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ECONOMIC INTELLIGENCE REPORT

THE ECONOMIC IMPORTANCE OF THE PRINCIPAL TANNINS TO THE US AND OTHER FREE WORLD COUNTRIES



EIC-SR-2

31 October 1953

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ECONOMIC INTELLIGENCE COMMITTEE

SUBCOMMITTEE ON AGRICULTURE

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TO THE US AND OTHER FREE WORLD COUNTRIES

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ECONOMIC INTELLIGENCE COMMITTEE

Subcommittee on Agriculture

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FOREWORD

This report was prepared on the basis of contributions from the Department of Agriculture and CIA. The report has been concurred in by the EIC Subcommittee on Agriculture, including the intelligence representatives from CIA, the Foreign Operations Administration (formerly MSA), and the Departments of Defense, State, the Army, the Air Force, and Agriculture. The report has been approved for issuance as a Subcommittee Report by the Economic Intelligence Committee.

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Although tannins are produced in most countries, the production is not sufficient in large industrial countries, like the US and UK, to supply their tanning industries. During 1948-50 the US consumed about 150,000 tons of tannins annually, of which 40 to 50 percent came from Latin America and another 20 to 25 percent came from Africa. During the same period the UK used about 74,000 tons annually, of which about 73 percent came from Africa and an additional 15 to 20 percent from Latin America. With accelerated stockpiling beginning in 1951, the US substantially increased imports of tannins. The rest of the Free World, although equally dependent on imports, uses in the aggregate a small fraction of the world supply of tannins.

Although it is cheaper for the US to import tannins than to become self-sufficient, domestic production could be expanded, at higher costs, to supply all uses. On the other hand, the cost of becoming self-sufficient in tannins would be prohibitive to the UK, and the loss of its foreign source of supply would seriously jeopardize the British leather industry. Because of the small amount of tannins used, other countries in the Free World could replace lost imports through expanded domestic production of tannins or tannin substitutes without experiencing prolonged economic hardships.

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THE ECONOMIC IMPORTANCE OF THE PRINCIPAL TANNINS
TO THE US AND OTHER FREE WORLD COUNTRIES*

Summary

Quebracho and wattle, two of the most important vegetable tannins in terms of availability and use in the tanning of hides throughout the Free World, are important strategic commodities and have been stockpiled in the US in the form of solid extract of approximately 63 percent tannin content. Together, these two tannins make up the bulk of the vegetable tannins entering world trade. The primary sources of wattle and quebracho are, respectively, Africa and Latin America. Only a small fraction is consumed in the local tanning industries, the bulk of production being exported to the more industrially advanced countries in the Free World. It is estimated that during 1948-50 the combined net exports** of wattle and quebracho averaged from 300,000 to 350,000 tons*** per year. This amount could be increased considerably in 8 to 12 years by new plantings of wattle in Africa and by more efficient use of quebracho in Latin America.

* This report contains information available as of 1 August 1952. The basic statistics used in this report were provided by the Foreign Agricultural Service, US Department of Agriculture, as an unclassified contribution to the section on agriculture in NIE 56. Eval. A-1.

** The term net exports as used in this report refers to total exports of an area minus intra-area exports.

*** Tonnages throughout this report are given in metric tons.

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It should be noted that, while this report refers largely to 1948-50, there have been, in general, no radical changes from 1950 through 1952 in the geographical pattern of production and imports.

1. Introduction.

Quebracho and wattle, two important vegetable tannins from the point of view of present availability and use have been stockpiled by the US in the form of solid extract of approximately 63 percent tannin content. The stockpile objective is usually the difference between estimated requirements and supplies for a 5-year emergency.

A tannin is an amorphous, strongly astringent substance of complex structure. In the tanning operation, tannins have properties that extract blood from tissue, at the same time causing tissue to contract. Tannins also are capable of combining with proteins to form rather insoluble substances that render skins unalterable by those agents that tend to decompose them in their natural state. 1/* Tannins are widely distributed in the vegetable kingdom, being contained in substantial quantities in about 30 percent of the subplant families. However, there are only a small number of tannin-bearing plants which have commercial value.

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The US and UK depend upon distant areas for their supplies of quebracho and wattle, the principal vegetable tannins used. These two tannins account for the bulk of the vegetable tannins in world trade and are primarily utilized outside the areas where they are produced.* The importance of these commodities will be examined on the bases of their uses, of the dependency of Free World nations upon sources of supply, and of their production and trade.

2. Use, Interchangeability, and Substitutes.

Tannin (tannic acid), either pure or in commercial forms, has many uses outside of its major utilization in the leather and textile industries. It is used as a reagent in the analysis and manufacture of chemicals; in the brewing and manufacture of glass, paint, varnish, and paper; and in treating wines and potable waters, and other uses. Tannic acid is an ingredient of ceramic products, dyes, photographic and metallurgical baths, ink, shoe polish, pharmaceuticals, perfume, and rubber.

Quebracho is one of the most important of the vegetable tannins. It is the most widely used of the vegetable tannins and accounts for about one-half of the quantity of tannins in world trade. Quebracho is one of the quickest acting vegetable tans known. It differs from

* See the chart following p. 16.

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most other known tannin extracts in that it does not sour or ferment readily. For best results in making leather, however, it is mixed with chestnut, oak, and hemlock to obtain the necessary sugars essential to the most successful tanning. Quebracho extract ranks foremost in the tanning of heavy leathers such as sole leather and belting, but it is also a good tannin for lighter leathers when mixed in the proper proportion with other softer tannins. Other uses of quebracho, by itself or in combination with other tannins, are to prevent hard-water scale in boilers (used by railway and shipping companies), to preserve fish nets, and to facilitate the drilling of oil wells by conditioning the mud.

Wattle, like quebracho, is an astringent tannin. It is particularly well adapted for tanning light leathers but can also be used successfully for tanning sole leather. The chief value of wattle lies in its quick penetration, good color, and capacity to blend with other tannins. In areas where wattle-producing trees are adaptable, they grow more quickly and are more economically produced than quebracho or chestnut. Substitutes for wattle as a source of tannin probably run into several score, but the most suitable are the woods of the chestnut and quebracho trees and the barks of the oak, hemlock, and mangrove trees.

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Chestnut is a pyrogallol (weak acid) tannin, a type generally best adapted for tanning light-weight leathers. Like other tanning material, chestnut is not used alone but is blended in various concentrations with other tannins to obtain the desired results. In the US, it is used principally for tanning sole, belting, harness, and other heavy leathers because it gives good quality and weight to the leather. It is also used on light leathers such as upholstery, auto, bag, strap, and athletic leathers. Chestnut extract also is used in making boiler compounds to prevent hard-water scale in boilers. Chestnut and other tannin extracts are used in the flotation separation of feldspar from calcite and quartz, in the extraction and recovery of certain gold-bearing chemicals, and as an inhibitor of oxidation in petroleum hydrocarbons. ^{2/} Chestnut wood has been the most important source of tannin in the US, but the diminishing supply of this domestic product and the high cost of developing the tanbark resources of the forests in the Far West have made the US more dependent each year on imported wattle and quebracho.

The dependence of industrial nations on foreign sources of tannins is related to the ease with which substitutes can be found for tannins or for materials using tannins. In the US, for example, the Department of Commerce has found that the percentage of shoes with leather soles dropped from 75 percent in 1941-42 to 52 percent in 1950. In view

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of this trend, it is expected that the percentage could easily be reduced to 40 percent in an emergency. Substitutes for leather soles have more than offset the increased use of leather occasioned by our growing population, thereby saving substantial quantities of tanning materials. A hide used for sole leather requires about twice as much tannin as a hide used for upper leather, about 18 tan units as compared with about 9.

Some hides and skins are vegetable tanned, some are chrome tanned, and some are tanned with a combination of vegetable and chrome tannins. All of the chrome and most of the vegetable tannins are imported. Synthetic tannins such as orotan and calgon have properties that enable them to replace many of the vegetable tannins, but present high prices prevent their use on a large scale.

3. Dependency of Major Consuming Countries on Foreign Sources of Wattle and Quebracho.

a. US.

The US uses about one-half of the world's output of vegetable tannins but produces a much smaller fraction. The principal tannins produced in the US are chestnut, hemlock, oak, sumac, and canaigre, which is not yet in commercial production. Wattle and quebracho were first used in this country because of the failure of indigenous tannins to supply the needs of the US tanning industry and now remain in prominent use because they are cheaper than domestic products. The US is

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wholly dependent upon Africa for its supply of wattle (about 28,000 tons annually during 1948-49) and upon Latin America for its supply of quebracho (67,000 tons annually during 1948-50). To fulfill stockpile requirements in the US, the demand has been increased considerably. A total of 112,700 tons of quebracho went to the US in 1950.

About 70 percent of the tannins consumed in the US during 1948-50 were imported. Quebracho and wattle make up the bulk of these imports. US dependence on foreign sources of supply of tannins is at present more contingent upon the costs than upon the lack of raw materials. The large potential supply of domestic vegetable tanning materials -- principally Douglas fir bark, Western hemlock bark, Florida scrub oak, and canaigre root -- could conceivably fulfill all requirements, but because the cost of production is not competitive with imported tannins, they have not been fully exploited and developed. Orotan, a synthetic tannin, is also in production, but a large expansion of production under peacetime conditions will depend upon the ability of the manufacturer to reduce costs.

b. US Allies.*

Although much less vegetable tannin is consumed by US allies than by the US, almost all of the allies obtain vegetable tannins from

* In this report, US allies include the 13 NATO countries (UK, Canada, Iceland, France, Belgium, Luxembourg, the Netherlands, Portugal,

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Africa and Latin America. During 1948-49, exports of wattle to the UK, the NATO countries in Western Europe, and other allies amounted to an annual average of 88,000 tons, which constitute about 57 percent of Africa's exportable supply of wattle, extract equivalent,* as compared with 28,000 tons, or 18 percent, for the US. The UK, the world's largest user of wattle extract, imported about 35 percent of Africa's exportable supply of wattle during 1948-49. Wattle comprises 73 percent of the approximately 74,000 tons of vegetable tannins currently consumed in the UK. Other US allies received only small amounts of African wattle.

During 1948-50, annual exports of quebracho to US allies amounted to about 42,000 tons, which represented about 20 percent of Latin America's exports of quebracho. France, the UK, and Germany were the main importers of this tannin. Except for the UK, the individual allies do not depend to a great extent on vegetable tannins from Africa and Latin America. Europe has a number of different kinds of chestnut trees with good tanning qualities and is also the

Italy, Norway, Denmark, Turkey, and Greece) and Western Germany, Japan, Australia, and New Zealand.

* Two pounds of wattle bark yield 1 pound of extract.

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source of valonia, which is obtained from the acorn cups of certain species of oak. Italy, France, and Switzerland have adapted local chestnut extracts by treating them chemically for tanning coarse leather. Through this process, they have obtained a quality similar to quebracho.

c. Other Free World Countries.*

Some of the other countries in the Free World depend upon Latin American quebracho. Most important among these are Sweden and Finland, which import from 3,000 to 6,000 tons annually. Hong Kong increased its quebracho imports to over 19,000 tons in 1950. However, there is evidence that a large part of this was transshipped to Communist China, while only a relatively small amount was consumed in Hong Kong. In general, however, countries in the Far East do not rely upon Latin American tannins, since their own resources of tanning materials are extensive. Myrtan (the trade name for a tannin produced in Southwestern Australia from the Eucalyptus Redunca tree) and man-grove, or cutch (which comes from the swamps of Malaya, the Philippines, Borneo, Java, and Latin America), are increasing in importance and volume in the tanning industries of Far Eastern countries and are gaining in

* Other Free World countries include all areas outside the Soviet Bloc except the US and its allies.

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popularity and use in the Western World. Other Latin American countries receive considerable amounts of quebracho from Argentina and Paraguay in addition to other indigenous tannins such as divi-divi, urunday, and Cebil Colorado.

Other Free World countries in the Near and Middle East import less than 7,000 tons of African wattle annually, and Western European countries import slightly more than that amount each year. Hong Kong receives substantial quantities of wattle, but the amount going to other Free World areas is nil.

4. Production.

a. Wattle.

Practically the entire supply of wattle entering world trade is produced in the Union of South Africa, British East Africa, and Southern Rhodesia (see Table 1).* Prewar production in Africa is not accurately known. For the Union of South Africa, production during 1948-49 was 58 percent above the prewar figure. Since the Union is the predominant producer, this figure reflects with a fairly high degree of accuracy Africa's increased wattle production. Wattle is also produced in Brazil, Australia, India, Ceylon, and Indonesia, but this production has been of little commercial significance in

* Table 1 follows on p. 21.

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world trade. In recent years, more than 40 million wattle-producing trees have been planted in southern Brazil. So far the yield of wattle extract from these plantings has been about 5,000 tons annually.

Wattle bark is derived from several species of the acacia trees, which are native to Australia. The bark is the source of wattle extract, and it is possible to obtain 1 unit of extract by weight from 2 units of wattle bark. Experiments in the US have indicated that Arizona, New Mexico (with irrigation), and Florida possess the climate and soil necessary for wattle culture. Because of its quick growth relative to other tannin-producing trees and its economical production, wattle appears to have a good future in subtropical areas as a cultivated tannin source.

Wattle bark has been grown on a commercial scale in South Africa for more than 50 years, and some areas have produced their fifth crop of trees.* The trees are fast-growing but comparatively short-lived and reach maturity for bark in 8 to 12 years. For comparison, "1 acre of wattle trees 7 to 10 years of age, will yield 6 tons of bark, compared to 4 tons of oak bark and 8 tons of hemlock bark at an age of 80 years." 3/

* After the bark has been stripped from the tree the tree is removed and is replaced with new stock.

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The British exercise a fairly high degree of control over the production and distribution of wattle. Table 1 indicates a substantial postwar increase in wattle production over prewar. By 1949-50, war-time plantings had produced their first crop of trees. In recent years, wattle production appears to have been rather stable within a range of 130,000 to 160,000 tons per year. It is possible to obtain an immediate increase in the amount of wattle produced by harvesting bark from trees a year or two before they would normally be cut. This has the consequence that the supply available a year or two later will be smaller because of precutting and, unless the trees are replaced, the supply normally available in the future would be reduced.

b. Quebracho.

Quebracho trees are indigenous to Argentina and Paraguay, which together account for practically the entire world supply of quebracho extract (see Table 2).^{*} During the past 10 years, annual production of quebracho extract by these 2 countries has averaged 230,000 tons, of which about 180,000 tons were exported to foreign markets. Roughly, 80 percent of the extract originates in Argentina, and 20 percent in Paraguay.

The quebracho industry in Latin America did not develop until toward the end of the 19th century. Today quebracho is one of the most

^{*} Table 2 follows on p. 22.

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important and most widely used of the numerous vegetable tanning materials and accounts for about one-half of the volume of tannins in world commerce.

Quebracho trees grow very slowly, reaching a commercial stage for tannin extract in 100 to 150 years. Pure stands of quebracho do not occur. The trees are widely dispersed among numerous hardwood varieties. Only the heartwood of the tree is used to obtain extract, and its tannin content averages 20 to 26 percent by weight. Most of the existing stands of quebracho trees are in Argentina.

The principal factors determining the probable duration of these resources include (1) future world demand for quebracho extract; (2) future rate of utilization as fuel (during the last half century, 50 percent of all quebracho exploited was used for fuel); and (3) pressure on the land from Argentina's growing population, which makes it unlikely that land suitable for grazing crops can be devoted to 1 crop of quebracho every 100 to 150 years. On the basis of continued use at the present estimated rate, Argentina quebracho resources should last from 50 to 60 years. At the present rate of exploitation, it may take from 30 to 100 years to exhaust the quebracho supply in Paraguay. Although complete statistics are not available to support these widely varying estimates, the supply is declining, and reforestation of quebracho-producing areas is almost negligible.

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5. Trade.

a. Wattle.

During 1948-49, about 153,000 tons of wattle (extract equivalent), representing almost the entire world production of that tannin, was exported from the major wattle exporting countries in Africa (see Table 3).^{*} Almost 98 percent of this amount was exported to countries in the Free World. Table 4^{**} shows exports of wattle extract as such, and Table 5^{***} shows exports of wattle bark by destination. As indicated in the accompanying chart,^{****} over 75 percent of Africa's exportable supply of wattle was imported by the US and its allies. About 54,000 tons went to the UK, where it made up the bulk of the tannin used by the leather industry in that country. Wattle, although important for certain types of tanning in the US, is considered a supplemental tannin. In other countries of the Free World, except the colony of Hong Kong, wattle is used in very small quantities, supplementing indigenous tannins.

Average annual exports of wattle for 1948-49 were about 70 percent larger than the prewar average and 45 percent above the wartime average. Table 6,^{*****} which shows net exports of wattle, indicates

* Table 3 follows on p. 23.
** Table 4 follows on p. 25.
*** Table 5 follows on p. 27.
**** Following p. 16.
***** Table 6 follows on p. 29.

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a substantial upward trend in the export of that tannin since the close of World War II. It is possible that exports will level off at slightly less than 150,000 tons per year. Since there is virtually no tanning industry in Africa, nearly all the wattle produced there finds its way to foreign markets.

b. Quebracho.

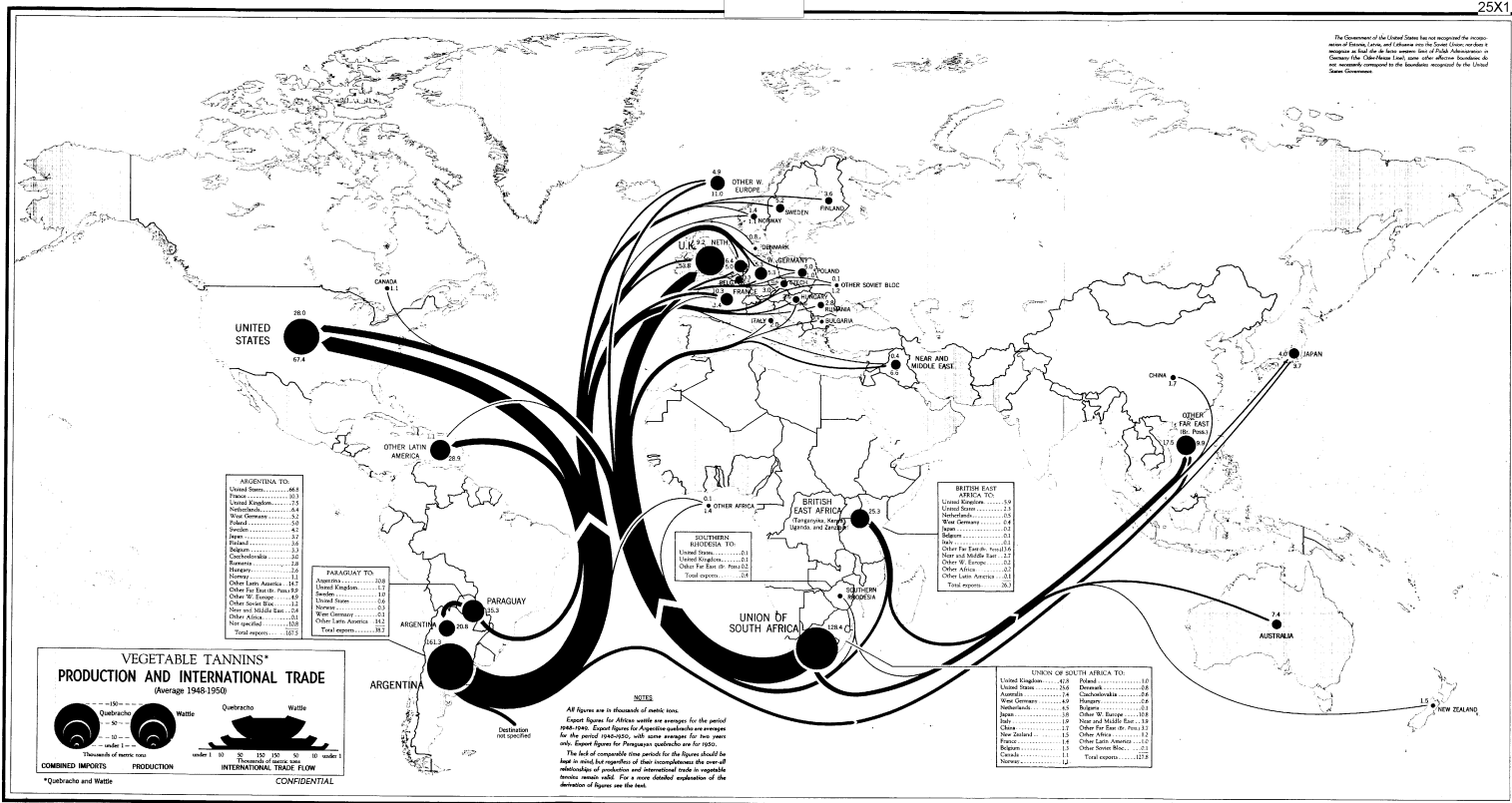
Data for Latin American quebracho exports, especially by destination, for the past few years provide a somewhat distorted picture. In Table 7,* many of the figures for Argentina are only 2-year averages, and the figures for Paraguay are for 1950 only. In some recent years, exports appear to have been larger than production (see Tables 2 and 8**) because exports of quebracho have been determined more by price than by production. During 1950, for example, production of quebracho was reported to be 186,000 tons, while exports were 287,000 tons. During this same year, 112,700 tons were exported to the US.

The data in Table 7 present a rather consistent pattern of the movement of quebracho in world trade. For 10 years prior to 1951, an average of 20 to 25 percent of the quebracho produced in Latin America was consumed domestically. Except for the shipments of

* Table 7 follows on p. 31.

** Table 8 follows on p. 33.

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quebracho to the US and the UK, the movement of this tannin to the other countries of the Free World almost parallels the movement of wattle as shown graphically in the accompanying chart.

Shipments of quebracho to the US in recent years have amounted to between 40 and 50 percent of Latin America's exportable supply. During 1940-49 the US imported 70 percent of its tannin. Quebracho constituted nearly 70 percent of US imports of tannins and made up more than 50 percent of total US tannin consumption. ^{4/} Although the UK has been a consistent user of quebracho, it has used only a small amount -- less than 10,000 tons annually in recent years.

Exports of quebracho were reduced significantly during World War II despite the large demand for tanning materials. 1950 exports were only 30 percent above prewar exports but were 71 percent above the average wartime exports. Since the close of the war, except in 1948-49, there has been a gradual upward trend in the exports of quebracho from Latin America. The adoption by Argentina of a conservation program which will outlaw the use of quebracho for fuel would, if enforced, increase the output of quebracho extract and at the same time decrease the annual cutting of quebracho trees. Furthermore, by reducing the half million-ton capacity of the partially used and uneconomically operated plants to an output capacity of 330,000 tons, and

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by concentrating this capacity in fewer and more efficiently operated plants, the Argentine Government plans to increase present output of quebracho extract at lower unit costs.

6. Conclusions.

a. Wattle.

On the basis of the data presented in this report, the denial to the Free World of African wattle, assuming no change in any other area, would probably have the following results:

(1) Except for the loss of its special tanning characteristics, the loss of the African supply of wattle would not directly affect the tanning industry in the US.

(2) The UK's tanning industry, which obtains about 73 percent of its tanning materials (mostly wattle) from Africa, would be seriously handicapped. Almost the entire amount of the UK's tannin requirements coming from Africa would have to be replaced from other foreign sources, since the UK's potential indigenous production of vegetable tannins could not replace this loss.

(3) Other US allies and other countries of the Free World would not be appreciably affected by the loss of African wattle. Although Western Europe is a net importer of vegetable tannins, considerable amounts of domestic tannins are exported. Many countries have, through the use of chemical mixtures, satisfactorily

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supplemented their indigenous production of vegetable tannins. Increased cutting and processing of the existing stands of quebracho in Latin America in the production of extract would mitigate the seriousness of the loss of African wattle.

b. Quebracho.

If the supply of quebracho were denied to the Free World, assuming no other changes, the following results would probably occur:

(1) The US probably could develop, at increased prices and with strict rationing, its potential domestic tannin production sufficiently to offset the loss of quebracho with the aid of stockpile reserves to cushion the effects of the loss of quebracho.

(2) The UK's tanning industry would be handicapped but not seriously altered by the loss of quebracho. It would be possible to obtain an immediate increase in the amount of wattle produced by harvesting bark from trees a year or two before they normally would be cut and thus probably mitigate the UK's loss of quebracho. This would mean that the supply 1 or 2 years hence would be reduced by the amount of precutting that took place, and these trees would have to be replaced in order to maintain future supply.

(3) Other nations of the Free World would not be appreciably affected by the loss of quebracho, because the contribution which quebracho makes to their economy through the tanning industry

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is very small. As the use of leather substitutes increases and the production of leather goods decreases, minimum tanning requirements for the decreased leather production could probably be maintained.

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Table 1

Wattle: Production of Bark and Extract in Specified Surplus Producing Countries in Africa a/
Average 1935-39 and 1940-44, Annual 1945-51

Period	Union of South Africa			British East Africa			Total Africa <u>b/</u>		
	Wattle Bark	Wattle Extract	Total Extract Equivalent <u>c/</u>	Wattle Bark	Wattle Extract	Total Extract Equivalent <u>c/</u>	Wattle Bark	Wattle Extract	Total Extract Equivalent <u>c/</u>
1935-39	79.0	41.8	81.3	N.A. <u>d/</u>	N.A.	N.A.	79.0	41.8	81.3
1940-44	55.3	66.5	94.1	N.A.	N.A.	N.A.	55.3	66.5	94.1
1945	43.7	75.0	96.8	27.6	N.A.	13.8	71.3	75.0	110.6
1946	53.4	75.6	102.3	24.9	N.A.	12.4	78.3	75.6	114.7
1947	53.0	88.0	114.5	N.A.	N.A.	N.A.	53.0	88.0	114.5
1948	61.9	98.0	129.0	37.4	N.A.	18.7	99.3	98.0	147.7
1949	62.6	103.6	134.9	55.6	N.A.	27.8	118.2	103.6	162.7
1950	56.3	93.3	121.4	58.6	N.A.	29.3	114.9	93.3	150.7
1951 <u>e/</u>	55.7	94.3	122.1	N.A.	N.A.	N.A.	55.7	94.3	122.1

a. Office of Foreign Agricultural Relations, USDA.

b. Total African production includes a small amount of Southern Rhodesian wattle bark for which statistics are not available.

c. Two tons of wattle bark are required to produce one ton of extract.

d. N.A. indicates that information is not available.

e. 1951 - preliminary estimate.

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Table 2

Quebracho: Production of Extract in Specified Countries
in Latin America a/
Average 1935-39 and 1940-44, Annual 1945-51

Thousand Metric Tons			
<u>Period</u>	<u>Argentina</u>	<u>Paraguay</u>	<u>Total</u>
1935-39	219 <u>b/</u>	42	261
1940-44	153	43	196
1945	232	30	262
1946	276	45	321
1947	208	26	234
1948	194	35	229
1949	135	40	175
1950	155	31	186
1951 <u>c/</u>	200	N.A. <u>d/</u>	200

a. Office of Foreign Agricultural Relations, USDA.

b. 1936-39 average.

c. 1951 - preliminary estimate.

d. N.A. indicates that information is not available.

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Table 3

Wattle: Extract Equivalent a/* of Total Wattle Exports
From Specified African Countries by Destination b/
Average 1948-49

Destination	Origin				Thousand Metric Tons
	Union of South Africa	British East Africa	Southern Rhodesia	Total Africa	
US and Possessions	25.6	2.3	0.1		28.0
Allies					
NATO Countries					
UK	47.8	5.9	0.1		53.8
Netherlands	4.5	0.5	c/		5.0
France	1.4	c/	c/		1.4
Belgium d/	1.3	0.1	0		1.4
Canada	1.1	e/	e/		1.1
Italy	1.9	0.1	0		2.0
Norway	1.1	0	0		1.1
Denmark	0.8	0	0		0.8
Other NATO e/	3.1	0.2	0		3.3
Total NATO	<u>63.0</u>	<u>6.8</u>	<u>0.1</u>		<u>69.9</u>
Australia	7.4	0	0		7.4
Western Germany	4.9	0.4	0		5.3
Japan	3.8	0.2	0		4.0
New Zealand	1.5	0	0		1.5
Total Allies	<u>80.6</u>	<u>7.4</u>	<u>0</u>		<u>88.1</u>
Other Free World					
Far East	3.7	13.6	0.2		17.5
Near and Middle East	3.9	2.7	Negligible		6.6
Western Europe e/	7.7	0	0		7.7
Africa	1.2	0.2	0		1.4
Latin America	1.0	0.1	0		1.1
Total Other Free World	<u>17.5</u>	<u>16.6</u>	<u>0.2</u>		<u>34.3</u>
Total Free World	<u>123.7</u>	<u>26.3</u>	<u>0.4</u>		<u>150.5</u>

* Footnotes for Table 3 follow on p. 24.

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Table 3

Wattle: Extract Equivalent a/ of Total Wattle Exports
From Specified African Countries by Destination b/
Average 1948-49
(Continued)

Destination	Origin			
	Union of South Africa	British East Africa	Southern Rhodesia	Total Africa
Soviet Bloc				
China	1.7 f/	0	0	1.7 f/
Poland	1.0 f/	0	0	1.0 f/
Hungary	0.6	0	0	0.6
Czechoslovakia	0.6	0	0	0.6
Bulgaria	0.1	0	0	0.1
Other	0.1	0	0	0.1
Total Soviet Bloc	<u>4.1</u>	<u>0</u>	<u>0</u>	<u>4.1</u>
Total Exports	<u>127.8</u>	<u>26.3</u>	<u>0.4</u>	<u>154.6</u>
Intra-Area Exports	1.2	0.2	0	1.4
Net Exports	<u>126.6</u>	<u>26.1</u>	<u>0.4</u>	<u>153.2</u>

- a. Includes extract equivalent of wattle bark plus extract exported as such.
b. Office of Foreign Agricultural Relations, USDA.
c. Less than 50 tons.
d. Includes Luxembourg.
e. These two items have been lumped together as "Other Western Europe" in Chart because "Other NATO" is composed of European countries.
f. 1948 only.

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Table 4

Wattle Extract: Exports from Specified African Countries by Destination a/*
Average 1948-49

Destination	Thousand Metric Tons		
	Origin		
	Union of South Africa	British b/ East Africa	Total Africa
US and Possessions	14.6	1.7	16.3
Allies			
NATO Countries			
UK	45.9	5.9	51.8
Netherlands	2.6	0.5	3.1
Belgium c/	1.3	0.1	1.4
Canada	1.1	Negligible	1.1
Norway	1.1	Negligible	1.1
Italy	1.0	0.1	1.1
Other NATO	1.7	0.2	1.9
Total NATO	<u>54.7</u>	<u>6.8</u>	<u>61.5</u>
Australia	6.8	0.0	6.8
New Zealand	1.5	0.0	1.5
Japan	1.2	0.2	1.4
Western Germany	0.6	0.4	1.0
Total Allies	<u>64.8</u>	<u>7.4</u>	<u>72.2</u>
Other Free World			
Far East	3.6	9.4	13.0
Near and Middle East	3.5	2.7	6.2
Western Europe	3.2	1.0	4.2
Africa	1.1	0.2	1.3
Latin America	1.0	0.1	1.1
Total Other Free World	<u>12.4</u>	<u>13.4</u>	<u>25.8</u>
Total Free World	<u>91.8</u>	<u>22.5</u>	<u>114.3</u>

* Footnotes for Table 4 follow on p. 26.

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Table 4

Wattle Extract: Exports from Specified African Countries by Destination a/
Average 1948-49
(Continued)

<u>Destination</u>	<u>Origin</u>		
	<u>Union of South Africa</u>	<u>British b/ East Africa</u>	<u>Total Africa</u>
Soviet Bloc			
China	1.4	0.0	1.4
Poland	0.5	0.0	0.5
Bulgaria	0.1	0.0	0.1
Other	0.1	0.0	0.1
Total Soviet Bloc	<u>2.1</u>	<u>0.0</u>	<u>2.1</u>
Total Exports	<u>93.9</u>	<u>22.5</u>	<u>116.4</u>
Intra-Area Exports	1.1	0.2	1.3
Net Exports	<u>92.8</u>	<u>22.3</u>	<u>115.1</u>

a. Office of Foreign Agricultural Relations, USDA.

b. 1949 only.

c. Includes Luxembourg.

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Table 5

Wattle Bark: Exports From Specified African Countries by Destination a/*
Average 1948-49

Destination	Origin				Total Africa
	Union of South Africa	British b/ East Africa	Southern Rhodesia		
US and Possessions	21.9	1.6	0.2		23.7
Allies					
NATO Countries					
UK	3.8	0.0	0.1		3.9
Netherlands	2.9	0.0	0.1		3.0
France	2.8	0.1	Negligible c/		2.9
Italy	1.7 b/	0.0	0.0		1.7
Denmark	1.6	0.0	0.0		1.6
Other NATO	2.8	0.0	0.0		2.8
Total NATO	<u>15.6</u>	<u>0.1</u>	<u>0.2</u>		<u>15.9</u>
Western Germany	8.6	0.0	0.0		8.6
Japan	5.2	0.0	0.0		5.2
Australia	1.2	0.0	0.0		1.2
New Zealand	Negligible	0.0	0.0		Negligible
Total Allies	<u>30.6</u>	<u>0.1</u>	<u>0.2</u>		<u>30.9</u>
Other Free World					
Far East	0.2	8.4	0.4 b/		9.0
Near and Middle East	0.7	Negligible	Negligible		0.7
Africa	0.1	0.0	0.0		0.1
Western Europe					
Sweden	7.5	0.0	0.0		7.5
Other Western Europe	1.5	0.0	Negligible c/		1.5
Total Other Free World	<u>10.0</u>	<u>8.4</u>	<u>0.4</u>		<u>18.8</u>
Total Free World	<u>62.5</u>	<u>10.1</u>	<u>0.8</u>		<u>73.4</u>

* Footnotes for Table 5 follow on p. 28.

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Table 5

Wattle Bark: Exports From Specified African Countries by Destination a/
Average 1948-49
(Continued)

Destination	Origin				Thousand Metric Tons
	Union of South Africa	British <u>b/</u> East Africa	Southern Rhodesia	Total Africa	
Soviet Bloc					
Hungary	1.2	0.0	0.0	1.2	
Czechoslovakia	1.1	0.0	0.0	1.1	
Poland	1.0 <u>c/</u>	0.0	0.0	1.0	
China	0.5 <u>c/</u>	0.0	0.0	0.5	
Total Soviet Bloc	<u>3.8</u>	<u>0.0</u>	<u>0.0</u>	<u>3.8</u>	
Total Exports	<u>66.3</u>	<u>10.1</u>	<u>0.8</u>	<u>77.2</u>	
Intra-Area Exports	0.1	0.0	0.0	0.1	
Net Exports	<u>66.2</u>	<u>10.1</u>	<u>0.8</u>	<u>77.1</u>	

- a. Office of Foreign Agricultural Relations, USDA.
b. 1949 only.
c. 1948 only.

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Table 6

Wattle: Net Exports a/ of Specified Surplus Producing Countries in Africa b/
Average 1935-39 and 1940-44, Annual 1945-51 c/

Period	Union of South Africa			British East Africa			Southern Rhodesia			Total Africa		
	Wattle Bark	Wattle Extract	Total Extract Equivalent <u>d/</u>	Wattle Bark	Wattle Extract	Total Extract Equivalent <u>d/</u>	Wattle Bark	Wattle Extract	Total Extract Equivalent <u>d/</u>	Wattle Bark	Wattle Extract	Total Extract Equivalent <u>d/</u>
1935-39	79.0	36.5	76.0	10.0	6.0	11.0	N.A. <u>e/</u>	0	N.A.	89.0	42.5	87.0
1940-44	55.3	62.5	90.2	8.8	8.5	12.9	N.A.	0	N.A.	64.1	71.0	103.1
1945	43.7	67.4	89.2	9.4	8.7	13.4	0.2	0	0.1	53.3	76.1	102.7
1946	53.4	66.7	93.4	8.0	12.1	16.1	0.8	0	0.4	62.2	78.8	109.9
1947	53.0	80.6	107.1	10.4	11.8	17.0	0.5	0	0.2	63.9	92.4	124.3
1948	61.9	92.6	123.5	11.7	12.9	18.8	0.5	0	0.2	74.1	105.5	142.5
1949	62.6	96.3	127.6	10.1	22.3	27.3	0.7	0	0.4	73.4	118.6	155.3
1950	56.3	86.7	114.9	5.1	24.5	27.1	0.3	0	0.1	61.7	111.2	142.1
1951 <u>c/</u>	55.7	87.7	115.5	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	55.7	87.7	115.5

a. Net exports is equal to total exports of the area minus intra-area exports.

b. Office of Foreign Agricultural Relations, USDA.

c. 1951 - preliminary estimate.

d. Two tons of bark are required to produce one ton of extract.

e. N.A. indicates that information is not available.

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Table 7

Quebracho Extract: Exports From Specified Latin American Countries by Destination a/
Average 1948-50

Destination	Origin		Total Latin America
	Argentina	Paraguay <u>b/</u>	
US and Possessions	66.8	0.6	67.4
Allies			
NATO Countries			
France	10.3	0.0	10.3
UK	7.5	1.7	9.2
Netherlands	6.4	0.0	6.4
Belgium	3.3	0.0	3.3
Norway	1.1	0.3	1.4
Other NATO <u>c/ d/</u>	2.1	0.0	2.1
Total NATO	<u>30.7</u>	<u>2.0</u>	<u>32.7</u>
Western Germany	5.2	0.1	5.3
Japan	3.7	0.0	3.7
Australia <u>c/</u>	Negligible	0.0	Negligible
Total Allies	<u>39.6</u>	<u>2.1</u>	<u>41.7</u>
Other Free World			
Latin America:			
Argentina	0	20.8 <u>e/</u>	20.8 <u>c/</u>
Other	14.7 <u>c/</u>	14.2	28.9 <u>c/</u>
Far East (British Poss.)	9.9 <u>c/</u>	0.0	9.9 <u>c/</u>
Western Europe:			
Sweden	4.2	1.0	5.2
Finland	3.6 <u>c/</u>	0.0	3.6 <u>c/</u>
Other <u>d/</u>	2.8 <u>c/</u>	0.0	2.8 <u>c/</u>
Near and Middle East	0.4 <u>c/</u>	0.0	0.4 <u>c/</u>
Africa	0.1 <u>c/</u>	0.0	0.1 <u>c/</u>
Other <u>f/</u>	0.5 <u>c/</u>	0.0	0.5 <u>c/</u>
Total Other Non-Communist	<u>36.2 c/</u>	<u>36.0</u>	<u>72.2 c/</u>
Total Free World	<u>142.6 c/</u>	<u>38.7</u>	<u>181.3 c/</u>

* Footnotes for Table 7 follow on p. 32. - 31 -

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Table 7

Quebracho Extract: Exports From Specified Latin American Countries by Destination a/
Average 1948-50
(Continued)

Destination	Origin		Total Latin America
	Argentina	Paraguay <u>b/</u>	
Soviet Bloc			
Poland	5.0	0.0	5.0
Czechoslovakia	3.0	0.0	3.0
Rumania	2.8	0.0	2.8
Hungary	2.6	0.0	2.6
Other	1.2 <u>c/</u>	0.0	1.2 <u>c/</u>
Total Soviet Bloc	<u>14.6</u>	<u>0.0</u>	<u>14.6</u>
Not Specified <u>f/</u>	10.3	0.0	10.3
Total Exports	<u>167.5 c/</u>	<u>38.7</u>	<u>206.2 c/</u>
Intra-Area Exports	14.7 <u>c/</u>	35.0 <u>e/</u>	49.7 <u>c/</u>
Net Exports	<u>152.8 c/</u>	<u>3.7 c/</u>	<u>156.5</u>

a. Office of Foreign Agricultural Relations, USDA.

b. 1950 only.

c. Less than 3-year average.

d. These two items have been lumped together as "Other Western Europe" in the chart because "Other NATO" is composed of European countries.

e. Paraguayan quebracho shipped to "Argentina in Transit" frequently loses its identity. In 1950, 20,756 tons of quebracho were shipped to Argentina in transit.

f. These two items have been lumped together as "Not Specified" in the accompanying chart.

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Table 8

Quebracho: Exports of Extract and Logs from Specified Countries
in Latin America a/
Average 1935-39 and 1940-44, Annual 1945-51 b/

Thousand Metric Tons

Period	<u>Argentina</u>		<u>Paraguay</u>	<u>Total Extract</u>
	<u>Extract</u>	<u>Logs <u>c/</u></u>	<u>Extract</u>	
1935-39	183	83	38 <u>d/</u>	221
1940-44	132	8	36	168
1945	191	<u>e/</u>	52	243
1946	207	<u>e/</u>	48	255
1947	215	<u>e/</u>	23	238
1948	131	<u>e/</u>	29	160
1949	99	<u>e/</u>	40	139
1950	248	<u>e/</u>	39	287
1951 <u>b/</u>	257	<u>e/</u>	40	297

a. Office of Foreign Agricultural Relations, USDA.

b. 1951 - preliminary.

c. Logs comprise only the heartwood of the tree and contain approximately 30.4 percent extract by weight.

d. Average of years 1935, 1936, and 1938.

e. Less than 500 tons.

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