THE CASTOR OIL INDUSTRY.

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THE USES OF CASTOR OIL.

Castor oil is now extensively used in countries which manufacture large quantities of calicoes and colored cotton goods. The United Kingdom is the greatest European consumer, and of the other principal consuming countries the United States ranks easily among the first. As compared with the enormously increased consumption of other fixed or expressed oils, the use of castor oil in the United States is on a small scale; the annual consumption is measured by hundreds of thousands of gallons, where that of either cotton-seed oil or linseed oil amounts to tens of millions. However, the functions that castor oil performs in industry and in the arts are of great economic importance, as becomes apparent from a consideration of the varied uses to which its peculiar properties adapt it.

USE IN DYEING AND PRINTING COTTON GOODS.

Within comparatively recent years, that is, since aniline dyes have almost completely supplanted the mineral and vegetable dyes formerly used in coloring cotton textiles, an extensive demand for castor oil has sprung up in the industry of dyeing and printing cotton goods. Without presuming to invade the intricacies of the dyer’s art wherein secret recipes for the composition of colors and their application to cloth are the property of each individual dyer, it may be said that the general principle underlying the utility of this oil in coloring processes is that the aniline and alizarine dyes are soluble in sulphated castor oil; in other neutral fats and oils these dyes, with few exceptions, are in general insoluble. In certain processes of dyeing and printing, therefore, castor oil enjoys a practical monopoly over all other oils.

The popular red, formerly known as Adrianople red, but now commonly as Turkey red, famous for the permanency, intensity, and beauty of its color, owes its quality of exceptional fastness to castor oil. The coloring matter itself, alizarine, which was originally derived from the root of the madder plant, but is now almost wholly supplanted by an artificial dyestuff of the same name obtained from anthracene, a product of the distillation of coal tar, has, like many dyes, little affinity for cotton fiber. Applied directly to the cloth by ordinary methods it gives a color of little permanency. To fix this color there
is necessary the treatment of the cloth with some substance or agent which, having an affinity for both the cotton tissue and the coloring matter, alizarine, assists in effecting a chemical combination between them. The substance now almost exclusively used for this purpose is castor oil. Mixed with a small quantity of concentrated acid, which is then washed away by a solution of common salt, and soda or ammonia being added to saponify the fatty acids, there is produced from castor oil another oil which is perfectly soluble in water, a property especially desirable for the saturation of cotton cloth. The resultant oil is known by many names—sulphurated castor oil, soluble oil, sulforicinate, etc.—but from the use to which it is largely devoted, that of fixing alizarine dye upon cotton goods, it is generally known as alizarine-assistant, or Turkey-red oil. The economic value of this oil depends largely upon the fact that the specific red thus fixed by it upon cotton cloth is one of the most permanent colors known to the dyer's art. Soluble oil is also used as a substitute for the more expensive glycerine in the treatment of cotton cloth. It has an admirable effect upon starch mixtures, and imparts to the fabric a quality of softness, suppleness, and pliancy. Although no definite figures are extant as to the the quantity of castor oil annually consumed by the textile industry, the consensus of opinion among those best qualified to know is that a greater portion of the castor-oil output of the United States is utilized in the treatment of cotton goods than for any other single purpose.

USE FOR MEDICINAL PURPOSES.

Probably the next most important channel of consumption is the drug trade. In earlier days castor oil was best known as a medicine. The once universal disposition to regard it as a “sovereign remedy” is still among the early remembrances of living men. Not only was the customary maternal diagnosis of each childish ailment prone to result in a repulsive dose of castor oil, but even among hearty adults occasional self-prescribed doses of this so-called panacea were deemed necessary to the continuance of perfect health. Thus, two factors contributed to its consumption—its positive value as a medicine and its apparently harmless effect upon good health. In addition to its common use as a purgative, rheumatism, lumbago, skin affections, cramps, colds, and a host of other ills were popularly believed to yield to its curative properties; in fact, medicinal use was a highly important element in the castor-oil trade. Naturally, the marvelous advance that has been made in medical science in recent years has resulted in the widespread substitution for this once popular cure-all of less nauseating, if not more efficacious, drugs. As a general rule, physicians less frequently prescribe it. Modern preparation in capsules and compounds has, it is true, had a decided tendency everywhere to perpetuate its traditional uses as a self-prescribed remedy. In some rural communities, too,
especially among the colored population of the South, its medicinal virtues still retain much of their old-time popularity, and in some pharmaceutical compounds it is still a staple. In short, considerable quantities of the high grade of castor oil are still absorbed by the drug trade, although its value as a medicine has, on the whole, somewhat declined in public esteem, and there no longer exists for it so universal a demand as a "home remedy."

**MISCELLANEOUS USES.**

Castor oil has many other and varied uses, some of which are not common to the United States. Was the trite saying, "Every man to his taste," ever better exemplified than by the almost incredible custom, said to prevail in parts of China, of using castor oil as a cooking grease, as lard is used in America? A less surprising but, as judged by American standards, almost equally uncommon custom is the use of this oil in British India and in some other Oriental countries as an illuminant. In British India it is reputed, among other uses, to be extensively used as a lamp oil, and reports of no ancient date even refer to it as the illuminating agent in railway cars. Castor oil also has in some countries extensive uses as a lubricant. In Australia, which imported 769,392 gallons in 1898, the chief use is officially stated to be for this purpose, and the decline in imports in 1902 to less than 500,000 gallons is attributed to the substitution for this vegetable product of the mineral product, petroleum. It may also be noted that in the Cape of Good Hope, where the oil is probably largely used for the same purpose, 307,728 gallons were imported in 1902. To a limited extent this oil is used for lubricating purposes in the United States. As is well known, the mechanical function of lubricating oils is to form a coating or cushion between rotary surfaces, thus keeping them free from contact and preventing loss of power through friction. To this purpose castor oil, being heavy bodied, viscous, and nondrying, is in most cases well adapted. It is the heaviest of fatty oils, having a density of 0.96, and is particularly adapted to the oiling of fast-moving machinery because the heat generated keeps it in a liquid state. In the oiling of special kinds of machinery, carriage wheels, etc., it is still used to a small extent in the United States; but for general lubricating purposes the cheaper but lighter-bodied mineral oils, to which the required viscosity is frequently given by the admixture of resin, have almost completely supplanted this as well as other oils. The esteem in which castor oil was popularly held as a lubricant, however, is suggested by the fact that petroleum products adulterated with resin are in some instances now sold upon the markets under the designation of "machine castor oil." Castor oil also has properties that adapt it to use in the dressing of leather, and a demand for limited quantities exists in the United States, especially in country districts, for domestic
use in oiling and softening boots, shoes, and harness. Among minor uses may be mentioned its use in the manufacture of "sticky fly paper" and of the so-called "glycerine soap." For some of its varied uses it is apparent that the demand for castor oil in the United States has declined; for others, especially in recent years, it has increased. The resultant of these opposing forces, however, is that consumption as a whole is on the upward trend. Quantitatively, the consumptive demand for this product in the United States is now probably at its maximum up to this date, and absorbs in round numbers about 1,000,000 gallons annually.

THE MANUFACTURE OF CASTOR OIL.

The manufacture of castor oil in the United States is an economically important, but, as measured by the capital invested and labor employed, a small industry. As is true of most of the industries engaged in this country in the expression of oil from oleaginous seeds, however, the productive capacity is far in excess of the total demand for oil. Of the dozen castor-oil mills located in different sections of the United States, several have been practically idle for some years. The remaining mills, though constituting the so-called active branch of the industry, are operated with irregularity, or as the exigencies of the supply of castor beans and the demand for castor oil require. The present principal active centers of the industry are Jersey City, N. J., St. Louis, Mo., Kansas City, Mo., and Memphis, Tenn. A single mill is located in each of these centers, excepting that in St. Louis (including one mill in east St. Louis) there are three. The mill in Jersey City, containing six presses, the largest number in any mill in the United States, is advantageously situated for handling imported beans. The western mills, operating three or four presses each, were originally established for pressing the crop of the castor-bean belt of the United States. There are also two mills in Boston, Mass., one of which is operated in connection with an alizarine-assistant manufactory, one in Brooklyn, N. Y., and a mill in Grand Rapids, Mich., adjunct to the manufacture of sticky fly paper. Doubtless the productive capacity of the castor-oil mills of the United States is sufficient to supply double the country's requirements of castor oil.

PROCESSES OF MANUFACTURE.

The equipment of a castor-oil mill is identical in its main feature with that of a linseed-oil mill or of a cotton-seed-oil mill, that is, the mechanical unit of production is the hydraulic press. Oil is obtained from castor beans, as it now is most commonly from all oleaginous seeds, by hydraulic pressure. In the preparation of the beans for pressure and in the clarifying and refining of the oil after expression it is possible that slightly different processes are used in different mills; consequently, as is natural in a small industry like this, considerable
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reserve is maintained by owners concerning even the mechanical operations of their plants. The principal features of the process of extracting oil from castor beans, however, are evident. The beans, first cleansed of fragments of capsules, stones, dust, etc., an operation that in the case of imported beans entails a loss of from 2 to 5 per cent, are not decorticated, as cotton seed is, nor crushed between rolls as most oleaginous seeds are, but are pressed whole. Decortication is not necessary, and the operation of crushing is impracticable, because the beans would cake too much upon the rolls. They are heated or not before pressure, according to the purposes for which the oil is destined. Heat renders the oil in the beans sufficiently liquid for easy expression, but, if carried to a degree higher than the hand can easily bear, has a tendency to discolor the oil and render it unfit for medicinal and undesirable for some other uses. The more common custom, therefore, is to press the beans cold by submitting them, inclosed in bags, to gradual pressure for the requisite length of time in a powerful hydraulic press. In most mills the practice seems to be to submit the beans to a single pressing. This custom differs from that prevailing in some other countries, where after the first pressing the pulp or pomace is removed from the press, broken into pieces, heated, and submitted to pressure a second or even a third time, each subsequent pressing, however, producing a lower grade of oil. The oil as it flows from the press is a whitish liquid, from which the starch, albumen, and mucilage are afterwards removed by careful processes of clarifying and refining; the resultant product is the castor oil of commerce.

Two grades are placed upon the market, known commercially as No. 1 and No. 3. The former grade commands the higher price and enters largely into medicinal uses; the latter is usually quoted at from one-half cent to 1 cent less per pound, and supplies various industrial needs. Both grades are sold by the pound, or unit of weight, and have lately been commanding from 9 to 11 cents per pound as compared with 10 to 12 cents per pound a few years ago.

CASTOR POMACE.

Two products are obtained from castor beans by the process of manufacture. The most valuable one, the primary object of the industry, is obviously oil; the other is a residual product, which is in reality an oil cake, but is commercially known as castor pomace. This latter product belongs to that class of oil cakes, including mustard-oil cakes, etc., which have no value as a cattle food, but are used only as fertilizers. In fact, castor pomace, retaining as it does the whole of the poisonous properties of the castor beans from which it is derived, is fatal to live stock. But, containing both potash and phosphoric acid, and being especially rich in nitrogen, it is well adapted to manurial uses. The high percentage of oil it contains prevents its rapid
decomposition in the soil, and thus prolongs its fertilizing effects. In some sections of the United States castor pomace is highly regarded as a fertilizer for tobacco and hops. In British India, where more of this by-product is made and used than in any other country, it is much esteemed as a manure for potatoes, wheat, oats, and corn. In the United States, however, the bulk of the output is sold direct to fertilizer factories, and thus enters into general fertilizing uses. The trade in this product is almost entirely domestic, little being exported and none imported.

**YIELD OF OIL AND POMACE.**

The yield of oil and pomace that may be obtained from a given quantity or weight of castor beans varies according to the quality and condition of the beans and the climatic conditions under which they were produced. Beans of good quality contain about 45 per cent of oil, but 32 per cent is, on a general average, about the proportion of oil extracted by the process of manufacture used in the United States. The rather high proportion of about 13 per cent remains unexpressed in the pomace. The weight of imported castor beans as fixed by the United States tariff regulations is 50 pounds to the bushel, and consequently in the eastern mills it is customary to estimate the yield of oil and pomace, respectively, at 16 pounds (2 gallons) and 34 pounds to the bushel. In the West the weight per bushel of domestic castor beans is fixed at 46 pounds, and on this basis the yield of oil per bushel of beans would be 14.72 pounds (1.84 gallons) and of pomace 31.28 pounds.«

**SOURCES OF SUPPLY OF CASTOR BEANS.**

The castor-bean supply of the United States is derived almost entirely from two widely separate sources: The first, a few counties in Oklahoma, eastern Kansas, western Missouri, and southwestern Illinois, where for many years has been produced practically the entire domestic crop; the second, British India, a country which has long had almost a monopoly of the commercial castor-bean production of the world. The domestic crop, once sufficient to supply the entire demand—that is, of the eastern as well as the western mills—has of late years greatly declined. And at present a striking feature of this industry is that, although the castor oil used in the United States is manufactured almost wholly in domestic mills, the bulk of the beans from which it is expressed is imported from the opposite side of the earth. Although statistics upon domestic production are deficient, enough is known to warrant the statement that probably three-fourths, possibly four-fifths, of the castor oil manufactured in the United States is now made from imported beans.

«In accordance with commercial usage, the imported beans referred to in this article are expressed in bushels of 50 pounds and the domestic product in bushels of 46 pounds.
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THE UNITED STATES AS A SOURCE OF SUPPLY.

Of the production of castor beans in the United States historic records are meager. The plant is not indigenous to the Western Hemisphere; but philological research has led to the belief that it was introduced into the West Indies soon after their discovery. It is known to have been extensively cultivated in Jamaica in the eighteenth century, and to that fact can probably be credited the curious application of the word "castor" to this plant and oil. Resident Spaniards and Portuguese, having confused it with a totally different plant, the *Vitex agnus castus*, called it "agno casto." From this designation the English who traded in this oil coined the word castor, and thus gave rise to the name since applied to it throughout the English-speaking world.⁴ This certainly seems a more reasonable origin of the word than that attributed to its fancied resemblance to castoreum, a product obtained from the beaver. The man who first brought castor beans into the United States has left no record of his achievement, and succeeding generations who fostered his enterprise have been scarcely less mute. A small crop, limited, at even the highest stage of its development, to groups of counties rather than to States, its early history is naturally lost in oblivion. The salient fact is that the crop has always been largely localized in parts of the States of Illinois, Missouri, and Kansas, and the Territory of Oklahoma. Incidental mention is found of its cultivation in Illinois before that State was admitted into the Union in 1818. Within the next quarter century there are occasional references to experimental culture in Georgia and other Southern States. But not until 1850 were there comprehensive data indicating the geographical distribution and extent of the crop.

ESTABLISHMENT OF CASTOR-OIL MILLS.

At the taking of the census in 1850 twenty-three castor-oil mills were reported for the entire United States; of these, ten were in the State of Illinois; three in each of the States of Missouri and Virginia; two each in Ohio and Tennessee; and one each in Pennsylvania, Alabama, and Arkansas. All were small establishments, doubtless of crude equipment, and evidently designed only for manufacturing the small crops of near-by farms, excepting that in Missouri St. Louis had already become, as it has since remained, the principal commercial center of castor-oil production in the West. As measured by the value of the oil produced, upward of 70 per cent of the total production of castor oil in the United States at that date was made in the Missouri mills. Though no statistics were taken of the actual production of castor beans, it is evident that the bulk of the entire crop was raised in territory tributary to St. Louis; in other words, as early as 1850

⁴ De Candolle's *Origin of Cultivated Plants.*
the cultivation of castor beans was already largely specialized in that section, beyond which it has never extended on an important and enduring scale.

In the Eastern States the castor plant, on account of its ready susceptibility to injury from frost, and other causes, has never been cultivated for industrial purposes. But, on account of the important consumptive market there for castor oil and the facilities for importing castor beans, attention was early attracted to the industry on the Atlantic coast. In 1857 a mill was erected in Jersey City, N. J. This was the largest mill, equipped with the latest improvements in machinery and constructed exclusively for the manufacture of castor oil, that had been erected in the United States. The industry thus became largely centralized in Jersey City and St. Louis, cities which have since remained the leading markets for castor beans. The respective advantages of each location with reference to the two sources of supply, domestic and foreign, are obvious. Many small mills, about this time, went out of business, and at the taking of the census in 1860 only eight castor-oil mills were reported for the entire country against 23 in 1850. Of the capital invested in these, half was represented by the two mills in Jersey City and St. Louis.

Overproduction of Castor Beans.

Soon after the civil war great local interest was revived in the producing sections in the culture of castor beans. In some years the crop exceeded the consumptive demand; even the supplies required in the East were drawn from the Western States, and the import trade from British India was threatened with extinction. Statistics of production as a whole were not collected; and comprehensive knowledge of the crop is not obtainable. The few figures that are extant, however, are valuable, in that they constitute the only statistical record upon this subject. As to Missouri and Oklahoma, beyond the fact that the crop was raised on a commercial scale, little is known. But in Kansas, which was then the chief producer, the State board of agriculture reported an increase in the crop from 59,435 bushels in 1873 to 766,143 bushels in 1879, the latter being the highest annual yield that has ever been reported for the State. There is reason for believing that this bumper crop in Kansas constituted practically the entire crop of the country. The Illinois State reports show the crop of that State in 1879 to have been only 24,314 bushels; and that the crops of Missouri and Oklahoma were not of great importance is indicated by the receipts of castor beans in St. Louis, which in that year were only 516,507 bushels, the bulk of which was undoubtedly from Kansas. The effect of this increase in domestic production upon imports was that the latter, which as early as 1867 had amounted to 60,588 bushels, declined to 1,655 bushels in 1879. Although castor beans are not a perishable product and can be carried over from year to year, the
effects of the heavy overproduction soon became apparent. Prices fell, and production rapidly declined until in 1884 it amounted in Kansas to only 89,183 bushels and to 19,295 bushels in Illinois. The import trade again became an important factor in the industry, the takings from British India attaining in that year the then unprecedented proportions of 262,505 bushels.

Up to this date few important changes had occurred in the industry of manufacturing castor oil. At the taking of the census in 1870 six mills were reported. All the old mills, excepting one each in St. Louis and Jersey City, had passed out of existence; but, as a result of tentative efforts to introduce the cultivation of castor beans into Texas and Tennessee, three new mills had been erected in the former and one in the latter State. These four mills were of small capacity and short-lived; at the taking of the next census they had disappeared. The annual output of oil for the whole country, as reported by the census, was 341,850 gallons, of which 270,000 gallons was the product of the two principal mills. Eight mills were reported by the census of 1880, but the only noteworthy addition to the old-established branch of the industry was a new mill in St. Louis and one in East St. Louis. The other four were small affairs, located in Ohio, Illinois, and Kansas. A notable increase in the output of oil over that of 1870 was reported, the total quantity being 893,802 gallons, the increase being partly due to the enormous overproduction of castor beans in Kansas in 1879 and to the introduction of improved machinery into the principal mills. The next important addition to the industry was the Kansas City, Mo., mill, which began operations in 1885.

DECLINE IN PRODUCTION OF CASTOR BEANS.

The subsequent history of castor-bean production in the United States is, as a whole, one of continuous, though irregular, decline. From the scant statistics upon the subject this is plainly apparent. In 1887 the crop of the single State of Kansas was reported by the State board of agriculture to be 405,488 bushels; in 1899 the entire crop of the United States, as returned by the census, was only 143,388 bushels. This heavy decline in production, though of late years common to all the producing States, was principally due to the abandonment of the crop in Kansas, the crop of 1887 never since having been equaled. That State, from being the leading producer, has become probably the smallest. Evidently, if the rate of decrease in Kansas—from a maximum of 766,148 bushels in 1879 to a minimum of 2,925 bushels in 1904—had been maintained in all the States, their crops would have long ago been practically extinct. But for many years as the crop of Kansas decreased, that of Oklahoma increased, though not in equal proportion, and that Territory has long been the chief source of supply for domestic castor beans crushed in the western mills. There are no means of determining the maximum
annual crop of Oklahoma, but in 1899, when the first and up to the present day the only Federal inquiry was made into the castor-bean production of the United States, it was found that the crop of that Territory amounted to 77,185 bushels, as compared with a production in Kansas of only 18,108 bushels, the latter figures, however, admittedly representing only about two-thirds of the crop. The relative importance of Oklahoma as a source of supply was further in evidence by the fact that the production in Missouri in the same year was given at 31,966 bushels, that of Illinois at 15,965 bushels, and the combined product of all other States at 434 bushels. The impulsion of this heavy fall in production has not been stayed up to the present day; though no figures are extant to show the exact limit reached, it is known that in general terms the annual castor-bean crop of the United States is now below 100,000 bushels. The quantity raised is insufficient for the demands even of the western mills. Lively competition arises each year in the principal producing sections for the possession of the crop, and the deficiency in western supplies is now made good, when the conditions of the trade warrant, by purchases of imported seed.

SUPPLY AND DEMAND.

Of the manufacturing industry to which castor beans give rise in the United States, little additional can be said. The activities of this industry have for almost a half century been limited to supplying the varying domestic demand for castor oil, for no noteworthy export trade exists and imports are of negligible quantities. The domestic uses of this oil, moreover, important as they are from an economic point of view, are peculiar, in that they absorb only moderate quantities. This is true even in the textile industry. However, there has been an increase, especially in recent years, in the demand in this country for castor oil. Notwithstanding the continuous decline for two decades past in the domestic crop of castor beans, additional capital has occasionally been attracted to the manufacture of this oil, and there has been some expansion in the total productive capacity, especially on the Atlantic coast. In the eighties a mill was erected in Brooklyn, in the nineties another was started in Boston, and within the last few years the manufacture of this oil has been taken up in Memphis, Tenn. But, beyond the mere fact of noting their existence, little significance attaches in this industry to a mere enumeration of mills. The irregularity of operation in some establishments, the long periods of inactivity in others, and a natural reticence among operators to reveal the workings of their plants render it impossible to form any exact idea from productive capacity of the country’s actual output of oil. Moreover, except in 1899, no statistics as to the total castor-bean crop have ever been collected. The only factor in the annual supply that is known with exactness is the quantities imported.
In recent years that factor has become very important. Instead of Kansas and Oklahoma, the chief source of supply is now the port of New York. In the fiscal year 1902–3 imports of castor beans into the United States amounted to 380,270 bushels, or potentially 760,540 gallons of oil; in 1903–4 the quantity imported amounted to 498,039 bushels, representing in oil 996,078 gallons. The domestic crop of castor beans, though statistically an unknown quantity, is known to have fallen greatly below the 150,000 bushels reported for 1899 by the United States census. Assuming the crop to have been a round 100,000 bushels in 1903, the quantity of castor beans available for manufacture in the year 1903–4 would therefore have been 598,039 bushels, or potentially about 1,200,000 gallons of oil, with a resultant by-product of upward of 10,000 tons of castor pomace. The present most striking characteristic of this industry is its heavy dependence for supplies upon British India.

**DISTRIBUTION OF THE CASTOR BEAN.**

The castor plant is one of the most interesting in the world's flora. Tropical in its origin, the antiquity of its culture is attested, first, by seeds found in the sarcophagi of the ancient Egyptians, and, later, by records of the utility of the plant in the earliest writings of the Hindus. Indigenous either to Africa or India, it has been carried by the many migrations of men in the course of ages to all parts of the tropical and subtropical world. The remarkable beauty of its foliage has also led to its culture as an ornamental plant far north of where it can be raised for industrial uses. A perennial in tropical climes, it grows to a height of 30 or 40 feet, but acclimated in cooler zones it becomes an annual, and attains a height of only from 8 to 12 feet. From the botanical, as distinguished from the cultural, point of view it is now widely distributed over all the warmer regions of earth. In our own possessions it grows wild in Porto Rico, is cultivated for oil to a small extent in Hawaii, and is also found in the Philippines. Cultivated in Mexico, there is official record of an increase of the crop from 57,000 bushels in 1900 to 327,000 bushels in 1902. The plant grows wild in many parts of South America, notably in Paraguay and Argentina, and a small export trade in castor beans is carried on from Brazil. It is cultivated in a small way in southern Europe, in northern and central Africa, and eastward, in about the same latitudes, grows sometimes wild, sometimes under cultivation, in Arabia, Persia, and, in fact, in most of the warmer countries and islands of the Oriental world. The botanical distribution of the plant, however, has little economic significance. In few countries does its cultivation give rise to even a small international trade in its products, and in none, except Mexico, are there statistical records of yield.
The one great castor-bean producing country of the world is British India. Although not produced there, as crops are reckoned in these days, in mammoth proportions, that country probably has a greater monopoly of the world’s production of castor beans than has the United States of the world’s crop of cotton or of corn. From British India is derived almost the entire supply of castor beans that enters into the international trade of the civilized world. A manufacturer of castor oil, too, on a large scale, her exports of the manufactured product far exceed those of any other nation. From British India the United States, England, France, Germany, Belgium, and Italy, all manufacturers of castor oil, derive practically their entire imports of castor beans. From the same source Australia, Natal, Cape Colony, the Straits Settlements, and Ceylon, all heavy consumers of the manufactured product, derive the bulk of their supplies of castor oil. No records exist of the production of British India, but the following statement of the total exports of castor beans and castor oil from that dependency to all countries since 1890 will illustrate the magnitude of her export trade; to the statement is added for comparative purposes a record of the imports of castor beans and castor oil into the United States.

Exports of castor beans and castor oil from British India, and imports into the United States, 1890–1904.

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<tr>
<th>Year ending March 31—</th>
<th>Exports from British India.</th>
<th>Year ending June 30—</th>
<th>Imports into the United States.</th>
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<td>1904</td>
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Two varieties of castor beans are produced in British India—a large-seeded variety and a small-seeded variety, the latter of which yields the better quality of oil. Both varieties are imported into the United States. Madras, Coromandel, and Bombay are the chief sources of supply, the small variety exclusively being imported from Bombay and both varieties from Madras. Small quantities of castor beans are also imported from Brazil. The exclusive port of entry is the port of New York.