

UNITED STATES TARIFF COMMISSION

TUNG OIL AND TUNG NUTS

**Report to the President
on
Investigation No. 22-23S
Under Section 22
of the
Agricultural Adjustment Act,
As Amended**



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**Washington
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C O N T E N T S

| | <u>Page</u> |
|---|-------------|
| Report to the President----- | 1 |
| Finding----- | 2 |
| Considerations bearing on the foregoing finding: | |
| Description and uses----- | 2 |
| U.S. customs treatment----- | 3 |
| The domestic industry----- | 5 |
| The price-support program----- | 10 |
| Nonrecourse loans----- | 11 |
| Purchase agreements----- | 12 |
| Price-supporting operations in recent years----- | 13 |
| U.S. production----- | 15 |
| U.S. exports----- | 16 |
| U.S. imports----- | 16 |
| Yearend stocks----- | 18 |
| U.S. consumption----- | 19 |
| Prices----- | 20 |
| Prices received for domestically produced tung oil----- | 21 |
| Prices received for imported tung oil----- | 22 |
| Foreign production and exports----- | 23 |
| Conclusion----- | 26 |
| Statistical appendix----- | 27 |
| | (TC28802) |

FIGURE

| | |
|--|---|
| The tung-nut producing areas of the United States----- | 6 |
|--|---|

TABLES

| | |
|---|----|
| 1. Tung oil: U.S. consumption, by end use, 1947-60----- | 28 |
| 2. Fats and oils: Quantities used in the United States in the manufacture of drying-oil products, 1935-60----- | 29 |
| 3. Drying oils: U.S. wholesale prices, by kinds of oil, and weighted average price, 1935-60----- | 30 |
| 4. Tung nuts: U.S. production, by principal producing States, 1950-60----- | 31 |
| 5. Tung nuts: Ratio of support rate to parity, average support rate to growers, prices, production of nuts and oil, Commodity Credit Corporation (CCC) operations, and total carryover in the United States, marketing years 1950/51 to 1961/62----- | 32 |

| | <u>Page</u> |
|---|-------------|
| 6. Tung oil: U.S. supply and disposition, marketing years 1942/43 to 1960/61----- | 33 |
| 7. Tung nuts: U.S. imports for consumption, by countries, market- ing years 1948/49 to 1960/61----- | 34 |
| 8. Tung oil: U.S. imports for consumption, by country of origin, average 1935-39, annual 1946-60, and January-September 1961---- | 35 |
| 9. Tung oil: Average prices received for domestically produced and imported tung oil in New York City and for Argentine/South American tung oil in European ports, 1957-61 and, by months, January-October 1961----- | 36 |
| 10. Tung oil: Estimated world production and estimated production in principal producing countries, marketing years, average 1935/36 to 1939/40, annual 1946/47 to 1961/62----- | 37 |
| 11. Tung oil: Exports from specified countries, average 1945-49, annual 1950-60----- | 38 |

REPORT TO THE PRESIDENT

U.S. Tariff Commission,
Washington, December 4, 1961

To the President:

Pursuant to your request, the U.S. Tariff Commission has made an investigation under section 22(d) of the Agricultural Adjustment Act, as amended, supplemental to its investigation No. 23 under section 22(a) of the said act, to determine whether the circumstances requiring Proclamation No. 3378 of October 27, 1960 (3 CFR, 1960 Supp., p. 44) imposing import quotas on tung oil and tung nuts no longer exist so that the said proclamation may therefore be terminated.

Notice of the institution of the supplemental investigation was given by posting a copy of the notice at the office of the Commission in Washington, D.C., and at its office in New York City, and by publication in the Federal Register (26 F.R. 9115) and in the September 28, 1961, issue of Treasury Decisions. Copies of the notice were also sent to press associations, to trade and similar organizations of producers, and to importers, known by the Commission to have an interest in the subject matter of the supplemental investigation. Said notice included a notice of a public hearing to be held in connection with the supplemental investigation; the hearing was duly held on October 24, 1961, and all interested parties were given opportunity to be present, to produce evidence, and to be heard at such hearing. In addition to the information submitted at the hearing, the Commission obtained information pertinent to the supplemental investigation from its files, from official U.S. Government sources including the U.S. Department of Agriculture, and from other appropriate sources.

Finding

On the basis of the supplemental investigation, including the hearing, the Commission ^{1/} finds that the circumstances requiring import quotas on tung oil and tung nuts, imposed by Proclamation No. 3378 of October 27, 1960, continue to exist, and that the termination of the said proclamation would therefore result in the importation of tung oil under such conditions and in such quantities as to materially interfere with the price-support program of the Department of Agriculture with respect to tung nuts. Accordingly, the Commission makes no recommendation for the termination of the said quotas.

Considerations Bearing on the Foregoing Finding

Description and uses

Tung nuts, from which tung oil is produced, are the fruit of either of two species of deciduous tropical trees native to China (Aleurites fordi and A. montana); nuts of both types fall within the scope of this investigation. The nuts, usually about 2 inches in diameter, consist of a hull enclosing 4 to 5 triangular thin-shelled seeds. The oil content of the nuts, based on a 15-percent moisture content, generally averages from 15 to 18 percent by weight, but may range up to 21 or 22 percent.

Tung oil is a drying oil used in many products that require a quick drying and water-resistant base. In the last 5 years, the manufacturers of paints and varnishes have used an average of 82 percent of the tung oil consumed in the United States (table 1, in the appendix). Tung oil is also used in

^{1/} Chairman Dorfman did not participate in this case inasmuch as the investigation had been concluded before he took office.

printing ink, linoleum, linings for food and beverage containers and for tank cars, automobile brakes and gaskets, insulation for electrical coils, synthetic fabrics, and wallboard. Tung oil is not suitable for use in food products. When used in paints, varnishes, and other protective coatings, unprocessed oil leaves a dull appearance and, because of its low elasticity, a wrinkled surface. The oil is preferably modified, therefore, either by the addition of other vehicles or by conversion into stand oil. ^{1/} A new use has been claimed for tung oil, involving its addition to exterior latex paints to give superior adhesion to chalky painted wood and to masonry surfaces. Ultimate acceptance of such a product still awaits time-consuming exposure tests.

Other important drying oils used for many of the same purposes as tung oil are linseed oil, soybean oil, fish oils, dehydrated castor oil, oiticica oil, and tall oil (table 2). The various drying oils, however, are not completely interchangeable; each has special properties which make it preferable in certain uses. The use of any individual oil in a given paint or varnish formula depends on various factors, including its technical properties, the supplies available, and the price relationships between competing oils and vehicles. The price of tung oil has generally been higher than the prices of the principal competing oils, indicating that it is preferred for certain uses (table 3).

U.S. customs treatment

Tung oil and tung nuts are free of duty under paragraphs 1732 and 1727, respectively, of the Tariff Act of 1930. Neither tung oil nor

^{1/} The term "stand oil" is applied to any drying oil the viscosity of which has been increased by heat treatment.

tung nuts are currently the subject of tariff concessions in any trade agreement. ^{1/}

Since December 17, 1950, imports of tung oil and tung nuts from Communist China and North Korea have been excluded from entry by the Foreign Assets Control Regulations of the Treasury Department. On three occasions imports of tung oil and/or tung nuts into the United States have been restricted by means of quotas imposed by the U.S. Government. The first of these was for the period April 8 through June 30, 1953, when a quota on the oil and nuts was imposed under the authority of section 104 of the Defense Production Act of 1950, as amended. Section 104 expired July 1, 1953.

On September 9, 1957, the President, by proclamation, established a series of import quotas on tung oil extending through October 31, 1960. For the period commencing September 9, 1957, and ending October 31, 1958 (a period of almost 14 months), the total quantity of tung oil entered could not exceed 26,000,000 pounds, of which not more than 846,066 pounds could be entered before October 1, 1957, and not more than 1,154,000 pounds could be entered during each of the succeeding 4 calendar months, and the remainder could be entered during the rest of the period. ^{2/} During

^{1/} Effective Jan. 1, 1948, the duty-free status of tung oil was bound pursuant to a concession granted by the United States in the General Agreement on Tariffs and Trade. However, this concession, which was initially negotiated with the Republic of China (the world's largest producer of tung oil and tung nuts), was withdrawn effective Dec. 11, 1950, following the withdrawal of China as a contracting party to the General Agreement.

^{2/} On Apr. 28, 1958, the President proclaimed that the oil equivalent of tung nuts must be charged against the existing tung oil quotas, on the basis of 15.9 pounds for each 100 pounds of whole nuts and 35.8 pounds for each 100 pounds of decorticated nuts.

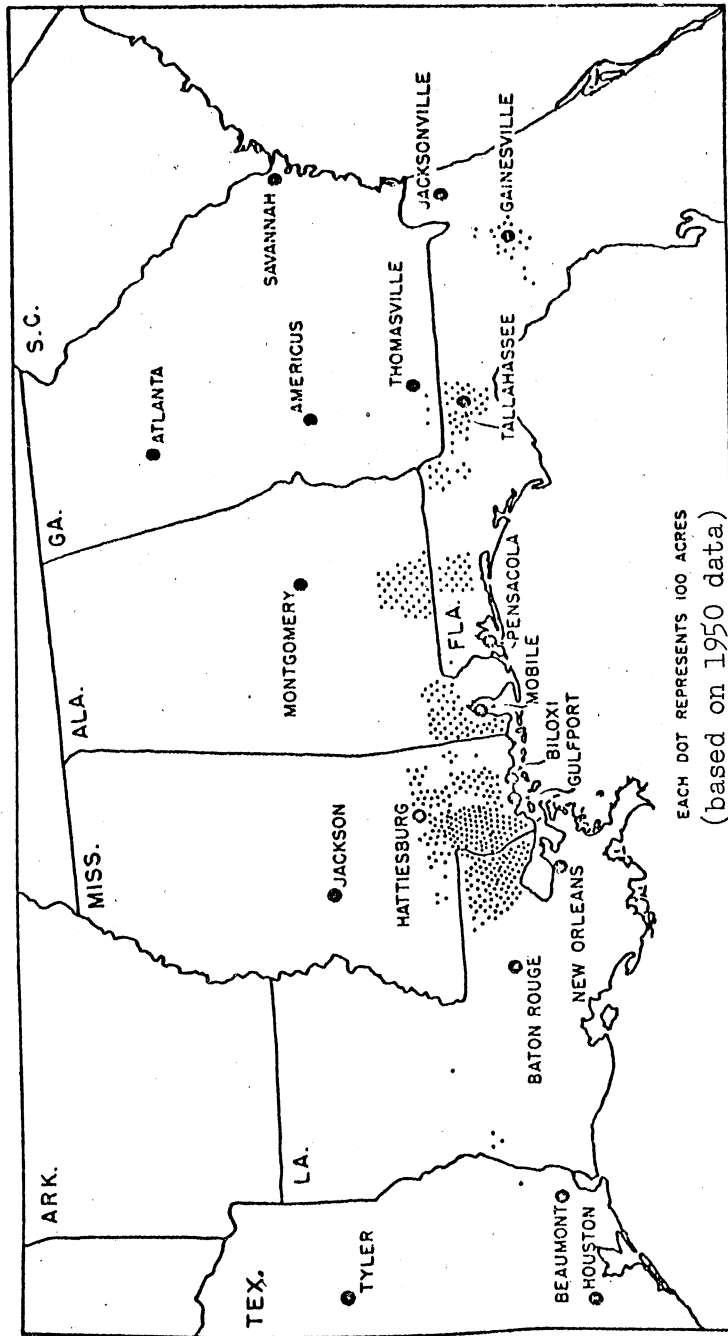
each of the 12-month periods commencing November 1, 1958, and November 1, 1959, the total quantity of tung oil that could be imported was limited to 26,000,000 pounds, of which not more than 6,500,000 pounds could be entered during the first quarter of each of these periods.

Imports of tung oil and tung nuts are currently restricted by means of quotas imposed by Presidential Proclamation No. 3378, dated October 27, 1960. This proclamation provided that for three consecutive 12-month periods, the first beginning November 1, 1960, and the last ending October 31, 1963, the annual imports of tung oil and tung nuts (in terms of their oil equivalent) are limited to 26,000,000 pounds, of which not more than 22,100,000 pounds may be the product of Argentina, not more than 2,964,000 pounds the product of Paraguay, and not more than 936,000 pounds the product of other foreign countries. The proclamation further stipulated that not more than 6,500,000 pounds may be entered during the first quarter of each quota year, and of this amount not more than 5,525,000 pounds may be the product of Argentina, not more than 741,000 pounds the product of Paraguay, and not more than 234,000 pounds the product of other foreign countries. Imports of tung nuts are charged against these quotas on the basis of 15.9 pounds of oil for each 100 pounds of whole nuts and 35.8 pounds of oil for each 100 pounds of decorticated nuts.

The domestic industry

Production of tung nuts in the United States is confined largely to an area about 100 miles wide, bordering the Gulf of Mexico and extending from eastern Texas to the Atlantic Ocean (figure, page 6). Climatic conditions in this belt have permitted the establishment of

The tung-nut producing areas of the United States



N-20323

Source: U.S. Department of Agriculture, Tung Production, Farmers' Bulletin
No. 2031, revised July 1957.

tung orchards. In the 5-year period 1956-60, about 60 percent of the domestic output of tung nuts was produced in Mississippi, 20 percent in Florida, 17 percent in Louisiana, 2 percent in Alabama, and less than 1 percent in Georgia (table 4).

Although tung trees were first planted in the United States in 1902, commercial plantings did not become important until about 1925. The Bureau of the Census reports that the number of tung trees ^{1/} in the United States was 0.4 million in 1930, 9.6 million in 1945, 13.0 million in 1950, 13.7 million in 1954, and 10.3 million in 1959. The decline in the number of trees between 1954 and 1959 was brought about by the removal of individual trees and whole orchards that were poorly located and/or were of poor-yielding varieties. ^{2/} The severe frosts experienced in the spring of 1955 were also responsible, as many orchards in marginal areas and locations were permanently injured. Most of the land from which tung trees were removed has been planted with other crops.

Trees of improved varieties have been gradually replacing inferior varieties in areas which have proved to be well adapted for tung nut production. As a consequence, the average productive capacity per tree has increased considerably. Moreover, recent plantings are more closely spaced than those made earlier. Closer spacing and the decline in the number of trees has undoubtedly caused a reduction in the number of acres devoted to tung trees.

^{1/} Including trees of both bearing and nonbearing age.

^{2/} The U.S. Department of Agriculture is currently undertaking several projects in the tung-nut-growing area to improve cultural and fertilization practices, to introduce improved and frost-resistant varieties of tung trees, and to encourage better utilization of air-drainage to prevent frost damage.

Data supplied by the Bureau of the Census show that the total number of farms producing tung nuts in 1954 and 1959 were 59 and 42 percent, respectively, of the 1950 total. Of the 2,300 farms that reported tung nut trees in 1959, it is estimated that about 50 of these accounted for nearly half of the domestic output. The bulk of the tung nut crop is produced on these and other large specialized farms in conjunction with the production of livestock; on such farms tung nuts usually provide the principal source of income. Most of the other producers operate small orchards, but for many of these, tung nuts are the principal cash crop.

Domestic producers of tung nuts are represented by two organizations: The Tung Growers Council of America (TGCA) and the American Tung Oil Association (ATOA). The membership of the TGCA consists exclusively of growers, whereas the ATOA represents industrial consumers and millers, as well as growers. Closely associated with the ATOA are two additional organizations that supply research and marketing services to their members; these are the Tung Research and Development League and the National Tung Oil Marketing Cooperative.

On December 15, 1958, the Pan American Tung Research and Development League was organized to promote U.S. consumption of tung oil through marketing, production, sales, and technological research. At present the members of the organization are the Argentine Tung Commission and the Tung Research and Development League. Other organizations, both domestic and foreign, are eligible for membership.

In the U.S. growing areas, tung nuts mature and fall to the ground in late September to early November. They are usually left on the ground to dry for 3 to 4 weeks, and, after being gathered, may be held by the grower for further drying before being delivered to the mill. Crushing of nuts from the annual crop begins in significant volume in November. The marketing year for tung oil in the United States, therefore, extends from November 1 to the following October 31.

Virtually all tung nuts are crushed in the areas where they are grown. About a dozen growers, a few of them organized as corporations, operate mills for this purpose. Other growers depend on these mills. In the performance of this service, the miller may purchase the nuts and mill them for his own account, or he may contract to crush them for the account of the grower. Purchase of the nuts was formerly more characteristic of the millers' operations than it is currently. In recent years, the grower has generally retained title to the oil until it is either sold through ordinary commercial channels or acquired by the Commodity Credit Corporation (CCC).

Domestically produced tung oil is generally marketed directly to industrial consumers by the millers, who act either for themselves or as agents for individual growers. Until it is marketed, the oil is usually stored at the mill. Except for some of the larger producers who have their own marketing facilities, the millers, and through them the growers, rely heavily upon the National Tung Oil Marketing Cooperative.

The price-support program

During most of the years since 1942, the Department of Agriculture has maintained programs to support prices of domestically grown tung nuts and of the tung oil derived therefrom. Since 1949, price support has been mandatory; tung nuts are designated by the Agricultural Act of 1949 as one of the "nonbasic" commodities for which the Department is directed to provide price support at a level between 60 and 90 percent of parity. Support may be maintained by means of purchases, loans, or other operations. ^{1/}

To be eligible for support under the 1961/62 program, tung nuts must be from the 1961 crop; moreover, they must be owned by the grower and must meet designated quality standards. Similarly, eligible tung oil must have been extracted from 1961-crop tung nuts and must meet Federal specifications.

For the 1961 domestic crop of tung nuts, the Department of Agriculture announced on June 2, 1961, that price support would be provided at the level representing 82.9 percent of parity as of June 1961 (table 5). The base support price for tung nuts from the 1961 crop was established at \$63.34 per short ton ^{2/} and that for tung oil at 24.0 cents per pound. ^{3/} In the 2 preceding marketing years the base support price was \$53.50 per short ton for tung nuts and 20.9 cents per pound for tung oil.

^{1/} These operations are carried out through the facilities of the Commodity Credit Corporation and the Agricultural Stabilization and Conservation Service of the U.S. Department of Agriculture.

^{2/} For tung nuts having an oil content other than 18.5 percent, the support price is greater or less than \$63.34 per short ton by 34 cents for each one-tenth of 1 percent by which the oil content of the nuts is greater or less than 18.5 percent.

^{3/} The support price for tung oil relates to the price f.o.b. southern crushing mills; it is equivalent in magnitude to the support price for tung nuts, with an allowance for milling costs.

Nonrecourse loans.--Under ordinary circumstances, the value of tung nuts is determined largely by the value of the end product, tung oil. It is more feasible to store the oil than the nuts. Price support to growers has thus proven to be materially more effective when applied to the oil rather than to the nuts. For all practical purposes, price support to growers of tung nuts has been accomplished by extending nonrecourse loans to qualified owners of tung oil.

Growers may obtain nonrecourse loans, at support levels, on eligible tung oil placed in approved storage facilities. The oil serves as collateral for the loan. Under the 1961/62 program, applications for loans may be made during the period November 1, 1961, through June 30, 1962. Loans mature on October 31, 1962. At any time prior to the loan's maturity date, the grower may redeem the oil so pledged by paying the amount of the loan, plus interest, storage costs, and certain minor charges. If the loan is not paid by the maturity date, the CCC takes title to the oil, and the loan--being of the nonrecourse type--is deemed fully satisfied.

To the grower, the availability of nonrecourse loans serves a three-fold purpose: (1) It assures him in advance that he will be able to dispose of his oil at a price no less than the support price on the date the loan was negotiated; (2) it provides a convenient way of financing while awaiting the possibility of a market price more favorable than that at the time of harvest; and (3) as a corollary to the foregoing, it enables growers to liquidate their product throughout the year, rather than to depress prices by unorganized mass selling soon after the harvest. Inasmuch as the loans are nonrecourse, the hedge thus supplied is available

without cost to the grower until such time as he elects to exercise it by redeeming the oil under loan. Thus the grower is not likely to redeem the oil, and to contract for its sale himself, unless the market price at some time prior to the date of maturity exceeds the support price by a margin sufficient to cover accrued costs and to provide some profit.

Purchase agreements.---Currently, price support is also extended, as it has been in the past, in the form of purchase agreements for both tung nuts and tung oil. However, as already indicated, little use has been made of such agreements. Purchase agreements on tung nuts are available to growers during the period November 1, 1961, through January 31, 1962. The agreements provide that the CCC will purchase, at the option of the grower, a quantity of tung nuts not in excess of a stated maximum, at the announced support price. Thus, although the grower is not obligated to sell any tung nuts to the CCC, the CCC has agreed to purchase up to the specified maximum, whatever quantity he offers. Moreover, growers who have signed purchase agreements for tung nuts may, at their option, deliver to the CCC an equivalent quantity of tung oil. Growers electing to sell tung nuts to the CCC under purchase agreements are required to indicate such intention during the 30-day period ending March 31, 1962. Following the required notification, the CCC will acquire such nuts at the support price.

Purchase agreements involving eligible tung oil are also obtainable by growers during the period November 1, 1961, through June 30, 1962. The agreements, which are similar to **those** for tung nuts, provide that the CCC will purchase at the support price, at the option of the grower, a quantity of tung oil not in excess of a designated maximum. Growers

who elect to sell tung oil to the CCC under the purchase agreements must so indicate within the 30-day period ending October 31, 1962 (which is also the maturity date of the nonrecourse loans on tung oil). Following the required notification, the CCC will acquire the oil.

Price-supporting operations in recent years.--During the marketing years 1956/57 to 1959/60, from two-thirds to three-fourths of the domestic output of tung oil was placed under price support and the CCC acquired substantial quantities of oil. In 1960/61, loans were made on 4.5 million pounds of oil (about one-third of the domestic output), but virtually all of it was redeemed by the growers by October 31, 1961 (table 5).

In December 1958 the CCC began selling tung oil for export at world free market prices. This method of disposal was resorted to when stocks became very large and when it became clear that holdings would continue to grow. The CCC rejected several other alternatives, among which was the selling of oil in the domestic market. It was feared that such action would cause a price break that would result in all domestically produced oil going to the CCC, thus bypassing normal marketing channels. Also rejected was the alternative of accumulating CCC oil stocks in anticipation of a series of crop failures that would curtail supplies and facilitate the disposal of CCC oil. Under this plan, storage costs would have been excessive, and the danger that the oil would deteriorate would have been great.

Effective January 24, 1961, the CCC policy was amended to include selling the oil for domestic use. This action was taken because the demand for tung oil continued while world supplies were declining. As a result of

the supply situation, prices paid to the CCC for its oil have in recent months been consistently above the support price.

During the 1958/59 marketing year, the CCC sold 20.7 million pounds of tung oil for export. This operation enabled the CCC to begin the 1959/60 marketing year with an inventory of 29.6 million pounds (table 5). The CCC acquired 16.0 million pounds of oil and disposed of 19.2 million pounds during the 1959/60 marketing year, which left it with an opening inventory of 26.4 million pounds for the marketing year 1960/61. During the 1960/61 marketing year nearly all of this inventory was sold. Inasmuch as the CCC acquired only a minor quantity of tung oil during the marketing year 1960/61, it ended the year with a carryover of only 134,000 pounds of oil.

The Commodity Credit Corporation reports that in the period from July 1, 1948, through June 30, 1961, it sustained losses of \$5.1 million in supporting prices of tung nuts and tung oil. Such losses are accounted for, not only by sales below cost, but also by accrued storage charges, costs of sales operations, handling and transportation charges, capital-carrying charges, and charge-offs (for damage, fire, and flood losses). Reported losses from tung-oil and tung-nut price-supporting operations, by specified periods, are as follows:

| | <u>Million dollars</u> |
|---|------------------------|
| July 1, 1948, through June 30, 1954---- | 0.1 |
| Fiscal year ending June 30-- | |
| 1955----- | .3 |
| 1956----- | .5 |
| 1957----- | .2 |
| 1958----- | - |
| 1959----- | 1.6 |
| 1960----- | 1.0 |
| 1961----- | 1.4 |
| Total----- | <u>5.1</u> |

U.S. production

U.S. production of tung oil depends almost entirely on the availability of domestically grown tung nuts; nuts are seldom imported, and virtually all those grown in the United States are crushed for oil. Inasmuch as the average oil content of the nuts varies only slightly from year to year, the output of tung oil in the United States closely parallels production of nuts. In recent years, however, owing to the introduction of improved varieties, there has been a gradual increase in the oil content of the nuts.

Because of the small acreage of tung nuts under cultivation, and the immaturity of existing trees, production in the United States was of little importance before World War II. The output of tung oil amounted to about 5 million pounds in the marketing year 1942/43 and to less than 2 million pounds in 1943/44. Thereafter, production increased irregularly until it amounted to 43 million pounds in 1952/53 (table 6). The 1954 crop of tung nuts was damaged severely and the 1955 crop was almost totally destroyed by frost, with the result that the oil obtained from the domestic crop amounted to only 15 million pounds in the marketing year 1954/55 and to 2 million pounds in 1955/56. In 1958/59, production reached a high of 45 million pounds. The 1959/60 output was 34 million pounds, but severe frosts in the spring of 1960 reduced the production in 1960/61 to only 13 million pounds. From recent information available on the 1961 crop of tung nuts, it is estimated that the output of tung oil in the 1961/62 marketing year will amount to around 35 million pounds.

Domestic production of tung nuts has been restricted not only by unfavorable weather conditions, but also by attacks of the fungus Cercospora

aleuritidis. This fungus, which has been known since 1925, at first caused dark-colored leaf spots which apparently did little or no damage. Since 1953, however, premature defoliation of trees in many orchards has occurred annually in varying degree during the months of August and September. Such defoliation weakens the trees and reduces their productive capacity. In October 1961, according to a trade report, the tree foliage appeared to be healthy and the effect of leaf spot was not significant. Apparently this disease will not affect the output of tung oil significantly during the 1961/62 marketing year.

U.S. exports

U.S. exports of tung oil before the 1958/59 marketing year were seldom important relative to the total domestic supply (table 6). Before the United States became an important producer of tung oil, exports reported consisted largely of reexports. During the marketing years 1951/52 to 1957/58 exports averaged about 0.5 million pounds annually. In contrast, they amounted to 20.7 million pounds in 1958/59, to 19.2 million pounds in 1959/60, and to approximately 26 million pounds in 1960/61. The substantial quantities sold abroad in recent years have been accounted for largely by export sales from accumulated CCC holdings, which sales have entailed considerable financial loss to the Government.

U.S. imports

Imports of tung nuts, which have been small and erratic during the past decade, have come predominantly from Mozambique and British East Africa (table 7). There have been no imports since the marketing year 1955/56.

Imports of tung oil were formerly much more important than they have been in recent years. In the period 1935-39, when domestic requirements

were supplied largely by imports, and when domestic consumption was considerably more than double the quantities used in recent years, imports averaged 123 million pounds annually (table 8). They were small during World War II, but in 1947-50 averaged 108 million pounds annually. Since 1950, imports of tung oil have been considerably smaller, with the quantity depending on three principal factors: the availability of stocks from South American countries, the supply-demand situation in foreign markets, and the import quotas imposed by the United States.

During the marketing years 1951/52 to 1955/56, imports of tung oil averaged 27 million pounds (table 6). In the 1952/53 marketing year, however, imports totaled only 13 million pounds, largely as a result of a poor crop in Argentina, and in 1954/55, following the imposition of export controls in Argentina and Paraguay, they amounted to about 23 million pounds. In both of these years, market prices in the United States were sufficiently high to cause the great bulk of the production from the domestic crop to move into regular commercial channels. The maximum imports in recent years occurred in 1953/54, when the CCC acquired its largest holdings of tung oil (table 5). In the marketing years since 1956/57 (i.e., since the quota of 26 million pounds was imposed) imports have averaged more than 25 million pounds. Imports in the 1960/61 marketing year were only slightly below the quota of 26 million pounds.

Before 1949, China was virtually the sole source of imports of tung oil (table 8). It continued to be the principal supplier through 1950. The Foreign Assets Control Regulations which excluded Chinese tung oil became effective on December 17, 1950. Since then Argentina has become

the principal source of U.S. imports, Paraguay has supplied most of the rest, and Brazil has generally ranked as the third supplier.

Yearend stocks

Yearend (October 31) holdings of tung oil in the United States have varied widely in recent years. In the marketing years 1951/52 to 1960/61, inclusive, ^{1/} they ranged between 9 million and 47 million pounds, and averaged 26 million pounds (table 6). During that period, closing stocks were at a maximum at the end of the 1953/54 marketing year as a result of the large acquisitions by the CCC of oil crushed from the 1953 crop. After poor harvests in 1954 and 1955, and after restrictions on exports were imposed by Argentina and Paraguay during the 1954/55 marketing year, U.S. holdings declined to 32.4 million pounds at the end of 1954/55 and to 13.0 million pounds at the end of 1955/56. With the recovery of domestic production and a continuing flow of imports, the CCC acquired substantial quantities of tung oil during the next 4 marketing years, and despite large sales for export, total stocks in the United States rose to 38.5 million pounds at the end of 1958/59 and amounted to 37.3 million pounds at the end of 1959/60. Because of the small U.S. harvest of tung nuts in 1960 and the disposition during the marketing year 1960/61 of virtually all of the stocks of tung oil held by the CCC, total yearend holdings in the United States were reduced to about 11 million pounds on October 31, 1961.

Yearend holdings of tung oil in commercial channels (excluding CCC stocks) have averaged about 10 million pounds in recent years and have

^{1/} The period during which a price-support program for tung nuts was maintained and during which imports from China were excluded under the Foreign Assets Control Regulations.

not varied greatly from this average in any of the last 5 years. Thus 10 million pounds appears to be a reasonable carryover necessary to meet the needs of consumers until the new crop is harvested and to permit orderly functioning of the market.

U.S. consumption

Domestic consumption of tung oil averaged about 102 million pounds annually during the period 1946/47 through 1950/51, but declined to an average of about 51 million pounds annually during the period 1951/52 through 1956/57. It dropped to 38 million pounds in 1957/58, rose to 47 million pounds in 1958/59, declined to 42 million pounds in 1959/60 and to an estimated 39 million pounds in 1960/61 (table 6). Consumption in recent years has been considerably less than half that during the years immediately following World War II, when the production in China was available to the U.S. market. The general downward trend in consumption has been accounted for primarily by competition from other drying oils and synthetic vehicles, such as non-oil latex, vinyl, and acrylic emulsions. During the past decade, technological changes have given rise to important shifts in uses of drying oils. Tall oil and castor oil, for example, have captured a substantial share of the market for drying oils formerly held by linseed, soybean, and tung oils (table 2). Consumption of drying oils in the aggregate has declined, particularly during the last 3 years; moreover, synthetic materials have supplied an increasing share of the market for protective coatings. These shifts are still in progress. It is unlikely that natural drying oils will regain their former position in these markets.

A substantial increase in the price of tung oil in 1961, without a corresponding increase in the prices of competing products, has encouraged the use of substitutes for tung oil in the United States, as well as in foreign countries.

The ratio of imports of tung oil to apparent U.S. consumption averaged 57 percent during the 10 marketing years 1951/52 to 1960/61. It was 65 percent in 1957/58, 53 percent in 1958/59, 62 percent in 1959/60, and 66 percent in 1960/61.

Prices

Prices received for tung oil have usually been higher than those for other drying oils. Although prices for the various drying oils are affected materially by changes in the prices for competing oils, quotations for the individual oils have manifested considerable short-run independence of one another (table 3). Annual variations in the supply of any of the oils are usually reflected by movements in the price for that oil independent of the pattern of prices for drying oils in the aggregate. The more specialized the use of an oil and the less readily it can be replaced in use by other drying oils, the more frequently will its price deviate measurably from the pattern for drying oils as a group. Thus, the price of tung oil frequently shows considerable independence of price variations for other oils. Additional factors have contributed to the independence of tung oil prices. Price-supporting operations have alternately withheld or released supplies of domestic origin, and these activities, together with varying import controls, have affected the quantities of oil reaching the market. In addition, the maintenance of a support price has supplied the domestic market with an

element of stability that would not otherwise have prevailed. This stability in price has probably contributed to stability in consumption, particularly in view of the fact that users of drying oils resist making short-term alterations in their formulas.

Prices received for domestically produced tung oil.--In all but one year since 1951, the average market price received for domestically produced tung oil has exceeded the support price maintained by the Department of Agriculture. Average market prices, f.o.b. southern mills, for 1951/52 to 1960/61 are compared with the corresponding support prices in the following tabulation:

| <u>Marketing year</u> <u>(beginning Nov. 1)</u> | <u>Market price ^{1/}</u> <u>(Cents per pound)</u> | <u>Support price</u> <u>(Cents per pound)</u> |
|--|---|--|
| 1951/52----- | 39.1 | 26.5 |
| 1952/53----- | 28.6 | 26.5 |
| 1953/54----- | 23.8 | 23.9 |
| 1954/55----- | 23.3 | 21.2 |
| 1955/56----- | 24.4 | 20.0 |
| 1956/57----- | 22.7 | 21.0 |
| 1957/58----- | 21.4 | 21.0 |
| 1958/59----- | 21.9 | 21.0 |
| 1959/60----- | 21.9 | 20.9 |
| 1960/61----- | 26.5 | 20.9 |
| 1960/61: | | |
| November----- | 22.5 | 20.9 |
| December----- | 22.3 | 20.9 |
| January----- | 23.7 | 20.9 |
| February----- | 28.7 | 20.9 |
| March----- | 28.1 | 20.9 |
| April----- | 27.0 | 20.9 |
| May----- | 25.5 | 20.9 |
| June----- | 26.1 | 20.9 |
| July----- | 27.9 | 20.9 |
| August----- | 27.7 | 20.9 |
| September----- | 28.7 | 20.9 |
| October----- | 30.3 | 20.9 |

^{1/} Wholesale price in tank cars, f.o.b. southern mills.

As indicated earlier, the CCC acquired large stocks of tung oil under its 1953/54 program, when the support price exceeded the market price. However, because of the poor crops in 1954/55 and 1955/56, the CCC was able to liquidate these excess stocks on the domestic market. During the years 1956/57 to 1959/60 the market price was often at or near the support price and the CCC again acquired substantial stocks. These were held within manageable limits by sales for export. In order to make these sales, the CCC (before 1961) usually had to take a loss of 5 cents or more per pound. During the 1960/61 marketing year, owing to the short world supply, both foreign and domestic market prices of tung oil were substantially above the support level of 20.9 cents per pound, and the CCC disposed of virtually all of its holdings, largely in export markets. The support level for 1961/62 is 24 cents per pound. The quoted market price was slightly above 30 cents per pound in October and November 1961. Trade reports indicate, however, that few sales of tung oil were being made at this high price. Effective resistance to high prices may be expected to result in a sharp reduction in price, a substantial decline in consumption, or both.

Prices received for imported tung oil.--The average price received for imported tung oil in the United States remained fairly stable during the period 1957-60, ranging from about 21 to 23 cents per pound (table 9). The limitations on U.S. imports of tung oil, together with price supports on domestic oil, contributed to this price stability. During 1961, however, because of comparatively short supplies in world markets, the average price rose considerably, from about 22 cents per pound in 1960 to about 30 cents per pound in October 1961. In recent years the price

(f.o.b. New York City) for domestic tung oil has usually exceeded that for imported oil by approximately 1 cent per pound.

During the 1957-60 period, the average price received in the United States for South American tung oil exceeded that received in Europe by a considerable margin, ranging from about 5 to 10 cents per pound. However, in 1961, a decline in the supply of Chinese tung oil in Europe created a greater demand for South American oil. As a result, the European price for South American oil almost doubled, rising from an average of about 16 cents per pound in 1960 to about 30 cents per pound in October 1961. Consequently, the price in Europe exceeded that received for imported oil in the United States during February-September of 1961. In October 1961, however, the price in the United States again exceeded that in Europe.

Foreign production and exports

All the major producing countries, except the United States, produce tung oil primarily for export. It is estimated that the world output before World War II averaged 300 million pounds annually; China was the only important producer (table 10). World output since the war is estimated to have averaged about 255 million pounds annually. Although no reliable figures are available for recent production in China, that country probably is still the principal producer. It is believed that China's tung oil production for 1960/61 was considerably below that for 1959/60, owing to the political reorganization of Chinese agriculture and to extended drought conditions. Production outside of China since World War II, principally in Argentina and the United States, has averaged about 62 million pounds per year and has supplied an increasing share of the world supply.

World exports of tung oil have increased materially in the past decade (table 11). China has continued to be the principal exporter and Argentina has ranked second. Increased exports from Argentina since the 1940's have in large measure accounted for the increased world exports.

The U.S. prohibition of imports from China serves not only to reduce the supply of tung oil available for export to this market, but also to increase the quantities seeking an outlet in the principal European consuming countries and Japan. This situation, together with the maintenance of a domestic support price for tung oil, has generally caused the United States to be a more attractive market for Argentine and Paraguayan tung oil than can be found elsewhere. However, during most of 1961 the price in the European market has been somewhat higher than in the United States. This is undoubtedly a temporary situation, as indicated by the fact that in October 1961 the price of South American oil in the United States again exceeded the price in Europe.

During the period 1952-54, nearly all Argentine exports were shipped to the United States. It was during this period that the CCC acquired substantial holdings of domestically produced tung oil. During most of 1955 Argentine exports to this country were subject to quantitative limitations. In that year about two-thirds of Argentina's shipments came to the United States. In 1956, when the CCC was liquidating stocks accumulated from the 1953 crop at prices above the support level, about two-thirds of Argentine exports were marketed in the United States. During the years 1957-60 about 55 percent of Argentine exports came to the United States.

Production of tung oil in Argentina was at a record high of 55 million pounds in the Argentine marketing year 1960/61 ^{1/} (table 10). As a result of this large output, the carryover in Argentina on July 31, 1961, was at a record high of 29 million pounds. This quantity compares with a carryover in Argentina of 13 million pounds on July 31, 1960, and 14 million pounds on July 31, 1959. Although preliminary estimates indicate a short Argentine crop in 1961/62, the large carryover at the beginning of that year will make it possible for Argentina to export at least 40 million pounds of oil during the current U.S. marketing year. The usual quantities will also be available for export from Paraguay.

With the prevailing high price of tung oil in European markets, it is likely that production in China will be stimulated by the opportunity for that country to increase its earnings of foreign exchange. ^{2/} A significant increase in China's exports to European markets would tend to divert substantial quantities of South American oil to the U.S. market. Large shipments to the United States would depress the price in this market and force substantial acquisitions by the CCC. A price reduction of about 6 cents per pound from the present high level is all that is necessary for such a development. Price changes of this magnitude or greater within a short time have been common in the past in unrestricted markets.

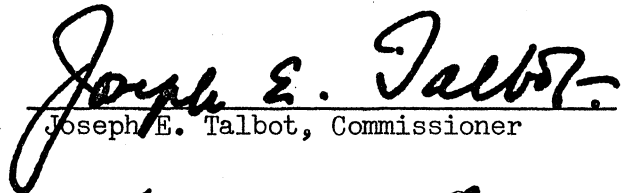
^{1/} The Argentine marketing year begins Aug. 1.

^{2/} Tung trees grow wild in some areas of China, and production of tung oil can be increased readily by gathering the nuts in certain areas where they have not been harvested in recent years.

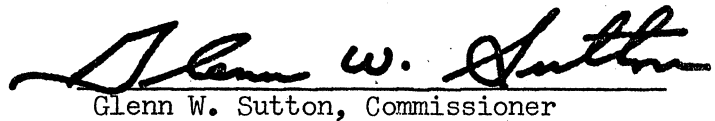
Conclusion

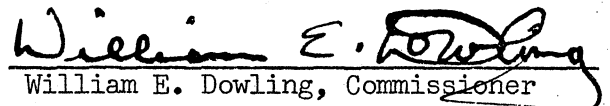
In view of the foregoing considerations, we conclude that in the absence of import restrictions tung oil is practically certain to be imported into the United States in such quantities and under such conditions as to materially interfere with the price-support program for tung nuts maintained by the Department of Agriculture. We therefore make no recommendation for the termination of the quotas imposed by Proclamation No. 3378 of October 27, 1960.

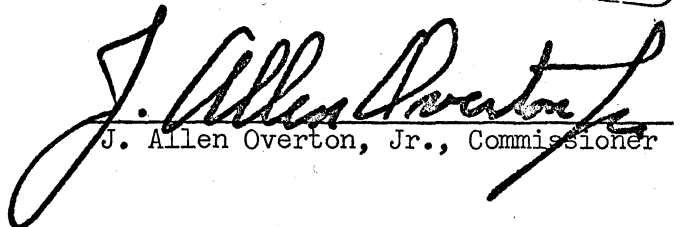
Respectfully submitted.


Joseph E. Talbot, Commissioner


Walter R. Schreiber, Commissioner


Glenn W. Sutton, Commissioner


William E. Dowling, Commissioner


J. Allen Overton, Jr., Commissioner

STATISTICAL APPENDIX

Table 1.--Tung oil: U.S. consumption, by end use, 1947-60

(In millions of pounds)

| Year | Paint and varnish ^{1/} | Linoleum and oilcloth | Resin | Other drying uses | Other inedible uses | Total consump- tion ^{2/} |
|--------------------------|---------------------------------------|-----------------------------|-------|-------------------------|---------------------------|---|
| 1947----- | 87 | 5 | - | 14 | - | 106 |
| 1948----- | 102 | 9 | - | 20 | - | 130 |
| 1949----- | 84 | 10 | 2 | 7 | - | 103 |
| 1950----- | 92 | 5 | 4 | 8 | - | 109 |
| 1951----- | 54 | 1 | 4 | 2 | - | 61 |
| 1952----- | 44 | <u>3/</u> | 3 | 3 | - | 51 |
| 1953----- | 43 | <u>3/</u> | 4 | 4 | - | 51 |
| 1954----- | 42 | <u>1</u> | 3 | 3 | - | 48 |
| 1955----- | 43 | <u>3/</u> | 4 | 4 | - | 51 |
| 1956----- | 44 | <u>3/</u> | 4 | 3 | - | 51 |
| 1957----- | 40 | - | 4 | 3 | <u>3/</u> | 48 |
| 1958----- | 32 | - | 3 | 6 | <u>3/</u> | 41 |
| 1959 ^{4/} ----- | 40 | - | 4 | 2 | <u>2</u> | 48 |
| 1960 ^{4/} ----- | 31 | - | 5 | 2 | <u>2</u> | 40 |

^{1/} Includes unreported disappearance; unreported disappearance is the difference between total consumption (production, plus imports, less exports, plus stocks at beginning of year less stocks at end of year) and reported factory consumption.

^{2/} Computed from production, imports, exports, and stocks; totals made up from unrounded figures.

^{3/} Less than 500,000 pounds.

^{4/} Preliminary.

Source: Compiled by the U.S. Department of Agriculture from official statistics of the U.S. Bureau of the Census.

Table 2.--Fats and oils: Quantities used in the United States in the manufacture of drying-oil products, 1935-60

| Year | (In millions of pounds) | | | | | | | | | | | | | Secondary fatty materials | Tall oil | Total |
|--------------|-------------------------|-------------|----------|----------|------------|--------------|-------|-------|----------|------------|--------------|--|--|---------------------------|----------|--------|
| | Primary oils | | | | | | | Other | Oilseeds | Castor oil | Oiticica oil | | | | | |
| | Linseed oil | Soybean oil | Tung oil | Fish oil | Castor oil | Oiticica oil | Other | | | | | | | | | |
| 1935----- | 467 | 19 | 128 | 34 | 4 | 2 | 68 | | | | | | | | | 721 |
| 1936----- | 481 | 19 | 119 | 41 | 5 | 3 | 126 | | | | | | | | | 793 |
| 1937----- | 583 | 19 | 148 | 46 | 8 | 3 | 47 | | | | | | | | | 852 |
| 1938----- | 485 | 22 | 91 | 31 | 6 | 4 | 44 | | | | | | | | | 682 |
| 1939----- | 556 | 33 | 106 | 44 | 12 | 17 | 56 | | | | | | | | | 822 |
| 1940----- | 585 | 46 | 67 | 47 | 25 | 15 | 24 | | | | | | | | | 807 |
| 1941----- | 807 | 62 | 69 | 57 | 46 | 27 | 12 | | | | | | | | | 1,079 |
| 1942----- | 819 | 33 | 12 | 32 | 63 | 9 | 6 | | | | | | | | | 973 |
| 1943----- | 757 | 39 | 12 | 36 | 22 | 4 | 3 | | | 15 | | | | 2 | | 890 |
| 1944----- | 688 | 37 | 10 | 47 | 90 | 11 | 17 | | | 27 | | | | 7 | | 917 |
| 1945----- | 627 | 46 | 23 | 58 | 60 | 19 | 3 | | | 32 | | | | 7 | | 874 |
| 1946----- | 663 | 67 | 36 | 48 | 35 | 25 | 8 | | | 39 | | | | 15 | | 934 |
| 1947----- | 567 | 159 | 106 | 47 | 44 | 13 | 6 | | | 44 | | | | 32 | | 1,017 |
| 1948----- | 595 | 162 | 130 | 40 | 53 | 13 | 7 | | | 46 | | | | 36 | | 1,081 |
| 1949----- | 428 | 220 | 103 | 26 | 51 | 12 | 8 | | | 73 | | | | 53 | | 974 |
| 1950----- | 590 | 213 | 109 | 33 | 66 | 12 | | | | 60 | | | | 70 | | 1,178 |
| 1951----- | 665 | 194 | 61 | 28 | 38 | 12 | | | | 57 | | | | 84 | | 1,151 |
| 1952----- | 536 | 209 | 51 | 36 | 41 | 11 | | | | 50 | | | | 87 | | 1,033 |
| 1953----- | 536 | 242 | 51 | 34 | 39 | 10 | | | | 69 | | | | 93 | | 1,086 |
| 1954----- | 498 | 209 | 48 | 23 | 38 | 8 | | | | 60 | | | | 116 | | 1,017 |
| 1955----- | 504 | 226 | 51 | 33 | 63 | 12 | | | | 89 | | | | 123 | | 1,125 |
| 1956----- | 513 | 194 | 51 | 32 | 73 | 11 | | | | 67 | | | | 146 | | 1,107 |
| 1957----- | 437 | 191 | 48 | 33 | 79 | 11 | | | | 93 | | | | 128 | | 1,032 |
| 1958----- | 427 | 158 | 41 | 30 | 64 | 10 | | | | 81 | | | | 111 | | 934 |
| 1959 2/----- | 448 | 184 | 46 | 21 | 83 | 9 | | | | 35 | | | | 84 | | 3/ 924 |
| 1960 2/----- | 354 | 171 | 36 | 52 | 87 | 15 | | | | 21 | | | | 85 | | 3/ 830 |

1/ Less than 500,000 pounds.

2/ Preliminary.

3/ Excludes fats and oils used in fatty acids, many of which are used in drying-oil products.

Source: Compiled by the U.S. Department of Agriculture from official statistics of the U.S. Bureau of the Census.

Table 3.--Drying oils: U.S. wholesale prices, by kinds of oil, and weighted average price, 1935-60

| Year | (In cents per pound) | | | | | | | | | | | Weighted average price $\frac{5}{5}$ |
|-----------|---------------------------------|--|------------------------------------|---|-------------------------------|----------------------------------|---------------------------------|--|--|--|------|--------------------------------------|
| | Linseed oil, tanks, Minneapolis | Tung oil, tanks, New York City $\frac{1}{1}$ | Oiticica oil, drums, New York City | Castor oil, No. 1, tanks, New York City $\frac{2}{2}$ | Fish oil, tanks $\frac{3}{3}$ | Soybean oil, tanks, f.o.b. mills | Tall oil, refined, tanks, works | Other primary fats and oils, tanks or bulk basis $\frac{4}{4}$ | | | | |
| 1935----- | 8.8 | 17.0 | - | 9.8 | 4.3 | 8.1 | - | 7.7 | | | 10.0 | |
| 1936----- | 9.5 | 16.1 | 12.6 | 10.0 | 4.4 | 7.5 | - | 7.9 | | | 10.1 | |
| 1937----- | 10.3 | 15.7 | 12.9 | 10.0 | 5.6 | 8.1 | - | 9.0 | | | 11.0 | |
| 1938----- | 8.7 | 13.5 | 11.1 | 9.0 | 4.6 | 5.6 | 5.0 | 6.7 | | | 9.2 | |
| 1939----- | 8.8 | 21.0 | 15.0 | 8.8 | 4.0 | 4.8 | 4.6 | 6.0 | | | 10.3 | |
| 1940----- | 9.0 | 26.3 | 18.9 | 11.4 | 4.6 | 4.7 | 3.6 | 8.2 | | | 10.2 | |
| 1941----- | 9.7 | 32.2 | 20.2 | 10.6 | 7.1 | 8.5 | 3.5 | 10.8 | | | 11.2 | |
| 1942----- | 12.3 | 39.6 | 25.6 | 12.9 | 8.8 | 11.6 | 4.3 | 13.5 | | | 12.7 | |
| 1943----- | 14.4 | 39.0 | 26.2 | 13.0 | 8.8 | 11.8 | 4.5 | 13.5 | | | 14.4 | |
| 1944----- | 14.3 | 39.0 | 21.9 | 13.0 | 8.8 | 11.8 | 4.5 | 11.3 | | | 14.1 | |
| 1945----- | 14.3 | 38.4 | 23.7 | 13.0 | 8.9 | 11.8 | 4.5 | 11.3 | | | 14.5 | |
| 1946----- | 18.4 | 38.4 | 26.8 | 18.1 | 11.4 | 14.6 | 4.9 | 13.9 | | | 18.5 | |
| 1947----- | 34.0 | 29.2 | 28.9 | 29.1 | 20.6 | 23.3 | 6.9 | 24.5 | | | 29.9 | |
| 1948----- | 27.8 | 23.2 | 21.5 | 22.7 | 17.5 | 22.3 | 5.8 | 23.9 | | | 24.8 | |
| 1949----- | 22.7 | 22.4 | 19.8 | 18.0 | 7.8 | 11.0 | 5.4 | 13.6 | | | 17.8 | |
| 1950----- | 16.5 | 25.5 | 21.7 | 20.4 | 9.0 | 14.1 | 5.1 | 15.1 | | | 16.2 | |
| 1951----- | 18.9 | 38.4 | 30.7 | 33.6 | 13.8 | 16.8 | 5.8 | 18.3 | | | 19.1 | |
| 1952----- | 15.9 | 38.8 | 25.4 | 28.9 | 8.0 | 11.0 | 5.2 | 12.7 | | | 15.4 | |
| 1953----- | 15.0 | 27.7 | 23.5 | 22.6 | 7.0 | 12.4 | 5.0 | 13.0 | | | 14.4 | |
| 1954----- | 14.6 | 22.4 | 18.3 | 17.2 | 7.8 | 13.3 | 5.0 | 13.3 | | | 13.5 | |
| 1955----- | 12.9 | 24.3 | 15.0 | 15.9 | 8.2 | 11.6 | 5.2 | 12.5 | | | 12.3 | |
| 1956----- | 14.1 | 24.3 | 16.4 | 19.2 | 8.8 | 13.2 | 5.2 | 12.8 | | | 13.4 | |
| 1957----- | 13.6 | 23.2 | 18.6 | 23.1 | 8.9 | 12.2 | 5.5 | 12.8 | | | 13.4 | |
| 1958----- | 13.8 | 21.3 | 18.2 | 21.0 | 8.0 | 10.5 | 5.5 | 12.6 | | | 12.8 | |
| 1959----- | 13.1 | 22.8 | 21.4 | 20.0 | 7.3 | 9.0 | 5.5 | 11.9 | | | 12.6 | |
| 1960----- | 13.1 | 22.3 | 17.0 | 20.0 | 6.5 | 8.8 | 5.3 | 10.5 | | | 12.1 | |

$\frac{1}{1}$ Drums prior to January 1945.

$\frac{2}{2}$ Barrels prior to January 1936. In recent years, f.o.b. Jersey mills.

$\frac{3}{3}$ Average of menhaden and sardine oils; since 1952, menhaden, crude, tanks, Baltimore.

$\frac{4}{4}$ Average of other fats and oils.

$\frac{5}{5}$ Based on percentages of oils going into drying-oil products.

Source: Compiled from official statistics of the U.S. Department of Agriculture.

Table 4.--Tung nuts: U.S. production, by principal producing States, 1950-60

(In short tons)

| Year | Mississippi | Florida | Louisiana <u>1/</u> | Alabama | Georgia | Total United States |
|----------------------|-------------|---------|---------------------|-----------|-----------|------------------------|
| 1950----- | 20,800 | 8,200 | 6,100 | 1,000 | 400 | 36,500 |
| 1951----- | 32,900 | 12,200 | 2,900 | 820 | 240 | 49,060 |
| 1952----- | 67,800 | 31,000 | 30,200 | 2,800 | 300 | 132,100 |
| 1953----- | 68,000 | 28,400 | 21,700 | 1,300 | 600 | 120,000 |
| 1954----- | 21,500 | 21,600 | 4,900 | 2,800 | 250 | 51,050 |
| 1955----- | <u>2/</u> | 6,200 | <u>2/</u> | <u>2/</u> | <u>2/</u> | 6,200 |
| 1956----- | 66,800 | 16,500 | 19,000 | 1,100 | 100 | 103,500 |
| 1957----- | 52,100 | 16,000 | 13,700 | 700 | 100 | 82,600 |
| 1958----- | 84,800 | 35,000 | 22,700 | 3,800 | 400 | 146,700 |
| 1959 <u>3/</u> ----- | 60,700 | 29,000 | 18,000 | 2,700 | 200 | 110,600 |
| 1960 <u>3/</u> ----- | 29,000 | 2,300 | 10,900 | 400 | <u>2/</u> | 42,600 |

1/ Includes small quantities of tung nuts produced in Texas.

2/ Production negligible.

3/ Preliminary.

Source: Compiled from official statistics of the U.S. Department of Agriculture.

Table 5.--Tung nuts: Ratio of support rate to parity, average support rate to growers, prices, production of nuts and oil, Commodity Credit Corporation (CCC) operations, and total carryover in the United States, marketing years 1950/51 to 1961/62

| Marketing year beginning Nov. 1 | Average support rate to growers | | | Price | | Production | | CCC operations (in terms of oil) | | | | Total stock of oil at year-end (Oct. 31) |
|---------------------------------------|--|---|-----------------------|--|-----------|-----------------|--|----------------------------------|--|-----------------|-----------------|--|
| | Ratio of support rate to parity (Nov. 1) | Nuts 1/ Equivalent price of oil 2/ | Farm price of nuts | Wholesale price of oil at southern mills | Tung nuts | Tung oil | Quantity placed under support | Quantity acquired | Stocks owned by CCC at year-end (Oct. 31) | 3/ | | |
| | | | | | | | | | | | | |
| Percent | Per short ton | Per pound | Per ton | Cents per pound | Tons | 1,000 pounds | 1,000 pounds | 1,000 pounds | 1,000 pounds | 1,000 pounds | 1,000 pounds | |
| 1950/51----- | 60 | \$63.00 | \$0.251 | \$111.00 | 36.7 | 36,500 | 12,285 | - | - | 4/ 1,568 | 16,038 | |
| 1951/52----- | 60 | 67.20 | .265 | 106.00 | 39.1 | 49,060 | 14,728 | - | - | 485 | 8,711 | |
| 1952/53----- | 62 | 67.20 | .265 | 79.80 | 28.6 | 132,100 | 43,358 | 5/ 9,480 | 5,775 | 5,770 | 15,135 | |
| 1953/54----- | 65 | 63.38 | .239 | 66.80 | 23.8 | 120,000 | 39,649 | 5/ 33,609 | 33,069 | 38,612 | 46,740 | |
| 1954/55----- | 60 | 54.96 | .212 | 59.40 | 23.3 | 51,050 | 15,188 | 5/ 25 | 25 | 19,205 | 32,406 | |
| 1955/56----- | 60 | 51.06 | .200 | 64.00 | 24.4 | 6,200 | 2,230 | - | - | 410 | 13,010 | |
| 1956/57----- | 65 | 53.75 | .210 | 53.40 | 22.7 | 103,500 | 31,972 | 21,041 | 14,890 | 14,890 | 24,785 | |
| 1957/58----- | 65 | 52.13 | .205 | 52.30 | 21.4 | 82,600 | 25,463 | 15,166 | 11,118 | 25,755 | 36,867 | |
| 1958/59----- | 65 | 53.89 | .210 | 53.20 | 21.9 | 146,700 | 44,798 | 33,877 | 24,616 | 29,644 | 38,500 | |
| 1959/60 6/----- | 65.2 | 53.50 | .209 | 52.40 | 21.9 | 110,600 | 34,000 | 23,039 | 16,001 | 26,433 | 37,300 | |
| 1960/61 6/----- | 65.7 | 53.50 | .209 | 62.50 | 26.5 | 42,600 | 13,000 | 4,544 | 3 | 134 | 710,942 | |
| 1961/62 6/----- | 8/ 82.9 | 63.34 | .240 | 9/ | 9/ | 2/ | 2/ | 2/ | 2/ | 2/ | 2/ | |

1/ Support price based on nuts with these oil contents: 1950-52, 17.5 percent; 1953-61, 18.5 percent.

2/ Including cost of processing nuts.

3/ Obtained from operating records of the Agricultural Stabilization and Conservation Service of the U.S. Department of Agriculture.

4/ Transferred to stockpile for defense purposes.

5/ Covers loans and purchase agreements, including, for 1953, 1,015 tons of tung nuts converted to oil-equivalent basis.

6/ Preliminary.

7/ Estimated by the U.S. Tariff Commission.

8/ Based on parity in June 1961.

9/ Not available.

Source: Compiled from official statistics of the U.S. Department of Agriculture, except as noted.

Table 6.--Tung oil: U.S. supply and disposition, marketing years 1942/43 to 1960/61

| (In thousands of pounds) | | | | | | | | | |
|---------------------------------------|---------------------|------------|------------------|-----------------|--|-------------------------------------|------------------|--|--|
| Marketing year beginning Nov. 1 | Beginning stocks | Production | Imports <u>1</u> | Total supply | Exports 2/ of domestic merchandise | Apparent domestic consumption | Ending stocks | | |
| 1942/43 | 31,406 | 5,193 | 17 | 36,616 | 1,787 | 3/ 11,527 | 28,690 | | |
| 1943/44 | 28,690 | 1,864 | 1,716 | 32,270 | 668 | 3/ 10,469 | 22,824 | | |
| 1944/45 | 22,824 | 8,767 | 55 | 31,646 | 2,199 | 21,748 | 7,699 | | |
| 1945/46 | 7,699 | 9,129 | 23,875 | 40,703 | 305 | 33,211 | 7,187 | | |
| 1946/47 | 7,187 | 14,400 | 99,592 | 121,179 | 2,134 | 87,096 | 31,949 | | |
| 1947/48 | 31,949 | 16,012 | 132,878 | 180,839 | 2,834 | 130,422 | 47,583 | | |
| 1948/49 | 47,583 | 17,031 | 64,442 | 129,056 | 2,928 | 107,656 | 18,472 | | |
| 1949/50 | 18,472 | 26,773 | 98,130 | 143,375 | 433 | 112,476 | 30,466 | | |
| 1950/51 | 30,466 | 12,285 | 42,398 | 85,149 | 590 | 3/ 72,450 | 16,038 | | |
| 1951/52 | 16,038 | 14,728 | 29,521 | 60,287 | 367 | 51,209 | 8,711 | | |
| 1952/53 | 8,711 | 43,358 | 12,946 | 65,015 | 295 | 49,585 | 15,135 | | |
| 1953/54 | 15,135 | 39,649 | 41,355 | 96,139 | 131 | 49,268 | 46,740 | | |
| 1954/55 | 46,740 | 15,188 | 23,172 | 85,100 | 1,513 | 51,181 | 32,406 | | |
| 1955/56 | 32,406 | 2,230 | 30,306 | 64,942 | 383 | 51,549 | 13,010 | | |
| 1956/57 | 13,010 | 31,972 | 30,561 | 75,543 | 322 | 50,436 | 24,785 | | |
| 1957/58 | 24,785 | 25,463 | 24,688 | 74,936 | 370 | 37,699 | 36,867 | | |
| 1958/59 | 36,867 | 44,798 | 24,947 | 106,612 | 20,690 | 47,422 | 38,500 | | |
| 1959/60 | 38,500 | 34,000 | 26,021 | 98,521 | 19,212 | 42,009 | 37,300 | | |
| 1960/61 | 37,300 | 13,000 | 5/ 25,642 | 75,942 | 6/ 26,000 | 6/ 39,000 | 6/ 10,942 | | |

1/ Imports for consumption less reexports of foreign merchandise.2/ Reported as domestic merchandise in official statistics, but known to include some imported merchandise (reexports).3/ Factory consumption figures used for years in which reported factory consumption exceeds domestic disappearance.4/ Preliminary.5/ Reported by the U.S. Bureau of Customs.6/ Estimated by the U.S. Tariff Commission.

Source: Compiled from official statistics of the U.S. Bureau of the Census and the U.S. Department of Agriculture, Agricultural Marketing Service, except as noted.

Table 7.--Tung nuts: U.S. imports for consumption, by countries, marketing years 1948/49 to 1960/61 ^{1/}

| Year beginning Nov. 1 | Mozambique | Paraguay | British East Africa | Total, all countries |
|-----------------------------|------------|-----------|------------------------|-------------------------|
| Quantity (pounds) | | | | |
| 1948/49----- | - | 2,439,537 | - | 2,439,537 |
| 1949/50----- | 275,575 | - | - | 275,575 |
| 1950/51----- | - | - | - | - |
| 1951/52----- | 969,913 | - | 22,368 | 992,281 |
| 1952/53----- | 475,385 | - | - | 475,385 |
| 1953/54----- | - | - | - | - |
| 1954/55----- | - | - | - | - |
| 1955/56----- | 966,920 | - | - | 966,920 |
| Foreign value | | | | |
| 1948/49----- | - | \$105,317 | - | \$105,317 |
| 1949/50----- | \$11,688 | - | - | 11,688 |
| 1950/51----- | - | - | - | - |
| 1951/52----- | 79,512 | - | \$1,603 | 81,115 |
| 1952/53----- | 30,496 | - | - | 30,496 |
| 1953/54----- | - | - | - | - |
| 1954/55----- | - | - | - | - |
| 1955/56----- | 29,405 | - | - | 29,405 |
| Foreign value per short ton | | | | |
| 1948/49----- | - | \$86.34 | - | \$86.34 |
| 1949/50----- | \$84.82 | - | - | 84.82 |
| 1950/51----- | - | - | - | - |
| 1951/52----- | 163.96 | - | \$143.32 | 163.50 |
| 1952/53----- | 128.30 | - | - | 128.30 |
| 1953/54----- | - | - | - | - |
| 1954/55----- | - | - | - | - |
| 1955/56----- | 60.82 | - | - | 60.82 |

^{1/} No tung nuts have been imported since 1955/56.

Source: Compiled from official statistics of the U.S. Department of Commerce.

Table 8.--Tung oil: U.S. imports for consumption, by country of origin, average 1935-39, annual 1946-60, and January-September 1961

| (In thousands of pounds) | | | | | | |
|---|-----------------|-----------|--------|----------|-----------|---------|
| Period | China <u>1/</u> | Argentina | Brazil | Paraguay | All other | Total |
| Average 1935-39---- | 122,720 | - | 1 | - | 468 | 123,189 |
| Annual: | | | | | | |
| 1946----- | 35,062 | 966 | 124 | 55 | - | 36,207 |
| 1947----- | 121,564 | - | - | - | - | 121,564 |
| 1948----- | 131,739 | - | 1,475 | - | 68 | 133,282 |
| 1949----- | 48,349 | 16,487 | - | 132 | - | 64,968 |
| 1950----- | 92,126 | 18,612 | 1,143 | 603 | - | 112,484 |
| 1951----- | 13,330 | 14,398 | 703 | 1,723 | - | 30,154 |
| 1952----- | 9 | 23,191 | 1,913 | 4,295 | 464 | 29,869 |
| 1953----- | - | 20,943 | - | 2,056 | 486 | 23,485 |
| 1954----- | - | 31,566 | - | 4,118 | 793 | 36,477 |
| 1955----- | - | 17,790 | 484 | 2,204 | 576 | 21,054 |
| 1956----- | - | 27,113 | 254 | 3,715 | 224 | 31,306 |
| 1957----- | - | 22,456 | 310 | 6,031 | 373 | 29,170 |
| 1958----- | - | 24,489 | 454 | 2,982 | 427 | 28,352 |
| 1959 <u>2/</u> ----- | - | 19,773 | 309 | 2,608 | 626 | 23,316 |
| 1960 <u>2/</u> ----- | - | 19,712 | 175 | 3,060 | 411 | 23,358 |
| 1961 (January-September) <u>2/</u> ---- | - | 20,076 | 551 | 2,266 | - | 22,893 |

1/ Includes Hong Kong and Kwantung.

2/ Preliminary.

Source: Compiled from official statistics of the U.S. Department of Commerce.

Table 9.---Tung oil: Average prices received for domestically produced and imported tung oil in New York City and for Argentine/South American tung oil in European ports, 1957-61 and, by months, January-October 1961

| Period | (In cents per pound) | | | | | | |
|---------------|----------------------------|----------------------|--|---------------------------|--|--|--|
| | Average price received for | | Average price received for | | Average price margin between--- | | |
| | domestic tung oil 1/ | imported tung oil 1/ | Argentine/South American tung oil in European ports 2/ | Domestic and imported oil | Imported oil in New York City and in European ports 3/ | | |
| 1957----- | 23.85 | 23.17 | 18.58 | 0.68 | 4.59 | | |
| 1958----- | 22.47 | 21.33 | 11.47 | 1.14 | 9.86 | | |
| 1959----- | 23.28 | 22.81 | 15.99 | .47 | 6.82 | | |
| 1960----- | 23.27 | 22.27 | 16.29 | 1.00 | 5.98 | | |
| 1961 4/----- | 28.61 | 27.43 | 28.39 | 1.18 | -.96 | | |
| 1961: | | | | | | | |
| Jan----- | 24.94 | 23.75 | - | 1.19 | - | | |
| Feb----- | 29.94 | 28.88 | 29.25 | 1.06 | -.37 | | |
| Mar----- | 29.31 | 28.15 | 28.75 | 1.16 | -.60 | | |
| Apr----- | 28.25 | 27.00 | 27.50 | 1.25 | -.50 | | |
| May----- | 26.75 | 25.50 | 26.66 | 1.25 | -1.16 | | |
| June----- | 27.30 | 26.05 | 26.89 | 1.25 | -.84 | | |
| July----- | 29.13 | 27.94 | 28.06 | 1.19 | -.12 | | |
| Aug----- | 28.94 | 27.75 | - | 1.19 | - | | |
| Sept. 5/----- | 29.95 | 29.00 | 30.01 | .95 | -1.01 | | |
| Oct. 5/----- | 31.56 | 30.31 | 30.03 | 1.25 | .28 | | |

1/ Tanks, f.o.b. New York City.

2/ Bulk, c.i.f. European ports.

3/ Minus sign (-) indicates price of imported oil in European ports exceeds that of imported oil in New York City.

4/ January-October.

5/ Preliminary.

Source: Compiled from official statistics of the U.S. Department of Agriculture.

Table 10.--Tung oil: Estimated world production and estimated production in principal producing countries, marketing years, average 1935/36 to 1939/40, annual 1946/47 to 1961/62

| Marketing year | (In thousands of pounds) | | | | | | |
|---------------------------------|--------------------------|--------|----------|---------|---------------|-----------|---------|
| | Argentina | Brazil | Paraguay | China | United States | All other | Total |
| Average 1935/36 to 1939/40----- | 70 | 1/ 130 | 2/ | 300,000 | 2/ | 3/ | 300,200 |
| 1946/47----- | 4,860 | 642 | 510 | 200,000 | 14,400 | 3/ | 220,412 |
| 1947/48----- | 3,120 | 450 | 160 | 231,500 | 16,012 | 4,340 | 255,582 |
| 1948/49----- | 8,020 | 790 | 560 | 253,600 | 17,031 | 9,999 | 290,000 |
| 1949/50----- | 13,300 | 1,620 | 2,600 | 176,400 | 26,773 | 9,307 | 230,000 |
| 1950/51----- | 20,400 | 1,320 | 2,870 | 200,000 | 12,285 | 9,125 | 246,000 |
| 1951/52----- | 29,000 | 1,830 | 3,970 | 200,000 | 14,058 | 7,142 | 256,000 |
| 1952/53----- | 9,900 | 2,600 | 3,400 | 188,000 | 43,358 | 6,000 | 253,258 |
| 1953/54----- | 39,600 | 1,520 | 7,700 | 154,000 | 39,649 | 4,600 | 247,069 |
| 1954/55----- | 29,650 | 3,000 | 6,400 | 154,000 | 15,188 | 5,800 | 214,038 |
| 1955/56----- | 33,860 | 1,280 | 6,600 | 154,000 | 2,230 | 4,000 | 201,970 |
| 1956/57----- | 48,530 | 1,780 | 7,300 | 194,000 | 31,972 | 6,000 | 289,580 |
| 1957/58----- | 50,700 | 1,800 | 9,020 | 210,000 | 25,463 | 3,800 | 300,780 |
| 1958/59----- | 31,526 | 1,520 | 5,694 | 194,000 | 44,798 | 5,000 | 282,540 |
| 1959/60----- | 39,370 | 1,760 | 7,740 | 180,000 | 34,000 | 7,200 | 270,070 |
| 1960/61 5/----- | 55,110 | 1,764 | 11,000 | 170,000 | 13,000 | 6,000 | 256,870 |
| 1961/62 5/----- | 24,000 | 1,764 | 7,055 | 3/ | 6/35,000 | 3/ | 3/ |

- 1/ 1939 only.
- 2/ Negligible.
- 3/ Not available.
- 4/ Unofficial estimate.
- 5/ Preliminary.
- 6/ Estimated by the Tariff Commission.

Source: Compiled by the U.S. Department of Agriculture, except as noted.

Table 11.--Tung oil: Exports from specified countries, average 1945-49, annual 1950-60

(In thousands of pounds)

| Period | China | Argentina | Paraguay | United States 1/ | Madagascar | Nyasaland | All other 2/ | Estimated world total |
|---------------------|------------|-----------|----------|------------------|------------|-----------|--------------|-----------------------|
| Average 1945-49---- | 101,630 | 4,600 | 686 | 1,916 | 84 | 398 | 692 | 110,006 |
| Annual: | | | | | | | | |
| 1950----- | 120,000 | 23,530 | 2,870 | 436 | 574 | 770 | 22 | 148,202 |
| 1951----- | 3/ 82,000 | 16,889 | 2,424 | 616 | 778 | 784 | 312 | 103,803 |
| 1952----- | 66,000 | 20,336 | 3,460 | 336 | 660 | 1,702 | 1,968 | 94,465 |
| 1953----- | 70,000 | 24,910 | 2,829 | 314 | 502 | 1,806 | 34 | 100,395 |
| 1954----- | 66,000 | 27,452 | 5,577 | 108 | 768 | 2,000 | 14 | 101,919 |
| 1955----- | 4/ 83,442 | 27,904 | 5,468 | 1,561 | 1,389 | 1,889 | 1,639 | 123,292 |
| 1956----- | 4/ 93,583 | 36,852 | 4,418 | 404 | 1,441 | 1,730 | 943 | 139,371 |
| 1957----- | 4/ 94,699 | 34,477 | 8,302 | 268 | 4/ 1,240 | 1,672 | 679 | 141,337 |
| 1958----- | 4/ 102,101 | 45,535 | 9,160 | 372 | 4/ 1,497 | 1,830 | 1,000 | 161,495 |
| 1959 5/----- | 4/ 83,800 | 36,526 | 8,358 | 24,234 | 4/ 2,178 | 3,268 | 6/ | 6/ |
| 1960 5/----- | 4/ 80,000 | 40,481 | 7/ 2,723 | 21,851 | 2,000 | 2,000 | 6/ | 6/ |

1/ Does not include reexports.

2/ Includes estimates for minor producing countries, exports from no one of which were significant in the total, except those from Brazil in recent years.

3/ Estimated by the American Consulate General, Hong Kong.

4/ From importers' records only.

5/ Preliminary.

6/ Not available.

7/ January-July only.

Source: Compiled from official statistics of the U.S. Department of Agriculture.