

Salem Is Already the Crude Drug Market Center of Oregon, and There Should Be a Drug Garden on Every Farm in This Section of the State

AT ONE-TENTH THE EXPENSE AND WITH TWICE THE YIELD

That Is the Remarkable Statement of the Dean of the School of Pharmacy of Oregon Agricultural College, Comparing Oregon With Michigan and Minnesota

Editor Statesman: Your letter under date of March 25, sent to Mrs. Margaret F. Cook, extension secretary, has been referred to me. I was pleased to note in your letter that you appreciate the advantages of cultivating drugs in Oregon. During the past six years, I have recommended annually that O. A. C. establish a drug garden. Having had considerable experience in eastern states with drug cultivation, I am in position to state that drugs can be grown at one-tenth the expense and with twice the yield that they can be in Michigan and Minnesota. The reason why we have been unable to maintain a drug garden has been on account of the lack of funds. If the higher education tax act

passes on May 21st, I am almost certain that we will start a drug garden in a year from this spring. I have hesitated to recommend the cultivation of drugs in Oregon because I have no records to prove that they can be successfully grown. I do know, however, that the conditions are such that there should be no difficulty in getting a good yield. I am familiar with all bulletins on the cultivation of drugs which have been published in the United States during the past 10 years. I would be more than pleased to take up this matter with you at any time and as soon as a drug garden has been established, I will advise you regarding our progress. Very truly yours, A. ZIEFLE, Dean, School of Pharmacy, Corvallis, Ore., April 2, 1920.

(The above remarkable encouraging letter from Professor Ziefle, dean of the School of Pharmacy, O. A. C., was largely the inspiration that encouraged the Salem statesman, editor of The Statesman, to take up the subject of a drug garden at the present time. Professor Ziefle was away from home last week, so his kindly proffered help was not available for this issue. But the subject will be taken up again, at least within a year—and, in the intervening time, no doubt there will be a great deal of development in this line. There will be many Oregon drug gardens, especially in the Salem district.—Ed.)

THE DRUG PLANTS UNDER CULTIVATION AS GIVEN OUT BY OUR UNCLE SAMUEL

The List Is a Long One, and a Careful Study of the Whole Range of Possibilities Is Worthy of the Attention of Every Forward Looking Farmer in the Salem District

(The following are excerpts from Farmers' Bulletin 662 of the United States Department of Agriculture. The date of this Bulletin is June 5, 1917. There have been great changes in prices since that time; in many cases they are a great deal higher; in some cases several hundred per cent higher. There is space only sufficient to merely touch upon the data given—to merely suggest to the farmers in the Salem district some of the possibilities of reaping profits from drug gardens here. The Statesman expects to revert to this subject many times in the future, and every forward looking farmer in this district owes it to himself and his children and children's children to keep up with the matter that is available or will become available in this promising field.)

Introduction. Interest in the possibility of deriving profit from the growing of drug plants is increasing yearly. The clearing of forests; the extension of the area of land under tillage; and the activities of drug collectors threaten the extermination of a number of valuable native drug plants. Annually large sums of money are expended for crude drugs imported from countries where they are grown under conditions of soil and climate resembling those of many localities in the United States. As a means of guaranteeing the future supply of crude drugs and of lessening the dependence on importations, attention is now being turned to the cultivation of drug plants with a view to increasing domestic production.

The problems presented by the cultivation of drug plants are not less difficult than those encountered in the production of many other crops. Drug plants are subject to the same diseases and risks as other crops and are similarly affected by variations in soil and climatic conditions. They require a considerable outlay of labor, the same as other crops, and likewise require intelligent care and handling. They are subject to the same laws of supply and demand, and like other products, must conform to the consumer's fancy and to definite trade requirements.

A number of common medicinal plants have long been cultivated in gardens in this country, either as ornamentals or as a source of herbs for use in cookery and as domestic remedies. A few of these plants, such as goldenseal, wormwood, wormseed, and peppermint, have been grown commercially for sale as crude drugs; but the acreage devoted to their production has been relatively small and for the most part restricted to certain localities. Other drug plants which occur as common weeds in many places may prove to respond to cultivation; experiments should then be undertaken to determine whether it is profitable to grow them. In this connection it should be remembered that the soil type very often is an important limiting factor in propagating different kinds of plants. Some plants grow best in well-drained loam, some prefer a marsh, some require soils rich in lime, while others thrive only in acid soil. The soil requirements of all plants are not understood; in fact, it is not improbable that better conditions of soil, climatic and cultural conditions adapted to the different kinds of plants will enable the successful propagation of species now regarded as unsuited to cultivation. In undertaking the growing of medicinal plants, therefore, it is essential to know that the species selected for cultivation will do well under the conditions of soil and climate existing where the planting is to be made. When necessary, this should be determined on small experimental plots before undertaking commercial plantings.

Assuming that the soil and climate of the situation selected are suitable for the growing of drug plants, it does not necessarily follow that they can be produced at a profit. The cost of production and marketing may be greater than the amount received for the crop when it is sold. Some drug plants not well suited for cultivation on a large scale may be found profitable when grown on small areas as a side line. On the other hand, some may be produced more cheaply when cultivated on a scale large enough to warrant the use

of labor-saving devices than when grown on small areas with the aid of hand labor alone. The value of land, the cost and availability of labor, and the possible returns from other crops are all factors to be considered carefully. On account of the variation in these factors according to locality, the same crop might prove to be profitable in one location and unprofitable in another. It is for these reasons that unqualified statements concerning the ease and profitability of drug-plant growing should not be taken too seriously. Some Drug Plants Suitable for Cultivation in the United States.

The number of drug plants which may be grown in the United States is large, although the same plants are not equally adapted to the conditions of soil and climate prevailing in different sections. Often the most suitable plants for a particular locality can not be foretold, especially in those situations where no attempts have been made to grow them. In such cases it is well to select for cultivation plants which thrive elsewhere under conditions most closely resembling those of the new situation in which it is proposed to grow them. The success with which ordinary field or garden crops can be grown will in general indicate the possible suitability of a given location for growing many medicinal plants. Since a number of native medicinal plants which in their wild state are restricted to certain localities have been successfully cultivated in situations far beyond their natural range, there are good reasons for believing that many such plants will thrive in sections where they are not now grown. However, good results can scarcely be expected unless the plants are placed under conditions similar to those in which they normally thrive.

In suitable soil and under favorable weather conditions the following drug plants have been found to thrive under cultivation in numerous places in the central and eastern states and will probably be found suitable for cultivation in many other situations if the difference in climatic conditions is not too great: Anise, belladonna, burdock, camomile, caraway, catnip, comfrey, coriander, digitalis, dill, echinacea, elecampane, fennel, horehound, pennyroyal, sage, stramonium, tansy, thyme.

Some plants, such as belladonna and digitalis, are only partly hardy and would be subject to winterkilling in the colder sections. Such plants as aconite, arnica, lovage, poppy, seneca, valerian and wormwood seem to thrive best in the northern half of the United States in situations where the rainfall is well distributed throughout the growing season. On the other hand, cannabis, licorice and wormseed are better suited to the warmer climate of the southern half of the United States. Aletria, althea, angelica, calamus, orris, pinkroot, peppermint, serpentaria and spearmint are adapted generally for situations in which the soil is rich and moist, but licorice and larkspur are partial to well-drained sandy soil. Ginseng and goldenseal occur naturally on rich soil in the partial shade of forest trees and can be cultivated successfully only when planted in woodlands or in specially prepared soil under artificial shade.

General Cultural Suggestions. The special details of cultivation for each of the medicinal plants mentioned are given under the discussion of the individual species. Applications which are of general application, however, are here brought together, in order to avoid unnecessary duplication. Propagation.—A number of the species considered later can be grown easily from seed, but others are best propagated from cuttings or by division. Many well known medicinal plants are much more difficult to propagate from seeds than the species commonly grown in gardens. Likewise, some of the species now grown abroad and suitable for cultivation in this country are not easily propagated and require special conditions if good results are to be realized. Some of the better known varieties of medicinal plants are regularly listed in the catalogues of numerous seed houses, and those which are less common can usually be obtained from dealers who make a specialty of one or more of these species. Plants can frequently be obtained from nurseries or from dealers in hardy ornamentals. The catalogues of a number of dealers should be consulted, and the varieties for propagation carefully selected. In ordering, the medicinal variety should always be called for, since many of the related ornamental forms which are listed are of doubtful, if any, medicinal value.

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prime importance, whether the sowing of the seed is made in the open or under cover. Many seeds, especially those which are very small, do not germinate well in heavy soils or in those which are cloddy and coarse in texture. A seed bed prepared by thoroughly mixing equal parts of garden soil, leaf mold, well-rotted manure and clean sand will be suitable for the germination of most seeds.

The yield that can be obtained from drug plants in different localities will naturally vary according to the suitability of the situation for the plants selected for cultivation. Even in the same locality wide variations in yield will result from differences in the lay of the land and in soil, drainage and seasonal conditions. The skill of the grower and the degree of care and attention that he bestows upon his crop are also factors affecting the yield. Aconite.—Reliable data on yield are not available, although some estimates place the yield at about 450 pounds of dry root per acre. The American market is supplied with imported aconite root, for which the wholesale price normally ranges from about 9 to 15 cents a pound. The quantity imported in 1913 was about 13,000 pounds. The demand for this drug is limited.

Altria.—Star grass, or true unicorn root. There are no available data on the probable yield. The prices usually range from 12 to 25 cents a pound. Angelica.—The root of the European garden angelica found in our drug markets is imported largely from Germany. During the past few years the wholesale price has averaged about 20 cents a pound. The root of a native species of angelica (Angelica atropurpurea), commonly called American angelica, also occurs in the drug markets of this country. It is collected from wild plants and usually brings from 6 to 10 cents a pound.

Anise.—Yields of anise seed are quite variable, since the plant is very sensitive to unfavorable weather conditions. In a good season from 400 to 600 pounds per acre may be reasonably expected. The price usually ranges from 5 to 8 cents a pound. On the average about 500 tons are annually imported into this country.

Arnica.—Is a herbaceous perennial plant of the aster family, native in northern and central Europe, where it thrives in the cool climate of the mountain meadows and upland moors. The flowers, leaves and the roots are employed in medicine. It is a hardy plant, which in marshy soil, abundant rainfall and a cool climate for its best development.

Belladonna.—On experimental areas near Washington, D. C., under rather unfavorable soil conditions, yields at the rate of 300 to 400 pounds of dried leaves per acre were obtained. When both leaves and tops are included these figures should be somewhat increased. The dried root harvested at the end of the second year averaged 1100 pounds per acre. For some years past the range of prices, as quoted in the wholesale drug markets, has been from 14 to 25 cents a pound for the leaves and from 9 to 15 cents for the root. Prices to growers have, of course, been proportionately less.

Blue Flag.—Yields at the rate of 3 or 4 tons of dried root per acre have been obtained from small plots. The price paid to collectors varies from year to year, usually ranging from 10 to 15 cents a pound. The crop does not appear to be very promising, owing to the relatively small demand for the root.

Boneset.—Yields of well cultivated boneset are quite large and 2000 pounds or more per acre of dry herb may be obtained under favorable conditions. The price for boneset is highly variable, but returns are usually in excess of 2 or 3 cents a pound. Since the demand is limited and the wild supply fairly available, the cultivation of boneset does not offer much prospect of profit.

THE LIST OF DRUG PLANTS IS A VERY LENGTHY ONE

The Roots, Weeds, Flowers, Fruits, Seeds and Barks Listed by the United States Department of Agriculture in Bulletins

(The United States Department of Agriculture publishes a number of Bulletins on drug plants in this country. Notable among them are No. 107 on American Root Drugs; No. 118 on Woods Used in Medicines; No. 238 on American Medicinal Flowers, Fruits and Seeds; and No. 329 on American Medicinal Barks. Space will permit only the naming of the things thus listed—but it is full of interest to the people of this section, suggesting many items that may prove profitable to follow up. Following are the lists.)

Burdock.—Burdock, dandelion, dock (yellow), dock (broad leaved), dock (yellow-rooted water), couch grass, pokeweed, foxglove, mullein, lobelia, tan-y-gum plant, scaly grindelia, catnip, horehound, blessed thistle, yarrow, Canada thistle, Jimson weed, purple thorn apple, American wormseed, black mustard, white mustard. **Flowers.**—Fennel, wormseed, pokeweed, black mustard, white mustard, raspberries, prickly ash, smooth snail, American hinds, poison hemlock, Jimson weed, mullein, elder.

Barks.—White pine, lamarck, aspen, white willow, yellow birch, butternut, iron wood, sweet ash, tag-alder, white birch, slippery elm, sassafras, tulip, poplar, black oak, white oak, witch hazel, blackberry, American mountain ash, wild cherry, prickly ash, water ash, black ash, white ash, false hickory, hickory, chestnut, castor, sassafras, cottonwood, hickory, dogwood, moonwood, white ash, fringe tree, hickory, burdock, camp bark tree, black haw.

approximately 80 cents a pound, are imported each year. Cascara Sagrada.—Cascara, or cascara sagrada (Rhamnus purshiana), is a small tree 20 to 30 feet high, native to the western part of the United States, and found most abundantly in a narrow belt along the Pacific slope from northern California to southern British Columbia. The bark from the trunk and branches is the source of the drug, for which there is a constant and steady demand.

Plantings which have been made in the eastern states indicate that this tree may probably be grown along the Atlantic slope in the Piedmont or foothill belt from Pennsylvania to Georgia. The trees have been found to grow better in clay loam than in either sand or clay. Propagation from seeds is possible, but the seeds should be planted in the fall soon after they ripen or stratified in sand until used, since germination is very poor. If the seeds are allowed to become dry, the seeds are drilled in a seed bed under shade in rows 8 inches apart and covered about 1 inch deep. The seedlings reach a height of 10 to 15 inches the first year, and in the following spring before the leaves appear they are set in the field 6 feet apart each way. It is advisable to cultivate frequently, in order to keep the weeds down and to maintain a shallow surface mulch.

If the trees are pruned properly, a crop of bark may be harvested each year without killing the whole tree, as is done in collecting the bark from wild trees. At the time of transplanting, the trees are cut back to a straight stem about a foot high, from which all except the four uppermost buds are removed. The branches which afterward develop from these buds are later covered with their lower side shoots, thus causing the tree to grow a head of four long, stout branches instead of a single straight trunk. When the trees are large enough to yield a crop of bark, the longest of the four branches is cut off early in the spring (back with the trunk and a new branch is allowed to grow in its place. This process may be repeated yearly, removing only the largest branches of each tree in any one season.

The bark on the cut off branches is divided with a sharp knife into lengthwise strips of about an inch or two in width, which may be readily pulled off. It is then dried carefully at a low temperature in the shade and broken into small pieces to facilitate packing and handling. Catnip.—Returns from experimental areas indicate that a yield of about 2000 pounds of dried flowering tops per acre may be expected under good conditions. The herb must be carefully sorted and all the large or coarse stems removed, after which it may be made up for the market in bales of 100 to 300 pounds each. The prices offered by dealers usually range from 2 to 4 cents a pound.

Comium.—Estimated yields at the rate of 600 to 800 pounds of seed per acre have been obtained, but the yield is very uncertain, since the flowering plants are especially subject to the attacks of insects which destroy the crop of seed. For several years past the range of prices as quoted in the wholesale drug markets has been from 5 to 10 cents a pound for the seed and 5 to 6 cents for the leaves.

Coriander.—The yield of seed is quite variable, but returns from experimental areas indicate that from 500 to 800 pounds per acre may be expected. Five hundred pounds of seed will usually yield from 1 to 5 pounds of oil, according to the localities where grown. The annual importation of coriander seed is about 1,300,000 pounds, valued at approximately 3 cents a pound. The wholesale price of the oil of coriander usually ranges from \$5 to \$7 a pound. Dandelion.—Under favorable conditions, yields at the rate of 1000 to 1500 pounds of dry roots per acre have been obtained from second-year plants. The prices usually offered for the dry roots range from 4 to 10 cents a pound. Digitalis.—Digitalis or foxglove (Digitalis purpurea), is a fairly hardy European perennial, which has long been grown in flower gardens in

root, Culver's root, dandelion, queen-of-the-meadow, elecampane, echinacea, burdock. **Weeds.**—Burdock, dandelion, dock (yellow), dock (broad leaved), dock (yellow-rooted water), couch grass, pokeweed, foxglove, mullein, lobelia, tan-y-gum plant, scaly grindelia, catnip, horehound, blessed thistle, yarrow, Canada thistle, Jimson weed, purple thorn apple, American wormseed, black mustard, white mustard. **Flowers.**—Fennel, wormseed, pokeweed, black mustard, white mustard, raspberries, prickly ash, smooth snail, American hinds, poison hemlock, Jimson weed, mullein, elder.

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this country as an ornamental plant. The leaves are used in medicine. Those from plants of the second year's growth being required for the official drug. The results of experiments indicate that yields of 450 to 600 pounds of dry leaves per acre may be obtained under favorable conditions. During the past few years the wholesale price for the leaves has ranged from 8 to 10 cents a pound, averaging about 15 cents a pound.

Dill.—The yield of dill seed is quite variable and is much influenced by climatic conditions. From 500 to 700 pounds of seed per acre is considered a good yield. The price normally ranges from about 6 to 8 cents a pound. Elecampane.—The roots are dug in the fall of the second year, thoroughly cleaned, sliced and dried in the shade. The valuable part of the yield indicate that a ton or more of dry root per acre may be expected. The price to producers usually ranges from 9 to 6 cents a pound.

Fennel.—A yield of 600 to 800 pounds of seed per acre may be expected. During the past 10 years an average of approximately 100,000 pounds of seed and 15,000 pounds of the oil have been imported annually. The wholesale price of fennel seed usually ranges from 5 to 8 cents a pound, and that of the oil from \$1.10 to \$1.50 a pound.

Ginseng.—The price of cultivated ginseng root, as quoted in wholesale drug lists, has ranged during the past few years from \$5 to \$7.50 per pound. A detailed account of ginseng culture is given in Farmers' Bulletin 551, entitled "The Cultivation of American Ginseng."

Goldenseal.—The market is found with crude-drug dealers and manufacturing druggists in many large cities. During the past few years market quotations have ranged from \$1.50 to \$2.50 per pound, but prices to producers are usually much lower than the wholesale price. Horehound.—Yields at the rate of 2000 pounds of dry herb per acre have been obtained. The wholesale price for the herb has averaged during the past few years from 5 to 8 cents per pound.

Insect Flowers.—The average yield of dried flowers appears to be about 450 pounds per acre. In the trade distinction is made between "closed" flowers and those which are "open" or "full blown." The wholesale prices for the imported flowers usually range from 18 to 22 cents a pound for open flowers and 20 to 24 cents for closed flowers. Larkspur.—The wholesale price quoted in 1914 for larkspur seed was between 25 and 30 cents a pound.

Lavender.—On ordinary soil yields of 600 to 1000 pounds per acre of fresh flowering tops have been obtained. The dry weight is about four fifths of the green weight. The yield of oil varies widely, but from 12 to 15 pounds per acre may be expected under good conditions. During the past few years the wholesale prices have averaged as follows: For ordinary flowers, from 5 to 12 cents a pound; for "select" flowers, from 1 to 20 cents a pound. Oil of lavender flowers has ranged in price from \$1.50 to \$4 a pound, the latter figure being considerably above the average. Lobelia.—Small areas have given yields at the rate of 1000 pounds of dry herb per acre. The price usually paid for the dried leaves and tops is about 3 cents a pound.

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DATES OF SLOGANS IN DAILY STATESMAN
(In Twice-a-Week Statesman Following Day)
Leganberries, Oct. 9.
Fruites, Oct. 16.
Dairying October 23.
Flax, October 30.
Filberts, Nov. 6.
Walnuts, Nov. 13.
Strawberries, Nov. 20.
Apples, November 27.
Raspberries, December 4.
Nuts, December 11.
Great Cows, December 18.
Blackberries, December 25.
Cherries, January 1, 1920.
Pears, January 8, 1920.
Gonberries, January 15, 1920.
Carrots, January 22, 1920.
Celery, January 29, 1920.
Spinach, February 5, 1920.
Onions, February 12, 1920.
Potatoes, February 19, 1920.
Bees, February 26, 1920.
Mining, March 4, 1920.
Goats, March 11, 1920.
Beans, March 18, 1920.
Paved highways, March 25, 1920.
Broccoli, April 1, 1920.
Siles, April 8, 1920.
Legumes, April 15, 1920.
Asparagus, April 22, 1920.
Grapes, April 29, 1920.
Drug Garden, May 6, 1920.
Sugar beets, May 13, 1920.
Paper Mill, May 20, 1920.
Lard, May 27, 1920.
National Advertising, June 3, 1920.
Sheep, June 10, 1920.
Dehydration, June 17, 1920.
Hops, June 24, 1920.
Poultry, July 1, 1920.
Late Cabbage, July 8, 1920.
Hogs, July 15, 1920.
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(Continued on page 4.)