NATIONAL FARM CHEMURGIC COUNCIL

BULLETIN

UNITED STATES IMPORTS AS POSSIBLE NEW CROPS FOR EXPERIMENTATION AND LARGE SCALE DOMESTIC CULTIVATION

Published by the

National Farm Chemurgic Council

50 WEST BROAD STREET • COLUMBUS, OHIO

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Introductory Remarks

If there are any who doubt the desirability of seeking to establish new crops in the American agricultural economy, one needs only to refer to any farmer or businessman in the soybean-producing states. In 1914, about 2,000 bushels of soybeans were harvested for seed. I haven't looked up the consumption, but it certainly was small. The 1941 crop is around 110,000,000 bushels. Considerable acreages were grown in addition for hay and forage. Because of the rapid expansion of uses in the food, feed and industrial fields, soybeans for several years, despite a phenomenal rise in production (from 45,000,000 bushels in 1935), have been the most satisfactorily priced major farm crop. Without this crop, more acres of corn, wheat and oats would have been grown further to depress the prices of those commodities.

The present American expenditure for many of the crops described in this bulletin is trivial, compared with total farm income. But one or more of them may earn its way to a large expansion of demand, once it is amply available. Some of them may be adaptable for production in communities of limited area. In any event, their establishment on American farms will represent a specific economic gain, be it large or small.

All of these are items now purchased by American users. Most of them are purchased first by industrial processors who later sell the end products to American consumers. It is out of place to ask whether the purchase of these materials from foreign farmers is not in a way equivalent to purchase by the American farm consumer of the industry's end product from a foreign processor? Possibly he could buy it cheaper, but would he thus employ American labor and capital? The industrial user will, I believe, profit in the long run by buying his raw material from consumers of his product. It is to his advantage to support a new crops program. His supply will be under better control as to quality if produced in this country, and certainly will be more stable as to quantity available and price. Submarines don't sink farms.

A striking fact is that 89% of the national farm income is earned by half of the farms. The other half of the farms earns the remaining 11%. These simple figures dramatize the urgent need for more sources of cash income to occupy more fully the lands, hands and energies of agriculture. If the future security of the nation in any way depends upon a fair proportion of the people being associated with the land, the increase of profit-making opportunity on the land is a problem of major importance.

The authors of this bulletin have made a forceful contribution by its preparation. They have revealed a wide and varied list of new farm opportunities, worthy of experimentation and test. To anyone familiar

with the total imports of agricultural products, and of items made from raw materials, it will be apparent that they have been exceedingly modest in pointing to a total of only $131,000,000. They have not included such non-competitive products as coffee, for which domestic production is naturally very unlikely. They have not included several competitive (and controversial) items such as meats and sugar, which run into large figures, nor the tropical starches. Nor have they mentioned rubber, which no one knows we *can't* produce from some other plants than the hevea tree. With new knowledge of plant genetics and experimentation with chromosomes, the thought of increasing the latex content of some present weed is not inconceivable.

The National Farm Chemurgic Council is genuinely appreciative of the extensive labor to which the authors have gone in preparing this material for publication and for the arrangement they have made for its publication. It will, I am sure, prove an important stimulus to chemurgic thinking with regard to new crops on American farms.

Wheeler McMillen, President
National Farm Chemurgic Council
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Columbus, Ohio

Preface

About a dozen different types of aromatic plants, drugs, and specialty crops have been discussed in a series of publications by the authors during the past three years. This bulletin covers a larger scope; it contains a list of United States imports during the ten-year period from 1929 to 1938 of crops worth considering for experimentation and subsequent large-scale cultivation. By listing the amount of each item imported, as given in the yearly publication of the United States Department of Commerce, *FOREIGN COMMERCE AND NAVIGATION OF THE UNITED STATES,* we have found that over this ten-year period an average of over 131 million dollars was spent yearly for materials that could be successfully produced in the United States.

All of these crops show unusual possibilities for cultivation in this country, some in the subtropical regions of California, Florida, and the Gulf of Mexico, others in the northern regions of the country. The United States is geographically fortunate, inasmuch as there is a wide range of climatic conditions and soils within its borders. For this reason, we could cultivate any of the crops listed in this bulletin.

However, United States farmers are conservative. They have a preconceived idea that certain crops can be grown successfully only in Europe, Asia, or South America. The United States Department of Agriculture, agricultural colleges and experiment stations should take the initiative to correct this prejudice. Secondly, those presently engaged in the import and sale of such products naturally are loathe to see the business and profits derived therefrom dispersed to other channels.

A year ago when we came out with the statement that specialty crops should be cultivated in our country, the idea was ridiculed as an impossibility, but experimentation proved that cultivation of these crops is practical not only on a small scale, but in large acreages.

The advisability of growing specialty crops becomes a matter of economy when one considers that our scientific implements and agricultural knowledge enable us to produce crops actually more cheaply by our machine methods than they can be grown and harvested in foreign countries where labor is available for a few cents a day. We can grow rice more economically than we can buy it from China.

During the first World War when our import trade was cut off, American farmers took over the cultivation of many foreign-grown crops and continued to produce them after the Armistice. Whereas we had previously bought large quantities of apple seedlings from France, our domestic production now supplies our needs. When German dyes were

no longer available during the War of 1918, the American dye industry was forced into existence. Now the permancy and color of American dyes has completely eradicated the belief that German dyes could not be equalled, and 98 per cent of our needs are supplied by our own dye industries.

The 1940 Census revealed the tendency of the new generation of American farmers to remain in the country rather than move to the city. This fact emphasizes the necessity for growing crops with a higher profit per acre than is being obtained by many farmers at present. American farmers are urged to diversify their crops instead of relying on one or two staples. This can be accomplished by experimentation, which will reveal what crops are adapted to various soils and climates. Already we know that while Indiana and Illinois soils yield about fifty bushels of corn per acre, Texas farmers do well to obtain sixteen. Obviously it would profit the Texan to experiment with crops better suited to his soil and climate.

Of the 131 items which we have listed, there is a sufficient domestic market for some crops to warrant their cultivation on a large scale. Others are marketable only in small quantities, not necessarily because of any inherent quality of the plant, but because insufficient knowledge prevents the realization of its possibilities. Here again, experimentation is our keyword. Consider the lowly soybean, brought from Asia to this country nearly a century and a half ago, which only in the past twenty-five years has come to be such an important crop that ten million acres are cultivated not only for agricultural purposes of hay, pasture, and silage, but for extensive use of the extracted oil as an edible product and for wide industrial use.

Perhaps some efforts to grow a few of these crops in this country twenty or thirty years ago were not successful, and experimentation was not sufficient to develop any practical method for growing them on American soil. But today the picture has changed, for increased knowledge of plant chemistry, soil and climatic conditions, irrigation and fertilization has put the work on an entirely different basis.

When we purchase from foreign countries an annual average of 131 million dollars worth of aromatic plants and essential oils, drugs, spices, gardening and foraging seeds, oil seeds, edible oils, and quick-drying oils for the paint and varnish industry, we are buying only what we actually need, and with just enough materials at hand for immediate demands, the door is closed to experimentation for wider use of the materials and for utilization of by-products. If we had a small surplus, we could experiment, and we might uncover more valuable facts like the discovery that an odor identical to that of the costly oil of rose can be made from coriander oil.

However, efforts should first be in the directions of increasing the quality and the yield per acre. Only one country — Germany — cultivates licorice. In other countries where the plant is grown in the wild state, the

yield is about 900 pounds per acre. The yield in Germany is 3300 pounds per acre. Poppy seed grown in Holland contains fifty to fifty-five per cent oil. German-grown poppy seed yields 80 per cent oil. In the light of these facts, experimentation with sunflower seed, for instance, might increase the oil yield from its present 32 per cent to perhaps 50 per cent. Factors influencing the yield of oil are soil, irrigation, fertilization, climatic conditions, planting methods, and quality and variety of seed. In botany, the "Law of Minimum" states that the factor represented in the minimum guides and governs the growth of the plant. Since the elements present in smallest quantities play this most important role, a thorough investigation of soil composition is urged, so that conditions of cultivation may always be optimum.

Already our domestic mint oil is sold in competition with the Japanese oil. Our production of citrus oils is almost sufficient to supply our needs, and domestic lemongrass oil is a still more recent enterprise. Thus, we are proving to the conservatives in the flavoring industry that imported oils can be equalled in quality, and even improved upon.

In experimenting with new crops it is strongly advised that the best varieties of seeds, roots, or cuttings be used. We must not repeat the mistake made in the development of hybrid corn, for although we know the yield per acre has been increased, we doubt whether the quality of the grain has been improved. The use industry makes of corn should be considered along with increased yield the farmer obtains. The agronomist did not consult with the chemist in choosing the seed that would produce a crop complying with its industrial usages.

When Russian and Hungarian coriander seed yields one per cent essential oil, it is not worth while to plant Moroccan seed, which contains .25 per cent, or the East Indian variety giving about .1 per cent. The best type of material is usually obtained from the country where the finest quality seed is cultivated. We stress the importance of experiments with crossing to develop an even better type of seed.

A 131 million dollar domestic market challenges the research man, the industrial chemist, and the agronomist to work hand in hand in their respective fields of increasing scientific knowledge, developing varied usages, and cultivating new crops.

Appreciation is extended to Mr. J. R. Stuetz of the Public Relations Department for his cooperation in the preparation of this bulletin, and to Miss Lois C. Nesbit for compiling the statistical data.

The AUTHORS

Louisville, Kentucky,

October, 1941.

ITEMIZED LIST OF IMPORTS

Showing Average Amount Imported per Year, 1929 - 1938, and Average Amount Paid per Year

1. ACACIA GUM, or GUM ARABIC, *Leguminosae*
   Sources: Italy, United Kingdom, Egypt, French Africa
   Pounds Imported: 6,914,753
   Amount Paid: $584,161
   Uses: Pharmacy, adhesives, inks, textile printing, confectionery

2. ACONITE, ALTHEA, or MARSHMALLOW ROOT, leaves and flowers, *Aconitum napelius*
   Sources: Italy, Belgium, U.S.S.R.
   Pounds Imported: 23,934
   Amount Paid: $3,012
   Use: Medicine (cardiac and nerve sedative)

3. ACORNS, Quercitol, and DANDELION ROOTS, *Taraxacum*
   Sources: Hungary, Germany, Italy
   Pounds Imported: 1,383,469
   Amount Paid: $44,923
   Uses: Medicine

4. AGAR AGAR, dried mucilaginous substance extracted from various species of Gelidium and Algae
   Sources: United Kingdom, Japan
   Pounds Imported: 530,492
   Amount Paid: $273,126
   Uses: Culture medium in bacteriology, sizing for silk, adhesives, substitute for gelatin, pharmaceutical preparations, photography (Ingredient of sensitized emulsions); ingredient of vegetarian foods; sausage casing manufacture, foodstuffs (thickening agent in milk, cream, ice cream, etc., substitute for white of egg)

5. ALFALFA, *Medicago sativa*
   Sources: Canada, Argentina, Union of South Africa, France, Hungary.
   Pounds Imported: (Seed) 1,135,938
   Amount Paid: $195,698
   Use: Seeding purposes

6. ALMONDS, shelled, *Prunus communis*
   Sources: Spain, Italy
   Pounds Imported: 9,983,866
   Amount Paid: $2,225,918
   Uses: Recovery of the essential oil: flavoring compounds, preparation of amygdalin

7. ALMOND OIL, SWEET, from ripe, seed of *Prunis amygdalus,* var. *dulcis*
   Sources: France, Netherlands, United Kingdom
   Pounds Imported: 93,447
   Amount Paid: $41,708
   Uses: Perfumes; lubricant for delicate mechanisms, medicine (emollient)

8. ALMOND OIL, BITTER, essential oil from seeds of *Prunus amygdalus,* Stokes (*Amygdalus communis L.*) the almond tree, or the seeds of *Prunus armeniacus, L.,* the apricot tree
   Sources: France, Germany, Italy Netherlands, Canada
   Pounds Imported: 16,665
   Amount Paid: $31,766
   Uses: Medicine, flavoring

9. ALMOND PASTE, residue obtained after expressing oil from almonds
   Sources: France, Germany, Netherlands
   Pounds Imported: 1,900
   Amount Paid: $692
   Uses: Cosmetics; manufacturing bitter almond water; perfume base; cooking; confectionery

10. ALOES, *Liliacae*
    Sources: Netherlands W. India
    Pounds Imported: 860,671
    Amount Paid: $142,408
    Use: Cathartic. Aloes Oil, stimulant of fermentation

11. AMBER SEED OIL, *Abalmoschus*
    Source: Germany
    Pounds Imported: 1,826
    Amount Paid: $3,725
    (9 year average)
    Uses: Medicine, treatment of hysteria and whooping cough, skin irritant

12. ANGELICA ROOT, *Angelica archangelica L., umbelliferae*
    Source: Germany
    Pounds Imported: 33,253
    Amount Paid: $26,871
    (2 year average, 1937 and 1938)
    Uses: Medicine (aromatic), tonic for digestion; candy; food ingredient; source of angelica root oil (used in perfumes and for flavoring bitters); rectification of alcohol and distilled liquors

13. ANISE SEED, *Pimpinella anisum*
    Sources: Bulgaria, Rumania, Russia, China, French Indo-China
    Pounds Imported: 492,259
    Amount Paid: $38,086
    Uses: Manufacture of oil: condiment; flavoring pastries, candies, fruit preserves, pickles, and canned foods such as soups and meats

14. ARROWROOT, *Maranta arundinacea*
    Sources: France, British West India
    Pounds Imported: 3,205,292
    Amount Paid: $189,571
    Uses: Food, sizing laundry, adhesives, face powder, starches, baking and food industries

15. AVOCADOS, *Persea americana*
    Sources: British West Indies, Cuba
    Pounds Imported: 7,610,457
    Amount Paid: $152,755
    (8 year average)
    Use: Food

16. BELLADONNA, *Atropa belladonna*
    Sources: Russia, Yugoslavia, Italy
    Pounds Imported: 184,604
    Amount Paid: $18,206
    Uses: Roots and leaves in medicine as narcotic and anodyne, and as a powerful mydriatic

17. BERGAMOT OIL, *Citrus bergamia*
    Sources: Italy, France
    Pounds Imported: 94,637
    Amount Paid: $225,024
    Uses: Perfumery

18. BLUBERRIES, *V. corybosum*
    Sources: Norway, Canada, Newfoundland, Labrador
    Pounds Imported: 9,188,547
    Amount Paid: $558,154
    (4 year average, 1935 - 1938)
    Use: Food and preserves

19. BUCHU LEAVES, *Diasma ericoides*
    Sources: Union of South Africa
    Pounds Imported: 107,507
    Amount Paid: $22,873
    Use: Medicine - diseases of urinary organs

20. CABBAGE SEED, *Brassica oleracea*
Sources: Netherlands, Denmark
Pounds Imported: 286,560
Amount Paid: $124,033
Uses: Seeding purposes: Oil used as illuminant; soap manufacture; ointments and linaments; substitute for olive oil

21. CALAMUS ROOT, *Acorus calamus*
Source: Russia
Pounds Imported: 13,428
Amount Paid: $497
(7 year average, 1929 - 1935)
Uses: Medicine and preparation of calamus oil, which is used in the preparation of liqueurs; medicine, perfumery

22. CAMOMILE (CHAMOMILE), Chamomile Flowers, *Matricaria, Anthemis nobilis*
Sources: Hungary, Yugoslavia, Belgium
Pounds Imported: 183,448
Amount Paid: $24,332
Use: Medicine - aromatic bitter

23. CANANGA or YLANG-YLANG, *Canangium*
Sources: France, Netherlands India
Pounds Imported: 42,522
Amount Paid: $108,069
Uses: Perfumery, medicine

24. CANARY SEED, *Phalaria canariensis* (Canary Grass)
Sources: Argentina, Turkey
Pounds Imported: 18,224,891
Amount Paid: $519,783
Use: Canary food

25. CAPSICUM or CAYENNE PEPPERS, *Capsicum solanaceae*
Sources: Japan, Mexico, French Africa
Pounds Imported: 1,681,172
Amount Paid: $152,176
Uses: Condiment; medicine (powerful local stimulant)

26. CARAWAY SEED, *Carum carvi*
Sources: Netherlands, Russia
Pounds Imported: 5,469,100
Amount Paid: $370,413
Uses: Seed - Medicine, carminative and stomachic; flavoring; condiment. Oil - medicine; flavoring; soaps, gin, perfumes.

27. CARDAMON SEED, *Elettaria*
Sources: British India, Guatemala
Pounds Imported: 209,532
Amount Paid: $146,646
Uses: Medicine (aromatic) : condiment; source of perfume, extract

28. CASHEW NUTS, *Anacardium occidentale*
Sources: British India, Haiti, United Kingdom, British East Africa
Pounds Imported: 16,748,735
Amount Paid: $2,811,210
(9 year average)
Uses: Eating purposes; oil used in medicine, cosmetics

29. CASSIA BUDS, CASSIA, and CASSIA VERA, *Leguminosae*
Sources: China, Netherlands India, French Indo China
Pounds Imported: 876,163
Amount Paid: $67,162
Uses: Dried fruit used in manufacture of medicines. Oil (distilled from twigs and leaves) used in making flavoring and perfumery

30. CASTOR BEANS, *Ricinus*
Sources: Brazil, Haiti, Argentina
Pounds Imported: 116, 953, 041
Amount Paid: $2,794,048
Uses: Source of Castor Oil, a medicine, cathartic, high-grade lubricant; leather preservative; textiles (cotton dyeing, preparation of sulfonated oil, Turkey red oil; fly paper; fly oils and dope; electrical insulating compositions; toilet creams and hair dressings; special soaps; rubber substitutes

31. CAULIFLOWER SEED, *Brassica oleracea Var. Botrytis*
Sources: Netherlands, Denmark
Pounds Imported: 15,238
Amount Paid: $87,912
Use: Seeding purposes

32. CELERY SEED, *Apium*
Sources: British India, France, Italy
Pounds Imported: 1,010,242
Amount Paid: $19,314
(9 year average)
Uses: Seeding purposes; condiment; oil used for flavoring and medicine

33. CHICKORY, CRUDE, *Cichorium intybus,* and ENDIVE, *Cichorium endivia*
Sources: Belgium
Pounds Imported: 2,155,196
Amount Paid: $78,043
Uses: (Chickory) leaves for salad; roots roasted for mixing with coffee
(Endive) Leaves for salad

34. CINCHONA BARK, *Cascarilla hexandra*
Source: Netherlands, India
Pounds Imported: 1,697,836
Amount Paid: $587,366
Use: Tonic and stomachic

35. CINNAMON AND CHIPS, *Cinnamomum zeylanicum*
Sources: Ceylon, British East Africa
Pounds Imported: 748,438
Amount Paid: $92,883
Uses: Medicine; source of cinnamon oil; flavoring; condiment
Cinnamon-leaf oil: medicine, flavoring, perfumery
Cinnamon oil: medicine, flavoring, perfumery

36. CITRON OR CITRON PEEL, *Citrus medica*
Sources: Italy, Greece, Palestine, Greece Albania, Italy
in brine -
Pounds Imported: 2,160,936
Amount Paid: $122,490
crude dried -
Pounds Imported: 19,543
Amount Paid: $9,470
candied-
Pounds Imported: 1,424,752
Amount Paid: $149,564
(9 year averages)
Uses: Cookery, fruitcakes and puddings

37. CITRONELLA OIL, *Collinsonia canadensis*
Sources: Netherlands India, Ceylon
Pounds Imported: 1,592,801
Amount Paid: $522,020
Uses: Perfumes; medicines; insectifuge; source of citronellal, geraniol; toilet soaps

38. CLOVER SEEDS, *Trifolium*
Sources: France, Canada, Poland, Rumania, Hungary
Red -
Pounds Imported: 3,750,384
Amount Paid: $506,640 (9 year average)
Alsike -
Pounds Imported: 1,810,144
Amount Paid: $294,006 (9 year average)
Crimson -
Pounds Imported: 2,616,142
Amount Paid: $144,702 (10 year average)
Sweet -
Pounds Imported: 2,479,604
Amount Paid: $130,595 (9 year average)
White and Ladino -
Pounds Imported: 1,554,548
Amount Paid: $251,535 (9 year average)

39. CLOVES, unground, *Eugenia aromatica*
Sources: British East Africa, Madagascar, Netherlands India
Pounds Imported: 3,405,715
Amount Paid: $426,464
Uses: Condiment, medicine, aromatic; manufacture of clove oil.
Clove oil: medicine (local irritant, anesthetic); flavoring, dentistry, perfumery, confectionery, soaps

40. COCOA LEAVES, *Erythropylon coca*
Sources: Peru, Netherlands India
Pounds Imported: 291,888
Amount Paid: $54,184
Uses: Flavoring popular beverages; medicine (an unofficial drug; contains very small amount of cocaine)

41. COCONUT MEAT, *Cocos nuciferae*
Sources: Cuba, Philippine Islands, British Malaya, Ceylon, China, Japan
Pounds Imported: 56,412,650
Amount Paid: $2,855,849
Uses: Eating purposes, in cakes, candies, etc.

42. COCONUT OIL
Sources: Philippine Islands, Czecho-Slovakia, Jamaica, British Guiana, Canada
Pounds Imported: 308,662,742
Amount Paid: $12,435,910
Uses: Soaps; butter substitutes; foodstuffs; cosmetics, candles, emulsions, dyeing cotton

43. CORIANDER SEED, *Coriandrum sativum*
Sources: Morocco, Hungary, United Kingdom
Pounds Imported: 1,844,675
Amount Paid: $59,833
Uses: Condiment, medicine, manufacture of coriander oil. Coriander oil: flavoring material for alcoholic beverages; condiment sauces; mayonnaise, candies, canned foods, catsup, chili sauce. Pickling agent; in salad dressing, soups, spice extractive; spice oils, tobacco products; source of linalol in perfumes, soaps; flavoring gins and cordials

44. CORK WOOD AND BARK, *Quercus suber*
Sources: Portugal, Spain, Italy, (Algeria) France
Pounds Imported: 71,976,325
Amount Paid: $2,142,152
Uses: Filler, stoppers; insulation, sound deafener, life preservers, gaskets, etc.

45. CREAM OF TARTAR, *Potassium bitartrate,* from argols (by-product of the wine industry) by extraction with water and crystallization.
Source: Italy
Pounds Imported: 55,371
Amount Paid: $7,847
Uses: Baking powder; preparation of other tartrates, medicine (diuretic and cathartic); galvanic tinning of metals

46. CUMMIN SEED, *Umbelliferae*
Sources: Algeria, Malta, France, Iran
Pounds Imported: 794,982
Amount Paid: $64,380
Uses: Medicine, flavoring, source of cummin oil. Cummin oil: medicine, flavoring, perfumery

47. DIGITALIS, *Scrophulariaceae*
Sources: Germany, United Kingdom, Canada, Italy, Belgium
Pounds Imported: 55,869
Amount Paid: $9,198
Uses: Medicine (stimulant in acute circulatory failures, as a diuretic, and as a cardiac tonic)

48. ERGOT, *Claviceps purpurea*
Sources: Portugal, Germany, Spain, United Kingdom, Poland
Pounds Imported: 242,034
Amount Paid: $147,842
Uses: Medicine (obstetrics), source of ergot oil

49. EUCALYPTUS OIL, *Myrtaceae*
Source: Australia
Pounds Imported: 365,687
Amount Paid: $84,854
Uses: Medicine, flotation process of ore concentration; perfumes, soap

50. FENNEL SEED, *Foenum graecum* and *Foeniculum vulgare*
Sources: British India, Italy, Czechoslovakia, France
Pounds Imported: 235,079
Amount Paid: $16,331
Uses: Medicine (aromatic and carminative); oil - medicine, liqueurs, perfumery, soap-making. After essential oil has been extracted, fennel can be utilized as a cattle and chicken feed.

51. FENUGREEK SEED, *Foenum graecum, Trigonella*
Sources: Egypt, Morocco
Pounds Imported: 448,630
Amount Paid: $11,580
Uses: Medicine, vetinerary medicine

52. CHEWING FESCUE, *Festuca*
Sources: New Zealand, United Kingdom, Germany
Pounds Imported: 722,202
Amount Paid: $143,385
(9 year average)
Uses: Seeding purposes; pasture grass

53. FLOWER SEED
Sources: Netherlands, United Kingdom, Japan, Germany, Italy, France
Pounds Imported: 149,227
Amount Paid: $200,839
Use: Seeding purposes

54. GAMBIER OR TERRA SAPONICA, *Quercus aegilops*
Sources: Netherlands India, Br. Malaya, Nigeria
Pounds Imported: 3,381,514
Amount Paid: $218,832
Uses: Textile dyeing; tanning; medicine (astringent)

55. GARLIC, *Allium sativum*
Sources: Mexico, Chile, Japan, New Zealand, Italy
Pounds Imported: 5,218,322
Amount Paid: $208,799
Uses: Condiment; in medicine; source of garlic oil

56. GENTIAN (YELLOW GENTIAN, BITTER ROOT), *Gentiana*
Sources: France, Yugoslavia
Pounds Imported: 391,038
Amount Paid: $26,839
Use: Medicine, for its local effect on mucous membrane of alimentary tract; liqueurs

57. GRASS SEED, *Gramineae*
Sources: Denmark, Canada, Australia
Pounds Imported: 3,510,782
Amount Paid: $423,170
Use: Seeding purposes

58. HEMLOCK, *Conium*
Source: Canada
Pounds Imported: 1,175,766
Amount Paid: $4,221
Uses: a. bark — tanning industry, boiler compounds, pharmaceutical preparations
b. oil - medicine

59. HENNA, *Lawsonia alba*
Sources: Egypt, Iran, British India
Pounds Imported: 386,249
Amount Paid: $16,848
Uses: Hair dye, medicine
(3 year average, 1936 - 1938)

60. HOPS, dried strobiles of *Humulus lupulus*
Sources: Belgium, Czechoslovakia, France, Germany, Hungary, Italy, Netherlands, Poland and Danzig, Yugoslavia
Pounds Imported: 4,570,547
Amount Paid: $1,671,808
Uses: Medicine (aromatic bitter); brewing beer and beer substitutes

61. JUNIPER OIL AND BERRIES, *Juniperus communis*
Sources: Austria, Italy, Yugoslavia, Czechoslovakia
Pounds Imported (Oil): 7,174
Amount Paid: (Oil) $6,853
Pounds Imported (Berries): 553,932
Amount Paid: $31,349 (2 year average, 1937 and 1938)
Uses: Gin, cordials, medicine (treatment of cystites, etc.); fumigating, source of juniper oil. Juniper oil: medicine, veterinary practice, preparation of gin and liqueurs

62. LAVENDER FLOWERS, *Lavandula spica*
Sources: France, Spain, Germany, United Kingdom
Pounds Imported: 25,042
Amount Paid: $5,340
Uses: Medicine, insectifuge, perfumery, source of oil
The following figures for 1938 only:
LAVENDER OIL, *Lavendula spica* (Spike)
Pounds Imported: 14,035
Amount Paid: $18,424
Uses: Veterinary practice, linaments
LAVENDER OIL, *Lavendula vera*
Pounds Imported: 99,389
Amount Paid: $221,036
Uses: Perfumes, soap, insectifuge, ceramics, liqueurs, lacquers, medicine

63. LEMONGRASS OIL, from *Andropogon citratus*
Sources: British India
Pounds Imported: 1,035,011
Amount Paid: $396,301
Uses: Food extracts; manufacture of perfumery (manufacture of ionone)

64. LEMON OIL, from peel of *Citrus limonum*
Source: Italy
Pounds Imported: 234,351
Amount Paid: $309,373
Uses: Flavoring agent, soft drinks, perfumery, confectionery, polishes

65. LICORICE ROOT, *Glycyrrhiza globra*
Sources: Turkey, Iraq, Russia, Greece, Syria, Italy
Pounds Imported: 66,130,602
Amount Paid: $1,419,206
Uses: Flavoring tobacco and candy, chewing gums, beer and liquor industries, stabilizer in foam of some fire extinguishers, medicine, laxatives and cough mixtures

66. LIME OIL, from *Citrus aurantifolia*
Sources: Mexico, Trinidad, British West India, Jamaica, Netherlands, United Kingdom, Canada, British Guiana
Pounds Imported: 56,928
Amount Paid: $330,625
Uses: Extracts, flavoring, perfumery, toilet soaps, cosmetics

67. LINSEED OIL, from *Linum usitatissimum*
Sources: Netherlands, United Kingdom
Pounds Imported: 3,553,213
Amount Paid: $198,918
Uses: Paints, varnishes, patent leather lacquers, linoleum, rubber substitutes, preparing carron oil

68. LOCUST OR CAROB BEANS, PODS, AND SEED, *Robinia*
Sources: Italy, Malta
Pounds Imported: 1,386,664
Amount Paid: $24,546
(5 year average)
Use: Fodder

69. MACE, the coating (arillus) of nutmeg seeds, *Myristic fragans*
Sources: United Kingdom, British West Indies, British Malaya, French Indo China
Pounds Imported: 714,614
Amount Paid: $286,768
Uses: Medicine, condiment

70. MANGROVE BARK, *Rhizophora*
Sources: British East Africa, Philippine Islands, British Malaya
Pounds Imported: 7,228,254
Amount Paid: $111,985
Use: Tanning

71. MARJORAM LEAVES, *Origanum majorana*
Sources: Canada
Pounds Imported: 79,851
Amount Paid: $9,178
Uses: Medicine, distillation of oil. Marjoram oil (Calamintha oil): medicine, perfuming soaps, toilet preparations

72. MENTHOL, Hexahydrothymol, by freezing from peppermint oil. (Peppermint plant - *Mentha piperita*)
Sources: China and Japan
Pounds Imported: 339,424
Amount Paid: $864,412
Uses: Medicine - local anesthetic, antiseptic or counter-irritant; perfumery, confectionery

73. MILLET SEED, *Panicum miliaceum*
Sources: Hungary, Turkey
Pounds Imported: 3,168,671
Amount Paid: $47,516
Use: Grain

74. MUSHROOMS, *Agaricus campestris*, common mushroom
Sources: France, Germany, Italy, Poland and Danzig, Yugoslavia, Japan
Pounds Imported: 2,030,527
Amount Paid: $668,719
Uses: Eating purposes

75. MUSTARD SEED, *Brassica juncea*
Sources: China, United Kingdom, Netherlands, Rumania, Poland, Japan
Pounds Imported: 11,609,749
Amount Paid: $561,037
Uses: Condiment, source of mustard oil used in medicine

76. NEROLI, Orange Flower Oil
Sources: France, Netherlands
Pounds Imported: 795
Amount Paid: $54,206
Uses: perfumery, flavoring
a. Bitter orange-flower oil, distilled from the fresh flowers of the bitter orange, *Citrus bigardia, Risso,* or *Citrus aurantium*
b. Sweet orange-flower oil, distilled from the fresh flowers of the sweet orange, *Citrus aurantium,* L., subspecies *Sinensis*

77. NUTGALLS OR GALLNUTS, (*Quercus*) an excrescence on trees, usually a variety of oak, caused by animals
Sources: China, Hongkong, Syria, Iran, Italy
Pounds Imported: 2,292,047
Amount Paid: $196,760
Uses: Source of gallic and gallotannic acids; tanning industry; ink manufacture; medicine; textile printing; pharmaceuticals

78. NUTMEGS, WHOLE, *Myristica fragans*
Sources: British West Indies, Netherlands, West Indies, Trinidad, and Tobago, Cuba
Pounds Imported: 4,347,926
Amount Paid: $480,338
Uses: Medicine, condiment; damaged seeds used as source of nutmeg oil

79. OKRA, *pods of Hibiscus escuplentus*
Sources: Cuba, Dominican Republic
Pounds Imported: 1,449,694
Amount Paid: $57,916
Use: Eating purposes

80. OTICICA OIL (In small seed of tree *Covepia grandiflora* of the *Rosaceae*)
Source: Brazil
Pounds Imported: 3,941,394
Amount Paid: $381,807
(3 year average, 1936 - 1938)
Uses: Ingredient of special coatings; plasticizer in antifouling coatings for bottom of ships (claims to be very effective)

81. OLIVE OIL, Edible, *Olea europaea*
Sources: Italy, Spain, France, Greece, Portugal, Tunisia, Algeria
Pounds Imported: 63,514,472
Amount Paid: $7,464,340
Uses: As food, in ointments, linaments, etc., for manufacture of "Castile" soap; special textile soaps; lubricant, wool oil; tanning

82. ORRIS OR IRIS ROOT, *Iris pallida Lam., Iridaceae*
Sources: Italy, Morocco, France, United Kingdom, Germany
Pounds Imported: 403,987
Amount Paid: $28,107
Uses: Medicine - cathartic and emetic; tooth powders, perfumery; source of orris oil used in perfumery, cosmetics, flavoring liqueurs

83. ORRIS ROOT OIL
Sources: Italy, Morocco, France, United Kingdom, Germany
Pounds Imported: 134
Amount Paid: $4,951
(9 year average)
Uses: Perfumery, cosmetics, flavoring gins and liqueurs

84. PALMAROSA OIL, Indian Grass Oil, Rusa Oil, Indian Geranium Oil, or Turkish Geranium Oil
Pounds Imported: 12,508
Amount Paid: $33,280
Use: Perfumery

85. PAPAIN, Crude (PAPAW JUICE), juice of fruit and leaves and *Carica papaya*
Sources: United Kingdom, Ceylon, Japan, Siam, New Zealand
Pounds Imported: 130,130
Amount Paid: $196,909
Uses: Medicine and food products

86. PAPRICA, *Capsicum annum*
Sources: Hungary, Spain, Czechoslovakia, Bulgaria
Pounds Imported: 5,722,717
Amount Paid: 763,649
Use: Condiment

87. PATCHOULI OIL AND LEAVES, *Pogostemon patchouly*
Sources: British Malaya
Oil -
Pounds Imported: 7,677
Amount Paid: $18,318
(8 year average)
Leaves -
Pounds Imported: 549,067
Amount Paid: $39,769
(3 year average - 1936 - 1938)
Uses: Oil used in perfumery (fixative); toilet preparations

88. PEPPER, Unground, Black, *Piper nigrum*
Sources: Netherlands India, British Malaya
Pounds Imported: 34,943,346
Amount Paid: $3,000,965
Uses: Condiment; medicine; pepper oil (medicine)

89. PERILLA OIL, *Labiatae*
Sources: Japan, Kwantung, China
Pounds Imported: 33,884,421
Amount Paid: $2,006,195
Uses: Substitute for linseed oil in printer's ink, varnish, etc.; edible oil in Japan, China, India, etc.; manufacture of cheap varnishes; artificial leathers

90. PETTIGRAIN OIL, from leaves of *Citrus aurantium*
Sources: Paraguay, France, Argentina
Pounds Imported: 74,685
Amount Paid: $62,334
Uses: Perfumery (soaps; synthetic neroli; skin creams). (Distilled from the leaves and unripe fruit of bitter orange tree, *Citrus aurantium*, var. Amara (Southern France, Tunis) and *C. Assessu* (Paraguay).

91. PIMENTO, OR ALLSPICE, *Pimenta officinalis*
Source: Jamaica
Pounds Imported: 2,199,380
Amount Paid: $205,903
Uses: Condiment; perfumery

92. PISTACHE NUTS, *Anacardiaceae*
Sources: Egypt, Italy, British Indies, Syria, Other Asia
Pounds Imported: 2,243,141
Amount Paid: $584,142
Uses: Eating and confectionery purposes

93. POPPY SEED, *Papaver somniferum*
Sources: Netherlands, Poland, Hungary, Iran, France
Pounds Imported: 6,658,571
Amount Paid: $429,528
Uses: Medicine; source of oil used as food oil, artists' colors; adulterant for olive oil; soap stock; varnishes

POPPY SEED OIL
Pounds Imported: 23,670
Amount Paid: $3,085

94. PSYLLIUM SEED, Plantago, *Plantaginaceae*
Sources: British India, France
Pounds Imported: 3,257,764
Amount Paid: $310,669
(9 year average)
Uses: Sizing silk, printing fabrics, paper manufacture, medicine, cathartic

95. POTATOES, IRISH, *Solanum tuberosum*
Certified seed -
Source: Canada
Pounds Imported: 71,722,025
Amount Paid: $1,168,177

95. POTATOES, IRISH (Continued)
Other -
Sources: Canada, Bermuda, British West Indies, Cuba, Dominican Republic, French West Indies
Pounds Imported: 58,741,975
Amount Paid: $650,324
Uses: Eating purposes

96. PYRETHRUM FLOWERS, *Compasitae*
Sources: Japan, British East Africa
Pounds Imported: 10,508,504
Amount Paid: $1,518,284
Uses: Insecticides

97. QUINCE SEED, *Cydonia vulgaris*
Sources: Persia, Syria, Palestine, Germany
Pounds Imported: 953,990
Amount Paid: $36,191 (3 year average, 1936 - 1938)
Uses: Medicine

98. RADISH SEED, *Raphanus sativum*
Sources: Netherlands, Hungary, Denmark, United Kingdom, Japan
Pounds Imported: 1,583,466
Amount Paid: $81,649
(9 year average)
Use: Seeding purposes

99. RAPESEED OIL, *Brassica campestris*
Sources: Netherlands, Japan, Argentina, Hungary, Rumania, Germany, Belgium, Poland
Denatured (Colza) -
Pounds Imported: 9,475,552
Amount Paid: $707,386
Not Denatured -
Pounds Imported: 5,306,446
Amount Paid: $573,367
(9 year average)

RAPESEED--
Pounds Imported: 13,457,715
Amount Paid: $394,407
Uses: Refined and "blown" rapeseed oil is used as a lubricant; illuminant; manufacture of rubber substitutes; heat treatment of steel. The refined cold-drawn oil is also used for edible purposes

100. ROSEMARY OIL, *Rasmarinus officinalis*
Sources: France, Spain, Tunisia, United Kingdom
Pounds Imported: 140,552
Amount Paid: $55,556
Uses: Distillation of leaves gives oil used in perfumery and as a carminative in medicine.

101. SAFFRON, Crude, stigmas of *Crocus sativus*
Sources: Spain, France, Italy
Pounds Imported: 3,657
Amount Paid: $27,247
Uses: Flavoring, coloring

102. SAGE, *Salvia officinalis*
Sources: Yugoslavia, Italy, Greece
Pounds Imported: 1,477,062
Amount Paid: $42,964
Uses: Condiment, source of oil used in medicine and perfumery

103. SAGO, Tapioca, Cassava, *Manihot esculanta,* flour and crude
Sources: Netherlands, India
Pounds Imported: 39,963,459
Amount Paid: $646,855
Uses: Foodstuffs, laundry starches, adhesives

104. SANDALWOOD, SANTALWOOD, *Santalum album* of India
Sources: British India, Asia
Pounds Imported: 1,330,200
Amount Paid: $226,855
(3 year average, 1936 - 1938)
Uses: Source of oil, medicine, perfumery

SANDALWOOD OIL
Pounds Imported: 7,608
Amount Paid: $32,531

105. SASSAFRAS OIL, *Lauraceae*
Source: Japan
Pounds Imported: 931,111
Amount Paid: $223,872
(2 year average, 1937, 1938)
Uses: Flavoring, perfumery, medicine

106. SPINACH SEED, *Spinacia oleracea*
Sources: Netherlands, Denmark
Pounds Imported: 3,084,007
Amount Paid: $462,769
Use: Seeding purposes

107. STRAMONIUM, *Datura stramonium* (Also Jamestown Weed; Jimson Weed)
Sources: Hungary, Italy, Yugoslavia, Germany, Russia
Pounds Imported: 307,729
Amount Paid: $322,695
Use: Medicine (similar to Belladonna)

108. SUGAR BEET SEED, *Beta vulgaris*
Sources: Germany, Poland
Pounds Imported: 14,108,136
Amount Paid: $1,456,045
Use: Seeding purposes

109. SUNFLOWER SEED, *Helianthus annus*
Sources: Russia, Hungary, Netherlands
Pounds Imported: 503,049
Amount Paid: $28,594
Uses: Source of oil; medicine
SUNFLOWER SEED OIL
Pounds Imported: 10,160,247
Amount Paid: $684,012
(9 year average)
Uses: Edible oil, soap, illuminant, manufacture of paper and plastics, glues; drying oil in paint and varnish industry

110. TEA, *Thea sasanqua*
Sources: Ceylon, Netherlands India, British India, Japan, British India, United Kingdom, Japan
Pounds Imported: 80,413,299
Amount Paid: $16,669,361
Uses: Beverage, source of tea-seed oil; illuminant, soap-making, edible oil, hair oil, lubricant

111. THYME LEAVES, *Thymus vulgaris*
Sources: Syria, France, Spain, Morocco, Hungary
Pounds Imported: 115,173
Amount Paid: $6,782

THYME OIL
Pounds Imported: 24,830
Amount Paid: $18,067
Uses: Leaves used in flavoring; oil used in perfumery, cosmetics, toilet soaps, flavoring, medicine

112. TOMATOES, Natural State, *Lycopersicon esculentum* and *L. pimpinellifolium*
Sources: Mexico, Cuba, Bermuda, Canada
Pounds Imported: 87,719,970
Amount Paid: $2,461,307
Uses: Eating and preserving purposes

113. GUM TRAGACANTH, Gum exudation from *Astragalus gummifer*
Sources: Iran, Turkey, U.S.S.R., France, United Kingdom, Netherlands, Indies
Pounds Imported: 1,745,882
Amount Paid: $629,028
Uses: Pharmacy for making emulsions; adhesives, leather dressing, calico printing; emulsifying agent

114. TUBA ROOT OR DERRIS, (*Degulia*) *Leguminosae, Derris elliptica*
Sources: British Malaya, Japan, Philippine Islands
Pounds Imported: 389,448
Amount Paid: $57,647
Uses: Powdered root used as insecticide, fish poison, arrow poison

115. TUNG OIL, seeds of *Aleurites cordata*
Sources: China, French Indo China, Hongkong
Pounds Imported: 117,223,014
Amount Paid: $10,999,714
Uses: Varnishes, linoleum, making varnish driers

116. TURMERIC, *Curcuma longa*
Sources: United Kingdom, Haiti, British Indies, Japan
Pounds Imported: 1,125,399
Amount Paid: $35,726
Uses: Coloring foods (yellow); condiment (curry powder); textile dyeing; indicator in analytic chemistry

117. TURNIPS AND RUTABAGAS, *Brassica rapa* and *Brassica napobrassica*
Source: Canada
Pounds Imported: 97,876,703
Amount Paid: $718,713
Uses: Eating and planting purposes

118. VALONIA, Acorn cups of an oak *Quercus aegilops*
Source: Turkey
Pounds Imported: 15,844,183
Amount Paid: $239,582
Uses: Tanning industry (contain 65 per cent tannin)

119. VANILLA BEANS, cured, full-grown but immatured fruit of *Vanilla planifolia*
Sources: France, Mexico, Jamaica
Pounds Imported: 1,137,330
Amount Paid: $1,661,549
Uses: Confectionery, flavoring, perfumery, pharmaceuticals

120. VETCH SEED (Hairy Vetch), *Vicia sativa*
Sources: Hungary, Czechoslovakia, Lithuania
Pounds Imported: 2,932,098
Amount Paid: $127,481
Use: Seeding purposes

121. VETIVERT OIL, *Andropogon muricatus* (root)
Sources: France, Netherlands India, French Africa, Netherlands
Pounds Imported: 6,371
Amount Paid: $27,517
Use: Perfumery as Cuscus Oil
Total Number of Pounds Imported - 1,604,130,354
Total Amount Paid - $100,951,762

IMPORTS BY OUNCES

122. QUININE SULPHATE, QUININE ALKALOID, and other salts derived from Cinchona Bark (*Cascarilla hexandra*)
Sources: Germany, Netherlands, Switzerland, United Kingdom
Ounces Imported: 2,030,827
Amount Paid: $875,662
Use: Medicinal purposes

123. OTTO OF ROSES, *Rosa damascena* (Distillate derived from fresh flowers)
Sources: France, Bulgaria, Italy, Switzerland, Turkey
Ounces Imported: 29,884
Amount Paid: $231,883
Uses: Perfumes, flavoring

IMPORTS BY BUSHELS

124. FLAXSEED, *Linum usitatissimum* (LINSEED)
Sources: Argentina, Uruguay, Canada
Bushels Imported: 16,311,465
Amount Paid: $20,156,210
Uses: Source of linseed oil and cake; medicine, as a demulcent and emollient. Linseed oil is used for paints, varnishes, patent leather, lacquers, linoleum, rubber substitute, preparing carron oil.

IMPORTS BY TONS

125. JUTE, *Corchorus tiliaceae and* JUTE BUTTS
Sources: British India, China, Netherlands India
Tons Imported: 50,703
Amount Paid: $4,643,283
Uses: Grown for fiber which is used for sacking, burlap, and the cheaper varieties of twine, also made into wrapping paper

JUTE BUTTS
Tons Imported: 14,682
Amount Paid: $892,299
Uses: Made up in cotton bagging, etc.

IMPORTS BY NUMBERS

126. BRIER, IVY, AND LAUREL ROOT, cut into blocks
Sources: Algeria, Spain, Italy, Greece, France, Albania
Number Imported: 27,867,763 (4 year average, 1935 - 1938)
Amount Paid: $413,573
Uses: Brier pipes; ivy and laurel for medicinal purposes

127. COCONUTS in the shell, *Cocos nuciferae*
Sources: Trinidad and Tobago, British Honduras, Guatemala, Nicaragua, Panama Canal Zone, Republic of Panama, Mexico, Jamaica
Number Imported: 45,308,150
Amount Paid: $952,715
Uses: Food and confectionery purposes

128. HYACINTH BULBS, *Hyacinthus*
Sources: Netherlands, France
Number Imported: 16,839,359
Amount Paid: $766,879

129. LILY-OF-THE-VALLEY, *Convallaria*
Source: Germany
Number Imported: 11,037,117
Amount Paid: $199,326

130. NARCISSUS BULBS, *Amaryllidaceae*
Sources: Netherlands, United Kingdom
Number Imported: 1,637,718
Amount Paid: $47,686

131. TULIP BULBS, *Tulipa gesneriana*
Source: Netherlands
Number Imported: 88,958,478
Amount Paid: $1,356,378

TOTAL AMOUNT SPENT PER YEAR (AVERAGE) 1929 - 1938
$131,487,656

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