo que las demás.

Las excavaciones para la siembra de los tocones deberán tener un diámetro de 60 centímetros y una profundidad igual; algunos finqueros prefieren hacerlas de un metro de diámetro y un metro de profundidad. La tierra sacada de la excavación deberá dejarse al lado del hoyo, escogiendo lo mejor de ella al volver a llenar las excavaciones durante la siembra de los tocones.

DESEMPAQUE DE LOS TOCONES INJERTADOS

Destapese el cajón en que vienen empacados los tocones injertados y búsquese la etiqueta metálica que llevará uno de los tocones en el cajón. Clávese esta etiqueta a una estaca blanca, para que sirva para identificar la variedad o "clon" en el vivero. Los trabajos de desempaque de los tocones deberán hacerse bajo sombra.

Sáquese con cuidado los tocones del cajón para no magullarlos. Cuidado especial deberá observarse si las yemas hayan brotado. Fórmense manojos de tocones, envueltos en arpillera húmeda, para transportarlos al jardín en donde

se sembrarán. No permítase que se sequen las raíces. El aserrín y otro material usado para el empaque de los tocones deberá quemarse después, para destruir cualesquier insectos, huevos o esporas de honguillos que contenga. A pesar de haber sido esterilizado el aserrín que se usa para el empaque, esta precaución nunca está demás.

SIEMBRA DE LOS TOCONES

(1). Acuéstese un palito recto sobre la boca de la excavación. Póngase la raiz del tocón en la excavación de tal manera que quede la yema que ha sido injertada sobre el tocón, al nivel del palito. Manteniéndose el tocón en posición vertical, échese tierra adentro de la excavación, apretándosela con los pies. Deberá llevarse cuidado durante esta operación para no lastimar las raíces. El hoyo deberá llenarse hasta llegar al nivel del borde inferior de la yema injertada.

(2). Con tal que esté húmeda la tierra y haya lluvia, no habrá necesidad de regar el tocón; pero si está muy seca la tierra, el tocón deberá regarse con un poco de agua inmediatamente después de ser sembrada.

(3). Inmediatamente después de la siembra del tocón, levántese sobre él un techito de hoja de palma para sombrearlo. La sombra, que deberá mantenerse en posición durante ocho días, ayudará al tocón a ajustarse al nuevo medio hasta que salgan nuevas raíces.

(4). Remuévanse cualesquier brotones que hayan salido de parte otra que la de la yema injertada. Esta precaución es necesaria para que no crezca ningún sarmiento del patrón, sino solamente de la yema injertada sobre el patrón, porque dicha yema es de la variedad valiosa que se quiere multiplicar.

CUIDO SUBSECUENTE

El cultivo y la limpia frecuentes fomentarán el crecimiento rápido. En tierras cansadas es aconsejable hacer pequenas aplicaciones de abono, tal como el "Ammo-Phos", cada dos meses. Una cucharadita esparcida al pie de cada planta será suficiente.

Dentro de un período de nueve meses a un año, cada tocón habrá producido un tallo de dos metros de largo conteniendo unos 20 a 25 yemas utilizables, las cuales, injertadas sobre otros patrones, darán una multiplicación de como 20 a uno.

Al cortar los tallos que llevan las yemas, deberá tomarse cuidado de dejar dos o tres yemas de las que se conozcan como provenidas de la yema originalmente injertada, para que ésta vuelva a retoñar, así reproduciéndose la variedad valiosa. Si se necesitan más yemas, uno o dos brotones se pueden dejar crecer. Al dejar crecer solo un brotón, se formará un nuevo tallo con

yemas dentro de seis meses; y dentro de nueve meses, si se hayan dejado crecer dos yemas, habrán dos tallos nuevos.

Al no necesitar más yemas, el tocón se podrá transplantar en su posición permanente en la plantación, dejándose crecer un solo sarmiento. Si el jardín está en el campo dentro de la plantación misma, se podrá transplantar algunos de los tocones, dejando los demás para que queden en posición permanente con su debido intervalo entre sí, de este modo transformándose el jardín en plantación.

Preparado por la Oficina de
Investigaciones de Plantas Hulíferas,
Departamento de Agricultura de los
Estados Unidos de América.

ESTABLECIMIENTO DE UN JARDIN PARA LA MULTIPLICACION DE YEMAS PARA INJERTAR

UBICACION

La ubicación del jardín para la multiplicación de yemas para injertar a menudo depende del método de hacer las plantaciones; es decir, ya haciendo el injerto en el vivero, transplantándose después las plantitas injertadas al campo (1), ya haciendo el injerto en el campo mismo sobre las plantitas nacidas de semillas que fueron sembradas en sus sitios permanentes en la plantación (2). Usándose el método No. 1, el jardín para la multiplicación de las yemas deberá estar cerca del vivero que contenga las plantitas que se van a injertar; y, usándose el método No. 2, el jardín puede situarse en el campo mismo de la plantación, resultando ser después una parte de ésta. En este último caso, los intervalos de siembra se hacen de tal manera que el jardín pueda ser transformado en plantación permanente, así evitando la necesidad de hacer un vivero intermedio.

PREPARACION DEL TERRENO

Deberá limpiarse bien el terreno y quemarse o quitarse toda la basura. Levántese un cerco alrededor del terreno para evitar las molestias de los animales. Los intervalos entre las excavaciones para los tocones dependerán del método que se use; si se escogiera el método No. 1, de multiplicar las yemas en un vivero, las excavaciones deberán colocarse con una separación de metro y medio (medida de centro a centro), una de otra, o en filas, con un intervalo de un metro de fila a fila, y con intervalos de dos metros entre las excavaciones en cada fila, para así permitir el cultivo con maquinaria. El jardín que se haga de acuerdo con el método No. 2, eso es, directamente en el campo de la plantación, deberá tener tal intervalo de planta a planta para que, al transplantar algunas de éstas a las plantaciones, las plantas que queden formen también una plantación con el mismo intervalo que las demás.

Las excavaciones para la siembra de los tocones deberán tener un diámetro de 60 centímetros y una profundidad igual; algunos finqueros prefieren hacerlas de un metro de diámetro y un metro de profundidad. La tierra sacada de la excavación deberá dejarse al lado del hoyo, escogiendo lo mejor de ella al volver a llenar las excavaciones durante la siembra de los tocones.

DESEMPAQUE DE LOS TOCONES INJERTADOS

Destapese el cajón en que vienen empacados los tocones injertados y búsquese la etiqueta metálica que llevará uno de los tocones en el cajón. Clávese esta etiqueta a una estaca blanca, para que sirva para identificar la variedad o "clon" en el vivero. Los trabajos de desempaque de los tocones deberán hacerse bajo sombra.

Sáquese con cuidado los tocones del cajón para no magullarlos. Cuidado especial deberá observarse si las yemas hayan brotado. Fórmense manojos de tocones, envueltos en arpillera húmeda, para transportarlos al jardín en donde

se sembrarán. No permítase que se sequen las raíces. El aserrín y otro material usado para el empaque de los tocones deberá quemarse después, para destruir cualesquier insectos, huevos o esporas de honguillos que contenga. A pesar de haber sido esterilizado el aserrín que se usa para el empaque, esta precaución nunca está demás.

SIEMBRA DE LOS TOCONES

(1). Acuéstese un palito recto sobre la boca de la excavación. Póngase la raiz del tocón en la excavación de tal manera que quede la yema que ha sido injertada sobre el tocón, al nivel del palito. Manteniéndose el tocón en posición vertical, échese tierra adentro de la excavación, apretándosela con los pies. Deberá llevarse cuidado durante esta operación para no lastimar las raíces. El hoyo deberá llenarse hasta llegar al nivel del borde inferior de la yema injertada.

(2). Con tal que esté húmeda la tierra y haya lluvia, no habrá necesidad de regar el tocón; pero si está muy seca la tierra, el tocón deberá regarse con un poco de agua inmediatamente después de ser sembrada.

(3). Inmediatamente después de la siembra del tocón, levántese sobre él un techito de hoja de palma para sombrearlo. La sombra, que deberá mantenerse en posición durante ocho días, ayudará al tocón a ajustarse al nuevo medio hasta que salgan nuevas raíces.

(4). Remuévanse cualesquier brotones que hayan salido de parte otra que la de la yema injertada. Esta precaución es necesaria para que no crezca ningún sarmiento del patrón, sino solamente de la yema injertada sobre el patrón, porque dicha yema es de la variedad valiosa que se quiere multiplicar.

CUIDO SUBSECUENTE

El cultivo y la limpia frecuentes fomentarán el crecimiento rápido. En tierras cansadas es aconsejable hacer pequenas aplicaciones de abono, tal como el "Ammo-Phos", cada dos meses. Una cucharadita esparcida al pie de cada planta será suficiente.

Dentro de un período de nueve meses a un año, cada tocón habrá producido un tallo de dos metros de largo conteniendo unos 20 a 25 yemas utilizables, las cuales, injertadas sobre otros patrones, darán una multiplicación de como 20 a uno.

Al cortar los tallos que llevan las yemas, deberá tomarse cuidado de dejar dos o tres yemas de las que se conozcan como provenidas de la yema originalmente injertada, para que ésta vuelva a retoñar, así reproduciéndose la variedad valiosa. Si se necesitan más yemas, uno o dos brotones se pueden dejar crecer. Al dejar crecer solo un brotón, se formará un nuevo tallo con

yemas dentro de seis meses; y dentro de nueve meses, si se hayan dejado crecer dos yemas, habrán dos tallos nuevos.

Al no necesitar más yemas, el tocón se podrá transplantar en su posición permanente en la plantación, dejándose crecer un solo sarmiento. Si el jardín está en el campo dentro de la plantación misma, se podrá transplantar algunos de los tocones, dejando los demás para que queden en posición permanente con su debido intervalo entre sí, de este modo transformándose el jardín en plantación.

Preparado por la Oficina de
Investigaciones de Plantas Hulíferas,
Departamento de Agricultura de los
Estados Unidos de América.

ESTABLECIMIENTO DE UN JARDIN PARA LA MULTIPLICACION DE YEMAS PARA INJERTAR

UBICACION

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PREPARACION DEL TERRENO

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DESEMPAQUE DE LOS TOCONES INJERTADOS

Destapese el cajón en que vienen empacados los tocones injertados y búsquese la etiqueta metálica que llevará uno de los tocones en el cajón. Clávese esta etiqueta a una estaca blanca, para que sirva para identificar la variedad o "clon" en el vivero. Los trabajos de desempaque de los tocones deberán hacerse bajo sombra.

Sáquese con cuidado los tocones del cajón para no magullarlos. Cuidado especial deberá observarse si las yemas hayan brotado. Fórmense manojos de tocones, envueltos en arpillera húmeda, para transportarlos al jardín en donde

se sembrarán. No permítase que se sequen las raíces. El aserrín y otro material usado para el empaque de los tocones deberá quemarse después, para destruir cualesquier insectos, huevos o esporas de honguillos que contenga. A pesar de haber sido esterilizado el aserrín que se usa para el empaque, esta precaución nunca está demás.

SIEMBRA DE LOS TOCONES

(1). Acuéstese un palito recto sobre la boca de la excavación. Póngase la raiz del tocón en la excavación de tal manera que quede la yema que ha sido injertada sobre el tocón, al nivel del palito. Manteniéndose el tocón en posición vertical, échase tierra adentro de la excavación, apretándosela con los pies. Deberá llevarse cuidado durante esta operación para no lastimar las raíces. El hoyo deberá llenarse hasta llegar al nivel del borde inferior de la yema injertada.

(2). Con tal que esté húmeda la tierra y haya lluvia, no habrá necesidad de regar el tocón; pero si está muy seca la tierra, el tocón deberá regarse con un poco de agua inmediatamente después de ser sembrada.

(3). Inmediatamente después de la siembra del tocón, levántese sobre él un techito de hoja de palma para sombrearlo. La sombra, que deberá mantenerse en posición durante ocho días, ayudará al tocón a ajustarse al nuevo medio hasta que salgan nuevas raíces.

(4). Remuévanse cualesquier brotones que hayan salido de parte otra que la de la yema injertada. Esta precaución es necesaria para que no crezca ningún sarmiento del patrón, sino solamente de la yema injertada sobre el patrón, porque dicha yema es de la variedad valiosa que se quiere multiplicar.

CUIDO SUBSECUENTE

El cultivo y la limpia frecuentes fomentarán el crecimiento rápido. En tierras cansadas es aconsejable hacer pequenas aplicaciones de abono, tal como el "Ammo-Phos", cada dos meses. Una cucharadita esparcida al pie de cada planta será suficiente.

Dentro de un período de nueve meses a un año, cada tocón habrá producido un tallo de dos metros de largo conteniendo unos 20 a 25 yemas utilizables, las cuales, injertadas sobre otros patrones, darán una multiplicación de como 20 a uno.

Al cortar los tallos que llevan las yemas, deberá tomarse cuidado de dejar dos o tres yemas de las que se conozcan como provenidas de la yema originalmente injertada, para que ésta vuelva a retoñar, así reproduciéndose la variedad valiosa. Si se necesitan más yemas, uno o dos brotones se pueden dejar crecer. Al dejar crecer solo un brotón, se formará un nuevo tallo con

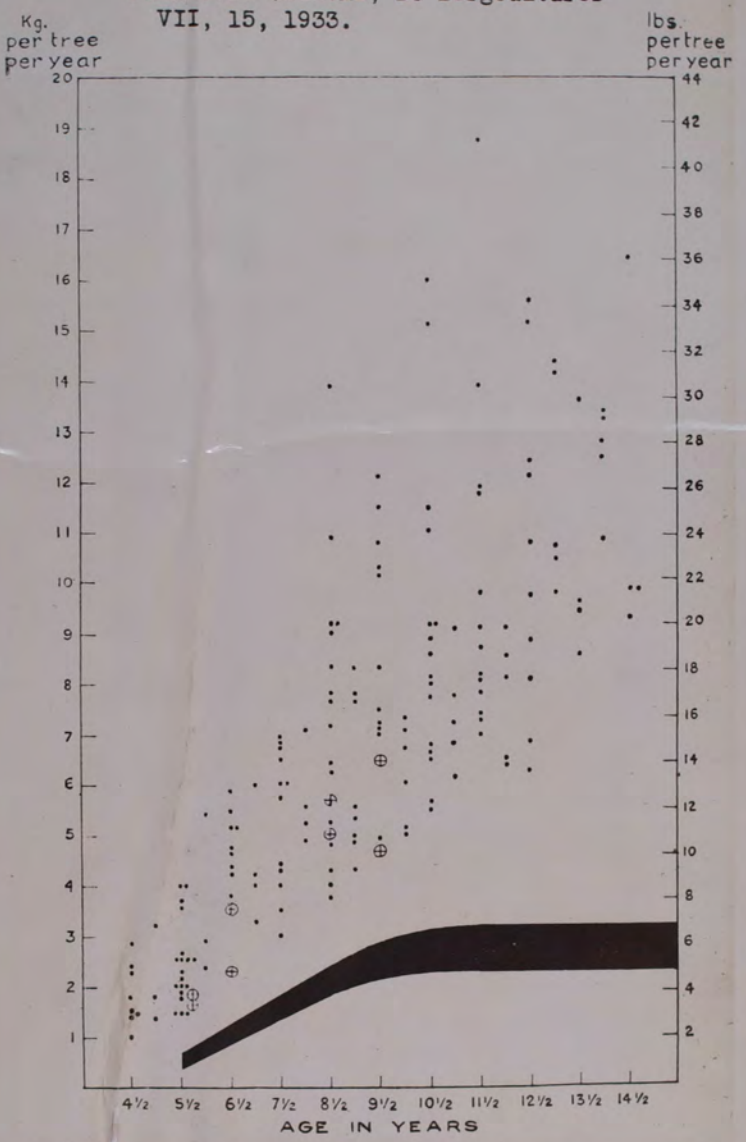
yemas dentro de seis meses; y dentro de nueve meses, si se hayan dejado crecer dos yemas, habrán dos tallos nuevos.

Al no necesitar más yemas, el tocón se podrá transplantar en su posición permanente en la plantación, dejándose crecer un solo sarmiento. Si el jardín está en el campo dentro de la plantación misma, se podrá transplantar algunos de los tocones, dejando los demás para que queden en posición permanente con su debido intervalo entre sí, de este modo transformándose el jardín en plantación.

Preparado por la Oficina de
Investigaciones de Plantas Hulíferas,
Departamento de Agricultura de los
Estados Unidos de América.

Comparative yields of Oriental clones and unselected seedlings of *Hevea braziliensis*.

From J.S. Vollema, De Bergcultures VII, 15, 1933.



The wide black curve indicates the range in tree yield of unselected seedling plantations. The dots refer to results with individual clones in experimental plots or minimum commercial acreage (calculated to tree basis). Crossed circles show average clonal yields from large commercial areas.

Calculating acre yields

First few years multiply trial yield x 200,
later 150, and at 12-15 x = 100.

[10 June 1940]

Memorandum for the American Minister

Re: PARA RUBBER PRODUCTION IN TROPICAL AMERICA

In response to your request for my personal comments on the possibilities of Pará rubber production in tropical America, and more particularly in Guatemala, I have the honor to offer the following:

During the time Mr. Hoover was Secretary of Commerce, our government undertook a survey of this subject. As a result, a publication was issued, entitled "Possibilities for Pará Rubber Production in Northern Tropical America" (Trade Promotion Series No. 40, Washington, 1926) in which was brought together a large amount of information, based on the observations of Messrs Treadwell, Hill, and Bennett, who were sent to the Tropics for the purpose.

This work, and the keen interest of our government in the subject, resulted in several experimental plantings in various parts of tropical America, including those made by the United Fruit Company in Costa Rica and Honduras. Several experimental plantings had been made previously in these and other countries.

Slightly later, the Goodyear people embarked upon a well-organised project in Panama and Costa Rica, which project in my opinion is pointing the way to successful rubber cultivation in these countries. The United Fruit Company is cooperating in this project through supplying land and certain other facilities.

It is my understanding that our government now proposes to investigate further the possibilities of this crop in northern tropical America. This is admittedly desirable. But it is my perso nal feeling, based on a good deal of agricultural work around the Caribbean during the past quarter of a century, that the time has come when we can and should push ahead vigorously with the actual development of rubber cultivation in regions which we have every reason to believe are satisfactory from the standpoint of climate and soil.

In the publication mentioned above, Treadwell, Hill and Bennett are more optimistic regarding the suitability of many regions than am I. Probably the truth is this: rubber can be grown in a great many regions, but it will be much more successful, commercially, in some than in others. For example, it is my personal feeling that Guatemala does not offer very satisfactory conditions. Some of the former banana lands in the Motagua valley are probably good, so far as soils are concerned, but the winters are inclined to be cool, and the dry season may be long. Our experiments at Tela, Honduras - not far from this region - have not been very encouraging.

The Goodyear people chose Costa Rica as the main base for their work - presumably after extensive study of the matter - and I have recently had the pleasure of going over their work with the man locally in charge, Mr. Walter Klippert. I have never seen a better organised, better conducted piece of tropical agricultural research than the one which they have done.

Mr. Klippert, who has had extensive experience in the rubber regions of Malaya, told me that the soils of the

Atlantic side of Costa Rica are fully as good as those of Malaya, if not better. Climate is considered altogether satisfactory. At a rough guess, I would estimate there are at least 30,000 to 40,000 acres of suitable land in the general area where the Goodyear people are working.

There are also some good areas in Panama, and I have particularly been impressed by an area close to the border in Colombia - the region known as Acandí, on the Gulf of Urabá. Here there are probably 25,000 acres or more of beautiful soil in a climate which should be about the same as that of the Atlantic side of Costa Rica.

Why not push ahead as rapidly as possible with the development of these areas? The facts which warrant us in doing so, as I see them, are these:

The Goodyear people have brought from the Far East, or are developing in Costa Rica, "clones" or grafted varieties of Hevea which yield three to five times as much rubber per annum as the seedling trees which constitute the great bulk of Malayan plantations. The people in the Far East are also developing superior grafted varieties, of course, and are going to plant them; but they have in production immense areas of seedlings which cannot be abandoned suddenly for the substitution of grafted strains.

A strong argument against rubber production in tropical America has always been the higher labor costs in this part of the world, as compared with Sumatra and the Malay States. This admitted fact no longer constitutes an insurmountable obstacle, for three reasons: (1) political conditions, and the emphasis placed by our government upon the desirability

of having our supply of rubber nearer at home; (2) the fact that these high-yielding strains will produce so much more rubber per acre than the existing plantations in the Far East, thus lowering the overhead; and (3) the fact that growers in the Far East have had their output restricted by governmental regulation, and have been able to ship only half their potential production for some time past.

Presumably, at the present moment all other factors fade into relative insignificance when compared with the desirability of having our rubber supply nearer at home. At best, I can see no hope of supplying American markets with American rubber (based on Pará grown in tropical America) for 12 to 15 years, since there is still one problem to be solved, and after this is done (and I believe it will be very soon) it will take time to build up stocks of grafted trees, plant them, and bring them into production (approximately six years from planting). The problem mentioned is the South American Leaf Disease, which is not known in Malaya, but which is a serious factor in all tropical American countries. The Goodyear people in Costa Rica are developing strains which are high-yielding, and at the same time resistant to this disease. There is every likelihood that they will shortly be succesful, as they already have sufficient evidence to show that this can be done.

.....

Wilson Popenoe

Antigua, Guatemala
10 June 1940

Via Air-Mail

UNITED STATES DEPARTMENT OF AGRICULTURE
BUREAU OF PLANT INDUSTRY
WASHINGTON

July 3, 1940

DIVISION OF
SUGAR PLANT INVESTIGATIONS

Dr. Wilson Popenoe,
Casa Popenoe,
Antigua, Guatemala,
Central America.

Dear Dr. Popenoe:

You have doubtless heard about the recent appropriation by Congress of $500,000 for investigations by this Department looking toward the establishment of a tropical American rubber industry. The funds will be available until expended, which, in relation to keen interest by the major rubber companies, as well as the United Fruit Company and national concern in the project as a defense measure, guarantees probably for the first time satisfactory backing of a long-period research program.

The project as now outlined calls for the making of several surveys by parties consisting of plant and soils experts one of which will be in Guatemala, Honduras and Southern Mexico. At least two experiment stations will be established, in or north of Panama and sub-stations in South America.

Remembering your long interest in the possibilities of rubber development and your intimate knowledge of the region where you are now headquartered, I am writing to beg your assistance on various questions in advance of arrival of our survey, which we hope may leave here not later than August 1.

In particular, we desire your advice and assistance in tentative selection of an experiment station site in Honduras or eastern Guatemala, the location to be as far as possible free from the threat of South American leaf disease. The station will undertake immediate propagation of disease-free superior strains and will need ultimately for nursery and subsequent experiments an area of at least one-thousand acres. We hope for local government cooperation in conducting the survey and in the acquisition of land for the station. The site should, as far as possible, take into consideration necessary quarantine measures, i.e., should not be a thorofare for tourists and at the same time be reasonably convenient for station workers and their families. Any suggestion you may have on possible sites, valuation, present condition as to plant cover, etc., also any records of Hevea plantings in that region, will be gratefully received.

Sincerely yours,

E. W. Brandes

E. W. Brandes,
Head Pathologist in Charge,
Division of Sugar Plant Investigations.
Rubber Investigations, P.E.I.

EWB:ecl

4 copies

Antigua, Guatemala, 14 July 1940

Dr. E.W.Brandes,
Bureau of Plant Industry,
U.S.Department of Agriculture,
Washington, D.C.

Dear Doctor Brandes:

Your letter of the 3rd arrived while I was on the Pacific coast in connection with the Cinchona project, to which I am at the moment devoting all my time. I am sorry for the delay in replying.

Naturally I am delighted to learn that the Department is undertaking further rubber work in tropical America, and I am sure that my chief, Mr. Turnbull, will want me to assist in any way you desire.

With regard to the best site for an experiment station in Honduras or eastern Guatemala, I am rather inclined to think that the best place would be somewhere in the vicinity of Tela or La Ceiba, Honduras. In the lower Motagua valley of Guatemala, most of the good land is still occupied by banana plantations. You want a relatively large tract - one thousand acres or more. I would be fearful that any tract of this size which you could get in the Motagua valley would not be well-drained, or have particularly good soil.

As a matter of fact, I do not feel confident that the North coast of Honduras offers large areas of really first-class rubber land. As you probably know, we made several small experimental plantings of Hevea when I first came down to Honduras in 1925-26. At Lancetilla Experiment Station, near Tela, we still have some five acres in Hevea, planted in 1926. These trees have not made

particularly good growth - probably due in part to the fact that we planted them 14 x 14 feet with the intention of thinning them out, and have never thinned them sufficiently. When your people come down, I would suggest that they make a careful study of these trees and the soils on which they are growing, as the latter are, I think, representative of what is available on the North coast of Honduras.

At the time we made these two plantings, we made one of twenty acres at Montana farm, some 15 miles East of Tela on the railroad to La Ceiba. This was a farm which had been in bananas for several years and abandoned because of Panama disease. We thought it was fairly well drained, but it proved not to be so. We tried to improve the drainage, but the rubber trees continued to do badly and we finally abandoned them.

From what I have seen of rubber (Hevea) around the Caribbean I have reached the conclusion that the large areas available in northern Honduras must be classified as marginal lands, so far as this crop is concerned. Good spots exist, of course; but even on these conditions are not too favorable, since we have a good deal of cold weather in winter and sometimes a rather long dry season.

I think it highly probable that both the Honduran government and the United Fruit Company would be glad to assist you in obtaining use of the necessary lands in this area, which from many standpoints fulfils admirably your requirements. Proximity of United Fruit settlements - and those of Standard Fruit near La Ceiba - would assure decent living conditions. Transportation facilities are satisfactory, yet at the same time you are not in the tourist zone.

Most of the lands available on the North coast of Honduras are former banana plantations, now in "guamil" or second growth, from one to fifteen years old. So far as I know, the only data regarding the behavior of Hevea in this region are those furnished by our small plantings at Tela. If you desired to carry out tapping experiments on these, or use them otherwise in connection with your study, I feel sure the United Fruit Company would be glad to cooperate fully. As you know, good rainfall records are available for this region, and at Lancetilla we have complete meteological data over a period of ten years or more. These are, of course, entirely at your disposition.

Now for a few other comments not in line with your queries, but which I offer for what they may be worth. In the first place, I have been wondering if the Pacific side of Guatemala does not offer possibilities for this crop. Knowing the dry climate of the littoral this may strike you as improbable; but I am thinking not of the flat lands along the coast but of the zone between 1000 and 2000 feet at the foot of the volcanos. Here the rainfall is very much greater than on the coast proper, and there are large areas of perfectly magnificent soils. I particularly have in mind the region between Santa Lucia Cotzumalhuapa and Retalhuleu. There is, admittedly, a rather long dry season in this zone; yet the soils are so retentive of moisture that excellent bananas are grown without irrigation. Occasionally, in particularly dry years, the fruit suffers a bit; and rubber yields might occasionally be affected by drought. But in any case I believe the matter is worth investigation by your people, and I shall be happy to cooperate in any way possible, if you wish me to do so. Coffee plantations situated in this region are not paying well at present,

and it is the opinion of many that coffee grown at low elevations may not again be profitable. In recent years a good many plantations at 1000-1500 feet have scarcely been maintained. I think many of the coffee growers would welcome an opportunity to find another crop; and I believe the temperatures throughout this zone would be quite satisfactory.

I have seen the excellent work done by the Goodyear people in Costa Rica and have had the feeling that the region in which they are working, together with similar areas which exist in Panama and around the Gulf of Urabá in Colombia are some of the most promising rubber lands in tropical America. I would like particularly to invite your attention to the regiin known as Acandí, on the West side of the Gulf of Urabá, in Colombia, just south of the Panama boundary. There is a banana development in this region but Panama disease and Sigatoka seem likely to kill it. I had occasion to go over the area two years ago and was tremendously impressed by the excellent soils. Climatic conditions should be ideal for rubber. I do not think anyone has studied the area from this standpoint. No one can say how many thousand acres are available, but it must be ten thousand - perhaps a good deal more.

I hope you will let me know if I can be of service in connection with your proposed surveys. I shall probably be in Guatemala for at least two months yet, perhaps longer.

With personal regards,

Sincerely yours,

Wilson Popenoe

Blind copy to Mr W E Turnbull

Antigua, Guatemala, 15 July 1940

Mr W E Turnbull:

I em enclosing, in duplicate, an exchange of correspondence with Dr E W Brandes of the United States Department of Agriculture on the subject of Hevea rubber cultivation in Central America. I believe this matter is of sufficient interest so that you may desire to send one of the copies to Boston.

You will note reference to the possibility of establishing an experiment station for rubber work somewhere on the Atlantic Side of Honduras or Guatemala. Our experiments at Tela have not led us to believe that this is a particularly good region for rubber production; but we have by no means exhausted the possibilities. Personally I feel that emphasis should be placed, right now, on furthering the progress of the work in Costa Rica, where we have good evidence to indicate that rubber will grow very successfully. This would also assist Mr Chittenden in his efforts to re-habilitate the Atlantic side of that country.

Sincerely,

Antigua, 15 July 1940

Personal

Dear Mr. Cabot:

Shortly before the Minister left for the United States I talked with him, and gave him a memorandum, regarding the possibilities of Pará rubber cultivation in Central America as I view them. In this same connection I think you may be interested in the enclosed exchange of correspondence with Dr. E.W.Brandes of the United States Department of Agriculture.

With best regards,

Sincerely yours,

LEGATION OF THE
UNITED STATES OF AMERICA

Guatemala, July 18, 1940.

Dr. Wilson Popenoe,

Antigua, Guatemala.

Dear Dr. Popenoe:

I wish to thank you very much for your kind letter of July 15th, with which you enclosed two letters regarding the possibility of Pará rubber cultivation in Central America.

I am also very grateful for the opportunity which we had to show your house in Antigua to the party of Congressmen who came through here last Monday. It was the high point of their visit to Antigua. I hope we did not disturb your daughters during their play when visiting the pigeon loft and roof.

With kindest regards to you and Mrs. Popenoe from us both, I am,

Very sincerely yours,

John McCafferty

July 30, 1940

Mr. W. L. Taillon
Assistant General Manager
La Lima, Honduras

Dear Mr. Taillon:

Your letter of July 23rd enclosing copy of correspondence exchanged between Dr. Popenoe and Dr. E. W. Brandes of the Bureau of Plant Industry, United States Department of Agriculture, regarding rubber cultivation in Central America.

The Department is sending out four survey parties to cover areas from southern Mexico to Peru. Under date of July 26th we wrote to Managers of those Divisions which will be visited by the parties giving details of personnel, itineraries, objectives, etc.

Naturally, we wish to do all possible to assist the Department in carrying on this work of exploration, even though we feel that planting of rubber north of Nicaragua will not be 100% successful.

Yours very truly,

A. A. Pollan

Copy to: Mr. W. E. Turnbull - Boston
Dr. W. Popenoe

UNITED STATES DEPARTMENT OF AGRICULTURE
BUREAU OF PLANT INDUSTRY
WASHINGTON

RUBBER PLANT INVESTIGATIONS
OF THE
DIVISION OF
PLANT EXPLORATION AND INTRODUCTION

August 2, 1940

Mr. Wilson Popenoe,
Antigua,
Guatemala, C. A.

Dear Mr. Popenoe:

Dr. Bressman, of the Office of the Secretary, handed me your letter of July 29 with the request that I reply direct.

With regard to your questions on the rubber survey party, my recent letter enclosing an outline of plans will probably suffice for an answer. It is very gratifying to have this second expression of your interest in the rubber project and in due course we will take the liberty of imposing on your good nature by requesting advice and assistance.

Sincerely yours,

E. W. Brandes

E. W. Brandes,
Head Pathologist in Charge.

EWB:ecl

Antigua, Guatemala, 11 August 1940

Mr J F Aycock, Manager,
Tela Railroad Company,
La Lima, Honduras.

Dear Mr. Aycock:

Dr. Baldwin tells me that he thinks Lancetilla might make a very good base for nursery work in connection with their program of experimental rubber cultivation in northern Central America. I like the idea very much. When Lancetilla was established back in 1926, its purpose was to assist in developing new crops for this part of Central America. It seems to me that Dr. Baldwin's program is right in line with this, and that it would be advantageous to Honduras and surrounding regions to have our facilities utilised as he plans.

I just want you to know that I am wholly sympathetic with the idea. As good Americans, I know we all want to do all we can to further rubber production in tropical America, and it looks to me as though we have a real opportunity here.

Before much more water runs over the dam I hope to get over to La Lima and have a good visit with you. It is a long time since I have done so. But I have not forgotten your many kindnesses of the past - not by any means.

With warmest regards always,

Sincerely yours,

Antigua, Guatemala, 12 August 1940

Mr. W.E.Turnbull:

I have spent the last three days with Dr. Mark Baldwin, in charge of the party sent down by the United States Department of Agriculture to investigate the possibilities of Pará rubber production in southern Mexico and northern Central America. Dr. Baldwin explained that his visit at the moment was unofficial, so de did not call upon any of the Guatemalan authorities; but at his suggestion I took him to pay an informal call on Mr Cabot, Chargé d'Affaires of our Legation, and on Mr. Williamson, our Consul General in Guatemala City.

We discussed all phases of the problem and Dr Baldwin impressed me as being very sound in his outlook and more conservative than the members of the commission which made a similar survey back in 1924 or 1925. He expressed himself as doubtful that the Atlantic side of Honduras and Guatemala have large areas of land suitable for commercial rubber cultivation; and is also of the opinion that the winter climate may be rather cold for best results. He was verymmuch interested in my suggestionthat certain areas on the West side of Guatemala might offer suitable conditions. When he returns here with his part in late September he intends to explore fully the possibilities in that region.

The arguments as I see them are these: There are many areas of exceedingly good soil along the lower slopes of the volcanos, between elevations of 1000 and 2500 feet, in the neighborhood (for example) of Santa Lucia Cotz., Chicacao, San Antonio, Mazatenango, and San Felipe. While they have a well-marked dry season (not considered altogether desirable for rubber) their soils are highly

retentive of moisture. Bananas are commercially grown without irrigation. Though they suffer from drought occasionally, you know what good fruit we get from areas such as San Antonio.

Dr Baldwin feels that the elevations mentioned are not prohibitive, and he feels that the dry season may not be wholly harmful since it coincides with the normal wintering season of the Hevea trees. The region is provided with more abundant labor than the Atlantic side, at a much lower rate. Most of the land is in the hands of finqueros who would view with great satisfaction the development of a new crop, particularly in the lower coffee areas where coffee is now unprofitable and even in good years not highly profitable. Though the Guatemalan government has not yet been approached on the subject, so far as I am aware, there seems little doubt that an effort to develop a new industry on the West coast would meet with great favor.

The objects of the present effort on the part of the U.S.government ate two, (1) to study further the possibilities of tropical America, and (2) to establish bases for experimentation and research. In connection with this last point, Dr Baldwin is much impressed by the situation at Lancetilla. We have, there, the only sizeable experimental planting of Hevea in northern Central America, and the trees are old ehough for tapping experiments and the provision of excellent supplies of seed. The location is a central and convenient one for distribution of plant material in Honduras and Guatemala. No preliminary work would be required to put things in shape for nursery work.

Dr Baldwin is anxious to start this year on the last-named phase. From what he told me, I infer that he will probably approach

the Company with a view to making arrangements for utilising some of our facilities at Lancetilla, and establishing there his base for experimental work in northern Central America. In additional he would make, as soon as material propagated at Lancetilla is available, small experimental plantings at one or two other places in northern Honduras, perhaps one in the Motagua valley, and certainly one on the Guatemala West Coast.

I asked Dr Baldwin to take advantage of his opportunity in Honduras to discuss with yourself or Mr Taillon any further assistance he thought I might personally be able to give his party in connection with their program.

Wilson Popenoe

UNITED STATES DEPARTMENT OF AGRICULTURE

BUREAU OF PLANT INDUSTRY

WASHINGTON

DIVISION OF
SOIL SURVEY

Tela, Honduras,
August 20th, 1940.

Dr. Wilson Popenoe,
Antigua, Guatemala.

Dear Dr. Popenoe:-

I wish to thank you, although much time has lapsed, for your very kind hospitality to me during my trip to Guatemala City and Antigua. It was not only a pleasant, but a very profitable experience for me. I am sure the information you gave me will be of great value in our investigation.

We have examined and surveyed the lands at Lancetilla suggested for a nursery site. These lands, as you know, lie in section 24 and possibly entend into adjacent sections. Some of the land pointed out by Mr. Edwards seems to me to have a little too much hazard of flood and are somewhat too sandy for good nursery soil. In my survey I have excluded such land. There remains about three and one half acres of suitable land which Mr. Edwards says is above overflow in four separate tracts. Possibly the most satisfactory lies adjacent to and just north of the planting of Hevea trees, in section 24. There is about one and one fourth acres in this tract. Mr. Edwards suggested putting one seed bed of four rows each between the Mangosteen rows. This seems feasible to me and I do not believe the shade by the Mangosteen will interfere at all with the growth of the rubber seedlings, in fact the shade may be beneficial. I have written Mr. Aycock telling him our plans and asking his permission to plant seeds in this proposed nursery.

Dr. Brandes wrote me that he wanted space for about one hundred twenty-five thousand seeds this year. These seeds are beginning to ripen in the Hevea plantings in both section seven and section twenty-four; they are ripening very slowly, however. We are taking care of them in small plantings and by storage. I presume other seeds will be shipped in from Haiti and possibly Costa Rica.

You may be interested in knowing that in section twenty-four there are one hundred thirty-six trees remaining with an average circumference of 38.7 inches three feet above the ground. In section seven there are two hundred eighty-three trees with an average circumference of 37.5 inches. The trees in both sections seem very tall relative to the girth, due no doubt to their close spacing.

I hope your work with quinine is proceeding satisfactorily. I thank you again for your kind hospitality and the time you gave me during my visit in Antigua. Remember me to Mrs. Popenoe and thank her for her hospitality, I presume she is in the midst of final preparations to leave for the States with the children.

Very truly yours,

Mark Baldwin

MARK BALDWIN

Tela, Hond.
Aug. 21, 1940

Dear Dr. Popenoe:

If you know the name of the plant from which the enclosed leaf is a specimen will you kindly tell us? The plant is a very common stoloniferous weed in the Hevea plantings at Lancetilla and is quite generally distributed in the wet lowlands. The plant has a tendency to climb. Only sterile material has been available and no one here including, Mr. Edwards knows the name of it.

Dr. Baldwin reports a fine visit with you. The other members of our party are looking forward to meeting you before many weeks. You of course know Stadelman and possibly Dr. Ted Grant also.

Sincerely yours,

T. D. Mallery

Courtesy of Dr. Baldwin

La Lima, Honduras

August 24, 1940

By air mail

Dr. Wilson Popenoe
% Mr. M. V. Molanphy
United Fruit Company
Guatemala City

Dear Doctor:

This is merely to acknowledge receipt of your interesting letter of August 12 dealing mostly with the interest in rubber production in Central America, and the use of our Lancetilla Experimental Station by the rubber people. I am all for it, and will help out along these lines.

Yours very truly

A. E. Dunstan

Tela, Honduras
September 8, 1990

Dr. Wilson Popenoe
Ardigua, Guatemala

Dear Dr. Popenoe:

I appreciate your letter of September 5, and the information regarding the Hevea plantings in Guatemala. This information will be most useful in our investigations, and I am handing your letter to Dr. Grant who will be in charge of the party after I leave. Dr. Grant and Mr. Stadelman plan now to leave here by boat for Barrios on the night of the 18th. They can reach Guatemala City the evening of September 19. They want to be sure to see you in Guatemala, but there seems to be a difficulty in that you plan to be there (or at Jacksina), September 15 to 20. In order to suit your plans they might be able to reach Guatemala City by air September 14 or 15. Or possibly you will have completed your trip to Honduras and be ready to return to Guatemala by September 20. In the latter case they can go ahead with present

plans and see you in Guatemala City about September 20, or soon thereafter.

I am leaving for New Orleans on the morning of September 11. The party, with Dr. Grant as chief, will continue as planned, and I am sure will appreciate your help and advice, as I have. You will find Dr. Grant to be entirely capable and interested in the project. May I suggest that you address him by wire or mail regarding the plans I have here proposed? His present address: Dr. T. J. Grant, Tela, Honduras - care Tela Railroad Company.

With best regards.

Very truly yours,

Mark Baldwin

Favor telegrafiarle Turnbull Lalima que comunique mis planes al Doctor Grant en Tela informandole ~~xxxxxxxxx~~ al Doctor que espere verle aqui antes salir para Houdubas

TELA RAILROAD COMPANY

GENERAL OFFICES, ONE FEDERAL STREET, BOSTON, MASS.

W. E. TURNBULL
GERENTE GENERAL

La Lima, Honduras,
September 14, 1940.

Mr. A. A. Pollan,
Executive Vice President,
Boston, Massachusetts.

Dear Mr. Pollan:

The attached letter from Dr. Popenoe to Dr. Mark Baldwin, Head of the Rubber Commission here, gives you his ideas on rubber possibilities in Guatemala.

Dr. Popenoe is coming to La Lima on September 23. He has turned over the Cinchona job to Mr. Lukens of Merck & Company, and will now be available for other jobs we have in mind for him.

Yours very truly,

W E Turnbull

Copy to: Dr. W. Popenoe
Guatemala City
Via Air Mail

La Lima, Honduras, 26 September 1940

Mr. W. E. Turnbull:

On September 16th I turned over the administration of the Cinchona project in Guatemala to Mr. Frederic Rosengarten Jr., a capable young man whose father is Chairman of the Board of Directors of Merck and Company. Shortly before this, Mr. R. P. Lukens came down from Rahway and we went over the work together. At that time, Mr. Lukens asked if I thought the United Fruit Company would be willing to have me maintain contact with the project in the future, answering any questions they might address to me through the mails, and going over the work on the ground whenever I happen to be in Guatemala and can spare the time.

I told Mr. Lukens I felt confident you would be glad to continue your cooperation in this work, inasmuch as it is a unit of the National Defense program of the United States government, and in view of the fact that it is United Fruit policy to assist in the development of any legitimate project in the Caribbean region which makes for the agricultural prosperity of these countries. I said, however, that I should of course wish to refer the matter to you for decision.

My own feeling is, that the work we do on Cinchona is not only of material assistance to the project itself, but is strengthening our Company's position in Guatemala. During the four months I have been on the job, I have maintained close contact both with officials of the Guatemalan Ministerio de Agricultura, and of the American Legation. All of these people are keenly interested in the success of the Cinchona project and I believe they appreciate the fact that our cooperation not only is helpful, but has no mercenary ends so far as United Fruit is concerned. I, therefore, recommend that Merck and

Company be informed that United Fruit is glad to continue its cooperation through allowing me to act as consultant for the project, without remuneration so far as Merck and Company are concerned. Mr. Lukens stressed their desire to cover any travelling or other expense connected with visits to their plantations; hence United Fruit will be involved in no cash outlay in connection with any future services I might render.

So far as I can foresee, this work will not take sufficient of my time so that we will need to consider charging any of my salary against Merck and Company. Personally I feel it would be best not to have an understanding on this point: they may ask for more of my time than we wish to devote to the work, whereas, if no remuneration is involved, we can give the Cinchona project only such occasional attention as will not interfere with my usual activities. If, however, the Company thinks otherwise, and wished to stipulate that any time given the cinchona will be charged against Merck and Company, I am sure they will be agreeable.

Wilson Popenoe

UNITED FRUIT COMPANY

GENERAL OFFICES, ONE FEDERAL STREET
BOSTON, MASSACHUSETTS

ARTHUR A. POLLAN
EXECUTIVE VICE PRESIDENT

September 26, 1940

Dr. Wilson Popenoe
United Fruit Company
Guatemala City, Guatemala

My dear Doctor:

I have seen copy of your letter of September 5th to Dr. Mark Baldwin, regarding rubber planting on the West Coast of Guatemala. You state that you were under the impression that a few trees were planted on the Pacific side of Guatemala but that you could not verify this.

I, too, remember that rubber was planted on the West Coast of Guatemala and was tapped as long as twenty to twenty-five years ago. I believe the older Herreras did this planting and you might be able to find out about it from them.

Kind regards.

Sincerely yours,

M. J. Donnelly

La Lima, Honduras

Sept. 27, 1940

Mr. A. A. Pollan
Boston, Mass.

Dear Mr. Pollan:

Regarding work that Dr. Popenoe has done and may continue to do for Merck & Company in Guatemala provided this work in no way interferes with Dr. Popenoe's services to us:

From attached copy of letter written to me yesterday by Dr. Popenoe you will note that Merck & Company would like very much to be able to have Dr. Popenoe act as Consultant for them in connection with their Guatemalan project. They offer to pay Dr. Popenoe for this work, but he does not think it well to receive payment from them for consultation, so as not to be bound to them in any way that would interfere with the work he does for us. I am very much in favor of our helping the Merck people out, not only on account of them, but particularly on account of the fact that I firmly believe that the Guatemalan Government is interested in the Merck project and appreciate the coöperation that we give them. Consequently, I have told Dr. Popenoe that it is in order for him to act as Consultant to these people who will feel at liberty to write to him about their project wherever Dr. Popenoe may be located. When Dr. Popenoe is in Guatemala, and without interfering with his other work, he can visit this project for a day or two and help them out. If the Merck people again require that the Doctor give them a few weeks or months of his time as was the case this year, and we can spare Dr. Popenoe, we would in that case bill the Merck Company as we are going to do now covering the period

of four months service which he recently gave to Merck & Company.

I trust that you are in accordance with my ideas regarding the above.

Yours very truly

W. E. Turnbull

cc Dr. Wilson Popenoe

October 1, 1940

Mr. W. E. Turnbull
Tela Railroad Company
La Lima, Honduras

Dear Mr. Turnbull:

For your information I quote below letter received by Mr. Coolidge from Mr. George W. Perkins, Executive Vice President of Merck & Company, Inc., which is self-explanatory.

"As I think you know, Dr. Popenoe was loaned to us last summer to help us straighten out some of our problems in Cinchona propagation and cultivation in Guatemala. Unfortunately for us, he has now gone back to the Fruit Company.

"I do want to express to you and to the Fruit Company our very great appreciation of your having made it possible for Dr. Popenoe to help us. His aid was invaluable in the immediate problems before us. We also believe he got our situation sufficiently well in hand so that we can look forward to the future with considerable confidence.

"I am sure you also know that the Government has taken a real interest in the project in Guatemala as a defense measure and, of course, Dr. Popenoe's assistance has been invaluable from this point of view as well.

"With kindest regards."

Very truly yours

R. A. Pollard

Copy to: Dr. Wilson Popenoe ✓

October 4, 1940

Mr. George W. Perkins
Executive Vice President
Merck & Company, Inc.
161 Sixth Avenue
New York

Dear Mr. Perkins:

I was very glad to receive your letter of September 27 about our Dr. Popenoe and your Cinchona project in Guatemala.

It gives us pleasure to note what you say about Dr. Popenoe's services. We are glad to have contributed in this way to your good project, and whenever we can do so in the future, we shall derive great satisfaction from letting the Doctor assist you with your problems. I know that he enjoys doing this.

You will shortly hear from our Boston office regarding the account for Dr. Popenoe's services recently rendered.

Kindest regards.

Sincerely,

[Walter Turnbull]

cc Mr. A. A. Pollan
Dr. Wilson Popenoe
) With copy of letter above referred to.

La Lima, 4 October 1940

Mr. W. E. Turnbull:

This is to put on record the results of yesterday's meeting with the Rubber Survey Party of the United States Department of Agriculture. At this meeting the following were present: Dr. R. D. Rands, who is in general administrative charge of the field work being done throughout tropical America in conjunction with the present investigation; Mr. Manifold, rubber technologist of the Department, with experience in the Far East; Dr. T. J. Grant, who originally came down as Plant Pathologist but who has been in charge of the local party since the return of Dr. Mark Baldwin to the States; Mr. Stanwood, the horticulturist who has recently come here from the Canal Zone Experiment Gardens to take charge of the rubber nurseries the Department of Agriculture is establishing at Lancetilla Experiment Station; and on our side, yourself, Mr. R. M. Beasley, Mr. George F. Bowman, and myself.

Dr. Rands explained that the United States government feels that use of the high-yielding strains now available will make possible the competition of Latin America with the Far East in spite of the differential in labor costs. The industry in the Far East is based upon seedling plantations of relatively low yield. These plantations cannot suddenly be eliminated; it will be twenty-five years or more before they can be replaced by plantings of grafted trees of the high-yielding strains.

The Department's program is approximately as follows: To develop several bases in tropical America where extensive nurseries can be operated, where the high-yielding varieties from the Far East can be planted and propagated, and where young grafted stock of these strains can be supplied to experimenters for test planting in as many promising localities as possible.

So far as Central America is concerned, the investigations carried out to date have led the Department to feel that these purposes can best be served by working in Costa Rica, in cooperation with the Goodyear people, and by working at Lancetilla Experiment Station. Dr. Rands points out that the experimental plantings established by our Company about 1925 in Costa Rica, Almirante, and at Lancetilla, are of tremendous value and importance to the project. Without these plantings, they would be forced to lose much time.

They consider that larger and better areas are available for rubber in Costa Rica and Panama than here in Honduras. They are interested in the Guatemala West Coast as a possibility, and propose to establish nurseries in that area, as well as at Lancetilla. The situation in the Costa Rica-Panama region is complicated by the presence of South American Leaf Disease, which has not yet reached the Honduras-Guatemala region. The Goodyear people have made great progress toward the selection of high yielding clones which are at the same time resistant to this disease. It is felt that such strains will almost certainly become available in the near future. But this does not solve the problem of propagation. To grow these selected clones, it is necessary to have extensive nurseries of ordinary seedlings. These seedlings are not resistant to leaf disease, and at present there is no way to obtain seedlings which are resistant. It is therefore highly desirable to provide nurseries in an area where the disease is not present. This is the major advantage offered by Lancetilla.

The Department proposes to place Ted Grant in Costa Rica, where he will study the pathological problems (primarily the control of South American Leaf Disease) and will cooperate with the Goodyear people. In this connection, Dr. Rands intimated that they would probably wish to establish headquarters at Turrialba, and he asked if you thought the Company might be willing to sell or

lease the old site of the overseer's house at that place, so that they could construct quarters and laboratories there.

The Department further proposes to make the major base for work in the northern area Lancetilla Experiment Station, and to this end has brought Mr. Stanwood here to take charge. They propose to erect a portable house on the hill where we formerly had our staff house, for use of Mr. Stanwood and family. They have indicated that they will need about 40 acres of land for nursery purposes. Mr. Bowman and I have gone over that phase of the situation with them, and have pointed out areas which are available, and which we feel confident will prove satisfactory. The Department has cleaned up our two small plantings of Hevea, those in Section 24 and Section 7. They have harvested all seeds available to date, and have planted more than 70,000 in nursery beds which they have prepared in Section 24. They propose to continue planting this season, using all seeds which will be produced (perhaps 50,000 more); and they propose to bring here from the Philippines, in the very near future, about 2000 grafted "stumps"(dormant buds) of the best high-yielding clones. These trees will be planted at Lancetilla to provide propagating material in coming years. As rapidly as grafted trees of these high-yielding clones are locally available, they would propose to distribute them among interested parties who desire to conduct experimental plantings.

Dr. Rands has drawn up a general form of agreement covering all of the above, which he proposes to submit to the Department's solicitor, then to the United Fruit Company. This agreement is necessary from their standpoint, as providing a basis on which they can make expenditures. So far as the northern area is concerned, our proposed cooperation consists almost wholly in allowing the Department to use the facilities of Lancetilla Experiment Station,

including such areas of land as may be available, and as they may desire, for rubber nurseries. This cooperation involves the Company in no cash outlay, and seems wholly appropriate in view of (1) the fact that the present rubber work is part of the National Defense program, (2) there seems to be a strong probability that this effort may result in developing a new crop for many of those regions which formerly grew bananas, but which now, through the ravages of Panama disease and Sigatoka , are in deplorable economic condition, and (3) it is for precisely this kind of work that Lancetilla Experiment Station was originally founded.

Dr. Rands and Mr. Manifold, both of whom are familiar with rubber in the Far East, have expressed themselves as favorably impressed by the growth made by our experimental plantings both here and in Costa Rica. They point out that some of the old views regarding the climatic and soil requirements of Hevea are changing. They are coming to feel, for example, that a climate uniformly moist the year 'round is not necessary, and on this basis they are considerably interested in the Guatemala West Coast, where there are large areas of excellent soil available and where a new crop is a crying need.

All in all, it is our feeling that this project not only holds great hope for many local agriculturists, but that there is also a possibility that we might ourselves wish, later on, to take up rubber production on some of our abandoned banana lands in several of the Central American divisions. Naturally the whole subject requires much further study, and much time must pass before we can consider anything more extensive than small experimental plantings in various areas. We are of the opinion, however, that such plantings should be made by us, just as soon as the government is able to provide grafted trees of the high-yielding clones for this purpose. Such a move would not only prove worth while from our own standpoint, but also, would assist in paving the way

for sound development by private growers in those areas involved.

Wilson Popenoe

October 9, 1940

Mr. George W. Perkins
Executive Vice President
Merck & Company, Inc.
161 Sixth Avenue
New York, New York

Dear Mr. Perkins:

As you know, Dr. Wilson Popenoe recently completed his assignment with your Company.

It is my understanding that your Mr. R. P. Lukens, during his recent visit to Guatemala, asked Dr. Popenoe whether the United Fruit Company would be willing to have Dr. Popenoe maintain contact with the Cinchona project, answering any questions that you might address him through the mails, and going over the work on the ground whenever he happened to be in Guatemala and could spare the time. We are quite willing that Dr. Popenoe do this and without any remuneration other than his travelling and other expenses connected with visits to your cultivations. Of course, if you should require Dr. Popenoe's services for any extended periods we will bill you with the amount of his salary for such periods.

I am enclosing herewith our bill covering Dr. Popenoe's salary for the period he was with you, May 16th to September 15th inclusive.

Yours very truly,

Enclosure

BC: Mr. W. E. Turnbull
Dr. W. Popenoe

UNITED STATES DEPARTMENT OF AGRICULTURE
BUREAU OF PLANT INDUSTRY
WASHINGTON

RUBBER PLANT INVESTIGATIONS
OF THE
DIVISION OF
PLANT EXPLORATION AND INTRODUCTION

Bananera, Guat.
Oct. 13. 1940

Dr. Wilson Popenoe
Antigua, Guat.

Dear Doctor Popenoe-

We have spent a very interesting few days here going over much of the valley lands in development. Mr. Losey and Mr. Fowler were both most helpful in examining the lands.

Tomorrow we go over the lower valley, and on Tues. they will go with us, using the Frutis company launch, to spend two days in the Lake Izabal region. From there we will go up the Polochic River and overland to Coban. Then we will examine the area to the north, including the planting of Hevea on Mr. Dieseldorff's place, which you mentioned to Dr. Baldwin.

If things go well we should be back in Guatemala City about the 22 nd. When we reach there, we will get in touch with you relative to plans for examining the west coast and other points.

Mr. Stadelman is assisting Dr. Roberto Estrada in planting a small nursery at Finca Chitalon. Some seeds were being sent to Mr. Owen Smith.

Best regards to Mrs. Popenoe & yourself.

Sincerely. C B Wamiford [C.B. manifold]

TELA RAILROAD COMPANY
Office of the General Manager

La Lima, Honduras

October 17, 1940

Mr. A. A. Pollan
Boston, Mass.

Dear Mr. Pollan:

Attached hereto is memorandum of October 13 to me from Dr. Popenoe as regards usefulness of the Lancetilla Experiment Station in connection with the coöperative work being done by our Company with Latin-American governments.

Yours very truly

W. E. T.
[Walter Turnbull]

cc Mr. J. F. Aycock
Dr. Wilson Popenoe

Research Department
La Lima, Honduras
October 24, 1940

Mr. J. F. Aycock:

Regarding the Kohler electric light plant at Lancetilla.

This plant is old and has been costing around $150 a year for repairs and operation. It will doubtless cost more than that in the future.

Mr. Fox advises me that a new plant would cost around $500 but that it would cost only $250 to extend the power line from Tela to Lancetilla with practically no upkeep.

In view of the fact that we would save money over a two year period by making such an extension and that we shall likely have use for more power there in connection with the rubber development, I recommend that we make this change if possible in the near future.

V. C. Dunlap

CC: Mr. Verne Fox
Dr. Wilson Popenoe

Tiquisate, Guatemala
November 7, 1940

CONFIDENTIAL

Memorandum re work done in Guatemala by Rubber Survey Party of the United States Department of Agriculture, October-November 1940.

Mr. W. E. Turnbull:

The past two weeks have been spent cooperating with the above-named party, principally in their survey of the West Coast area. I accompanied Messrs. C. B. Manifold and T. J. Grant through this area, from Escuintla nearly to the Mexican border. Previously these gentlemen had spent considerable time in the lower Motagua valley; in the Lake Izabal region, and the Polochic valley; and in the Coban region.

Their first interest, here in Guatemala, was to locate and study any plantings of Hevea brasiliensis existing in this Republic. They were able to find only one planting, that made some years ago by Erwin P. Dieseldorff at Finca Cubilquitz, some nine leagues northwest of Coban. Here there are some thirteen trees in good condition. Other plantings of which they had received reports turned out to be, in every case, Castilloa instead of Hevea.

The preliminary survey of Guatemala has now been completed. From my talks with Mr. Manifold, in charge of the party, I have received the following impressions which, pending publication of their report at Washington, should of course be considered confidential.

They estimate that there are, in the lower Motagua valley, some 20,000 acres suitable for cultivation of Hevea, and a further 10,000 in the Izabal-Polochic area. They were not favorably impressed by what they saw north of Coban: they report a limestone area with "pot holes" of small size which might be suitable, but they do not consider the region as a whole satisfactory.

The major area in Guatemala which they consider of promise is on the West Coast, in the lower foothill belt mainly between Chicacao and the Mexican border. In general, they found that the farther one goes towards Mexico, the heavier are the soils, and they much prefer the heavier soils - the clay loams and light clays - to the black sandy loams such as those of the Escuintla area. They also consider that rainfall is more satisfactory toward Mexico. Mr. Manifold expressed himself on several occasions as confident that areas such as San Antonio, Such., the Costa Grande, and the Tumbador zone can grow Hevea satisfactorily, in spite of the longer dry season than is customary in most of the major rubber-producing areas of the world. It was his feeling that elevations between 1500 and 3000 feet will prove to be the best, because of their higher rainfall than areas closer to the sea. He made a rough estimate that there are 100,000 acres suitable for rubber on the West Coast, without taking into account the later possibility of irrigation.

Arrangements were made with the Estrada family, owners of Hacienda Chitalón, close to Mazatenango, for the establishment of a rubber nursery, and 9000 seeds from Lancetilla were planted to produce stocks on which they will later graft some of the high-yielding types they plan to bring here from the Eastern tropics. It is Mr. Manifold's idea to use these trees for the establishment of some ten or more small experimental plantings, to be scattered along the coast on the properties of reliable and progressive agriculturists.

Just at the moment of terminating their survey, word was received from Washington that the Department is considering the advisability of centering much of its Hevea work on the Guatemala West Coast, instead of in Costa Rica as was originally planned. This change in policy seems to have been due to (1) the fact that the presence of South American Leaf Disease in Costa Rica handicaps all work done in that area, and (2) Dr. Bands, with whom you talked

at La Lima, and who is in administrative charge of this program at Washington, was very favorably impressed by what he saw in the Mazatenango-San Antonio zone when he visited it a few weeks ago.

Consequently, Messrs. Manifold and Grant called upon the Guatemalan Foreign Minister in company with Mr. John Cabot of our Legation, and discussed the possibility of extensive experimental work in Guatemala. It is my understanding that Mr. Manifold hoped the Guatemalan government might be able to provide suitable land for this work, which is to include long-time breeding of superior types of rubber, using selected seed to be brought from the East. No definite decision seems to have been reached. If the Guatemalan government cannot supply land, then it is my understanding that the U. S. Department of Agriculture will consider the possibility of obtaining by lease, suitable land for the purpose.

W. Popenoe

Wilson Popenoe

Copies: Mr. A. A. Pollan
Mr. W. E. Turnbull (2)

Air Mail

UNITED STATES DEPARTMENT OF AGRICULTURE
BUREAU OF PLANT INDUSTRY
WASHINGTON

RUBBER PLANT INVESTIGATIONS
OF THE DIVISION OF
PLANT EXPLORATION AND INTRODUCTION

December 17, 1940.

Dr. Wilson Popenoe,
Casa Popenoe,
Antigua, Guatemala,
Central America.

Dear Dr. Popenoe:

During my pleasant conference with you at La lima, Honduras, you expressed interest in learning more details regarding the Cinchona plantings in Java.

On returning here I looked up Java Cinchona literature in the Library and found that the "Verslag omtrent's Lands Kina - en Thee - Bedrijf" is complete only for the years 1915 to 1930 (inclusive), and gives little more detail on actual methods than the enclosed booklet. This booklet and the accompanying photographs were secured in 1929 during a conducted tour of the Tjinjiroean Estate participated in by Dr. Oswald Schreiner and myself as delegates to the Fourth Pacific Science Congress. Dr. Schreiner had a larger supply of film so most of these photographs were kindly supplied by him. I hope they will give some idea of field procedures and condition of plantings.

Dr. Grant has forwarded us from Guatemala some disease specimens of Cinchona. The determinations will be sent you within the next 10 days, or as soon as the mycologists have completed their examinations. There is a considerable Dutch literature on diseases which I shall consult specifically in regard to your leaf trouble described by Grant. The Dutch apparently have done some breeding and selection for resistance to their local troubles, and if this C. A. disease is identified as one of those there might be some valuable hints in their literature. In this connection I was dismayed to learn that the Bureau turned down a 3 months' loan of Wellman to Merck & Co. to conduct a preliminary study of the problems in Guatemala. The feeling was that the period was too short to accomplish much. Wellman is a good pathologist as you know, and is doing fine work, although not of an emergency nature.

During the visit of our Rubber Survey Party No. 3 to Almirante, Mr. J. H. Permar showed them his work with Pili nuts (Canarium Ovatum) and asked for a list of literature on this interesting tree. This has been attended to but I thought you might be interested in

copies, which are also enclosed with this letter.

Knowing your long interest in rubber, I am also enclosing a photostat copy of the most recent published graph showing the contrast between seedling and clonal yields. The leaf-blight resistant clones which we are now beginning to propagate at Lancetilla will not reach as high as those near the top of this graph, but are nevertheless several times more productive than unselected seedlings on which the majority of Oriental yields are still obtained.

The proposed cooperative agreement with the United Fruit Company is still in the Department Solicitor's Office. When it is finally returned we shall forward you a copy at the time the original and two copies are sent to Mr. Turnbull as suggested at La Lima.

Dr. Dunlap and Mr. Stanwood have lately examined one or two localities on the North Coast of Honduras for their suitability under wet-season conditions for growing rubber. It is our hope that both United Fruit and Standard Fruit will cooperate in establishing in Honduras at least one demonstration planting, each on one of their abandoned farms in a locality containing considerable potential rubber acreage. However, there may be some individual growers with sufficient resources and promise of stability to handle initial demonstration plots.

Letters from Stanwood notifying us of his full use of the quarters at Lancetilla were indeed most gratifying to us, as such will save our appropriation much expense in providing our own house and facilities. Dr. Brandes has formulated a letter of appreciation to accompany the Cooperative Agreement to Mr. Turnbull, expressing the thanks of this Division not only for the assistance rendered the survey parties throughout Central America, but specifically the furnishing of Lancetilla and the help given by you and the men at La Lima in getting our work established there. A similar letter was sent some time ago to President Cooledge by the Secretary of Agriculture.

With best season's greetings.

Sincerely,

R. D. Rands

R. D. Rands
Senior Pathologist

RDR:GR

AEROGRAMMA VIA PAN AIR

PAN AMERICAN AIRWAYS SYSTEM, a maior rede de transportes aereos do mundo

c/o US Consulate
Manaos, Brazil
December 22, 1940
Belem (Para) tonight

Dr. Wilson Popenoe
Antigua, Guat.

Dear Doctor Popenoe:

I certainly did not mean to run out on you like it appears. But on the evening of Dec. 5th I had a wireless from Dr. Brandes to proceed at once to Belem and take over the party making the Brazilian survey. We rushed around and I made the plane out on morning of the 7th. Stopped three days in San Jose' to talk things over with Klippert and then on down to Port of Spain where I cought up with Mallery, also on his way to join the Brazilian survey party. In Trinidad we saw Mr. Robinson, who has a Hevea planting and is a leader in Agri. in the Colony, also stopped out to see Dr. Worley at the station in the evening. Have been here since the 12th, waiting to get a plane out up river. It looks as if wewill make it on the 24th. That will be to Manaos and we are headed for Porto Velho and the Acre Territory.

All of above explanation is to express the reasons why we regretfully need to abandon the idea of a very Merry Christmas with you. But just the same we are heartily wishing both Mrs. Popenoe and you a happy celebration and much good cheer with your many friends in that locality. It is pretty hard for gypsies to celebrate much of anything except making and breaking camp. We missed out Thanksgiving with you, but have had many very pleasant hours there and enjoyed fully the splendid hospitality that lives in your unique and famous home. Besides the pleasantness of being associated with you for a very happy period, we are extremely grateful for the very real assistand that you provided in giving time and expert guidance to our wanderings. I will always look back on that period of our survey with pleasure and have already marked down Guatemala and especially Antigua, as a place I must be sure to bring my family just as soon as time and fortune permit.

I have not heard from Grant as to whether he has a chance to see you before leaving. I left an extra copy of comments on the soils and rubber possiblities of Guatemala and suggested that he see that you got a copy, just so we can have something to argue about one of these days. We have nto given up hope of getting something started there before other countries take up all the slack. Guat. will never be a rubber empire, but there is sufficient suitable area and a fine class of real planters who can put the thing over in a reasonable fashion. I was especially glad to have the opportunity to see Velasques and meet Manuel Herrera.

We feel that we have left the door open for the authorities to change their minds and give the plan a chance. At any rate we dont feel that we wasted our time entirely and certainly have no bitter attitude against any part of the organization. They cant be blamed entirely for not plunging into the venture when there are so many angles to be made clear. Dr. LaRue will take over the party and call in Guat. again before going to Mexico or at least before closing out the work in Central America.

They are opening a consular office in Manaos and Mr Hubert Mannes is going up with us to take charge as Vice-consul. I am using his typewriter and doing queer things to it. There is a lot of Federal interest in rubber in the Amazon, the Ministry of Agri. having assigned four very fine men to the party, including Dr. Ducke. The State government of Para' is not quite sure yet that Wickham is dead, at least it doesn't take much to bring him out of the grave. They have a splendid set of buildings and grounds here as a reseach station but lack men to run the place. We will be setting out a number of plants of the best material that we can get, so that this place should become in time a worthy center for propogation and testing of material. Mr. Pohlamus is arriving in about a week and will look after the plantings until Mallery is released from the survey, when he will stay here.

Bangham was here when we arrived, having just finished three weeks on Ford's place. He gives a very optomistic report. One thing that pleased me most was that growth has been about as good as in Sumatra at the end of their six months dry period. They have an ideal soil on Belterra, what we consided the best in the Valley. It has 90 % clay, Doctor, and is so level that there is no chance for run-off. The next thing will be to learn the yields. Present checks show dry rubber content of 48%, when it should be about 30%. Dry atmospheric conditions produce such concentrated latex and affect the tubes so that yields are likely to be low, but Indo-China, with a long dry season corrects that by tapping at night. Wonder how Guat. Indians would like that? There will be a tree or a system found so that Guat. can be right along with the rest on rubber if she wants to.

Needless to say, I am very glad to be back in the Amazon and pick up rubber where I first met it sixteen years ago. We will have some setbacks here too but the thing must go ahead eventually even if there were no more wars for we want these lands used and to help build a sounder economy in Latin America. The United Fruit has done a termendous lot in that line, but cant be expect- to do it all forever.

Again, I wish to express our very sincere appreciation for all the pleasant associations and real help of the Popenoes.

Sincerely - C. Blumenfeld

Antigua, Guatemala, 23 Dec 1940

Dr R D Rands,
Bureau of Plant Industry,
Washington, D C

Dear Doctor Rands:

Many thanks for yours of the 17th, with enclosures. The pamphlet in Cinchona contains a good deal of information which is new to us. It will help us greatly in several respects. The photographs are very interesting and we are delighted to have them.

I am going to send the data on Canarium over to Stanwood at Lancetilla, since we have at least three species growing there. I believe we can do something to help popularise these trees in tropical America. Joe Permar has been boosting them for some years now.

We shall be glad to hear what you find on the Cinchona specimens which Ted Grant collected at Naranjo. We have been a little slow in looking into the fungous diseases of this tree, which is the reason we suggested that Wellman come down. I have no doubt the folks at Washington are correct in thinking three months too short a time to do a serious job; but I do hope some arrangement can be made next year to get something done, Perhaps J R Johnston, who is here at the Agricultural School, can tackle the job. I will talk to him about it.

The graph on rubber yields is highly interesting, in fact it will go on my wall. I have not heard much about rubber since your party left here a couple of weeks ago, but I am heading for the coast this week and will check up on the several small nursery plantings and if possible on yours at Chitalón. Manifold

told me you were favorably impressed by the soils of the San Antonio region. I am glad. It remains to be seen what the dry season will do to rubber. The interest which has been stimulated will result in sufficient small plantings throughout all that region to give us a test, even if you are not able to go ahead with the program you had planned.

It was a great pleasure to work with your party here in Guatemala. I learned a lot from Manifold, who impressed me as extremely sound and practical in his outlook. I have had a letter from Stanwood, who seems to be getting along well at Lancetilla. The arrangement there seems to be mutually advantageous; at least I can say, from our side, that we are delighted to have so keen and active a plantsman living there, for he is sure to make use of his opportunity to observe some of the material we have available in our plant collections. Dunlap was over here a couple of weeks ago and told me the Stanwoods are much liked by our Tela colony. I am truly delighted that we were prepared to cooperate through furnishing the facilities at Lancetilla.

Please give my regards to Dr Brandes and dont hesitate to let us know at any time you think we can be of further service in connection with the rubber project. That's what we are here for.

Cordially yours,

Copy to Dr. Popenoe

December 26, 1940.

Mr. W. E. Turnbull,
Assistant Vice President,
Tela Railroad Company,
La Lima, Honduras.

Dear Mr. Turnbull:

A proposed cooperative agreement between this Department and the United Fruit Company pertaining to rubber investigations in Latin America is submitted herewith for your consideration and possible recommendation for approval by your Company. It has finally been approved here by our Department's solicitors and in subject matter by the Bureau of Plant Industry.

It is my understanding that the essential provisions of this proposed agreement remain unchanged from the tentative outline informally discussed with you and associates by Dr. Rands during his visit to La Lima in October. You will note that the agreement is divided according to the two main subdivisions of our program, viz., (1) experiment station activity and (2) practical field demonstration plantings. Under the first section the work at Lancetilla is naturally classified, and under the second any cooperative demonstration plantings on Fruit Company land that may be mutually agreed upon. Both sections were sufficiently broad to include any future increase or change in cooperative activity, because agreements of this sort are usually continued over a long period of years.

When approved and signed, the agreement should be returned here for signature in the Secretary's office, after which it will be photostated and as many copies returned as your company requests.

It is the policy of this Department to cooperate with the local government in which any particular activity is located, and not solely with private individuals or companies therein. For example, in Honduras we were gratified that the local government representatives with our survey party suggested that we accept your kind offer of facilities at Lancetilla, and we anticipate that they may recommend location of one or more of the demonstration plantings on abandoned farms of your Company.

A copy of our proposed agreement with the Government of Honduras is enclosed for your information. Both English and Spanish versions will be submitted to Tegucigalpa in the near future. This agreement covers both experiment station and cooperative field plantings. It invites technical collaboration and anticipates eventual handling of the advisory, or extension-educational aspects of a commercial industry exclusively by trained personnel of the Honduran Government. A simplified type of agreement is being concluded with most of the countries where we will not maintain an experiment station, but where there is active interest in promoting a local rubber industry.

Lancetilla will be our principal progagation and breeding station, and in Costa Rica disease investigations and clonal resistance tests will be conducted at a new station now being established on land furnished by the Costa Rican Government. Technical personnel will also be headquartered in Brazil, Haiti, and Panama. In the immediate future our staff will concentrate on the multiplication of existing high yielding, disease resistant clones and their establishment and continued multiplication at a limited number of carefully selected demonstration farms in potential rubber producing areas of the various countries.

I need not emphasize to you the necessity of our supervising every stage of these initial undertakings. Your demonstrated success with the banana industry, utilizing the type of labor available in Central America, is our chief source of encouragement, in addition to our knowledge of the success of the native rubber industry of the East. If the latter can succeed, as it has for the last two decades, we may feel confident of the Latin Americans. However, a combination of individual and corporation enterprise is, of course, most desirable.

When our surveys have been completed and recommendations formulated, it is hoped the United Fruit Company may take a substantial interest in one or more of the commercial demonstration plantings. In view of the Company's pioneer experimentation with seedling rubber in Tropical America and its long experience with local conditions, I would feel confident of the outcome.

The preliminary part of our program involving surveys of potential rubber growing districts is now nearing completion. Our survey parties in practically all of the countries visited have reported invaluable assistance and advice from local officials of the United Fruit Company. Permission to examine Company soil maps and weather data, the furnishing of transportation, guides, and other tangible direct help have greatly facilitated the work.

In fact, the spirit of help and personal attention given our parties by every Company official with whom they came in contact could only be motivated by a genuine interest in the welfare of those countries. Although such cooperation will be duly acknowledged in the official reports, I am taking this opportunity of expressing our appreciation.

Sincerely yours,

EWB

E. W. Brandes
Head Pathologist in Charge

Enclosure

RDR:GR

cc: Dr. Wilson Popenoe,
Antigua, Guatemala.

Antigua, Guatemala,
2 January 1941

Dr. R.D.Rands,
Bureau of Plant Industry,
Washington D C

Dear Doctor Rands:

During the past few weeks I have had opportunity to see your rubber nursery at Chitalón near Mazatenango and the other Hevea nurseries on the West Coast. It occurs to me that you may be interested in knowing how things are coming along.

I was greatly pleased at the obvious indications of good care shown by the Chitalón nursery. Though I visited the place a day or two after Christmas, when agricultural activities in all parts of Christendom are perhaps inclined to be neglected a bit, men were busy irrigating; the nursery was clean and in good tilth; and the plants appeared to be in fine condition. We made an estimate based on the counted plants in one bed, and believe there are at least five thousand plants now growing. Leaf-cutting ants have been giving some trouble. I do not know how far this may go.

At Hacienda Velasquez there are some 75 plants in nursery, with which Don Manuel Herrera expects to establish a small experimental planting. These plants were grown from seed I brought over from Lancetilla in October.

At Finca Panama, Owen Smith and Co., there are about 90 plants growing in nursery, f om seed furnished by your Survey Party, source, Lancetilla.

At Finca Los Castaños, Chicacao, there are about 100 plants in nursery, from seed I brought over from Lancetilla in October.

These constitute the only plantings on the Pacific side of Guatemala of which I have knowledge. I do not know anything regarding the distribution of the seeds from Lancetilla which were furnished Don Mariano Pacheco, Director General of Agriculture, by your Survey Party.

Since I am expecting to leave Guatemala within the next fortnight and may not return for some months I may not be able to see these plantings again for some time; but if none of your own men visits Guatemala during the early part of this year I will try to give you another report when I do get back. Perhaps Mr. Stanwood will be comigg over here some time in the spring, in connection with the Chitalón nursery, and can take a look at the lots mentioned above.

With best regards always,

Sincerely yours

Wilson Popenoe

cc Mr W E Turnbull

UNITED FRUIT COMPANY

GENERAL OFFICES, ONE FEDERAL STREET, BOSTON, MASS.

W. E. TURNBULL
ASSISTANT VICE PRESIDENT

LA LIMA, HONDURAS, C. A.

January 6, 1941

Dr. E. W. Brandes
United States Department of Agriculture
Bureau of Plant Industry
Washington

Dear Dr. Brandes:

This will acknowledge receipt of your letter of December 26 ultimo relative to an agreement between that Department and the United Fruit Company pertaining to rubber investigations in Latin-America.

I read with interest the proposed cooperative agreement which you sent on to me -- I find that it covers all the points which came up for discussion when I talked to your Dr. Hands during his visit to La Lima last October.

I thank you for the copy of your proposed agreement with the Government of Honduras. I also found it interesting, and am confident that the Government of Honduras will very gladly enter into such an agreement with your Department.

As regards the proposed cooperative agreement between your Department and the United Fruit Company, or perhaps the Tela Railroad Company: I am sending copy of this agreement to our Executive Vice President, Mr. A. A. Pollan, at No. 1 Federal Street, Boston, Mass., recommending it and asking for authority to have it signed for the Company, either here or in our Boston office. Within a short time you will be hearing about this matter, either direct from our Boston office or from me.

Yours very truly,

cc Mr. A. A. Pollan
Mr. J. F. Aycock
Dr. Wilson Popenoe

La Lima, Honduras

January 6, 1941

Mr. A. A. Pollan
Boston, Mass.

Dear Mr. Pollan:

Attached hereto is copy of letter written to me on December 26 ultimo by Dr. E. W. Brandes of the United States Department of Agriculture -- also attached is copy of the proposed agreement which that Department wishes to sign with our Company, and copy of proposed agreement with the Department of Agriculture wants to enter into with the Government of Honduras. I am keeping the original of the document submitted to us for signature. I see nothing in this document that we could possibly object to, consequently, I recommend our entering into it. I would suggest that if you want the document signed by someone here, we ask Mr. Aycock to do so -- this particularly because I may be absent when needed here for the signing of the document. Please give me your instructions.

Yours very truly,

W. E. Turnbull

cc Mr. J. F. Aycock
Dr. Wilson Popenoe

UNITED STATES DEPARTMENT OF AGRICULTURE
BUREAU OF PLANT INDUSTRY
WASHINGTON

RUBBER PLANT INVESTIGATIONS
OF THE DIVISION OF
PLANT EXPLORATION AND INTRODUCTION

February 17, 1941

Dr. Wilson Popenoe,
United Fruit Company,
Havana, Cuba.

Dear Dr. Popenoe.

Mrs. C. H. Popenoe tells me you are in Havana for some months so we are enclosing our latest rubber News Letter to you there. Knowing your interest in our program we have taken the liberty of putting your name on our regular mailing list. The program is progressing satisfactorily, as you will note from this enclosure.

We have not as yet heard from Boston regarding the proposed cooperative agreement which Mr. Turnbull stated he was forwarding and recommending approval. We suppose the delay means merely that the Fruit Company lawyers are going to take as much time on it as the solicitors of this Department did earlier.

My old colleague at Buitenzorg, Mr. J. E. A. den Doop is now in this Country after twenty-five years' investigational work on various plantation crops in Java. With a premonition of coming events he has transferred his savings to this Country, resigned his job as Director of Research with the Anglo-Dutch Estates,and has already completed the initial procedure for becoming an American citizen. Since he is only fifty-two he can not think of stopping an active life and retiring, so he is attempting now to secure some sort of employment in this Country. Right now he is in the South hoping to line up something on either fibers or starch-producing crops with which he has had extensive experience both as an agronomist and in the factory operations. In 1938 he made a lengthy trip for his Company to this Country and Mexico, and on his way back spent some months in Germany studying the latest machinery developed there for handling ramie and abaca fibers.

Should he be unsuccessful in lining up any sort of work in this he will, of course, be interested in going to the American tropics. Dr. Barker, I believe, has written to his friends of Standard Fruit in Haiti,and I told him that I would write this letter to you, stating at the same time that I felt sure that you had no openings at present. Den Doop is one of the keenest Dutchmen I have ever met. He has published a number of original articles on the mathematics of field plot experimentation and has done some very fine work on fertilization of rubber, sisal, and casava.

With personal regards,

Sincerely yours,

R. D. Rands

R. D. Rands,
Senior Pathologist

Enc.
RDR:ARW

Progress Report #7 (News Letter) February 8, 1941

MEMORANDUM FOR EMPLOYEES OF RUBBER PLANT INVESTIGATIONS

Party No. 1 returned to Washington January 14, and has now largely completed its reports; Dr. Stakman left January 31 to resume his University duties at St. Paul, Minn.; Mr. Skutch plans to return February 21 to his former activities in Costa Rica; Mr. Striker to the Division of Soil Survey of this Bureau, and Mr. Blair to his home in California. After surmounting all hazzards to health and bodily harm from accident in the Andes the only bad luck of the party was suffered by Mr. Blair, first by an attack of Malaria on the boat to New York and second by an emergency appendectomy here last week from which he is now convalescing in a local hospital. The attached Press Release gives further data about Party 1, and other items of interest.

Party No. 2 entered Mexico from Guatemala on January 18, and were met at Tapachula by three scientists of the Mexican Ministry of Agriculture, including Dr. Jesus Patiño, who had just completed a world study tour including Oriental rubber plantations. Cooperative agreements were arranged in Mexico City, and surveys have been made of the Tapachula (West Coast), Vera Cruz and El Palmar (Eastern) districts. The party is now for two weeks near Villa Hermosa in Tabasco, after which it will split, with Dr. La Rue returning via Washington to his job at the University of Michigan, while Messrs. Grant and Stadelman will make brief stops in British Honduras and Tela, Spanish Honduras en route to Washington. Nurseries at the Lancetilla Station (Tela, Honduras) and other rubber plantings will again be inspected under more favorable conditions for possible presence of leaf blight which thus far has not been encountered north of Costa Rica.

Party No. 3 has completed surveys of the Cauca, Atrato, Magdalena and tributary valleys on the Atlantic slope of Colombia, and is now probably back in the Canal Zone preparing for a brief look at the Darien country of Panama southeastward from the Canal. A short stopover in Haiti and Santo Domingo to decide locations for propagation nurseries will be made en route home. The location of, and definite arrangements for, a cooperative breeding station in the southern peninsula of Haiti will be decided with the Ministry of Agriculture and his American Agricultural Adviser, Mr. Thomas A. Fennell. Haiti offers greater permanency of freedom from leaf blight than continental areas.

Party No. 4 has made rapid progress and covered by plane, at least, large areas in the Acre territory, the upper Purus, and tributaries of the middle Madeira working from headquarters at Porto Velho, Brazil. Proceeding to Manaos, a special launch was chartered for the trip down the Amazon to Santarem, where it will arrive February 11, and continue up the Tapajoz to the Ford plantations and beyond. Collections of bud-wood and seed of Hevea species and particular habitat types of H. brasiliensis for planting at Belem are being emphasized along with miscellaneous data supplementing the 1923 survey. At Santarem, Mr. Polhamus will join the party, and it is expected that he and Mr. Manifold at least will be returning to Washington around the first of March.

Cooperative experimental work with Brazil at the Instituto Agronomico do Norte at Belem has advanced rapidly under the temporary direction of Mr. L. G. Polhamus, who arrived there January 13. The 200 budded stumps forwarded by air express December 31, 1940 from Costa Rica, through the cooperation of Goodyear, are now growing in a bud-wood garden. The 10 clones represented in this shipment are mostly the ones that best combine resistance to leaf blight (Dothidella) with high yield among all the clones yet tested by that Company in Central America.

Through further cooperation with Goodyear two valuable shipments totaling 204,000 Philippine clonal seed, which arrived at Cristobal, C. Z. near the end of January, were turned over to the Department for enlargement of the investigation work at Belem. Failure of a boat connection within a reasonable time necessitated emergency action, and after the State Department had secured the usual clearances from foreign governments, three Army bombers made the delivery as described in the attached official Press Release by this Department. All disease-resistant seedlings from these clonal seeds will be established in local test gardens, along with the above-mentioned clones, and at the same time bud-wood will be forwarded for similar test plantings in other countries.

Prof. H. H. Bartlett will sail from Manila February 19 and arrive at Cristobal, C. Z., via San Francisco, on March 30, accompanying a valuable shipment of budded stumps obtained from the Goodyear Pathfinder Estate, Kabasalan, Zamboanga, P. I. The shipment will be divided, part going to Tela, Honduras and the remainder, including the most valuable breeding clones, to Haiti.

With the present surveys drawing to a close an impressive accummulation of reports and data on the potentialities of tropical America for growing rubber is provided. Such form a sound basis for rapid prosecution of the second phase of the program. That important progress has already been made on the latter is indicated by the above notes and miscellaneous items in previous News Letters.

Mistakes, omissions, and delays in our handling of some of the requests and administrative questions from the field parties and station men have been due mainly to the necessity of carrying both phases of the program simultaneously, to frequent need of working through other departments, and to an inadequate force here to handle all matters most efficiently. Though we have worked long and hard, we have also basked what little we might in the reflected glow of your achievements without sharing personally your hardships, exciting experiences and many new friends.

COPY INFORMATION FOR THE PRESS - UNITED STATES DEPARTMENT OF AGRICULTURE

FOR FEBRUARY 4 P.M. PAPERS: WASHINGTON, D.C.

FIRST RUBBER SURVEY PARTY RETURNS FROM SOUTH AMERICA

The Department of Agriculture announced today that the first of its rubber survey parties has returned from Latin America. The party was under the leadership of Dr. E. C. Stakman, Chief of the Division of Plant Pathology and Botany at the University of Minnesota and Agent of the Department. Others in the party were E. M. Blair, rubber technologist; M. M. Striker, soil specialist; and A. F. Skutch botanist.

Doctor Stakman and his party surveyed an area which covers roughly the headwaters of the Amazon tributaries east of the Andes in Peru and an area west of the Andes in Ecuador and Colombia. The group left the United States last August.

Doctor Stakman reports a cordial reception in all of the countries visited. The Peruvian Government supplied airplanes, motor cars, and even turned over to the party one of its river gunboats. In each country visited scientists of the local governments joined in the survey.

The purpose of the survey was to locate areas most suitable for commercial rubber growing and to make arrangements for nurseries where Hevea seedlings can be propagated on a large scale. These seedlings will be used as rootstocks on which to multiply the superior strains of Hevea already assembled by the Department from various sources throughout the world. The group also collected seeds from wild rubber trees growing in the area that might have potential value in those countries.

Four locations were selected for nurseries: two in Peru, one in Colombia, and one in Ecuador. These nurseries will become part of a chain extending throughout the tropical areas of Central and South America All countries participating in the program will share the superior disease-resistant strains already developed.

Three other parties are still in Latin America. One is in Panama, one in Brazil, and the other in Mexico. Another party is in the Philippine Islands, collecting seed and budwood.

To date nurseries have been arranged for or planted in more than a dozen localities in Central and South America. Between three and four tons of seed has been planted in these nurseries.

After all of the survey parties have returned the next step will be to determine locations of at least two experimental stations. Here problems of breeding, culture and disease control will be investigated. This work will be under the direction of the Bureau of Plant Industry. The Office of Foreign Agricultural Relations is responsible for coordinating the Department's rubber research with work of other federal agencies.

The entire rubber investigation including the preliminary surveys is being conducted in cooperation with the Latin American Republics that have suitabbe soil and climate for growing rubber. Results of the work will be made available to all countries cooperating, and to large and small growers.

The rubber tree is a native of tropical America, and was once the source of rubber used in the United States. Since 1910, however, most of our supplies have been imported from the Eastern hemisphere.

INFORMATION FOR THE PRESS

UNITED STATES DEPARTMENT OF AGRICULTURE

RELEASE - IMMEDIATE WASHINGTON, D. C. FEBRUARY 3, 1941.

PLANES TAKING RUBBER SEED FROM CANAL ZONE TO BRAZIL

Three large army bombers will leave Balboa (Canal Zone) tomorrow (February 4) with a ton of selected rubber seed for Brazil, the United States Department of Agriculture announced today. The planes will stop overnight at Trinidad, and arrive at Belem, February 6.

The seed was collected from high-yielding clones grown in the Philippines and shipped to the Canal Zone by boat. The plan was to ship it on to Belem, Brazil, but it was delayed in reaching the Canal Zone. The next scheduled boat transportation would require another month or more and by this time much of the seed would have deteriorated and been worthless.

Upon request of the Department of Agriculture the War Department consented to use the bombers to deliver the seed promptly. At Belem the seed will be delivered to the Instituto Agronomico do Norte, which is cooperating with the United States Department of Agriculture and the Latin American Republics in the rubber investigation. It will be tested by the institute for resistance to the leaf blight disease which is prevalent in many parts of Latin America.

The shipment contains 204,000 seeds. About a month ago the Department shipped 100 budded stumps from high-yielding blight-resistant strains of rubber to the institute at Belem.

-Y-

1567-41

Progress Report No. 8 (News Letter) March 6, 1941

MEMORANDUM FOR EMPLOYEES OF RUBBER PLANT INVESTIGATIONS

Party No. 1 has now disbanded, although Mr. Blair, the Rubber technologist, has kindly accepted the further job of making a brief report on a California Guayule enterprise en route to his home, and Mr. Striker has spent the month on reports and the cataloguing of photographs taken by the party. While the present rubber program is emphasizing high-yielding and disease-resistant clones of Hevea as the best means for the Americas to compete with Oriental sources of supply, the possibilities of both Guayule and Castilla rubber as emergency sources are not being overlooked. Therefore, Mr. Blair will bring us up to date on the splendid achievements along both biological and technological lines in the use of Guayule by the American Rubber Producers of Salinas, California. The specialized demand for Guayule as a plasticiser with other rubbers would alone justify our interest, but the new de-resinating method enabling its use for ordinary purposes assumes importance in the present emergency.

Party No. 2 has completed its surveys and returned to Washington; Dr. La Rue has resumed his University teaching at Ann Arbor, Michigan, while Dr. Grant and Mr. Stadelman are compiling data and finishing survey reports of the five countries visited by the party, viz., Nicaragua, Honduras, El Salvador, Guatemala and Mexico. Leaf blight was not found on any of the scattered earlier seedling plantings of Hevea throughout this region, which finding will naturally simplify and hasten nursery propagation of resistant clones through utilization of these local and susceptible seed sources for production of budding stocks. A total of eleven nurseries will have been established before the end of this year in these five countries.

Party No. 3 has reported two surprisingly suitable districts for rubber growing in Colombia; first, in the immense area being traversed by a new highway from Medellin to Turbo, which is on the Caribbean Gulf of Darien near the mouth of the Atrato river, and second, an extensive "wet" belt between the Coast and Caribbean Cordillera extending eastward from Santa Marta, Colombia. The party returned to Panama February 21, and through cooperation of the Army Air Corps, was enabled to make an air reconnaissance of the Darien country east of the Canal. Parts of the Bayano Valley, and a wide valley extending from the headwaters of the Chucunaque appeared particularly favorable, although inaccessibility and lack of population will retard development. The Party arrived in Port-au-Prince, Haiti on March 4, for a two weeks' trip in that country and the Dominican Republic before returning to Washington.

Party No. 4 has completed its trip down the Amazon from Manaos to Santarem and thence up the Tapajoz to the Ford plantations where four days were devoted to studies of planting materials, estate practices and activities. Although some problems are yet to be solved, there is apparently a good foundation for the very definite feeling of optimism displayed by the Ford management. Messrs.

Manifold and Mallery returned to Belem February 21 for conferences with Mr. Polhamus, while Dr. Butler proceeded back up the Amazon from Santarem to join Dr. Ducke at Manaos for a collection trip up the Rio Negro.

Mr. Polhamus left Belem March 2 and arrived in Washington March 4; Mr. Manifold will follow on March 7, leaving Dr. Mallery to continue the now well-launched cooperative project with the Instituto Agronomico do Norte. Dr. Felisberto Camargo, the new Director of this Institute is very much interested in developing a rubber growing industry in Brazil in complete cooperation with our general Latin American program.

While in Belem, Messrs. Polhamus and Manifold gave some attention to problems involved in improvement of the quality of wild rubber being marketed by Brazil. The Goodyear Tire and Rubber Company has presented the Brazilian Government with a dozen hand mangles which can be used by individual operators as the most important step in turning out a good quality of smoked sheet. Detailed specifications and directions for the complete change-over in procedure were likewise furnished, so that some initial demonstrations at Belem should enable spread of the program to the up-river country as soon as local manufacture of the mangles gets under way. At that time, or sooner this Division will supply them to the Lancetilla station and cooperators in the various countries where demonstrations may be conducted.

From recent correspondence it is gratifying to note that the governments of Brazil, Mexico and Peru have definitely budgeted funds for 1941 for rubber experiment station work. However, many of the remaining countries have either assigned personnel to the project, or sponsored local propagation nurseries, both involving substantial cost.

Prof. H. H. Bartlett sailed from Manila, P. I. on February 19 and will arrive at Cristobal, C. Z. March 31, escorting a shipment of 7,603 budded stumps from The Goodyear Pathfinder Estate near Zamboanga on the Island of Mindanao. He writes enthusiastically of the cooperation by Messrs. Huber and Lundberg, Manager and Assistant Manager of the Estate, in assembling, labelling, and packing the hundreds of clones represented in this shipment. As stated in our last letter, the shipment will be apportioned to stations in Haiti and Honduras.

On February 26 there was shipped from New Orleans in knock-down form four pre-fabricated, panelized buildings to serve as residences and laboratory at our Central rubber station near Turrialba, Costa Rica.

Attention of employees is again directed to the importance of securing good clear photographs of all subjects connected with the rubber project; for example, development of nurseries, rubber trees of special interest encountered in survey work, and any related subjects.

March 18, 1941

Hon. Henry A. Wallace
Vice President of the United States
Washington, D. C.

Sir:

Receipt is hereby acknowledged of your letter dated March 11th in which you advise that a good friend of yours who is Assistant Dean of the University of California, and who has been very active on the committee on Interamerican Cooperation in Agriculture Education, is anxious to have Doctor Popenoe attend the meeting of the committee the second and third of May 1941.

I shall be very glad indeed to arrange to have Doctor Popenoe attend the meeting to which you refer. For some time past Doctor Popenoe has been engaged in some special work in Cuba which he has done at the request of the United States Department of Agriculture. This work I understand is about completed, and Popenoe and his associates should return to the United States early in April. I believe he is expected to go to Washington during the first half of April and complete his report on Cuba. Once this is done he will be available for the committee meeting on the days hereinabove referred to, and I will request him to get in touch with the Assistant Dean and make all necessary preparations to carry out the program indicated in your letter.

With kindest regards, I am

Very sincerely yours

(Signed) A. A. Pollan

OFFICE OF THE VICE PRESIDENT

WASHINGTON

March 11, 1941

Mr. A. A. Pollan
Executive Vice President
United Fruit Company
No. 1 Federal Street
Boston, Massachusetts

Dear Mr. Pollan:

A good friend of mine who is Assistant Dean of the University of California, and who has been very active on the committee on Interamerican Cooperation in Agriculture Education, is exceedingly anxious to have Dr. Popenoe attend the meeting of the committee the 2nd and 3rd of May.

As I understand it, the committee especially desires to consider the problems connected with the starting of an Institute of Tropical Agriculture. There is a feeling that Dr. Popenoe's advice should be quite invaluable. Of course, I would not undertake to urge you unduly, but I do want you to know that I feel that Mr. Ryerson is a good man whose interest in Latin-American affairs and especially in an institute of tropical agriculture is of long standing.

Sincerely yours

(Signed) H. A. Wallace

CC: Mr. Knowles A. Ryerson
University of California
Davis, California

PROGRESS REPORT NO. 9 (News Letter) April 10, 1941.

MEMORANDUM FOR EMPLOYEES OF RUBBER PLANT INVESTIGATIONS

The return to Washington March 31 of Survey Party No. 3 marked completion of the Rubber Survey Program as originally planned. Party No. 3 arrived at Port-au-Prince, Haiti, March 4, as scheduled, and made a 10-day trip through the very promising rubber-growing districts of the southern peninsula, including detailed examination of several possible sites for establishment of a cooperative breeding station. Previous surveys in 1940, by H. L. Loomis of the United States Plant Introduction Garden, Coconut Grove, Florida, and Thomas A. Fennell, Agricultural Adviser to the Government of Haiti, together with general knowledge of Haitian conditions from the much earlier investigational program of the Department, obviated any need for a general survey as conducted in other countries by Party No. 3. Of the various station locations suggested by Mr. Fennell, an area of some 400 acres in the Grand 'Anse Valley near Marfranc, Haiti, which is about seven miles southwest of the city of Jeremie, was decided upon as most nearly meeting all requirements. This is about 175 miles from Port-au-Prince, with which it is connected by an automobile road as well as by boat from Jeremie.

Haiti was decided upon as the best location for a permanent breeding station, at which many of the leaf-blight susceptible, but excellent breeding clones can be crossed with resistant Belem and other indigenous collections from the Amazon. From all viewpoints it appears to have less chance of becoming invaded by South American leaf blight than any of the presently disease-free continental areas.

Party No. 3 then made brief inspection trips in the Dominican Republic, especially to examine the rubber plantings of the B. F. Goodrich Company near Bonao, under guidance of Mr. W. D. Stewart, company representative from Akron. These plantings, originating from seed of the "Black Hevea" collected in the Matto Grosso of Brazil, were found to have made satisfactory growth considering their twice replanting, the altitude, and other limitations of this small, temporary experimental site. While Messrs. Hargis, Lorens, and Seibert proceeded by car to the Northwestern districts and on to the north coast of Haiti, Messrs. Sorensen and Dr. R. Donatello-Herrera, Agronomist in Charge of the local Government agricultural service, made examinations in the northeastern part of the country, especially in the Province of Duarte and areas in the vicinity of Sabana de la Mar, which probably are the most promising for rubber growing in Santo Domingo. The party sailed for New York on March 25, with the firm conviction, as expressed by Mr. Hargis, that in view of the great interest and fine cooperative spirit of the local Governments, the serious economic situation resulting from decline of the banana and cacao industries, the density of population of Haiti, and especially the industrious small land-owners, the island of Hispaniola offers a real opportunity for encouragement of a small-grower rubber industry.

Now that preliminary reports are available from all potential rubber-growing areas it is recognized that each of the Latin American countries offers opportunity for the initiation of rubber planting. In some of the smaller countries the extent of possible expansion is limited by the extent of the land while in the large countries the opportunity is limited only by the future needs for rubber. The opportunity in a small country is of relatively great significance in its national economy but countries like Brazil must be relied upon to meet the main requirements.

Mr. Seibert remained in Haiti to assist Mr. Fennell in establishment of the station and planting of the breeding clones arriving on April 8 under escort of Professor Bartlett from the Philippines. On arrival in Washington Messrs. Sorensen and Lorenz immediately came down with malignant malaria, from which they have fortunately made a fairly quick recovery and are now out of the hospital.

The cooperative program with Brazil has made notable progress, especially in the exchange of planting materials during the present seed-ripening season near Belem. Through joint cooperation with the Goodyear Rubber Plantations Company of Costa Rica a second consignment amounting to 508 budded stumps of some 10 high-yielding clones was forwarded to Belem for extension of the multiplication gardens and experimental studies there. To this was added 100 bits of selected strains of Abaca, which Dr. Camargo is interested in testing at Belem and also trying out as an intercrop with Hevea. The Abaca was kindly furnished by the Canal Zone Experiment Gardens. The absence of steamship service necessitated calling upon the U. S. Army Air Corps, which responded with planes and quickly transported these perishable materials from Balboa to Belem.

On their return flight the bombers carried a large quantity of rubber seed collected from wild trees in the Belem area. Because of the high incidence of resistance to leaf-blight among seedlings of the "Belem strain", the Goodyear Company will finance a large planting on its Costa Rican Estate with the hope of securing clones combining high yield with resistance and otherwise suitable for widespread commercial use in the American Tropics. On arrival in Balboa, some 1,300 pounds of the seed were selected and lots reshipped to nine cooperating countries for establishment of nurseries and comparison with local seed sources. These included large lots to our breeding stations in the leaf-blight-free countries of Haiti and Honduras. Thus, the far-seeing policy of Brazil has permitted the inauguration of widespread cooperative research projects on her native and unimproved rubber-plant material which, without cost to her, will result in the eventual return of superior clones for the resuscitation of her own rubber industry.

According to latest word via Dr. Mallery in Belem, Dr. Butler, who returned to Manaos following the visit to Fordlandia, expected to leave Manaos March 21 with Dr. Ducke for a trip of about 6 days up the Rio Negro to collect budwood of species hybrids and seed from Hevea spruceana, H. Benthamiana, and other species for use in the disease-testing and breeding program. He then expected to leave Manaos between April 3rd and 6th on a 3 to 4 weeks trip up the Jaci-Parana into the Matto Grosso with General Rondon's son and party where he will collect seed from dry, upland areas in the most southerly latitudinal range of H. brasiliensis. This indigenous material should be the best source for the identification of high-yielding clones with inherent adaptability to the long, dry season characteristic of some of the best rubber-growing lands of Brazil and other countries of the American Tropics.

Professor H. H. Bartlett reports arrival in Cristobal March 30th with his 106 cases of budded stumps which he has escorted from the Goodyear Pathfinder Estate, Zamboanga, P. I. The shipment contains 7,603 stumps representing 132 different clones, of which all but about 14 are known to be susceptible to leaf disease or are untested. Many valuable breeding clones are included, although the largest representation of stumps are naturally of the resistant numbers destined for rapid increase in multiplication gardens. The shipment was divided at Cristobal and 10 of the cases containing 244 high budwood stumps of four clones were forwarded to the El Palmar Cooperative Station, Tezonapa, near Vera Cruz, Mexico; 35 cases containing 2,580 stumps of 48 clones were consigned to the Lancetilla propagation station at Tela, Honduras; and the remaining 61 cases containing 4,779 stumps, representing 132 clones, were taken on by Professor Bartlett to the cooperative station at Marfranc, Haiti, arriving April 9, or 57 days out of Zamboanga.

In both Haiti and Honduras isolated breeding gardens containing a 50 percent mixture of resistant Belem seedlings will be planted with stumps of this shipment. The gardens in Honduras are being located near La Lima with the cooperation of the Research Department of the United Fruit Company.

Official designations of Rubber Plant Field Stations, as of April 1, 1941, together with their locations, are given in the following list. These official names are in accordance with regulations and the usual custom of the U. S. Department of Agriculture to so designate all cooperative work where its own personnel is stationed, or where buildings or temporary structures for its use have been erected:

U. S. D. A. Cooperative Rubber Plant Field Station,
Marfranc, Haiti

U. S. D. A. Cooperative Rubber Plant Field Station,
Tela, Honduras

U. S. D. A. Cooperative Rubber Plant Field Station,
Turrialba, Costa Rica

U. S. D. A. Cooperative Rubber Plant Field Station,
Guapiles, Costa Rica.

U. S. D. A. Cooperative Rubber Plant Field Laboratory,
Cairo, Costa Rica.

U. S. D. A. Cooperative Rubber Plant Field Laboratory,
Gatun, Canal Zone.

U. S. D. A. Cooperative Rubber Plant Field Headquarters,
Belem do Para, Brazil.

Rubber stamps giving the full address will be supplied our personnel for stamping their official stationery.

Most of you probably know that the Office of Foreign Agricultural Relations inaugurated in February a new official monthly periodical entitled AGRICULTURE IN THE AMERICAS, written in semipopular style. Already a number of articles on rubber have appeared, including one in the April issue by Dr. E. W. Brandes, who gives an up-to-date summary of this project. If you are not receiving this journal please notify us and your name will be recommended for the mailing list.

Interest in the rubber project displayed from the beginning by the president and officials of the Firestone Tire & Rubber Company has led to recent conferences here in Washington with Dr. H. B. Babcock, director of research, and the formulation of definite plans for the collection and shipment to our stations of valuable hybrid clonal seed from the Liberian estates of this company. The seed crop there starts ripening in July and it is hoped that several tons may be secured and planted in nurseries for leaf-blight-resistance tests. Later, any resistant seedlings together with buddings therefrom will be put into field-test plantings in different locations for identification of clones combining resistance with superior yield. We recall with pleasure the several days' visit last summer of Dr. McIndoe, Director of Plantation Research for this company.

UNITED FRUIT COMPANY

GENERAL OFFICES, ONE FEDERAL STREET

BOSTON, MASSACHUSETTS

ARTHUR A. POLLAN
EXECUTIVE VICE PRESIDENT

March 24, 1941

Dr. Wilson Popenoe
401 Sligo Avenue
Silver Spring, Maryland

Dear Doctor Popenoe:

I enclose copies of letters exchanged with the Hon. Henry A. Wallace, Vice President of the United States, which you will find self-explanatory. You should, of course, arrange to attend the conference referred to, and I suggest that you immediately get in touch with Mr. Ryerson and ascertain just what he wishes you to do.

With kindest regards.

Very truly yours

A. A. Pollan

Enclosures
Copy to: Mr. W. E. Turnbull - Bogota - airmail

UNITED FRUIT COMPANY

GENERAL OFFICES, ONE FEDERAL STREET
BOSTON, MASSACHUSETTS

ARTHUR A. POLLAN
EXECUTIVE VICE PRESIDENT

March 24, 1941

Mr. Knowles A. Ryerson
Chairman
Committee on Inter-American
Cooperation in Agricultural Education
University of California
Davis, California

Dear Mr. Ryerson:

I acknowledge receipt of your letter of March 22nd advising that you would like to have Doctor Wilson Popenoe attend the meetings of the Committee on Inter-American Cooperation in Agricultural Education to be held in Washington on the 2nd and 3rd of May.

It so happens that only last week I received a similar communication from the Honorable Henry A. Wallace, Vice President of the United States, and we have already replied to the effect that we will be very glad indeed to arrange for Doctor Popenoe to be present at these meetings. The doctor is now enroute north from Cuba, and after spending a few days in Florida will proceed direct to his home near Washington. We have already instructed him to get in touch with you, and you will undoubtedly hear from him within the next week or ten days. In the meantime, if you wish to communicate with him, his address is 401 Sligo Avenue, Silver Spring, Maryland.

Very truly yours

A A Pollan

B/Copy to: Dr. Wilson Popenoe - Maryland
Mr. W. E. Turnbull - Bogota - airmail

copy

Dr. Popenoe

March 31, 1941

Mr. Hartley Rowe, Vice President,
United Fruit Company,
1 Federal Street,
Boston, Massachusetts.

Dear Mr. Rowe:

Most of the Rubber Survey Parties are now back in Washington and are in the process of getting their data organized. As soon as this work is well under way, or after its completion and at a time convenient to you, I can come to Boston and see you. We wish to let you know what has been accomplished since the time Mr. Pollan signed the letters of introduction for the various Survey Party leaders, and to express appreciation for the excellent and very effective cooperation given by the United Fruit Company.

Survey Party No. II began its activities at Tela and with the combined interest and attention of Mr. Turnbull, Dr. Popenoe, Mr. Aycock, Mr. Cloward, and Mr. Beasley things began to move rapidly. You probably know the general progress made to date, so I will simply state the current status. There are now about 85,000 young hevea seedlings three feet in height, growing at Lancetilla and about 1500 selected budwood stumps. Within the next two weeks 1700 additional stumps for the Lancetilla planting will arrive there from the Philippines. Also there will be 874 budwood stumps which are of special value for breeding purposes. It is hoped that these can be planted in spots isolated from all other Hevea rubber trees, so that only the desired crosses may be obtained.

Dr. Popenoe, with his energy, interest, and knowledge of conditions was of inestimable value to us. He greatly facilitated our work both in Honduras and Guatemala and made our travel in those countries very pleasant. The rubber plantings at Tela have served as the important source of seed for early development of the Rubber culture in Central America.

Although we had no direct contacts with Mr. Turnbull in Guatemala we learned indirectly of his helpful influence. Mr. Hyle and various members of his organization were very kind to us especially Mr. Mitchell, Mr. Posey, and Mr. Fowler. Mr. Austin at Barrios assisted us on numerous occasions and arranged for our trip in the Rio Dulce area. Mr. Molanphy in Guatemala City also greatly aided us on several occasions by taking charge of baggage shipments.

In Nicaragua, Mr. McClure furnished us rainfall data and helped in numerous other ways to make our stop in Bluefields pleasant.

Although I was only in Costa Rica for a short time, I learned of the help Mr. Chittenden had given to Dr. Rands and the others. They particularly appreciated the arrangement for transportation facilities that enabled Dr. Rands to see the areas proposed for experimental work. I was glad of the opportunity to talk with Mr. Chittenden for his interest and opinion of the work to be continued in Costa Rica is of value to us.

From members of the other survey parties I gather that they also appreciate the courtesies, helpful guidance, arrangementsfor transportation, and use of housing facilities that were made available to them by the United Fruit Company.

The whole program for establishment of Rubber Culture in the Western Hemisphere has advanced. The present list of Countries that have signed cooperative agreements includes: Mexico, Honduras, Nicaragua, Costa Rica, Panama, Colombia, Ecuador, Venezuela, Peru, Brazil, and Haiti. Most of these already have started rubber plantings and some have provided for more rapid development by the appropriation of funds.

El Salvador is willing to cooperate as soon as we obtain material suitable to their conditions. The Guatemala Agreement is still pending and judging from information obtained, the helpful influence of the United Fruit Company is of very considerable importance.

These are a few of the high lights, Mr. Rowe, and I hope that I may have the pleasure of seeing you so that I can express both official and personal appreciation for the many things that the United Fruit Company has done to make possible the accomplishments to date.

Sincerely yours,

Theodore J. Grant

cc: Mr. Turnbull
Mr. Brandes

UNITED STATES DEPARTMENT OF AGRICULTURE
BUREAU OF PLANT INDUSTRY
WASHINGTON

RUBBER PLANT INVESTIGATIONS
OF THE DIVISION OF
PLANT EXPLORATION AND INTRODUCTION

August 9, 1941

Dr. Wilson Popenoe
Casa Popenoe
Antigua, Guatemala

Dear Dr. Popenoe:

We have your letter of August 2 from Puerto Limon addressed to Dr. Rands who is now on vacation.

Your interest in helping out with the rubber work in Colombia is appreciated extremely and your apology in the last paragraph is entirely out of place. If we just had a few other cooperators who were willing to give the time and intelligent attention to our problems the way you have in Colombia, there is no question that the progress of our work would be improved and our work made a whole lot easier.

In connection with our work in Colombia, we have had some doubts as to just which responsible official we should address our letters and to whom copies of the letters should be sent. Lately, we have been addressing our letters to Sr. Francisco Ruiz. Now, in your letter we are informed that the work is being directed through Dr. Mejia Velez. We do not want to make the mistake of appearing to disregard any individual in the Colombian Government and would appreciate your advice as to exactly how the correspondence should be addressed.

We have made arrangements to send quite a number of seeds to Colombia and have written Dr. Ruiz that the shipments are being made. With the letter to Dr. Ruiz we have included copies of general instruction for planting nurseries and are enclosing, herewith, one copy each of the Spanish and English text of these instructions for your information.

Since we have been corresponding with Dr. Ruiz in connection with the impending visit of Dr. Arenas to Costa Rica, we are writing him today on your suggestion that it might be desirable to postpone the visit of Dr. Arenas to Costa Rica until the middle of September.

Your frankness in discussing the subject and your wholehearted cooperation are appreciated very much.

Very truly yours,

E. W. Brandes

E. W. Brandes
Head Pathologist in Charge

Enclosure

INSTRUCCIONES PARA LA PREPARACION Y SIEMBRA DE UN VIVERO ARASTRECEDOR DE CEPAS PARA EL INJERTO DE CLONES DE HEVEA BRASILIENSIS DE ALTO RENDIMIENTO

La preparación de un vivero puede dividirse en las siguientes fases principales:

I. Selección del sitio para el vivero.
II. Limpia del área escogido.
III. Preparación de las tablas del vivero.
IV. Germinación de las semillas.
V. Cuido subsecuente del vivero.

Estas fases se llevan a cabo en el órden apuntado y según las instrucciones detalladas que siguen.

I. SELECCION DEL SITIO PARA EL VIVERO

Extensión de terreno que se necesitará.

La extensión de terreno que se necesitará para el vivero dependerá del numero de cepas injertadas que se requiera para el transplante al campo. Puede calcularse en un hectárea de terreno por 45,000 semillas, cuando éstas se siembran a las distancias recomendadas en estas instrucciones. Este cálculo incluye, no solamente el espacio ocupado por las semillas mismas, sino también el área necesario para los caminos y calles. Los siguientes factores deberán considerarse al escoger el sitio para el vivero:

1. Locación.

El sitio para el vivero deberá estar cerca del sitio escogido para hacer la plantación de caucho para así evitar la necesidad de llevar las plantas largas distancias durante el transplante. En cuanto sea compatible con este requisito, también deberá estar situado el vivero en un local que pueda ser vigilado.

2. Topografía y suelo.

El terreno deberá tener buen drenaje y, de preferencia, una suave pendiente para permitir el desagüe de la superficie. El suelo deberá ser de la mejor calidad con respecto a su fertilidad, textura y estructura, y tener una profundidad de un metro, por lo menos.

3. Agua.

Aunque en la mayoría de casos la región escogida para hacer la plantación de caucho dispondrá de suficiente lluvia, es aconsejable tener en cuenta la posibilidad de que el vivero pueda necesitar el riego de vez

en cuando, y las facilidades para tal riego deberán estar a mano o, por lo menos, el vivero deberá estar situado cerca del agua, para facilitar la traída de ésta en caso de ser necesario. El terreno deberá estar libre de todo peligro de inundación durante la estación lluviosa y no tener un retallo de derrame demasiado elevado.

II. LIMPIA DEL AREA ESCOGIDO

1. La roza.

El área escogido para hacerse el vivero deberá estar rozado, quitándole toda la vegetación y los troncos.

2. El cercamiento.

Durante la roza, or inmediatamente después de ella, deberá cercarse todo el área del vivero con un cerco de malla fina para evitar la entrada de animales silvestres o domésticos, que apatecen las hojas tiernas de las plantas de caucho.

III. PREPARACION DE LAS TABLAS DEL VIVERO

1. Labranza del suelo.

El área rozado deberá ser bien labrado hasta una profundidad de 30 centímetros, sea con arado o con implementos de mano. Después de la aradura, los terrones se quiebran con una grada de dientes o de discos, u otro implemento parecido, y la superficie se empareja a la vez. Durante este procedimiento se quita toda basura y raíz que se encuentre.

2. Formación de las tablas.

Las tablas o macizos ya pueden formarse. Deberán extenderse transversalmente a la dirección del pendiente del terreno para así reducir al mínimo el lavamiento por las lluvias. Las tablas deberán tener una anchura de 120 centímetros y no más de 30 metros de largo. Entre cada dos tablas deberá dejarse un camino de un metro de ancho. Las tablas se forman con sacar la tierra de los caminos y amontonarla encima de las tablas. De esta manera se procede a la formación de los macizos o tablas hasta que la superficie de ellas quede a unos 30 centímetros arriba del nivel del fondo de los caminos. La altura exacta de las tablas dependerá de la cantidad de lluvia y la rapidez del drenaje. Puede ser que sea necesario aumentar la altura recomendada en caso de que la región cuente con fuertes aguaceros o, en caso contrario, hacer las tablas de menos altura en regiones que no sufran de los estragos de fuertes lluvias.

3. Formación de calles en el vivero.

El vivero deberá estar rodeado por una calle de tres metros de ancho. Otras calles de igual anchura deberán dividir el vivero en cuadros de aproximadamente 60 por 60 metros, cuando sea grande el vivero. Estas

calles facilitarán las operaciones de injertar que se practicarán en el futuro.

4. Protección del vivero con vegetación cortada.

En caso de que las tablas y calles del vivero hayan sido terminadas antes de que estén germinadas las semillas, a veces será necesario proteger el vivero contra el desecamiento excesivo o los estragos de fuertes aguaceros. Esto se logra con el cubrimiento de las tablas con zacate u otra vegetación no leñosa recién cortada. De este modo las tablas se protegen y el crecimiento de malezas se evita. Esta capa de vegetación se quita antes de la siembra o, en caso de que no tenga suficiente profundidad para suprimir el crecimiento de las plantitas de caucho, puede quedarse in situ, así reduciendo los gastos del desyerbe.

IV. GERMINACION DE LAS SEMILLAS

1. Preparación de las tablas de germinar.

La tabla para la germinación de las semillas podría ser una tabla aparte, si ésto facilitara el riego, o podría usarse una de las tablas del vivero. La extensión de la tabla de germinar deberá ser como el dos por ciento de la extensión total de las tablas del vivero.

2. Esparcimiento y cubrimiento de las semillas.

Las semillas de Hevea se esparcen sobre esta tabla en una sola capa, de modo que queden en contacto unas con otras, pero sin amontonarse. En seguida, las semillas se tapan con las malezas que han quedado de la roza del vivero. Esta capa de vegetación cortada deberá tener una profundidad de unos 10 a 20 centímetros. En caso de ser necesario, la humedad bajo la cobija de vegetación puede aumentarse por medio de agua regada encima.

3. Observación de las semillas.

Las semillas deberán examinarse diariamente, verificándose este exámen con el enrollamiento de la capa que las cubre. Las semillas que ya hayan germinado se sacan para sembrarlas, y la capa se vuelve a tender sobre las demás.

V. SIEMBRA DE LAS SEMILLAS GERMINADAS

1. Selección de las semillas germinadas.

Las semillas germinadas se examinan con cuidado y las defectuosas se rechazan. Deberá considerarse como defectuosa cualquier semilla cuyo tallito o raíz sea deformado, enredado, o dañado por insectos. Las semillas escogidas para la siembra deberán guardarse húmedas hasta el momento en que sean sembradas.

2. Intervalo de siembra.

Las semillas deberán sembrarse a intervalos de 30 centímetros en filas separadas una de otra por una distancia de 30 centímetros, y que

corren a lo largo de las tablas. Habiendo cuatro filas en cada tabla, deberá quedar un espacio de 15 centímetros entre las filas exteriores y los bordes de la tabla.

3. Manera de sembrar las semillas.

La siembra de la semilla deberá ejecutarse con cuidado para que el tallito y las raíces sobresalientes no sufran daño. Se abre un hoyito, de tamaño suficiente para recibir la semilla, hasta una profundidad de unos 5 centímetros, se mete la semilla con las raíces para abajo, y se tapa con tierra. Deberá evitarse la perforación de los hoyitos con un palito, especialmente en los suelos compactos. Es preferible abrir los hoyitos con la mano o con una cuchara.

VI. CUIDO SUBSECUENTE DEL VIVERO

Después de la siembra, el vivero no necesita más atención hasta que comiencen a salir las plantas, salvo en caso de que las tablas tengan una tendencia a secarse demasiado, en cuyo caso deberán regarse con agua. Las malezas que nacen entre las plantitas de caucho deberán quitarse periódicamente con el uso del machete, pero deberá llevarse cuidado de no lastimar las plantatas. Al aparecerse los ataques de los insectos, especialmente de las hormigas, deberán aplicarse medios efectivos para la exterminación de la plaga. Después de unos nueve meses o más, los árbolitos de caucho deberán estar listos para ser injertados.

Por la Oficina de Investigaciones de Plantas Hulíferas, Bureau de Industria Vegetal del Departamento de Agricultura de los Estados Unidos de América.

Wáshington, D. C.,
4 de agosto de 1941.

INSTRUCTIONS FOR THE PREPARATION AND PLANTING OF A SEEDLING NURSERY TO SUPPLY STOCKS FOR BUD-GRAFTING HIGH-YIELDING CLONES OF HEVEA BRASILIENSIS.

The preparation of a nursery may be divided into the following main steps:

I. Selection of the nursery site.
II. Cleaning the selected area.
III. Preparation of the nursery beds.
IV. Germination of seeds.
V. Planting the germinated seeds.
VI. Subsequent care of the nursery.

These steps are carried out in the order given above and according to the detailed directions below.

I. SELECTION OF THE NURSERY SITE.

Area required

The amount of land needed for a nursery will depend upon the number of budded stumps required for the field planting. It may be calculated on the basis of one hectare of land for each 45,000 seeds, when using the planting distance recommended in these instructions. This estimate includes not only the actual space planted with seeds but also the space needed for paths and alleys. The following factors should be considered when selecting the nursery site:

1. Accessibility.

The nursery site should be located as near the proposed plantation area as possible in order to avoid the necessity of carrying the planting material long distances into the field. Insofar as may be consistent with this location, the nursery should also be where it may be easily guarded.

2. Topography and soils.

The land should be well drained and preferably with a gentle slope to allow adequate surface runoff. The soil should be of the highest quality as regards fertility, texture, and structure, and should be at least one meter deep.

3. Water supply.

Although in most cases the area selected for planting rubber will have adequate rainfall, it is wise to consider the possibility that the nursery may require irrigation at times, and facilities for such irrigation should be present, or the nursery so located that, should the necessity arise, water may be easily brought to it. The land should be free from any danger of flooding or too high a water table during the rainy season.

II. CLEARING THE SELECTED AREA

1. Clearing.

The area selected for the nursery should be cleared of all existing vegetation and tree stumps.

2. Fencing.

As the land is being cleared, or immediately thereafter, it should be fenced in, preferably with poultry wire, in order to keep out wild and domestic animals, all of which are very fond of young Hevea foliage.

III. PREPARATION OF THE NURSERY BEDS

1. Tilling the soil.

The cleared area should be well tilled to a depth of 30 centimeters, either with a plow or by laborers with hand tools. After plowing, the soil should be well broken and smoothed by harrowing or dragging. All roots should be removed at this time.

2. Formation of beds.

Beds are now formed in the tilled area. It is advisable to run the beds across the slope in order to minimize erosion due to heavy rains. The beds should be 120 centimeters wide and not more than 30 meters long. Between each two beds should be a path one meter wide. The beds are built up by digging the earth from the paths and distributing it on top of the beds. In this way the beds are raised until their surface is about 20 centimeters above the bottom of the paths. The exact height of the beds will vary according to rainfall and drainage. For protection from heavy rainfall it may be necessary to increase the height of the beds somewhat or, conversely, make them lower should the rainfall in the region be more moderate.

3. Nursery alleys.

Alleys three meters wide should surround the nursery. Similar alleys should divide the nursery into plots 60 meters square, if the nursery is large. These alleys will facilitate nursery operations when budding is begun.

4. Mulching the nursery area.

When the preparation of the nursery beds and alleys is completed before the seeds are ready for planting, it is sometimes necessary to protect the surface of the beds from excessive drying or from erosion. This is accomplished by spreading freshly cut grass or non-woody weeds over the surface of the beds. By this means the bed is protected and the growth of grass or weeds prevented. The mulch is removed before

planting or, if not so deep as to suppress the young Hevea seedlings, may be retained to cut down costs of weeding.

IV. GERMINATION OF SEEDS

1. Preparation of germinating beds.

A germinating bed may be a separate bed where watering is easier, or one of the regular nursery beds. The area of the germinating bed should be about two percent of the total nursery bed area.

2. Spreading and covering seeds.

The Hevea seeds are spread closely together in a single layer on the germination bed and are then covered with grass and weeds, usually obtainable from the vegetation cleared from the nursery site. The layer of cut grass is piled on the seeds to a depth of 10 to 20 centimeters. When necessary, the seeds may be given additional moisture by sprinkling the top of the matted vegetation.

3. Observation of seeds.

The seeds should be examined daily by rolling back the matted covering. Seeds which have germinated are removed for planting and the covering replaced over the remaining seeds.

V. PLANTING THE GERMINATED SEEDS

1. Selection of germinated seeds.

The germinated seeds should be examined closely and any defective ones discarded. A seed should be considered defective when the rootlets or the shoot are twisted, tangled, or damaged by insects. Seeds selected for planting should be kept moist until actually planted.

2. Planting distance.

The seeds are planted at 30 centimeter intervals in rows 30 centimeters apart, running lengthwise of the beds. With four rows per bed, there will be a space of 15 centimeters between the outside rows and the edges of the bed.

3. Planting technique.

The actual planting of the seeds should be done with care so that the protruding stem and roots will not be injured. A hole of sufficient size should be opened to a depth of about 5 centimeters, the seed inserted with the roots downward, and then covered with soil. Perforation of the holes with a dibble should be avoided in soils which have a tendency to pack. The holes may be made with the hands or with a large spoon.

VI. SUBSEQUENT CARE OF THE NURSERY

After planting, the nursery requires no further immediate attention unless the beds have a tendency to dry out, when they should be irrigated. Weed competition should be kept at a minimum by frequent hand weeding with machetes, but care should be taken not to injure the seedlings. Attacks of insects, especially ants, should be watched for, and proper methods adopted for the extermination of the pests. After about nine months or longer the young rubber trees should be ready for budding.

Prepared by the Office of Rubber Plant Investigations,
Bureau of Plant Industry, United
States Department of Agriculture.

Washington, D.C.,
August 4, 1941.

UNITED STATES DEPARTMENT OF AGRICULTURE
BUREAU OF PLANT INDUSTRY
WASHINGTON

RUBBER PLANT INVESTIGATIONS
OF THE DIVISION OF
PLANT EXPLORATION AND INTRODUCTION

September 17, 1941

Dr. Wilson Popenoe
Antigua, Guatemala

Dear Dr. Popenoe:

Apparently your letter of August 14 got misplaced during its circulation among the office personnel before an acknowledgment was made. Recent conversations with Messrs. Edwards and Kempton indicate that you are probably in Antigua so I am addressing this reply there.

We certainly appreciate your valuable comments and suggestions pertaining to the situation in Ecuador and following your visit to Acandí. Although we have gotten out directions in Spanish for the establishment of both seedling nurseries and budwood multiplication gardens, we have come to realize the truth of your statement about the desirability of fairly close personal contact and supervision. Unfortunately, we have been unable to furnish such simultaneously in these initial phases of the cooperative program with so many countries, but gradually it is being done with very gratifying results. Just now Mr. Stadelman is in Mexico giving assistance to the new director of the station at El Palmar who has not had previous experience with rubber. Dr. Arenas has just made a study trip to Costa Rica and should be able to attend to the initial nursery planting in Acandí, as well as the three other places where we have shipped seed this year from the Canal Zone. No doubt you have seen Mr. Stanwood during his present stay in Guatemala where he is budding the nurseries at Chitalon and other places.

We have had much correspondence recently with Dr. Kevorkian, and we hope soon that at least the 50,000 allotment for the establishment of the station may become available in time to put out a rubber nursery from this season's crop on the new station site at Vinces. Arrangements have just been completed for an Ecuadorian technical man to accompany Dr. Kevorkian on a study trip to Costa Rica.

It is gratifying to note the remarkable progress being made in the development of a commercially successful Cinchona growing industry in Guatemala. A selection of the Ledger analyzing 17 percent sounds tops to me. In this connection I am wondering if you have received a copy of the Philippine Bureau of Science publication on Tota-Quina in which Professor H. H. Bartlett is one of the authors. If you have not, I am

sure you could secure a copy by addressing Professor Bartlett at the University of Michigan.

With personal regards,

Sincerely yours,

R. D. Rands

R. D. Rands
Senior Pathologist

RDR:MP

PROGRESS REPORT NO. 11 (NEWS LETTER) October 1, 1941

MEMORANDUM FOR EMPLOYEES OF RUBBER PLANT INVESTIGATIONS
Bureau of Plant Industry
U. S. Department of Agriculture

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Now that the initial survey stage of our work is largely passed the active planting of nurseries and propagation of special clones for distribution constitute the chief activities. The organization of stations and the outlining of experimental work are advancing rapidly. Every effort is being made to take advantage of all seed crops as rapidly as possible and to insure that the available seed are planted, even though it may be impossible to supply budwood of improved strains as soon as the seedlings reach budding size. With the rapid increase in budwood made possible by budding operations in Honduras this year, and in both Honduras and Haiti next year, there soon will be an excess of available budwood over growing seedlings for rootstocks. It is hoped that each country will plant the available seed and arrange to gather, for export to other countries cooperating in the general program, all seed produced within its borders in excess of its own needs. This Department is anxious to assist in every way in acting as a clearing house for the interchange of seed to insure that no available seeds go to waste.

SURVEY REPORTS

The reports for most of the countries are nearly completed. Dr. Thomas D. Mallery arrived in Washington from Brazil on August 4, after which he took a short period of leave, returning to the office early in September. He is now engaged in compiling his reports. Dr. Karl D. Butler and Mr. Russell J. Seibert are now the only members of the survey parties who as yet have been unable to return to Washington to put finishing touches on the survey reports.

NEWS FROM COOPERATORS

BRAZIL. Encouraging reports are being received regarding the organization of the Instituto Agronomico do Norte at Belem. Organization of important new projects under the directorship of Dr. Felisberto C. Camargo are expected to proceed rapidly now that the necessary preliminaries are largely out of the way.

Mr. Hans G. Sorensen left Washington on June 27 to relieve Dr. Mallery in Belem. He spent several days in Costa Rica and Panama making special studies of rubber-production methods and clonal resistance to the leaf blight,

for use in comparative studies in Brazil. In Brazil Mr. Sorensen, Dr. Mallery and Dr. Butler conferred regarding the cooperative projects at Belem, after which Dr. Mallery returned to Washington while Dr. Butler and Mr. Sorensen made a trip to the Ford properties on the Tapajos River. At the Ford properties conferences were held with Messrs. H. C. Deckard, J. A. Zilles, and other members of the Ford organization. Observations were made on the relative leaf-blight resistance of Eastern clones and of special selections made by Ford among seedlings from Brazilian seed. Budwood was obtained from promising selections and forwarded to Belem, Turrialba, and Washington. The material forwarded to Washington will be put through quarantine and then sent to Haiti and Honduras for rapid multiplication as soon as the disease-resistance and yield tests in Belem and Turrialba warrant. On September 11 additional selections at Belterra were obtained by Dr. Camargo and budded at Belem. Clones and seedlings from clonal seed supplied by this Department, and extensive nurseries from local seed are reported to be developing satisfactorily.

From May 17 to July 4, Dr. Butler made a trip into the southwestern part of Matto Grosso with Mr. Benjamin Rondon. The trip was very successful, and Dr. Butler was particularly pleased with Mr. Rondon's ability to facilitate travel on schedule in this region, where regular transportation facilities are largely absent. Extensive areas of virgin, untapped Hevea were found and selections made of outstandingly high-yielding trees.

COLOMBIA. Dr. Francisco Luis Arenas, Ingeniero Agronomo in the Department of Agriculture, has been placed in direct charge of the rubber work in Colombia, with the active interest and support of Dr. Francisco Ruiz, Minister of National Economy, and Dr. Eduardo Mejia Velez, Director of the Department of Agriculture. Seeds were shipped from Panama to the stations at Palmira and Sevilla (Magdalena), and to a principal propagation station near Acandi. A nursery also was planted by the American Colombian Corporation on their property at the junction of the Cauca and Magdalena rivers. The keen interest of Drs. Ruiz and Mejia and of Dr. Raul Varela Martinez, Director of the Agricultural Experiment Station at Palmira, augurs well for the future of rubber planting in Colombia. Dr. Wilson Popenoe, who recently visited Acandi and other districts of Colombia, reports enthusiastically regarding the prospects for rubber growing in that Republic.

Dr. Arenas recently visted our new experiment station at Turrialba, Costa Rica, taking advantage of the very generous offer of the Goodyear Rubber Plantations Company to assist in demonstrating modern methods of rubber production as practiced at their Speedway Estate at Cairo, Costa Rica. From the limited areas now being tapped the Goodyear company is preparing standard smoked sheet rubber, using native-type factory equipment such as might be used by small holders anywhere in the American Tropics. The opportunity to observe this method of producing rubber, as well as the commercial practices of preparing land for planting, establishing budding nurseries, budwood gardens, budding, transplanting, and upkeep of fields should be of great value to every individual charged with the initial development of rubber production in the Americas.

VENEZUELA. Dr. James R. Weir reports active planting of nurseries in several of the most promising districts in Venezuela. There is considerable need for additional seed, and a large shipment has been sent from the Canal Zone Experiment Gardens, Summit, Canal Zone. Dr. Weir reports new collections of Hevea species from the upper Orinoco, and important developments are expected under his energetic leadership of the Venezuelan Government's rubber program.

ECUADOR. Dr. Arthur G. Kevorkian, who has had long experience in Puerto Rico, has been named Agricultural Adviser to the Ecuadorian Government. A general agricultural experiment station, to serve the rich, undeveloped Pacific coastal areas, is being established at Vinces, where rubber growing also may be investigated. While Dr. Kevorkian's duties will prevent his giving the major part of his time to rubber, it is expected that rubber specialists may be assigned in the near future.

PERU. Sr. Manuel Sanchez del Aguila, in charge of the rubber project, and his assistant, Sr. Octavio Reategui, recently made an extended study trip to Panama and Costa Rica. Judging by the enthusiastic letters received from Señor Sanchez and from our representatives in Panama and Costa Rica, it is believed that the visit was very successful. In fact, Srs. Sanchez and Reategui were the first of what we hope will be a long list of South and Central American scientists to take advantage of our facilities and those of the Goodyear Rubber Plantations Company in Panama and Costa Rica, for the study of rubber-production methods. Mutual discussion of problems provides the best basis for effective cooperative effort and "teamwork" in overcoming difficulties in the establishing of any new industry.

PANAMA AND THE CANAL ZONE. At the Summit experiment gardens seeds were gathered, disinfected, and shipped to cooperators in South and Central America. Special thanks are due to Dr. Julius Matz, Division of Sugar Plant Investigations, and Mr. Walter R. Lindsay, in charge of the gardens, for their exceedingly kind and careful cooperation in gathering and shipping the seed.

Dr. Michael H. Langford has changed his headquarters from the Goodyear Allweather Estate on Gatun Lake to our newly completed station at Turrialba, Costa Rica, arriving there on August 29.

Additional nursery plantings were made at the United Fruit Company plantations at Almirante, Panama, where Mr. Joe H. Permar is taking a personal interest in the program and preparing regular reports on growth and disease resistance for the information of the Department.

COSTA RICA. Progress has been made in equipping the Turrialba station and completing the facilities for personnel engaged in cooperative work on the Goodyear Speedway Estate at Cairo. There has been a constant stream of official visitors to the Turrialba station. This, in addition to construction work, land preparation, planting, and upkeep, has kept the station personnel very busy.

Dr. Theodore J. Grant, accompanied by his family, sailed from New York on September 24 to assume his duties as director of the Turrialba station. Discussions of experiments have been conducted in Washington, and active extension of experimental plantings will be made on Dr. Grant's arrival in Costa Rica.

HONDURAS. At the Lancetilla Experiment Station near Tela, under the direction of Mr. Edward T. Stanwood, propagation of the clones received in the first Philippine shipment in 1940 has been proceeding rapidly. In the meantime, the 1941 seed crop has ripened somewhat earlier than in 1940, and the gathering, planting, and distribution of seed have occupied considerable time. Many official and casual visitors have inspected the station, and the Washington office has received numerous complimentary remarks concerning the work being done there. The continued cooperation of the Research Department of the United Fruit Company has assured uninterrupted progress of the station program during Mr. Stanwood's recent absence in Guatemala.

GUATEMALA. The formal understanding for cooperative test plantings in Guatemala has been completed and arrangements made with Dr. Roderico Anzueto, Minister for Agriculture, to bud graft the seedling nursery planted in Finca Chitalon in 1940 with budwood of selected clones from Lancetilla. Mr. Stanwood spent several days at Chitalon supervising the budding after which, with the enthusiastic help of Mr. L. Lind Petterson, designated by Dr. Anzueto, he made a quick survey of additional sites where finca owners are interested in planting rubber in Guatemala. Seed also were shipped to Guatemala from Lancetilla, and the last reports from Mr. Stanwood indicate a greater demand than can be supplied from Honduras.

MEXICO. Sr. Ing. Manuel Gollas Arias has been placed in charge of the Mexican rubber experiments. Mr. Raymond E. Stadelman left Washington on September 9 for El Palmar to assist Sr. Gollas on several phases of the program. Mr. Stadelman received a cordial welcome in Mexico City and was assured of the full cooperation of officials of the Mexican Department of Agriculture who are greatly interested in the possibility of rubber production in Mexico.

HAITI. Work in Haiti is progressing rapidly. A Haitian Government corporation has now been organized and incorporated under Haitian law as the Societe Haitiano-Americaine de Developpement Agricole (SHADA), with Mr. Thomas A. Fennell as general manager. Mr. Frank Bradshaw, formerly with Firestone in Liberia and more lately with Ford in Brazil, and Mr. M. P. Copeland, formerly with Firestone in Liberia, have been engaged to handle the development of rubber cultivation. Their excellent background gives promise that this phase of the corporation's activities will be well taken care of.

Mr. Simonet J. Breaux was borrowed from the Soil Conservation Service for soil surveys in Haiti. On September 1 Mr. Breaux was transferred to SHADA and will continue with his soil studies. Mr. Russell J. Seibert, of our Marfranc station, which is cooperating closely with SHADA, is at present engrossed in building plans for the office laboratory, foreman's residence, and service buildings to be constructed with funds available to the Government of Haiti.

COLLECTION AND PROPAGATION OF SPECIAL CLONES

Further collections of clones and clonal seed are being made and important additions to our basic material have been assembled. Important collections have been received from the Ford properties in Brazil. The pioneer work of the Ford company in the collection and testing of regional types of Hevea species assumes increasing significance from the standpoint of immediate utilization as well as for a breeding program involving the best clones from the East. This Amazonian material is being grown both at Belem, Brazil, and Turrialba, Costa Rica, for leaf-blight resistance tests preliminary to its establishment in field plantings for subsequent yield comparisons. In both countries natural infection will be supplemented by artificial inoculations in order to make sure of a thorough test of resistance and to determine whether there is any important difference in the fungus. In the meantime, budwood of outstanding Ford clones and valuable selections which will be contributed to the cooperative program by Peru and Venezuela will be forwarded to Washington. This material will be budded on seedlings and grown for 8 to 12 months in quarantine at Arlington Farm. New budwood, freed of all hazard of disease transmission, will then be distributed to our propagation stations in Haiti and Honduras. It is recognized, of course, that not every clone so treated will pass the intensive resistance tests in Brazil and Costa Rica and also show high-yielding or special breeding qualities. However, by getting these clones established at the propagation stations we will be in a very advantageous position for the rapid multiplication of every proved clone as soon as the widespread cooperative tests justify the recommendation of such clones for general distribution.

In blight-free countries the best of such clones also will be interplanted in seed gardens with the best high-yielding and proved breeding but highly susceptible clones from the East, to provide a future abundant source of hybrids for the isolation of new clones combining superior yielding with resistance, for subsequent testing in all countries. Thus, the contributing countries are guaranteed the return of planting material of greater value than could be produced locally under disease conditions.

A large shipment of clonal seed and special budwood arrived in New York from the Firestone plantations in Liberia on September 11. Mr. K. L. Hill, Executive Assistant, took personal charge of this shipment, dividing the seed into two lots, one for Belem and the other for Turrialba. At these stations rigid selections for disease resistance will be made with the assurance that many of the highly resistant seedlings, when propagated and tested as clones, also will prove to be high yielding. As emphasized previously, such hybrid material offers more promising immediate prospects for isolating superior clones than does the above outlined long-range program.

The budwood in the above shipment was divided between Turrialba for intensive resistance tests, and Honduras for propagation.

Because nurseries were started in Honduras immediately after the initiation of the program last year, intensive multiplication of clones received from the Philippines has been possible. It is now recognized that some of these clones are not the best for planting in areas where leaf blight is now found or where it may soon be expected. However, they are high-yielding clones and are at least moderately resistant. Polyclonal plantings with these clones should give good results even in infected localities if the usual range of weather conditions does not favor severe and repeated disease epidemics. However, newer clones combining higher resistance with high yield will be ready for distribution before any extensive commercial planting of present clones can be made. In all instances fairly dense polyclonal planting is recommended to enable selective thinning on the basis of local adaptability, as determined by growth and yield.

LEAF DISEASE STUDIES

In Panama, artificial inoculation by spraying with spore suspensions of the leaf-blight fungus has given good results in disease-resistance tests of clones and seedlings. Dr. Langford will continue these studies at his new headquarters in Costa Rica. With similar studies being conducted by Dr. Butler at Belem, the comparative tests on identical clones in the two locations will give more accurate and detailed information as to the behavior of the leaf-blight fungus than has heretofore been possible.

A detailed report from Dr. Langford indicates that spraying nurseries with copper fungicides for leaf-blight control may make possible the growing of highly susceptible seedlings for budding purposes. An important consideration in the spraying program is that the increased number of leaves retained by the seedlings in the nursery is sufficient to materially shade the ground and decrease weeding costs. While the saving in weeding probably will not entirely offset the spraying costs it increases the practicability of utilizing local seed in diseased areas.

GUAYULE

Interest in making plantings of guayule in the continental United States continues unabated. Dr. E. W. Brandes recently visited the properties of the Intercontinental Rubber Company in California. He conferred with officials of that company and other individuals having information in regard to guayule. He returned to Washington on September 25.

In July Dr. Brandes made a combined official trip and busman's holiday to the natural habitat of guayule in the Great Bend area of Texas, continuing his trip as a vacation into the guayule area in Mexico. He made observations on the natural stand of guayule in Texas and Mexico and visited the extraction factory of the Intercontinental Rubber Company at Torreon, Mexico.

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UNITED FRUIT COMPANY

Pollan - Pop

GENERAL OFFICES, ONE FEDERAL STREET
BOSTON, MASSACHUSETTS

ARTHUR A. POLLAN
EXECUTIVE VICE PRESIDENT

October 7, 1941

VIA AIR MAIL

Dr. Wilson Popenoe
c/o United Fruit Company
Guatemala City, Guatemala

Dear Doctor Popenoe:

We recently received a charge of $200 from the Pan American Airways system covering your transportation from Tegucigalpa to La Guaira. This was, of course, in connection with your trip for the United States Government, and as we were not sure how the Company would be reimbursed for this expenditure, we wrote to Doctor Bressman in Washington and in his absence received the following reply from Mr. W. H. Rohrman, Administrative Assistant:

> "In Dr. Bressman's absence I am replying to your letter of September 30 regarding the transportation charges incurred by Dr. Wilson Popenoe in connection with his work for this Department.
>
> "Dr. Popenoe is supposed to submit his expenses to us in a regular expense account, and this includes expenses incurred by him for air travel as well as for his per diem. The first bill which you have received covering transportation by Pan American Airways should be forwarded to us. It was never our intention that your company should finance Dr. Popenoe's expenses and be reimbursed by us. We have issued him a regular Letter of Authorization, authorizing him to incur the expenses involved in his trip."

As you are now back in Guatemala, we assume your trip for the Government has been completed and you will probably be submitting expense account direct to Washington. If this is correct, you should include the $200 above-mentioned, and then give the Company your check for the same amount. If you do not agree with this procedure, please advise and I will send bill direct to Mr. Rohrman and ask him to reimburse the Company for the $200 expended for government account.

Please let me hear from you by return air mail.

Very truly yours

A. A. Pollan

Antigua, Guatemala, 18 Oct 1941

Mr A A Pollan,
United Fruit Co.,
Boston, Mass.

Dear Mr. Pollan:

Replying to yours of the 7th instant, regarding charge of $200 from Pan American Airways for transportation Tegucigalpa to La Guaira:

Regular government transportation requests which were sent me by Mr Bressman and which were supposed to be used for this trip did not arrive in time, and to avoid upsetting plans I went ahead and secured ticket charged to the United Fruit Company. Later I discussed the matter with Mr R H Allee, head of the party, and he thought the best way to collect would be for me to include the item in my expense account and then reimburse the Company after the account was paid by the Government. I therefore turned over to him receipt for the transportation, which I had taken at Tegucigalpa on August 20th. Mr Allee is to have expense account made up on necessary government form in Washington and forwarded here to me for signature and jurat. I will then return it to Washington and if procedure is more or less as it was in the last instance, the account will be paid in three to four months. As soon as I am informed that the amount has been deposited to my account at the American Security and Trust Co., Washington, I will make our check for the $200, payable to the Tela RR Co., and turn in at Tela.

If you desire to have the matter handled otherwise, I suggest you write Mr Rohrman at Dr Bressman's office to withhold the item from my expense account which he is preparing, and with the receipt I forwarded as his authority, pay the amount to you direct.

Yours sincerely,

Antigua, Guatemala, 12 Oct 1941

Dr R D Rands,
Bureau of Plant Industry,
Washington D C

Dear Dr. Rands:

On returning here a week ago I found your interesting letter of 17 September.

As you perhaps know, I have just completed a hasty tour of Pará, Brazil; Venezuela; Ecuador; Costa Rica; and El Salvador in company with Messrs Boyd and Allee of the USDA. At Pará we were very favorably impressed by the workd under way. Particularly did I think Karl Butler is doing a fine job on the exploration end and I am glad to know there is a possibility of his being stationed in Costa Rica later on. I feel that Butler is the kind of man we need in this part of the world. This is not saying Sorensen doesnt fall in the same category. He does.

We had quite a session in Ecuador, and were pretty close to the Bucay nursery but failed to get there. Kevorkian said things were in pretty bad shape so we were not much interested in seeing the nursery again. I am afraid the local people are not quite up to the job, and for this reason am very glad to note, from your letter, that you propose to establish the new nursery at the Vinces site. It was our feeling that Vinces is a fine place for this purpose. We encouraged Kevorkian to start his cacao work there, too, on the grounds that it seems to offer better facilities than any other site which appears to be available at this time. I personally am very anxious to see Kevorkian settle down on one site and get something in the ground. Most of the iniative will probably have to come from him. The local people have insufficient experience and there is a good deal of red tape in the picture.

It was a joy to be with Bangham in Costa Rica. And we were much interested to see how far you have gone in setting up the Turrialba situation. While in Costa Rica we met Arenas, who was there from Colombia on his study tour. I had not previously met Arenas. He impressed me favorably. He

spoke to me about moving the nursery site from Acandí over to Turbo. I dont quite know what they will eventually do and I dont know just what is behind the idea; I would be inclined to think that Arenas prefers the Turbo site as being somewhat less isolated than Acandí. I have never been over the lands of the Turbo region but I imagine there must be plenty of good places for a nursery in the slightly higher land back from the coast - up toward the region where Padre Luis of the Mission at Turbo has his school.

When we got up here we found Stanwood in the country and have had one good visit with him. I am glad to see that he has taken up work in this country as well as Honduras. I havent been around the country yet but am going down to the West side in a week or so to go over the Cinchona work with Lukens and Krukoff who are due to arrive on the 19th. Dr and Mrs Fairchild are coming tomorrow to spend some time in the country.

Best regards to all of you. I hope to spend some time, now, in this country and Honduras. It seems that the job of developing the Company's new agricultural school in the latter republic is going to fall on my shoulders, in which case I shall not have to travel quite so widely and so fast as I have been doing this year. I am a bit dizzy at the moment. It is nine months since we left Antigua for Cuba, and during that period I havent had time to scratch my head.

Always sincerely yours,

PROGRESS REPORT NO. 12 (NEWS LETTER) November 15, 1941

MEMORANDUM FOR EMPLOYEES OF RUBBER PLANT INVESTIGATIONS
Bureau of Plant Industry
U. S. Department of Agriculture

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This is the season of seed collection and shipment in Central America; the Canal Zone, Honduras, and Mexico all furnished important supplies of seed to Haiti, Guatemala, Ecuador, Colombia, and Venezuela. An important shipment of clonal seed was received from the Liberian estates of the Firestone Tire & Rubber Company. This shipment totaled over two million seed, donated by the Firestone Company for the good of the rubber project in the Americas, and was in addition to the first shipment reported on page 5 of Progress Report No. 11. Mr. K. L. Hill and Dr. Thomas D. Mallery took charge of the relabeling and reconsigning of the 729 cases of seed on their arrival in New York. Dr. E. W. Brandes represented the Department of Agriculture in acknowledging the presentation of the seed by Mr. Harvey S. Firestone, Jr. The value and purpose of this seed can best be understood from the cooperative agreement under which the seed was furnished. This agreement reads as follows:

Purpose:

The testing of seedlings from clones known to give the highest percentage of leaf-blight resistant offspring is considered the quickest method for developing superior planting material for use in the Americas. Experience of the Goodyear Company in Central America indicates that crosses involving particularly AV-50 and AV-256 give many seedlings that are at least commercially resistant to South American leaf disease (Dothidella ulei). The annual establishment of experimental and semi-commercial plantings with mixed buddings from such apparently resistant seedlings for continued disease exposure and later test-tapping should bring to light a number of new clones combining highest resistance with superior yield. These will be of great value to the industry pending development of clones from the "Belem Strain", or hybrid seed from the local breeding program.

Procedure:

Through cooperation of the Firestone Company, large quantities of clonal seed, presumably representing for the most part natural crosses, will be collected from its Liberian Plantation beginning with the seed crop in July, and shipped via New York to Belem, Brazil, and Turrialba or Guapiles, Costa Rica. Collections will be made principally along the borders of the large blocks of AV-50 and AV-256 where these are together, as well as where either adjoins BD-5, Tji-1, 16, and other good clones, and there is a good chance of the seed representing crosses. The quantity of seed, methods of packing, and financial arrangements will be decided in conference, or by mail prior to the harvest season.

The Department of Agriculture will plant the seed in nurseries at its cooperative station at the Instituto Agronomico do Norte, Belém, Brazil, and at its stations in Costa Rica for leaf-disease resistance tests, aided by artificial inoculations of the young seedlings. At the age of 12 - 18 months, and on the basis of the final disease ratings, the 1-10% of the seedlings that are deemed resistant enough for field trials will be stumped, and the stumps, together with five or more buddings of each, put into a field planting for further study and later test-tapping. The remaining bud-wood from the mother seedling, after hot-formaldehyde disinfection could be distributed to the Firestone Company (should it have undertaken a plantation development in tropical America) or to cooperating experiment stations and planting companies. Budding from such resistant clonal seedlings would, of course, be planted in sufficient density for later selective thinning and the securing of a fair commercial rubber yield (in comparison with interplanted controls).

On conclusion of resistance and tapping tests, budwood of any apparently superior clones identified in such plantings will be shared with all cooperating parties in the various countries.

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In accordance with this agreement 348 cases of seed were forwarded on October 22 to Costa Rica for planting at Turrialba and Los Diamantes, and 338 cases were forwarded to Brazil on October 25 for planting at the Instituto Agronomico do Norte at Belém.

This same shipment provided special lots of seed for experimental testing of clonal seedlings as stocks in Haiti and Honduras. Two cases of Tj 1 x Tj 16 were sent to Haiti and three cases of the same cross were sent to Tela, Honduras, for planting at the Lancetilla station. In addition, 37 cases of seed from seedling trees were forwarded to Honduras for test plantings being established by the Firestone Tire & Rubber Company. One case was forwarded to Washington for tests of disinfection methods, and after treatment the seed were forwarded to the Plant Introduction Garden at Coconut Grove, Florida, for germination tests.

NEWS FROM COOPERATORS

BRAZIL. Reports from Mr. Hans G. Sorensen and Dr. Karl D. Butler are largely concerned with resistance studies of seedlings and clones now growing at the Instituto Agronomico do Norte at Belém. The isolation of the nursery plantings at the Instituto resulted in a rather slow build-up of infection earlier in the year but infection is now severe and the selection and study of the disease-resistant plants are progressing with greater certainty. Dr. Butler is subjecting all selections to artificial inoculation

to insure that their performance represents actual resistance and not accidental escape from the disease. Seedlings from the Acre are showing a particularly high incidence of resistance to the leaf blight and Mr. Sorensen expresses the opinion that because of the epidemic conditions selections made at Belem should prove outstandingly resistant.

COLOMBIA. Following the return of Dr. Francisco Luis Arenas from his trip to Costa Rica to study methods of rubber production, the Compañía Bananera de Acandí, at Acandí, also sent representatives to Costa Rica for similar studies. Seeds have been forwarded from the Canal Zone to the Government of Colombia for nursery plantings at Acandí, Turbo, Palmira, and Sevilla (Santa Marta).

Dr. Raul Varela Martinez, Director of the Estación Agricola Experimental at Palmira-Valle, has forwarded pictures and reports on nursery plantings at that station. Some slowing up of growth has occurred there during the dry season but Dr. Martinez writes that the beginning of the rains has made possible further extension of nursery plantings.

ECUADOR. Mr. E. G. Holt, Chief of the Biology Division of the Soil Conservation Service, U. S. Department of Agriculture, left for Ecuador on November 6 as the head of a Mission from the Office of the Coordinator of Inter-American Affairs of the Office of Emergency Management to study methods of improving agriculture in Ecuador. While Mr. Holt's Mission will not be interested solely in rubber it is expected that the possibility of initiating rubber growing will be an important phase of their studies. To this end Mr. Lee Hines, of the Division of Fruit and Vegetable Crops and Diseases, Bureau of Plant Industry, has been employed as the rubber expert of the Mission. Mr. Hines spent 4 years with the Firestone plantations in Liberia. Most of that time was spent in the research department, but Mr. Hines also had experience in all phases of the planting and tapping of trees.

Seeds have been forwarded to Ecuador from the Canal Zone and also local seed have been gathered and planted under the direction of Dr. Arthur G. Kevorkian, who writes that an experiment station is being established at Vinces, Ecuador.

PERU. Sr. Manuel Sanchez del Aguila reports encouragingly in regard to the Hevea plantings at Tingo Maria and Oromina. In connection with efforts to improve the quality of rubber produced in Peru he is investigating the possibility of obtaining washing and creping machinery to remill the rubber ball produced in Peru. In this connection he made a visit to Brazil to study methods used there.

PANAMA. Mr. Joe Permar, of the United Fruit Company, Almirante, reports data on blight resistance and growth of cooperative nursery plantings at Almirante. He writes that he was pleased to have a visit from Dr. Theodore J. Grant, of the Turrialba experiment station, who conferred with

him in regard to the location for a budwood garden and small demonstration field planting, authorized by the United Fruit Company.

COSTA RICA. The building program still continues at the Turrialba experiment station. However, this has now progressed sufficiently to permit major attention to experimental work. Dr. Theodore J. Grant is now established at Turrialba and writes enthusiastically of the splendid cooperation of Dr. Luis Cruz B., Director of the Departamento Agricola Nacional, and of other officials of the Costa Rican Government. The planting of more than a million clonal seeds for blight-resistance tests represents the most important current activity.

Mr. W. E. Klippert, Manager of the Central American plantations of the Goodyear Rubber Plantations Company, was in Washington recently and plans for cooperative work in Costa Rica were discussed with him. After his return to Costa Rica the details of clone-testing experiments were discussed in a conference including Mr. Klippert and Dr. Walter N. Bangham of the Goodyear Rubber Plantations Company and Drs. Grant and Michael H. Langford of the Division of Rubber Plant Investigations, U. S. Department of Agriculture. This plan visualizes the planting of clones to be tested between nursery beds of seedlings highly susceptible to the South American leaf blight to insure maximum and continued exposure to this disease. Duplicate tests will be conducted by this Division and by the Goodyear Company.

Dr. Langford is applying artificial inoculation to large numbers of clonal seedlings at Turrialba to assure as severe a test as possible to nurseries from which plants resistant to the South American leaf blight are to be selected. This is one of the important phases of our cooperative project with the Goodyear and Firestone companies and should result in the isolation of new clones for use in the assured development of commercial areas.

HONDURAS. The most important activity has been the budding of thousands of seedlings to the clones from the first shipment of budded stumps from the Philippines in 1940. Shipments of budded stumps have been made to Mexico, and stumps as well as budwood to Guatemala, while consignments to other countries are in progress as this is written. Arrangements also have been completed for cooperative plantings with the Government of Honduras.

During the absence in Guatemala of Mr. Edward T. Stanwood, Mr. O. Salvador Cordova, of the Honduran Ministry of Agriculture, has acted in charge of the station operations. This very kind cooperation of the Honduran Government has permitted the uninterrupted continuation of station operations at a time when interruption would have been serious.

Arrangements are being completed for important distribution of budded stumps to cooperating countries in Central and South America during the present month.

GUATEMALA. Dr. Roderico Anzueto, Minister of Agriculture, has appointed Mr. L. Lind Petterson as the direct cooperator for the Guatemalan Government in our cooperative program in Guatemala. Dr. Anzueto also assigned Sr. Antonio Toruño as his personal representative to cooperate with Mr. Edward T. Stanwood and also made it possible for Sr. Toruño to accompany Mr. Stanwood to Tela, Honduras, to study the work there for a period of 3 months.

Mr. Stanwood has received enthusiastic cooperation from both governmental and commercial officials in Guatemala. Seed was furnished along with technical assistance to 18 local cooperators for establishing nurseries. Nucleus supplies of budded stumps and budwood for budding the nursery started last year at Finca Chitalon were shipped from Tela, Honduras, and the necessary budding as well as the planting of the budded stumps was done under Mr. Stanwood's personal supervision. The widespread interest aroused in rubber growing in Guatemala is very gratifying.

MEXICO. The broad outlook of the Mexican Government in viewing the rubber program in its relation to hemispheric defense is most gratifying. Not only have they developed a plan for planting as many seed as possible but have volunteered to facilitate the export of surplus seeds available in Mexico to assist the general program in the Americas. Ing. Eduardo Morillo Safa, Director General of Agriculture, is taking a personal interest in the rubber program and under his leadership progress should be rapid.

The program for planting nurseries at El Palmar has advanced rapidly under the direction of Sr. Ing. Manuel Gollas A. Mr. Raymond E. Stadelman, of the Division of Rubber Plant Investigations, has been acting as technical adviser and assisting Sr. Gollas in the planting. The onset of the rainy season has seriously affected the progress of the work, and the road from El Palmar to Cozolapa has been nearly impassable. It is a real tribute to the ingenuity and fortitude of those directing this work that they have let nothing interfere with the progress of the planting program.

HAITI. Mr. Thomas A. Fennell writes that the work of the Societe Haitiano-Americaine de Developpement Agricole is progressing rapidly. At the time he wrote seeds were being collected from the Hevea trees at Bayeaux at the rate of thirty to forty thousand per week and arrangements were being completed for nurseries at Bayeaux and in the Bras Gauche Valley. Large shipments of seed have arrived from Mexico. An interesting report covering the Grand 'Anse Valley was received from Mr. Simonot J. Breaux, who is now continuing his surveys to include the Bras Gauche, one of the principal branches, farther inland and with higher rainfall than the main valley. Mr. Russell J. Seibert, of the Marfranc station, writes that the Bras Gauche area is very favorable for the cultivation of rubber.

PROGRESS REPORTS

It is contemplated that hereafter, if possible, this Progress Report will be issued on the 15th of each month. This will give opportunity to use the monthly reports of Division employees in compiling the information. It is suggested that our cooperators in each country submit such notes of the progress of their work as may be of interest to cooperators in other countries. It is not intended that these items be detailed reports of experiments, but what is desired are newsy, informative notes indicating the progress of the work, and any changes in personnel of the cooperating agencies, including correct name and title of new personnel or correction in spelling of names or titles given in previous reports. It is hoped that these reports will constitute a valuable record of the progress of the development of rubber cultivation in the Americas, as well as serve to keep all cooperating agencies informed as to what is being done.

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