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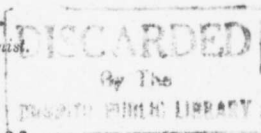
# MEDICINAL PLANTS

AND THEIR

## CULTIVATION IN CANADA

BY

J. ADAMS, M.A.  
*Assistant Dominion Botanist.*



BULLETIN No. 23

Second Series

The Second Series of the Bulletins of the Experimental Farms treat of such subjects as are of interest to a limited class of readers, and are mailed only to those to whom the information is likely to be useful.

Published by authority of  
Hon. Martin Burrell, Minister of Agriculture, Ottawa, Ont.

OTTAWA  
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1915

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# MEDICINAL PLANTS

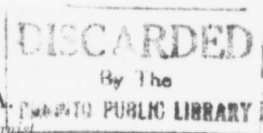
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OTTAWA, March 3, 1915.

The Honourable  
The Minister of Agriculture,  
Ottawa.

SIR,—I have the honour to transmit herewith, for your approval, Bulletin No. 23 of the second series, entitled "Medicinal Plants and their Cultivation in Canada," which has been prepared by Mr. J. Adams, M.A., Assistant Dominion Botanist.

The issuing of a publication dealing, as does this bulletin, with the medicinal properties of certain plants, and discussing the possibility of growing these plants in certain parts of Canada, is, I believe, advisable. Such information as is contained in this publication should, it seems to me, be of value to many of our farmers, both at the present time and in the near future.

I have the honour to be, sir,  
Your obedient servant,

J. H. GRISDALE,  
*Director, Dominion Experimental Farms.*

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OTTAWA, February 25, 1915.

J. H. GRISDALE, Esq., B. Agr.  
Director, Experimental Farms,  
Ottawa, Ont.

Sir,—I have the honour to transmit herewith a manuscript entitled "Medicinal Plants and their Cultivation in Canada," prepared, at my request, by the Assistant Dominion Botanist, Mr. John Adams, M.A.

The paper owes its preparation to the numerous inquiries received from time to time relating to the cultivation of plants possessed of certain medicinal or health-restoring properties. The interest manifested in these plants must have been largely due to the more or less exaggerated accounts of enormous profits that could be made from their cultivation.

Medicinal plants have from time immemorial occupied a rather mysterious position in the life of superstitious man; even now-a-days the inclination towards the "natural" drug, as opposed to the "synthetic" drug, is still prominent.

Mr. Adams, formerly lecturer on Botany and Vegetable Materia Medica at Dublin, Ireland, has carefully dealt with the practical side of the question, and, with the aid of his illustrations, descriptions, and explanatory text, all persons interested will find his account very instructive.

In respectfully recommending the publication of this manuscript as Bulletin No. 23 of the special series, I emphasize the necessity of exercising great care before rushing into an occupation which, alas, may be more laborious than profitable.

I have the honour to be, sir,  
Your obedient servant,

H. T. GÜSSOW,  
*Dominion Botanist.*



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## MEDICINAL PLANTS AND THEIR CULTIVATION IN CANADA.

## CHAPTER I.

## Introduction.

Formerly certain drug-plants growing wild in Canada and the United States were collected in sufficient quantity to supply the demand for them without any care being taken to perpetuate the species by seeds or otherwise. The inevitable result was that eventually they became so scarce that great difficulty was experienced in obtaining them. This was true of such species as Seneca Snake-root, Golden Seal, and Ginseng. In some localities the wild plant was almost exterminated, and it became evident that, in order to meet the future demand, certain drug-plants must be cultivated or cared for like any other field crop.

Before attempting the culture of drug-plants there are some preliminary considerations that should be carefully attended to by all who wish to make their cultivation a success. Assuming that both soil and climate are suitable, the question of cost of production has to be borne in mind. As the total quantity used in commerce of many drug-plants is comparatively small, it is evident that the area devoted to their growth on a single farm will also be small, and hand labour will have to be largely used.

"In many of the processes connected with drug-plant culture, much hand work is unavoidable. In picking leaves, seeds, and fruits, in digging certain types of roots and preparing them for market, and in grading and sorting the products, hand work is necessary" (R. H. True, 1903). The process of drying must be very carefully attended to, requiring much hand labour, and raising the cost. In reckoning up the cost of production, the expenses of packing and freight to the nearest market must also be considered.

The total amount consumed in commerce of some drug-plants being comparatively small, it may easily happen that if more than this amount is produced by the growers or collectors, the price may fall so low that there is no margin for profit left. Indeed it might happen that a farmer would have a consignment left on his hands without getting a single offer for it if the buyers were already fully stocked, and few drug-plants can be held over without a marked deterioration until the following year. On the other hand, if a farmer produces a few acres of oats, or potatoes, or peaches, he can generally find a market for them even if the price should not be all that he could wish, or, failing a market, he can feed his produce to live stock or otherwise dispose of it. But a few tons of drug-plants for which there is no demand can only be thrown on the manure heap.

It has been ascertained from the returns of exports and imports supplied by the Customs authorities, and from inquiries addressed to the leading drug merchants throughout the Dominion, that certain drugs are handled in considerable quantities. These are described in Chapter VI.

The price of each drug, as quoted in the present bulletin, has been ascertained partly from inquiries addressed to the leading drug merchants and partly from the price lists issued from time to time by certain firms. It is the price at which the drugs are sold to the smaller firms, and does not represent the price obtainable by a farmer when offering drug-plants for sale. Obviously the prices paid by the large dealers to a farmer would be much less than the figures quoted. For various reasons the prices are higher at present than ordinarily prevail, and they are quoted only to give a rough idea of the relative importance of various drug-plants, and to serve as a guide to intending growers. As the cost of labour is much lower in some European countries than in Canada, it is

extremely doubtful whether certain drugs can be grown here at a profit. And it must be borne in mind that many drug-plants will only begin to give a return two or three, or, in the case of shrubs, several years after planting. In the case of a highly priced drug, if a large number of farmers devote a considerable area to its culture, over-production will result and the price will fall, and disappointment will be inevitable.

Unless a farmer can convince himself that he can realize larger profits per acre from the growth of drug-plants than from the usual farm products, he would be wiser not to attempt it unless as a sort of subsidiary means of supplementing his income. In any case, he can run no great risk by devoting a small plot of about an acre to drug-culture as an experiment for a few years, and he should grow about ten different sorts of those best suited to his locality. In that case, over-production and depreciation in price in any one line will not affect him to the same extent.

In this connection, the following remarks from a recent paper by Dr. Stockberger, of the Bureau of Plant Industry at Washington, are most apt:—"The wide-spread interest in the possibility of growing medicinal plants for profit which has been developed in this country during the past decade has been capitalized by a number of crafty promoters, who use the mails and the columns of journals and magazines to disseminate flamboyant advertisements of the enormous profits which may be made by growing certain medicinal plants. Frequently the name of the plant is withheld until the victim has remitted from one to five dollars, for which he receives practically valueless instructions for the cultivation of some plant poorly adapted to our economic conditions. . . . I also have abundant evidence that hundreds of persons have received the impression that drug-crops can be grown by anybody anywhere at a profit far in excess of that to be obtained from ordinary cultivated crops. I am convinced that in some cases optimism and enthusiasm have been allowed to outrun common sense, but if, in the future, due consideration is given to the fundamental principles of agricultural economics, I believe that a rational attitude toward commercial drug-plant cultivation may be developed."

## CHAPTER II.

### Soil, Climate, and Cultivation.

Ordinarily a soil that is adapted for farm or garden crops may be expected to give similar results when drug-plants are grown on it, but there are exceptions. Plants such as Ginseng, that naturally grow in leaf-mould under the shade of forest trees, cannot be grown successfully if exposed to full sunlight, nor will Peppermint be a success if grown in a dry, sandy soil that might be suitable for some other crop.

With regard to climate, the plants mentioned in Chapters VI and VII are either native in some part of Canada or have been introduced in some way and have spread by natural means and are consequently known to be hardy. Those mentioned in Chapter VIII may be expected to succeed in Canada from a knowledge of their climatic requirements in other countries, but the question can only be settled by experimental culture. In the United States there are several farms where drug-plants are being grown experimentally, such as Arlington, in Virginia, and there are others in several different states, but no continuous experimental work on methods of cultivation, yield, drying, etc., seems to have been attempted in Canada. Some species have been proved to be hardy at the Central Experimental Farm, Ottawa, and elsewhere, and the culture of certain garden sweet herbs has been tried at Brandon, in Manitoba, with varying success.

In the case of certain annual plants, such as Anise, it is probable that they could be grown even in localities where the winter is very severe, provided that they can ripen their seeds before the first autumn frost. The plants just mentioned belong to the same family as the parsley and carrot, and the germination of their seeds is slow. Early sowing in such cases would, therefore, be necessary, and possibly still better results would be obtained by sowing the seed in late autumn before the ground freezes.

As regards Ginseng and other plants of the forest, the best results can only be obtained by growing the plants in partial shade. This is accomplished by making artificial screens out of laths fastened horizontally to vertical supports and leaving a space between each two laths. Probably it would be much cheaper to clear a space in the forest of all other herbaceous plants and grow the Ginseng there under natural conditions. Or it might be possible to grow it in rows under the trees in an old orchard.

In growing any of the plants mentioned in this Bulletin, the best method is to place the plant in soil and conditions resembling as closely as possible those in which it grows in a wild state. Only by so doing will the best results be obtained. As far as is known, the natural habitat of each species is indicated. The seeds of perennial herbs should be sown thinly on a specially prepared seed-bed in autumn. The young plants can be afterwards set in the ground provided for them, the work of transplanting being carried out as far as possible in rainy weather.

In the case of a considerable number of the drug-plants mentioned it will be very difficult to obtain seeds or roots for propagation, as the regular seedsmen and nurserymen do not stock them. Especially will this apply to European species. Probably the local seedsmen or nurserymen will be able to supply most of the common garden or pot herbs.

With regard to the shrubs and trees which are used medicinally, it is extremely probable that, with the exception of Sacred Bark, these occur at present in sufficient quantity in the wild state to satisfy the demand. Considering the number of years that would elapse before they yielded any return, it is very unlikely that their cultivation on land suited for farm crops would be worth the trouble. However, where a farmer has a few acres of rough or stony land it might be advisable to plant it with the following species:—Balsam fir, hemlock, sweet birch, butternut, slippery elm, witch hazel, wild black cherry, sheepberry. In this case the trees would need very little attention after the first few years, and in addition to their uses as drugs they would probably pay for their room eventually in the value of timber produced.

As some drug-plants are very poisonous, great care should be taken to prevent children and live stock from eating them.

## CHAPTER III.

### Collection and Drying.

The prospective grower of drug-plants must be very careful in finding out whether he has the right species of plant to start with. In the case of seeds or roots obtained from a seedsman or nurseryman, the species can generally be depended on as true to name. But where a grower obtains his first stock of plants by digging up wild species, he should compare the plant carefully with the descriptions and illustrations given in the present bulletin and, if at all uncertain, he should send specimens (including leaves, flowers, and fruits, and, in the case of herbs, roots also) to the Dominion Botanist, Ottawa, in order to make sure of the correct names.

Having got the proper species of plant, the next matter claiming attention is to find out what part of the plant is used in medicine. In some cases the root only is used; in others the leaves, or bark, or fruit, or care should be taken to exclude any other part of the plant other than that prescribed, as such accidental admixtures will undoubtedly lower the selling price.

In the case of roots or underground parts of plants, the soil should first be loosened with a fork, and the root should be dug up carefully, so as not to injure it or break it, thereby leaving part of it in the ground. They must then be gently but carefully washed and should be dried as quickly as possible at a moderate temperature.

The time of collection of drug-plants is most important, as the composition of the plant and the exact amount of the active principle present vary at different periods of the year. Directions are given in each case as to the proper time of collection, but the following general statements may be made here:—

Roots of annual plants should be dug just before the flowering period; those of biennial plants in the autumn of the first year, and those of perennial plants in the autumn of the second or later years of their growth. In some cases the collection may be made very early in spring before growth begins.

Underground stems or rhizomes should be collected at the same time of the year as perennial roots.

Barks should be collected in spring, when the sap begins to flow, but the process may be carried out at any time during the winter. It will be more difficult, however, to detach the bark at that time of year. As that part of the tree or branch above the region where the bark is peeled off will die, it would be simpler to cut down the whole tree or saw off a limb, and the process of stripping the bark could be done under cover. In some cases the bark will come off more easily if previously pounded with a mallet. In some trees, such as slippery elm and wild black cherry, the outer bark must first be shaved off, or "rossed," only the inner bark being official. In sassafras, it is the bark of the root only which is used.

Leaves should, as a rule, be collected when the plant is in flower, and only the healthy green leaves should be chosen.

Where the whole green plant or herb is used, the older thick stems should be rejected and only the younger branches, flowers, and leaves taken.

Flowers should be collected just after they open, and before they begin to wither.

Fruits are, unless otherwise directed, gathered when fully ripe.

Seeds should be collected when ripe and just before the seed-vessels split or open. In the case of some plants that have numerous small seeds ripening in succession, such as caraway, a branch should be cut as soon as the majority of the seeds on it are ripe.

Most drugs are purchased by the dealers in the dried condition, and the process of drying must be very carefully attended to. In warm, dry weather the plants may be spread out in thin layers in the open air, but they should not be exposed to direct sunlight, being put under cover at night to protect them from rain and dew until quite dry; or they may be spread on the clean floor of a barn and turned frequently. In the autumn and during rainy weather they will require to be dried by artificial heat, which can readily be done in a special drying shed with shelves, or in a greenhouse. Larger roots may be sliced lengthwise before drying. Three weeks or longer will be necessary for drying some species, according to the weather conditions and the time of year. The plants should be dried in such a way as to retain, as far as possible, their natural colours. When thoroughly dry they will usually break quite readily. Unless the drying is carefully and thoroughly done, the whole crop may be ruined by the growth of various moulds.

Before collecting drug-plants a sample should be sent to the buyer, giving the name of the plant or drug and ascertaining what quantity will be purchased, and the price. If there is no market, perennial herbs and shrubs can be left in the ground till next season. Annuals and biennials which cannot be held over must be got rid of even if the price should not be quite satisfactory.

## CHAPTER IV.

## Imports and Exports of Medicinal Plants.

In order to give some idea of the present trade carried on in Canada in drug-plants, the following figures have been obtained from the returns of Trade and Navigation issued by the Minister of Customs. In only a few cases are the returns given for an individual species, the majority of drug-plants being classified, for the purposes of the Customs authorities, into certain groups. Still the figures are useful as showing roughly the total trade in this line. At the present time, very few species are grown in Canada, the vast majority being imported from the United States or European countries. The figures given are for the year ending 31st of March, 1914. The first column gives the country, the second, the quantity, and the third, the value:—

## IMPORTS.

	Lbs.	\$
<b>Almonds, shelled—</b>		
From Great Britain.....	88,804	27,478
United States.....	43,553	15,115
France.....	67,139	17,016
Spain.....	767,928	228,649
Other countries.....	58,773	13,738
	1,026,197	301,996
<b>Almonds, not shelled—</b>		
From Great Britain.....	6,038	754
United States.....	145,567	19,896
France.....	130,239	15,214
Spain.....	401,904	49,166
Other countries.....	897	103
	684,645	85,133
<b>Hops—</b>		
From Great Britain.....	117,942	44,663
United States.....	1,513,593	375,957
Austria-Hungary.....	194,548	93,117
Germany.....	124,167	63,413
Other countries.....	6,792	2,721
	1,957,042	579,871
<b>Liquorice, in paste, rolls, and sticks, not sweetened, not otherwise provided for—</b>		
From Great Britain.....	8,033	991
United States.....	781,718	62,290
Turkey in Asia.....	1,176,284	94,705
Other countries.....	7,511	905
	1,973,546	158,891
<b>Mustard, seeds—</b>		
From Great Britain.....	13,687	713
United States.....	62,094	2,192
Other countries.....	111,317	3,669
	187,098	6,574

## IMPORTS—Continued.

	Lbs.	\$
Mustard, ground—		
From Great Britain.....	715,650	185,708
United States.....	269,290	17,775
Other countries.....	905	103
	985,845	203,586
Oil of peppermint—		
From Great Britain.....	1,302	1,966
United States.....	7,210	21,941
Other countries.....	381	429
	8,893	24,336
Drugs, crude, such as barks, flowers, roots, beans, berries, balsams, bulbs, fruits, insects, grains, gums and gum-resins, herbs, leaves, nuts, fruit and stem seeds, which are not edible, and which are in a crude state and not advanced in value by refining or grinding or any other process of manufacture, not otherwise provided for—		
From Great Britain.....		11,180
United States.....		72,739
Other countries.....		26,194
		110,113
Roots, medicinal, viz.: Alkanet, crude, crushed or ground, aconite, calumba, folia digitalis, gentian, ginseng, jalap, ipecacuanha, iris, orris root, liquorice, sarsaparilla, squills, taraxacum, rhubarb, and valerian, unground—		
From Great Britain.....		2,161
United States.....		24,462
Other countries.....		3,424
		30,047
Seeds, aromatic, crude, not edible and not advanced in value or condition by refining or refining, or by any other process of manufacture, viz.: Anise, star-anise, caraway, coriander, cardamom, cumin, fenugreek, and fennel—		
From Great Britain.....	33,712	2,020
United States.....	143,136	10,040
Other countries.....	84,046	3,623
	260,894	15,683

## EXPORTS (The produce of Canada).

Balsam—		
To Great Britain.....		4,536
United States.....		17,591
Other Countries.....		490
		22,617
Hops—		
To Great Britain.....	248,660	56,802
United States.....	892	363
Other countries.....	3,140	785
	252,692	57,890
Senega Root—		
To Great Britain.....	40,153	24,354
United States.....	308,295	187,031
Other countries.....	56,591	34,485
	405,039	245,870
Extract of Hemlock Bark—	Barrels.	
To Great Britain.....	1,267	15,170
United States.....	11	39
Other countries.....	691	8,292
	1,969	23,771

## CHAPTER V.

## Explanation of Terms.

§

In the description of plants used for medicine given in Chapters VI, VII, and VIII, the popular English or American name is first given, followed by the scientific or Latin name. This Latin name of the plant is always double and is followed by the name (often contracted) of the person who applied it. Sometimes the same plant has been given two Latin names, and, in these cases, the second one is given in square brackets. Following the scientific name is the name of the "family" to which the plant belongs. Both the scientific name and the name of the family follow those given in Britton & Brown's "Illustrated Flora of the Northern States and Canada," 2nd edition, 1913, and the "North American Flora," now in course of publication.

The particular part of the plant used—root, leaf, etc.—is next given, and the name of the drug as used in the Pharmacopœia of the United States (indicated by U.S.), the National Formulary of the American Pharmaceutical Association (indicated by N.F.), and the British Pharmacopœia, 1898 edition (indicated by B.P.). Drugs marked "not official" are not prescribed by either the United States or British Pharmacopœia, but are, nevertheless, used to some extent.

The time of collection, so far as known, is given, followed by a description of the plant and, in some cases, by a figure. In the descriptions, a certain amount of botanical knowledge will be necessary to understand the terms used, although simple language has been employed as far as possible. The following brief definitions may be useful to enable those who may read this bulletin to understand the terms employed. A reference to the illustrations will make the meaning clearer:—

A *herb* is a plant in which the erect green stem lives for one season only and then dies down. Herbs are divided into three groups:—

(1) *Annual herbs* complete their whole life history from seed to seed again inside one year or less, and then die. Caraway and mustard are examples.

(2) *Biennial herbs* usually produce a crown of leaves close to the ground and one or more thick roots during the first year. In the second year they form an erect stem, which produces seeds, and then the whole plant dies. Burdock is an example.

(3) *Perennial herbs* grow for many years and send up new shoots each year from some part of the plant underground, as Golden Seal and Peppermint.

*Shrubs* and *trees* have usually a taller stem than herbs, which grows in thickness year after year, forming rings of wood. They have usually winter buds. Sheepberry and Slippery Elm are examples.

A *rhizome* is a creeping, underground stem with small scales, which represent leaves, and roots arising from it at intervals, as in May Apple.

Leaves are *sessile* when they have no stalks, as in Seneca Snakeroot.

*Stipules* are two small flat outgrowths, which sometimes occur at the base of the leaf where it joins the stem, as in Hop.

Leaves are *simple* when the whole leaf is in a single piece, as in Peppermint.

When the broadest part of a leaf is nearest the base, it is *ovate*, as in Sweet Birch; but, when the broadest part is nearest the apex, it is *obovate*, as in Prince's Pine.

When the edge of a simple leaf is not indented in any way, but is a regular, continuous curve, the leaf is said to be *entire*, as in Black Indian Hemp.

When the edge is notched like the teeth of a saw, the leaf is *toothed*, as in Catnip.

185,708  
17,775  
103

203,586

1,966  
21,941  
429

24,336

11,180  
72,739  
26,194

110,113

2,161  
24,462  
3,424

30,047

2,020  
10,040  
3,623

15,683

4,536  
17,561  
490

22,617

56,802  
303  
785

57,860

24,374  
187,031  
34,483

245,870

15,170  
309  
8,292

23,771



When a leaf is more deeply notched, it is *lobed*, and then the lobes may occur along two sides of the central axis or midrib, as in Mustard, where it is *pinnately lobed*, or the lobes may radiate outwards from a central point when the leaf is *palmately lobed*, as in Hop.

A *compound* leaf is divided into several segments or leaflets, which are mostly of the same shape. It may be *palmately compound*, as in Ginseng, or *pinnately compound*. When there is an odd leaflet at the end, the others being in pairs, it is *unequally pinnate*, as in Butternut.

As regards their position on the stem, leaves may occur singly when they are said to be *alternate*, as in Mustard, or they may be in pairs, when they are *opposite*, as in Mint; or they may be in a circle, as in Juniper.

The term *inflorescence* refers to the way in which the flowers are grouped around the central axis or stem.

*Bracts* are small, leaf-like structures found on the inflorescence. Generally they are small, but sometimes large and coloured, as in Flowering Dogwood.

A *raceme* consists of stalked flowers arranged around a long central axis, as in Wild Black Cherry.

A *spike* has the flowers similarly arranged, but they are without stalks, as in Seneca Snakeroot.

A *simple umbel* consists of stalked flowers springing from a central point, as in Ginseng.

A *compound umbel* has the simple umbels attached to the ends of radiating branches, as in Caraway.

A *head* consists of unstalked flowers closely set together with a series of bracts underneath, as in Dandelion. Sometimes the outer flowers of the head are different from the others, and are much longer, being known as *ray flowers*, as in Elecampane.

A *flower* in the higher plants consists of four distinct parts:—

- (a) A *calyx*, usually green in colour, formed of separate or united parts called *sepals*.
- (b) A *corolla*, usually brightly coloured, formed of separate or united parts called *petals*.
- (c) *Stamens*, consisting of a stalk and an expanded top part, which contains the fertilizing dust or pollen.
- (d) *Carpels*, which may be separate or united, and which afterwards form the fruit. They are separate in Golden Seal, united in Ginseng.

Sometimes carpels or stamens are absent, the former being known as "*staminate flowers*," the latter as "*carpellary flowers*," as in Sassafras. Frequently the corolla is absent, as in Slippery Elm.

An *indehiscent* fruit is one which does not open when ripe, as in Dandelion.

A *capsule* is a dry fruit which splits when ripe to allow the seeds to escape, as in Thornapple. In some cases, it opens by means of a lid, as in Henbane.

A *berry* is a fleshy fruit which usually contains many small seeds.

A *drupe* or stone-fruit is a fleshy fruit which contains one or more seeds, each enclosed in a hard covering or stone, as in Wild Black Cherry.

Following the description of the plant, its distribution in Canada is given, and the nature of the situation in which it grows.

Finally the price is indicated, although it must be pointed out again that this is subject to rapid change, and is only a rough estimate.

The number of species of plants that were formerly used in medicine is very large, and in addition to those mentioned in the following pages, there is a considerable number of others, natives of Canada, the names of which will be found in the drug-merchants' catalogues. They are sold in small quantities, and probably would hardly pay the cost of collection.

The uses to which various drugs have been put have not been mentioned in this bulletin. A considerable number of drug plants are poisonous, and, if their use was mentioned, it would be necessary to state the dose and method of preparation. In the hands of inexperienced persons, this might lead to fatal results, and consequently the medicinal application of drug-plants had better be left to a skilled physician.

## CHAPTER VI.

### Medicinal Plants for which there is a considerable Demand.

All the plants mentioned in this chapter are either natives of Canada or have escaped from cultivation, and now reproduce themselves by self-sown seed in the same manner as native species. The distribution of each species in Canada is briefly indicated.

**AMERICAN WHITE HELLEBORE OR INDIAN POKE.** *Veratrum viride* Aiton. (Fam. *MELANTHACEÆ*.) The dried rhizome and roots yield *Veratrum* (U.S.) It is collected in autumn after the leaves have withered.

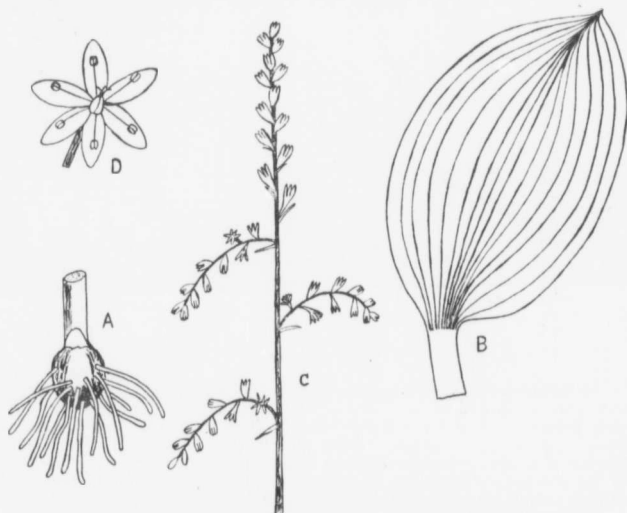


Fig. 1. AMERICAN WHITE HELLEBORE: A, Rhizome; B, Leaf; C, Inflorescence; D, Flower.

Perennial herbs with short, thick, underground stem and coarse fibrous roots. Leafy stem 2 to 8 feet high. Leaves alternate, broadly oval, clasping at the base, 6 to 12 inches long with several prominent veins. Flowers yellowish-green, numerous, in a branching inflorescence. Sepals 3, petals 3, stamens 6. Fruit a 3-celled capsule. Flowers May-July. Poisonous. (Fig. 1.) It occurs in swamps and wet woods from New Brunswick to British Columbia. Price 8 to 10 cents per pound

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**HOP.** *Humulus Lupulus* L. (Fam. CANNABINACEÆ). The dried carpellary flower-clusters yield *Humulus* (U.S.) and *Lupulus* (B.P.). From the glandular hairs on the fruit *Lupulinum* (U.S. and B.P.) is obtained. The hops are picked when fully grown, but before ripening, and are very carefully dried. Artificial drying, under shade, by hot air yields the best results. A considerable amount of *Lupulinum* is shaken or rubbed off in the process of drying. The drying-floor should be swept and the sweepings sifted through a fine sieve. The bulk of what passes through will be *Lupulinum*.

Perennial herbs with twining, prickly stems sometimes 25 feet long. Leaves opposite with three to seven lobes palmately arranged, and prominent united stipules. Staminate and carpellary flowers on different plants. Staminate flowers in a very much branched inflorescence. Each flower has a calyx, but no corolla, and five stamens. Carpellary flowers clustered, in drooping spikes, with large stipules and glandular bracts. When ripe, this inflorescence becomes cone-shaped, and is 1 to 2½ inches long. Flowers July—August. Fruit ripe, September—October. (Fig. 2.) It occurs in thickets and on river banks from Nova Scotia to Manitoba.

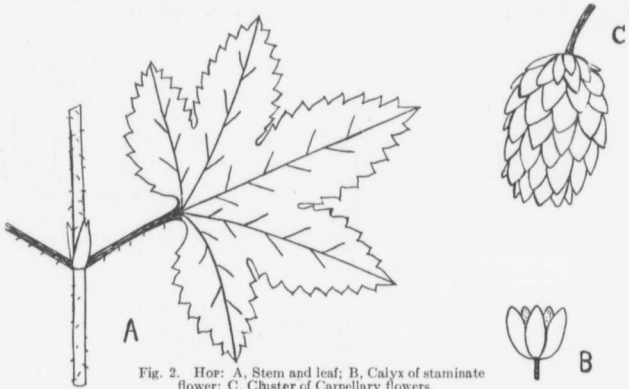


Fig. 2. HOP: A, Stem and leaf; B, Calyx of staminate flower; C, Cluster of Carpellary flowers.

In cultivation, plants with staminate flowers are excluded, as Hops are preferred with unripened seeds. They are propagated by "sets" or cuttings taken below ground, and about 6 inches long. They require a deep, porous soil, and an open sunny situation. Poles must be set around them nearly vertical and fastened at the top for the hop stems to twine round.

An average yield is 8 cwt. of dry hops per acre. Hops are at present cultivated to a considerable extent in Ontario and British Columbia.

Price of Hops, 25 to 55 cents per pound.

" *Lupulinum* \$1.00 to \$3.20 per pound.

**GOLDEN SEAL.** *Hydrastis canadensis* L. (Fam. RANUNCULACEÆ). The dried rhizome yields *Hydrastis* (U.S.) and *Hydrastis Rhizoma* (B.P.). It is collected in autumn after the seeds have ripened.

Perennial herbs with thick, yellow rhizome. Leafy stem, hairy, a foot high with alternate leaves, which are three in number, one basal and two borne at the top of the stem. Leaves palmately lobed, the segments toothed. The basal leaf is 5 to 8 inches broad. Flower solitary, terminal, greenish-white. Sepals 3, petals none, stamens numerous. Carpels numerous, each forming a

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crimson berry with one or two seeds when ripe, the cluster resembling a raspberry. Flowers in April. Fruit ripe in July or August, not poisonous, and eaten by birds. (Fig. 3.) Native in woods in Ontario. Golden Seal must be cultivated in shade like Ginseng. The seeds should be washed out and sown as soon as ripe. If they are allowed to become dry, they will not germinate. It takes five years from the time of sowing the seed until the rhizomes are ready for market, but it may be propagated by the division of old rhizomes. About two hundred tons are sold annually. Under good management, a ton of dried root may be expected per acre. Price, \$5.45 to \$5.75 per pound.

**WHITE MUSTARD.** *Sinapis alba* L. (Fam. CRUCIFERÆ.) The ripe seeds furnish *Sinapis alba* (U.S.) and *Sinapis albae Semina* (B.P.) Annual herbs 1 to 2 feet high, covered with stout hairs. Leaves alternate, pinnately

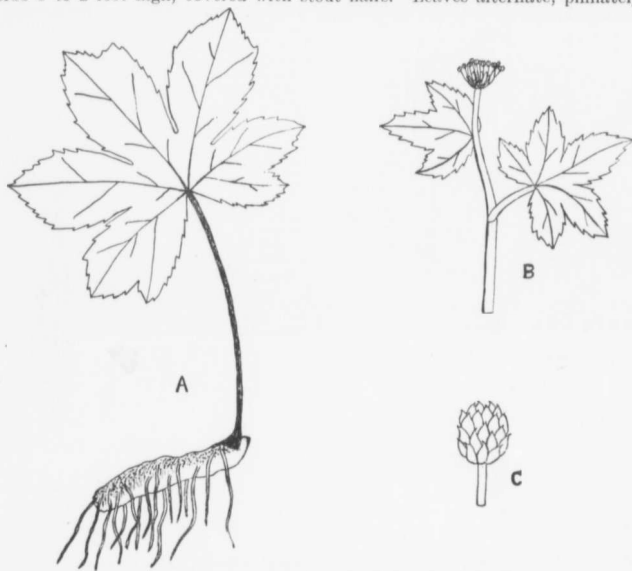


Fig. 3 GOLDEN SEAL: A, Rhizome and leaf; B, Flower; C, Fruit.

lobed, the lower ones 6 to 8 inches long, with irregular toothed segments. Flowers in racemes, yellow. Sepals 4, petals 4 (separate), stamens 6. Fruit, a long pod covered with bristles, having a flat sword-shaped beak, which frequently contains a single seed. The fruit opens, when ripe, by two valves falling away and leaving a central partition and the beak. Seeds yellow. Flowers all summer. It is a native of Europe, but has escaped from cultivation in Canada and occurs in fields and waste places. (Fig. 4.) The seeds of this and the following species when ground and mixed, constitute the Mustard of commerce. Price 8 cents per pound.)

**BLACK MUSTARD.** *Brassica nigra* Koch. (Fam. CRUCIFERÆ.) The dried ripe seeds furnish *Sinapis nigra* (U.S.) and *Sinapis nigrae Semina* (B.P.).

This species agrees with White Mustard in most of its characters, but differs in the following particulars: The pods are shorter, barely reaching three-quarters of an inch in length, and are closely pressed to the central axis; the beak is rounded and does not contain a seed, and the seeds are very dark purple in colour, and are more pungent in taste.

It is an annual plant, a native of Europe, but has escaped from cultivation in Canada and occurs in fields and waste places. (Fig. 5.) Price, 10 cents per pound.

**SENECA SNAKEROOT OR MOUNTAIN FLAX.** *Polygala Senega* L. (Fam. *POLYGALACEÆ*.) The dried root yields *Senega* (U.S.) and *Senegæ Radix* (B.P.) It should be collected in autumn.

Perennial herbs, with several leafy stems proceeding from the crown of the rootstock. Stem 6 to 12 inches high, with alternate leaves. The leaves are

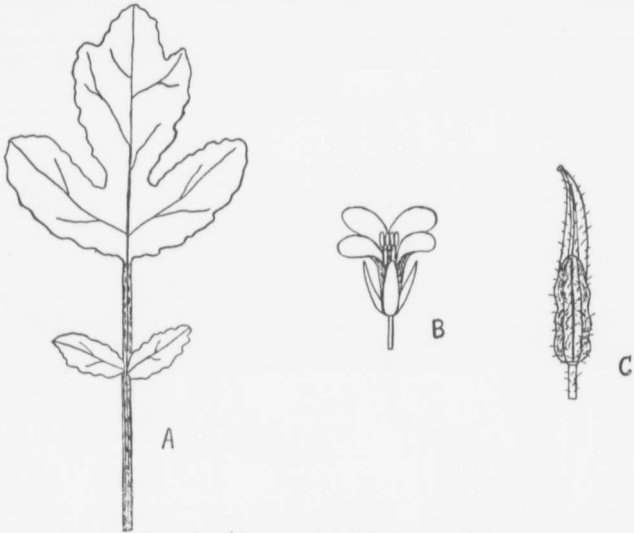


Fig. 4. WHITE MUSTARD: A, Leaf; B, Flower; C, Fruit.

without stalks, lance-shaped, faintly toothed, 1 to 2 inches long. Flowers white, in a spike. Sepals 5, two of them being much larger than the others. Petals, 3, united into a tube which is split along one side. Stamens, 8, more or less united with the petals. Fruit, a two-celled capsule with a single hairy seed in each cell. Flowers May-June. It grows in rocky woods from New Brunswick to Alberta (Fig. 6.) Price, 40 cents to \$1.15 per pound.

**SACRED BARK OR BEARBERRY.** *Rhamnus Purshiana* D.C. (Fam. *RHAMNACEÆ*.) The dried bark collected from June to August, at least one year before being used yields *Rhamnus purshiana* (U.S.) and *Cascara sagrada* (B.P.). A small tree 15 to 20 feet high, with alternate leaves. The leaves are 2 to 6 inches long, toothed, with prominent veins. Flowers greenish, in small clusters. The stamens stand in front of the petals. Fruit an ovoid, black, three-seeded berry.

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It occurs in moist situations in the mountains of British Columbia, and grows readily from seed. (Fig. 7.) Price, 8 to 10 cents per pound.

**AMERICAN GINSENG.** *Panax quinquefolium* L. (Fam. ARALIACEÆ.) The dried root yields the drug known to the Chinese as Ginseng, which is not official in any Pharmacopœia. It should be collected only in the autumn, about September or later.

Perennial herbs 8 to 15 inches high, with thick, fleshy, often forked, aromatic roots, and a circle of three leaves at the top of the stem. Leaves palmately compound, with five leaflets usually. Leaflets stalked, obovate, toothed, 2 to 5 inches long. Flowers in a terminal, simple umbel, greenish yellow. Sepals, petals, and stamens five, the petals being separate. Fruit a bright red somewhat

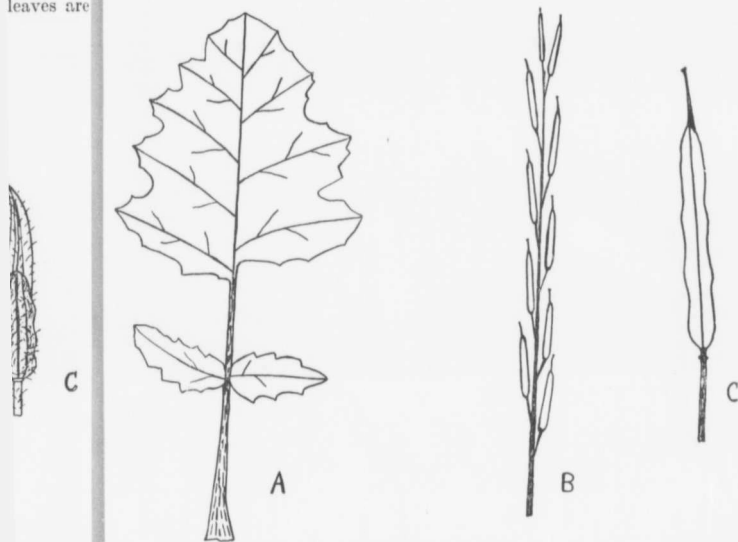


Fig. 5. BLACK MUSTARD: A, Lower leaf; B, Group of fruits; C, Single fruit.

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flattened berry, with two or three seeds. Flowers July-August. Fruits ripe from August onwards. It occurs in woods in Quebec and Ontario. It grows best in deep black forest mould, in shade. The seeds must not be allowed to become dry before planting, and should be planted as soon as possible after ripening. Sometimes they do not germinate till the second season. Roots three or four years old are fit for sale. (Fig. 8.) Price, \$5 per pound.

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**CARAWAY.** *Carum Carui* L. (Fam. AMMIACEÆ [UMBELLIFERÆ].) The dried, nearly ripe fruit furnishes *Carum* (U.S.) and *Carui fructus* (B.P.),

Biennial herbs, 1 to 2 feet high, with hollow stem. Leaves alternate, pinnately divided into narrow segments, with a sheathing base. Inflorescence, a compound umbel. There are no bracts below the simple umbel. Flowers,

white. Sepals very small, petals 5, (separate), stamens 5. Fruit oblong, about one-sixth inch long, ribbed, separating into two one-seeded pieces when ripe. Flowers May-July.

A native of Europe, but has escaped from cultivation and occurs on waste ground in Eastern Canada. (Fig. 9.). Price, 6 to 9 cents per pound.

**PEPPERMINT.** *Mentha Piperita* L. (Fam. *LABIATÆ*.) The dried leaves and flowering tops yield *Mentha Piperita* (U.S.), *Oleum Mentha Piperita* (U.S. and B.P.), and Menthol (U.S. and B.P.). It is collected at the commencement of flowering. Strongly scented perennial herbs, 1 to 3 feet high, with creeping underground stems. Leaves opposite, lance-shaped,  $1\frac{1}{2}$  to 3 inches long, toothed, with short stalks. Flowers in dense clusters, forming a central spike

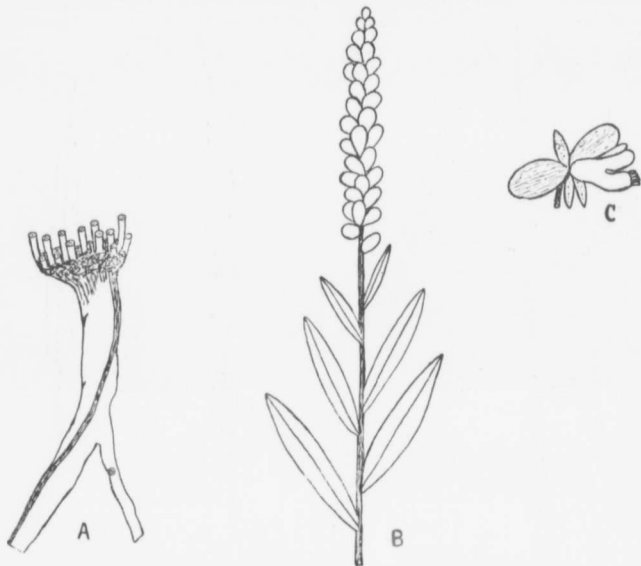


Fig. 6. SENECA SNAKEROOT: A, Root; B, Leaves and inflorescence; C, Single flower.

at the top of the stem, and two lateral spikes, which equal it in length, pale purple in colour. Calyx 5-toothed, corolla 2-lipped, stamens 4, equal in length. Fruit separating into 4 one-seeded pieces. Flowers July-September. (Fig. 10.)

A native of Europe, but has escaped from cultivation and occurs in wet ground from Nova Scotia to Ontario. Peppermint grows best on muck lands. It requires about 330 pounds of dried peppermint to produce 1 pound of oil, and the yield of oil from 1 acre varies from about 12 to 50 pounds. Price of leaves, 9 to 16 cents per pound

**SPEARMINT.** *Mentha spicata* L. [*Mentha viridis* L.] (Fam. *LABIATÆ*.) The dried leaves and flowering tops yield *Mentha Viridis* (U.S.) and *Oleum Mentha Viridis* (U.S. and B.P.). It should be collected just before the flowers open. It resembles *Mentha piperita*, but differs in the following characters: The

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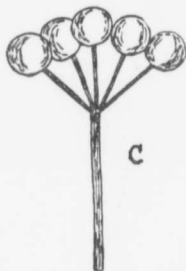
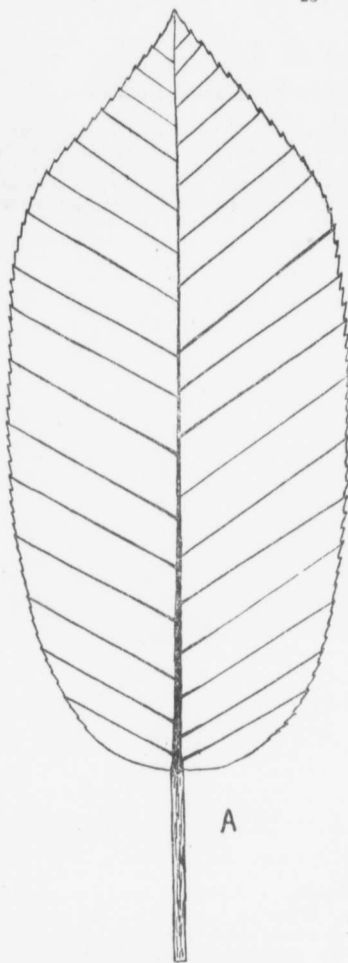


Fig. 7. SACRED BARK. A, Leaf; B, Calyx; C, Fruits.

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height is 1 to 1½ feet, the leaves are without stalks, the central spike is taller than the two lateral ones, and the flower clusters are arranged more loosely, with a short interval between them. It is a native of Europe, but has escaped from cultivation and grows in wet grounds from Nova Scotia to Ontario. (Fig. 11.) Price, 7 to 20 cents per pound.



## CHAPTER VII.

## Medicinal Plants used in Moderate or Small Quantities.

Of the species mentioned in this chapter, there is a considerable demand for some of those which are described more fully and are accompanied by illustrations. Whether it would pay to cultivate any of these must be determined by circumstances. The other species not illustrated, but described briefly, probably occur in sufficient quantity in the wild state to meet the demand.

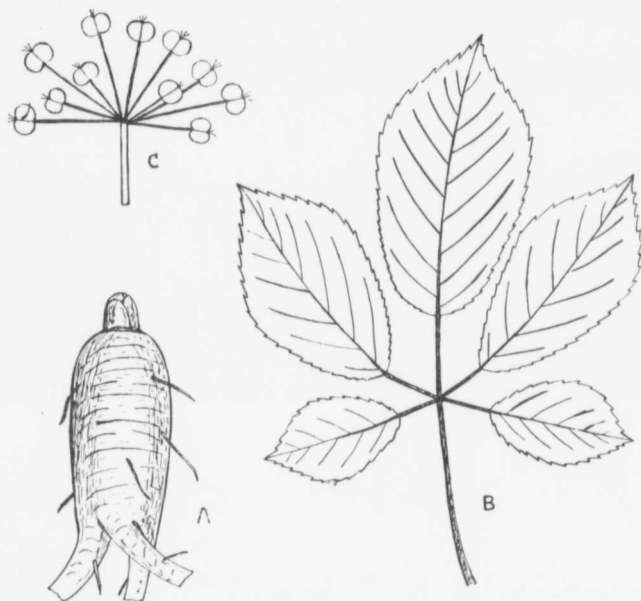


Fig. 8. AMERICAN GINSENG: A, Root with bud; B, Leaf; C, Fruits.

**IRISH MOSS OR CARRAGEEN.** *Chondrus crispus* Lyngb. (Class *Algae*, Fam. *GIGARTINACEÆ*.) The dried plant yields *Chondrus* (U.S.). This plant is a seaweed, which is dark purple in colour and forks repeatedly into two, the segments being flattened and wedge-shaped or sometimes narrow. Warts occur on the upper parts of the plant, and are slightly raised above the general surface. These are the reproductive organs of the plant.

It grows attached to rocks on the Atlantic coast of Canada just below low-water mark, and also on Vancouver island.

It is generally bleached by drying in the sun and watering, the process being repeated until it becomes of a yellowish-white colour. (Fig. 12.) Price, 8 to 20 cents per pound.

ERGOT. *Spermoedia Clavus* Fries. [*Claviceps purpurea* Tul.] (Class *Fungi*, Fam. *HYPOCREACEÆ*.) The "sclerotium" moderately dried, furnishes *Ergota* (U.S. and B.P.). The "sclerotium" is cylindrical, one-half to  $1\frac{1}{4}$  inches long, and dark purple in colour. It consists of densely interwoven filaments of a parasitic fungus, which replaces the grain or kernel of a rye flower. They ripen and are harvested about the same time as the rye crop. Price, 85 cents to \$1.65 per pound.

MALE FERN. *Dryopteris Filix-mas* Schott [*Aspidium Filix-mas* Sw.] (Fam. *POLYPODIACEÆ*.) The dried rhizome yields *Aspidium* (U.S.) and *Filix Mas* (B.P.). It should be collected from July to September, all brown scales, roots, and dead parts being removed, and only those parts being retained which have a green colour. The leaves are pinnately divided, 1 to  $3\frac{1}{2}$  feet long, and bear on the under side of the segments, not far from the principal vein, the kidney-shaped groups of spore-cases. It occurs in rocky woods throughout Canada.

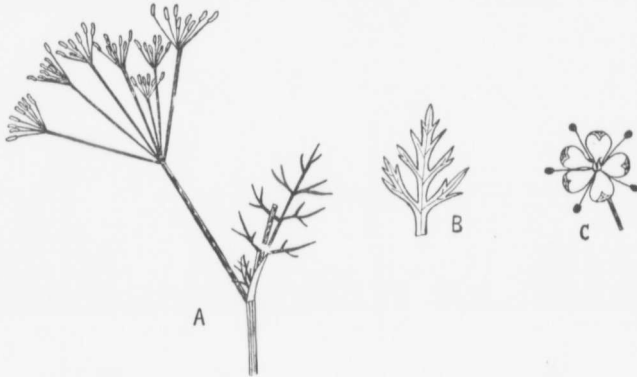


Fig. 9. CARAWAY: A, Upper leaf and fruiting umbel; B, Part of lower leaf; C, Flower.

THE MARGINAL SHIELD FERN. *Dryopteris marginalis* A. Gray. [*Aspidium marginale* Sw.] is used for the same purpose in the United States and is also official. It has the groups of spore-cases at the margin of the leaf-segments and has a similar distribution in Canada. Price, 9 to 14 cents per pound.

WHITE PINE OR WEYMOUTH PINE. *Pinus Strobus* L. (Fam. *PINACEÆ*.) The inner bark yields *Pinus Strobus* (N.F.). It is collected from autumn to early spring. A tall tree containing a resinous fluid, with needle-shaped leaves, in groups of five, and woody cones 4 to 6 inches long. It occurs from Newfoundland to Manitoba. Price 4 to 5 cents per pound.

HEMLOCK OR HEMLOCK SPRUCE. *Tsuga canadensis* Carr. (Fam. *PINACEÆ*.) The resinous exudation yields *Pix Canadensis* (not official). The bark is used extensively for tanning.

Tall forest evergreen trees over 100 feet high, with horizontal or drooping branches, and flaky bark. Leaves apparently in two rows, numerous, flat, narrow, almost sessile, with blunt tip, one-half to three-quarters of an inch long, falling off on drying. Staminate cones in the angle between the leaf and the stem. Seed-bearing cones hanging down, about as long as the leaves, the seed-bearing scales nearly circular in outline. Flowers April—May. Occurs on hills, Nova Scotia to Ontario. (Fig. 13.) Price of bark, 3 cents per pound.

**BALSAM FIR.** *Abies balsamea* Mill. (Fam. *PINACEÆ*.) The resinous exudation from the trunk yields Canada Balsam—*Terebinthina Canadensis* (U.S. and B.P.)

A forest evergreen tree with a maximum height of about 90 feet or, at higher elevations, a shrub, containing a resinous secretion in the trunk. Leaves alternate, apparently arranged in two rows, flattened, narrow, sessile, with the midrib prominent on the whitened lower surface, fragrant and persistent on drying, one-third to three-quarter inch long. Staminate cones in the angle between the leaf and the stem, with powdery pollen. Seed-bearing cones at first violet, 2 to 4 inches long, when mature, erect, cylindrical. The scales are in pairs, the outer being the shorter, and both kinds fall off when mature, from the central axis. Flowers May—June. A native of Canada from Labrador to Hudson bay and Alberta. (Fig. 14.) Price, 65 cents per pound.

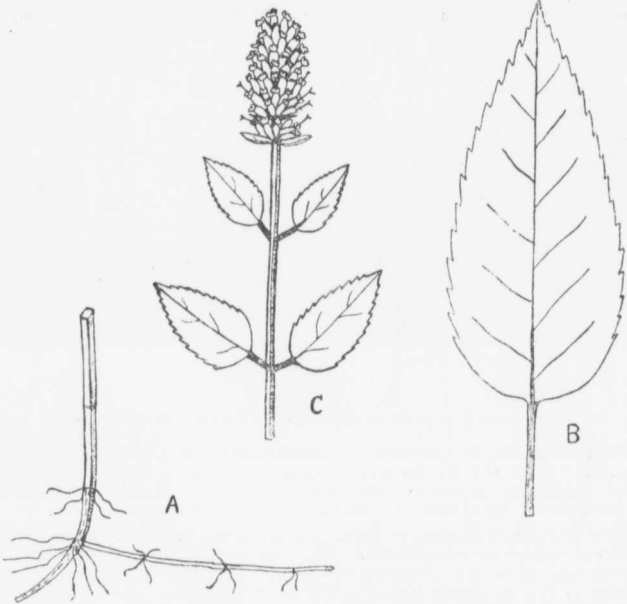


Fig. 10. PEPPERMINT: A, Rhizome; B, Leaf; C, Inflorescence.

**JUNIPER.** *Juniperus communis* L. (Fam. *PINACEÆ*.) The dried, ripe, berry-like cones yield *Juniperus* (N.F.) and *Oleum Juniperi* (U.S. and B.P.). Evergreen trees, sometimes attaining a height of 30 feet, or shrubs, with the bark in shreds. Leaves in groups of three, narrow and sharp-pointed, about one-half to three-quarter inch long. Staminate and seed-bearing cones usually on different trees. The seed-bearing cones are globular when ripe, with very short stalks. They are dark blue in colour, about one-quarter inch in diameter, and contain three very hard seeds. Flowers April-May. Cones ripe in October. Occurs on dry hills throughout Canada. (Fig 15.) Price, 3½ to 7 cents per pound.

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COUCH GRASS, TWITCH OR DOG GRASS. *Agropyron repens* Beauv. (Fam. POACEÆ [GRAMINEÆ].) The dried rhizome collected in the spring and deprived of its roots yields *Triticum* (U.S.)

A common weed 1 to 3 feet high with greenish flowers in a two-sided spike, a native of Europe but now occurring throughout Canada. Price, 15 to 35 cents per pound.

SKUNK CABBAGE. *Spathyema fatida* Raf. (Fam. ARACEÆ.) The dried rhizome and roots yield *Dracontium* (not official). It is collected early in spring, or after the seeds have ripened in August or September.

An ill-smelling herb, with the flowers in a dense cluster and a large purple and yellowish-green bract enclosing them. It grows in swamps and wet ground from Nova Scotia to Ontario. Price, 9 to 13½ cents per pound.

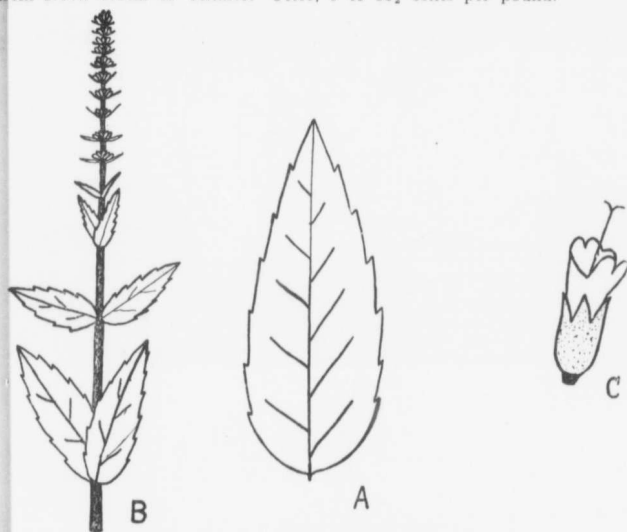


FIG. 11. SPEARMINT: A, Leaf; B, Inflorescence; C, Flower.

SWEET FLAG. *Acorus Calamus* L. (Fam. ARACEÆ.) The dried rhizome yields *Calamus* (U.S.).

Perennial herbs, with a thick, aromatic rhizome, 2 to 6 feet high, with sword-shaped leaves, provided with a prominent midrib. Flowers greenish-yellow in a thick spike, which tapers towards the tip and is attached to the edge of an apparent leaf. It grows in swamps from Nova Scotia to Ontario. Price 9 to 16 cents per pound.

STAR GRASS, UNICORN ROOT OR COLIC ROOT, *Aletris farinosa* L. (Fam. LILIACEÆ.) The dried rhizome and roots yield *Aletris* (N.F.). It is collected in autumn.

A perennial herb, 1½ to 3 feet high, with the leaves in a tuft close to the ground and the white flowers in a long spike. It occurs in dry, sandy soil in Ontario. Price 25 to 42 cents per pound.

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**BLUE FLAG.** *Iris versicolor* L. (Fam. *IRIDACEÆ*.) The dried rhizome and roots yield *Iris* (not official). It is collected in autumn. It is a perennial herb 2 to 3 feet high, with sword-shaped leaves, in two rows, and violet-blue flowers. It occurs in marshes and wet meadows from Newfoundland to Manitoba. Price, 11 to 12 cents per pound.

**YELLOW LADY'S SLIPPER OR YELLOW MOCCASIN FLOWER.** *Cypripedium parviflorum* Salisb. (Fam. *ORCHIDACEÆ*.) The dried rhizome and roots yield *Cypripedium* (U.S.). They are collected in autumn.

Perennial herbs 1 to 2½ feet high, with rhizomes and thick tufted roots. Leaves alternate, 2 to 6 inches long, broadly oval with many veins. Flower solitary, at top of the stem. Sepals 3, but 2 are fused together. Petals 3, two

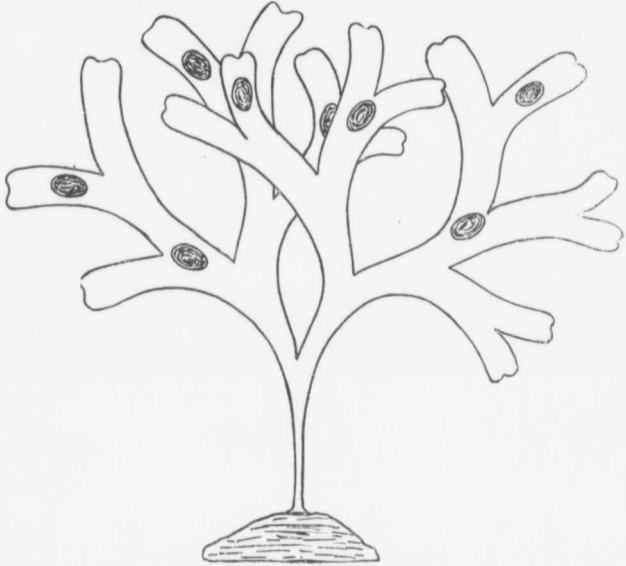


Fig. 12. IRISH MOSS: Whole plant showing the warts.

being narrow and twisted while the third is slipper-shaped, yellow in colour spotted with purple. Stamens 2. Fruit, a capsule with numerous small seeds. Flowers May-June. It occurs in swampy and boggy places in woods, from Nova Scotia to Ontario. (Fig. 16.) Price 20 to 30 cents per pound.

**BUTTERNUT.** *Juglans cinerea* L. (Fam. *JUGLANDACEÆ*.) The dried bark of the roots yields *Juglans* (N.F.). It is collected in autumn.

It is a tall tree with fragrant bark and unequally pinnate leaves, dull-coloured flowers and an elongated drupe covered with sticky hairs. It occurs in rocky ground from New Brunswick to Ontario. Price 3 to 4 cents per pound.

**BALM OF GILEAD.** *Populus candicans* Ait. (Fam. *SALICACEÆ*.) The dried buds collected late in winter or early spring furnish *Populus Candicans* (not official).

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It is a large tree with resinous buds, broadly ovate leaves and drooping inflorescences, the staminate and carpellary flowers being on different trees. The fruit is a capsule, and the seeds have a tuft of hairs. It occurs from Newfoundland to Alaska. Price, 25 to 26 cents per pound.

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**SWEET BIRCH, BLACK BIRCH OR CHERRY BIRCH.** *Betula Lenta* L. (Fam. *BETULACEÆ*.) The dried bark known as "*Betula*" is not official, but yields an oil from which Salicylic Acid is made. It is collected in late summer. The leaves are also used. A large tree with sweet-scented brownish-red bark, which does not separate into layers. Leaves alternate, ovate, stalked,  $2\frac{1}{2}$  to 4 inches long, toothed. Flowers in long, cylindrical, drooping inflorescences of two kinds, produced before the leaves. The staminate inflorescences are  $2\frac{1}{2}$  to 4 inches long, and fall off after shedding the pollen; the carpellary inflorescences are 1 inch long and a half inch thick when ripe. Flowers April-May. It occurs in sandy or gravelly loam from Newfoundland to Ontario. (Fig. 17.) Price,  $3\frac{1}{2}$  to 4 cents per pound.

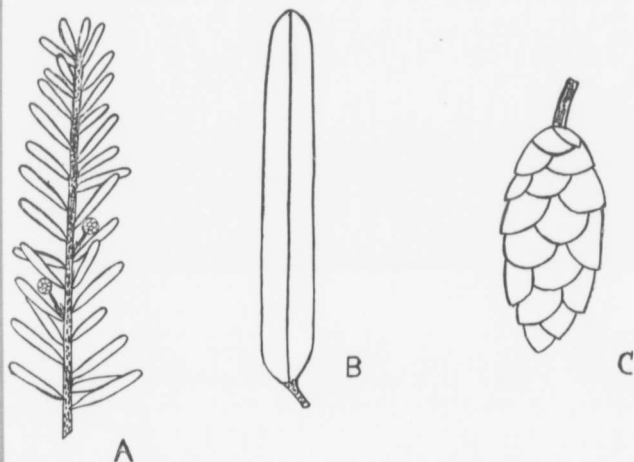


Fig. 13. HEMLOCK: A, Branch with staminate cones; B, Leaf; C, Seed-bearing cone.

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**WHITE OAK.** *Quercus alba* L. (Fam. *FAGACEÆ*.) The inner bark, dried, of trunks and branches, 10 to 25 years old, yields *Quercus* (U.S.). It is collected in spring.

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A tall tree with pinnately lobed leaves, the lobes being rounded, and with acorns enclosed in a shallow cup. It occurs in Ontario. Price  $2\frac{1}{2}$  to 6 cents per pound.

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**SLIPPERY ELM, RED ELM.** *Ulmus fulva* Mich. (Fam. *ULMACEÆ*.) The bark, deprived of its outer part, yields *Ulmus* (U.S.). It is collected in spring and is generally dried under pressure, so that the pieces remain flat.

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A large tree, with fragrant bark, the inner part of which is mucilaginous. The young twigs are covered with rough hairs. Leaves alternate, doubly toothed, unequal at the base, 4 to 8 inches long, fragrant on drying, shortly stalked. The stipules fall off early. Flowers in small clusters produced before the leaves.

There is no corolla. Stamens, 5 or more. The fruit is one-seeded, with a broad membranous wing surrounding the seed. The wing is not fringed with hairs as it is in other species of Elm. Flowers March-April. (Fig. 18.) Found in rich soil in Ontario and Quebec. Price 8 to 22 cents per pound.

**WILD GINGER OR CANADA SNAKEROOT.** *Asarum canadense* L. (Fam. *ARISTOLOCHIACEÆ*.) The dried rhizome and roots yield *Asarum* (N.F.). It is collected in autumn.

Perennial herbs, with aromatic rhizome and stout roots. There are two kidney-shaped leaves with a single flower between them. Calyx bell-shaped, 3-lobed, brownish-purple in colour. It occurs in woods from New Brunswick to Manitoba. Price, 12 to 19 cents per pound.

**YELLOW DOCK OR CURLED DOCK.** *Rumex crispus* L. and **BROAD-LEAVED DOCK** *Rumex obtusifolius* L. (Fam. *POLYGONACEÆ*.) The dried root yields *Rumex* (not official). It is collected in autumn after the fruits have turned brown, split lengthwise if large, and dried.

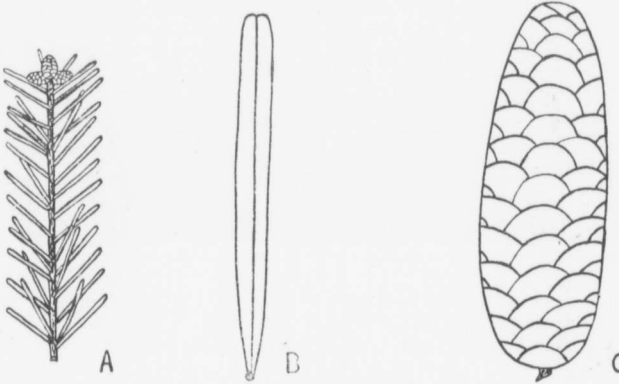


FIG. 14. BALSAM FIR: A, Leafy branch; B, Single leaf; C, Seed-bearing cone.

Yellow dock is a perennial herb 1 to 3½ feet high, with alternate leaves and stipules forming a sheath above the attachment of the leaf. Leaves 6 to 12 inches long, lance-shaped, long-stalked, crisped, with wavy margin. Inflorescence very much branched, with numerous greenish flowers. Sepals 3, petals 3 (each with smooth edge and a wart on back), stamens 6. Fruit 3-sided, one-seeded, indehiscent, brown in colour, enclosed by the dry calyx and corolla. Flowers June-August. It is a native of Europe, but has been introduced and occurs throughout Canada in cultivated and waste ground.

Broad-leaved dock resembles Yellow Dock in most characters, but is a stouter and taller plant with broader and less wavy leaves, and has the petals toothed on the edge, only one of them having a wart. The distribution is similar. (Fig. 19.) Price 6 to 7 cents per pound.

**MEXICAN TEA.** *Chenopodium ambrosioides* L. [*C. anthelminticum* L.] (Fam. *CHENOPODIACEÆ*.) The dried ripe fruit yields *Oleum Chenopodii* (U.S.) but the fruit itself is also used though not official.

Annual strong-scented herbs, 2 to 3½ feet high, with ovate, alternate leaves, and greenish, small clustered flowers. The fruit is enclosed by the calyx and contains a single black shining seed. It is a native of tropical America, but is naturalized in Ontario on waste ground. Price of fruit 8 to 11 cents per pound.

POKE, SCOKE, PIGEON BERRY, OR GARGET. *Phytolacca americana* L. (Fam. PHYTOLACCACEÆ.) The dried root yields *Phytolacca* (U.S.) They are collected in autumn at the end of the first year's growth, sliced and dried.

A perennial, strong-smelling herb with thick, fleshy root, attaining a height of 4 feet or more. Leaves alternate. Flowers white, in a raceme. Fruit a dark purple berry with ten seeds. It grows in rich soil in Ontario. Poisonous. Price 5 to 7 cents per pound.

SOAPWORT OR BOUNCING BET. *Saponaria officinalis* L. (Fam. CARYOPHYLLACEÆ.) The dried roots and smaller rhizomes yield *Saponaria* (not official). They are collected in spring or autumn.

Perennial herbs, 1 to 2 feet high, with opposite leaves and pink flowers. A native of Europe, but now widely distributed throughout Canada on waste ground. Price, 8½ cents per pound.

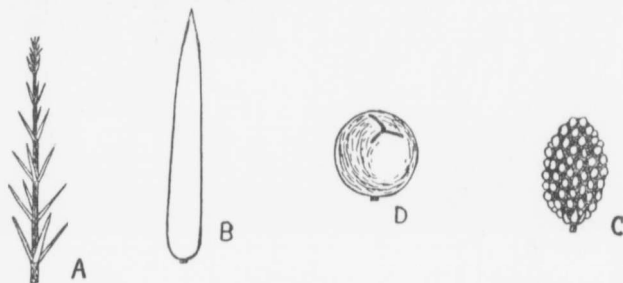


FIG. 15. JUNIPER: A, Leafy branch; B, Single leaf; C, Staminate cone; D, Seed-bearing cone.

BLACK SNAKEROOT, BLACK COHOSH. *Cimicifuga racemosa* Nutt. (Fam. RANUNCULACEÆ.) The dried rhizome and roots yield *Cimicifuga* (U.S.) and *Cimicifugæ Rhizoma* (B.P.). It should be collected after it ripens its fruit in September.

Perennial herbs, 3 to 8 feet high, with thick-knotted rhizomes and alternate leaves divided into mostly ovate segments. Flowers ill-smelling, in racemes, white, with numerous stamens. Fruit, several-seeded, splitting down one side when ripe. It occurs in rocky woods in Ontario. Price, 3 to 4½ cents per pound.

(a) TRAILING MAHONIA OR OREGON GRAPE-ROOT. *Odoestemon Aquifolium* Rydb. [*Berberis Aquifolium* Pursh.] (Fam. BERBERIDACEÆ.)

(b) EUROPEAN BARBERRY. *Berberis vulgaris* L. (Fam. BERBERIDACEÆ.) The dried rhizome and roots of these two species collected in autumn yield *Berberis* (U.S.)

(a) TRAILING MAHONIA is a low shrub with yellow wood, 2 to 6 feet high, with unequally pinnate leaves, yellow flowers and purple berries, and occurs in British Columbia.

(b) EUROPEAN BARBERRY is a shrub 6 to 8 feet high, with yellow wood, spiny branches, simple leaves, and scarlet fruit. It is a native of Europe, but has escaped from cultivation in different parts of Canada. Price 7½ to 25 cents per pound.



BLUE COHOSH. PAPOOSE ROOT. *Caulophyllum thalictroides* Michx. (Fam. BERBERIDACEÆ). The dried rhizome and roots yield *Caulophyllum* (N.F.). It is collected in autumn.

Smooth perennial herbs, 1 to 3 feet high, with matted rootstock and usually two leaves. Leaves alternate, dividing at first into three, then into a number of segments, which are obovate, 1 to 3 inches long, and mostly 3-lobed at the tip. Flowers greenish, in branched inflorescences. Sepals 6, petals 6 (separate), stamens 6. The two seeds are stalked, and at an early age rupture the ovary and grow out resembling berries. When ripe they are globular,



Fig. 16. YELLOW LADY'S SLIPPER: A, Base of stem and leaf; B, Flower.

about one-third of an inch in diameter, and deep blue in colour. Flowers April-May. In woods from New Brunswick to Manitoba (Fig. 20.). Price, 3 to 5½ cents per pound.

MAY APPLE OR WILD MANDRAKE *Podophyllum peltatum* L. (Fam. BERBERIDACEÆ.) The dried rhizome yields *Podophyllum* (U.S.) and *Podophylli Rhizoma* (B.P.). It is collected in the latter half of September or in October.

Perennial herbs with rhizomes and thick fibrous roots. Leafy stem 1 to 1½ feet high. Leaves with the veins radiating all round from the top of the

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stalk, palmately lobed, irregularly toothed at the apex, the lower leaves nearly a foot broad. Flowers solitary, white. Sepals 6, petals 6 to 9 (separate), stamens twice as many as the petals. Fruit yellowish, ovoid, 1 to 2 inches long, edible. Flowers in May. The rhizome is poisonous. Native in woods in Quebec and Ontario. It prefers a heavy or alluvial soil and partly open exposure. (Fig. 21.) Price, 8 to 13 cents per pound.

**SASSAFRAS OR AGUE TREE.** *Sassafras Sassafras* Karst. [*Sassafras officinale* Nees.] (Fam. LAURACEÆ.) The dried bark of the root yields *Sassafras* (U.S.) and *Sassafras Radix* (B.P.). It is collected in early spring or autumn.

A tall tree, with aromatic bark and leaves. The leaves are oval or 3-lobed in shape, and often as wide as long. Flowers in racemes, greenish-yellow, appearing as soon as the leaves. Staminate flowers and carpellary flowers on

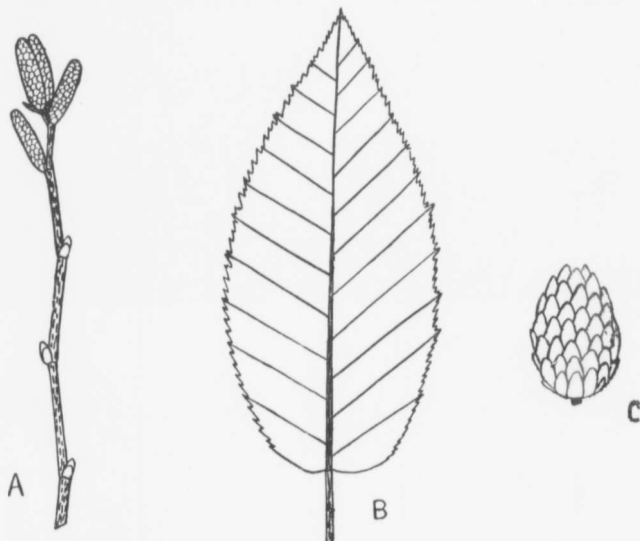


Fig. 17. SWEET BIRCH: A, Twig with 4 flower clusters; B, Leaf; C, Fruit cluster.

different trees. Calyx with 6 segments. No corolla. Stamens 9 in the staminate flowers, but only 6 and rudimentary in the carpellary flowers. Fruit an ovoid, blue drupe about half an inch long, supported on a red thickened stalk. Flowers April-May. Fruit ripens July-August. Native of southern Ontario in dry soil. (Fig. 22.) Price, 11 to 17 cents per pound.

**OPIUM POPPY.** *Papaver somniferum* L. (Fam. PAPAVERACEÆ.) The dried, unripe capsules furnish *Papaveris capsula* (B.P.) and the juice from the unripe capsules when dried furnishes *Opium* (U.S. and B.P.). The flowers are produced in July and August, and about four or five weeks after blooming the capsules are ready for cutting.

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Annual herbs, with milky juice, 1 to 3 feet high, and white or purple flowers. Capsule opening by pores under the crown, when ripe. A native of Europe, but occurs as an escape in different parts of Canada. It is easily cultivated in garden soil. Price of the capsules, 35 cents per pound.

**BLOODROOT.** *Sanguinaria canadensis* L. (Fam. *PAPAVERACEÆ*.) The dried rhizome yields *Sanguinaria* (U.S.). It should be collected after the death of the foliage in autumn.

Perennial herbs, with orange-red juice, palmately lobed leaves, solitary white flowers, and a capsule which splits when ripe down to the base into two valves. It occurs in rich woods from Nova Scotia to Manitoba. Price 9 to 12 cents per pound.

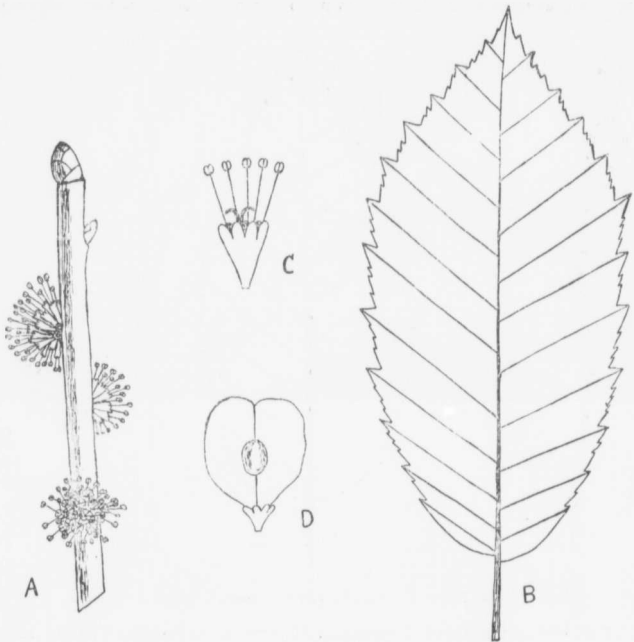


Fig. 18. SLIPPERY ELM. A, Branch in flower; B, Leaf; C, Flower; D, Fruit.

**WITCH HAZEL.** *Hamamelis virginiana* L. (Fam. *HAMAMELIDACEÆ*.) The bark and twigs yield *Hamamelidis Cortex* (U.S. and B.P.), and the dried leaves *Hamamelidis Folia* (U.S. and B.P.). The bark is collected in spring, and the leaves in autumn.

It is a shrub or small tree with a maximum height of 25 feet. Leaves alternate, broadly oval, 2 to 5 inches long, with wavy margin, and prominent veins. Flowers in clusters, yellow, appearing when the leaves are falling. Sepals 4, petals 4 (narrow, separate), stamens 8, four of them being imperfect.

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Fruit a woody 2-seeded capsule, ripening the next season. Flowers August-December. Native in damp woods on rocky soil, New Brunswick to Ontario. (Fig. 23.) Price of bark,  $3\frac{1}{2}$  to 4 cents per pound. Price of leaves, 4 to 5 cents per pound.

**HIGH BUSH BLACKBERRY.** *Rubus nigrobaccus* Bailey. (Fam. *ROSACEÆ*.) The dried bark of the rhizome yields *Rubus* (U.S.). It may be collected in autumn or early spring.

Shrub-like plants with biennial stems  $1\frac{1}{2}$  to 10 feet high, armed with prickles. Leaves compound, with 3 to 5 leaflets and stipules. Flowers, white. The fruit consists of a number of small black drupes. It occurs in dry soil in open woods from Nova Scotia to Ontario. Price,  $5\frac{1}{2}$  to 10 cents per pound.

**WILD BLACK CHERRY OR RUM CHERRY.** *Padus virginiana* Mill. [*Prunus serotina* Ehrh.] (Fam. *AMYGDALACEÆ*.) The bark collected in the autumn and dried yields *Prunus Virginiana* (U.S.) and *Prunū Virginianæ Cortex* (B.P.).

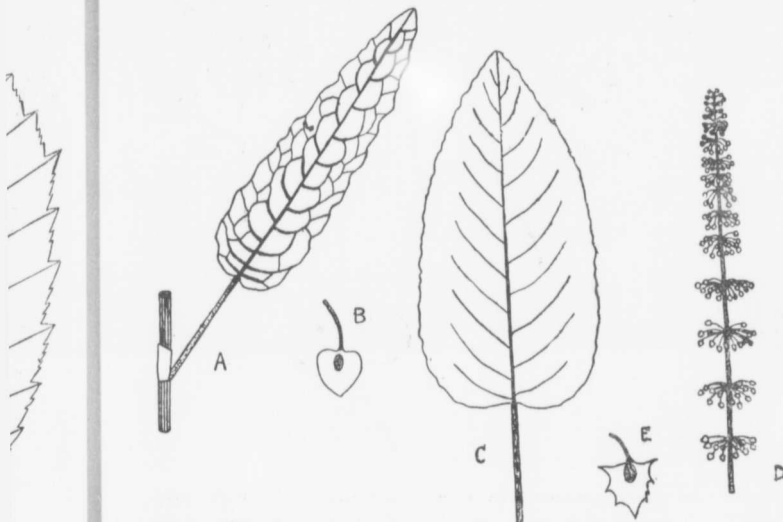


Fig. 19. A, Leaf, B, Fruit of CURLED DOCK; C, Leaf, D, Fruiting branch, and E, Fruit of BROAD-LEAVED DOCK.

A tree attaining a maximum height of 90 feet, with black bark. Leaves alternate, lance-shaped, toothed,  $2\frac{1}{2}$  to 4 inches long. Flowers in racemes, white. Sepals 5, petals 5 (separate), stamens numerous. Fruit a globular drupe about one-third of an inch in diameter, dark-purple or black.

Flowers in May. Fruit ripe August-September. It occurs in woods from Nova Scotia to Ontario. (Fig. 24.) Price, 6 to  $8\frac{1}{2}$  cents per pound.

**WILD INDIGO, INDIGO BROOM, HORSEFLY WEED.** *Baptisia tinctoria* R. Br. (Fam. *FABACEÆ* [*LEGUMINOSÆ*].) The dried root yields *Baptisia* (not official). It is collected in the autumn.

It is a perennial herb, 2 to 4 feet high, with compound leaves consisting of three leaflets, yellow flowers, and short pods. It occurs in dry soil in Ontario. Price, 4 to 25 cents per pound.

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SPOTTED CRANESBILL OR ALUM ROOT. *Geranium maculatum* L. (Fam. GERANIACEÆ.) The dried rhizome yields *Geranium* (U.S.). It should be collected just before flowering, that is, in April or May.

Hairy, perennial herbs, 1 to 2 feet high, with palmately lobed leaves, the two principal leaves being opposite. Flowers in pairs, rose-purple, an inch or more across. The fruit grows out into a long beak when ripe. It occurs in open woods and fields from Newfoundland to Manitoba. Price, 5 to 9 cents per pound.

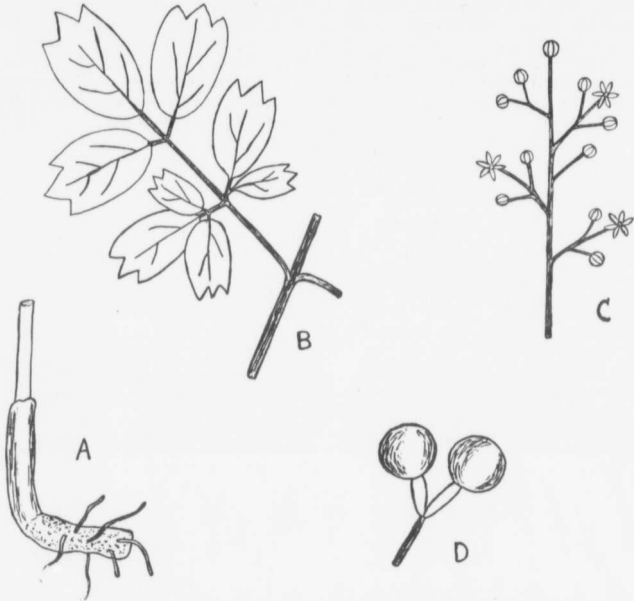


Fig. 20. BLUE COHOSH: A, Rhizome; B, Part of leaf; C, Inflorescence; D, Two fruit-like seeds.

PRICKLY ASH OR TOOTHACHE TREE. *Zanthoxylum americanum* Miller. (Fam. RUTACEÆ.) The dried bark yields *Xanthoxylum* (U.S.). It is collected in autumn or early spring.

It is a shrub or small tree with prickly twigs and unequally pinnate, strongly-scented leaves with oil glands. Flowers greenish-yellow, appearing before the leaves. Fruit fleshy, opening by two valves when ripe, containing one or two black seeds. It occurs in rocky woods and on river banks in Quebec and Ontario. Price, 8 to 15 cents per pound.

SMOOTH SUMACH. *Rhus glabra* L. (Fam. ANACARDIACEÆ.) The dried fruit furnishes *Rhus Glabra* (U.S.). It should be collected while the downy covering is still on it.

Shrubs or small trees with unequally pinnate, smooth leaves and green flowers in a dense, pyramid-shaped inflorescence. Fruit a one-seeded drupe, covered with red hairs. It occurs in dry soil from Nova Scotia to Ontario. Price, 3 to 11 cents per pound.

BURNING BUSH OR WAHOO. *Euonymus atropurpureus* Jacq. (Fam. CELASTRACEÆ.) The dried bark of the root yields *Euonymus* (U.S.) and *Euonymi Cortex* (B.P.). It is collected in autumn or early spring.

A shrub or small tree with four-sided twigs and opposite leaves. Flowers dark purple. Fruit a four-lobed capsule, opening, when ripe, to disclose the red seeds. It occurs in Ontario. Price, 28 to 44 cents per pound.

(a) AMERICAN SPIKENARD. *Aralia racemosa* L. (Fam. ARALIACEÆ.)

(b) WILD SARSAPARILLA. *Aralia nudicaulis* L. (Fam. ARALIACEÆ.)

The dried rhizome of both these species yields *Aralia* (N.F.). It is collected in autumn.

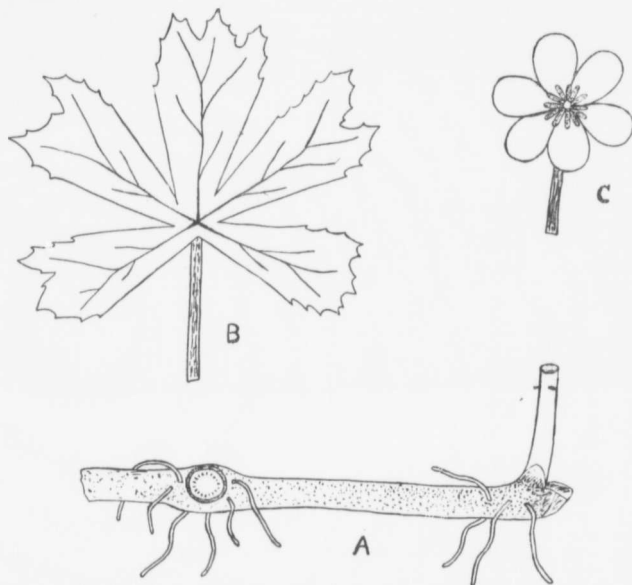


Fig. 21. MAY-APPLE: A, Rhizome; B, Leaf; C, Flower.

(a) AMERICAN SPIKENARD. Perennial herbs, 3 to 6 feet high, with long, thick, aromatic roots. Leaves divided at first into three, then pinnately. The inflorescence consists of numerous simple umbels. Flowers greenish. The fruit is a dark purple berry. It occurs in rich woods from New Brunswick to Ontario.

(b) WILD SARSAPARILLA. This differs from the above principally in having only a single leaf, and usually three simple umbels. It occurs in woods from Newfoundland to Manitoba. Price, 13 to 17 cents per pound.

AMERICAN ANGELICA OR PURPLE-STEMMED ANGELICA. *Angelica atropurpurea* L. (Fam. AMMIACEÆ [UMBELLIFERÆ].) The dried root yields *Angelica* (N.F.). It is collected in autumn.

Strong-scented, perennial herbs 4 to 6 feet high, with flowers in compound umbels and flattened fruits. It occurs in swamps and moist ground from Newfoundland to Ontario. Price, 10 to 20 cents per pound.

**HEMLOCK.** *Conium maculatum* L. (Fam. *AMMIACEÆ* [*UMBELLIFERÆ*].) The fresh leaves and young branches collected when the plant comes into flower and dried quickly in the sun yield *Conii folia* (B.P.). The full-grown but still green fruits collected about August or September and dried yield *Conium* (U.S.) and *Conii fructus* (B.P.).

It is a biennial herb 2 to 5 feet high, with purple spots on the hollow stem and large leaves several times pinnately divided. Flowers white, in compound umbels, with bracts below both the simple and the compound umbel. It is a native of Europe, but now occurs in waste places in Quebec and Ontario. Poisonous. Price of leaves, 10 cents per pound. Price of fruits, 9 cents per pound.

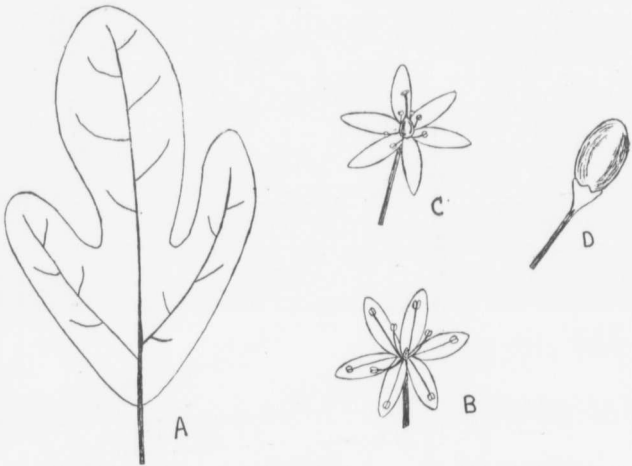


Fig. 22. SASSAFRAS: A. Leaf; B. Staminate flower; C. Carpellary flower; D. Fruit.

**FLOWERING DOGWOOD.** *Cynoxylon floridum* Raf. [*Cornus florida* L.] (Fam. *CORNACEÆ*.) The dried bark of the root yields *Cornus* (N.F.). It is collected in autumn.

A shrub or small tree, with opposite, ovate, entire leaves. Flowers greenish-yellow, in a dense cluster, with four large white or pinkish bracts, which are notched at the tip. Fruit an ovoid scarlet drupe. It occurs in dry woods in southern Ontario. Price, 4 to 6 cents per pound.

**PIPSISSEWA OR PRINCE'S PINE.** *Chimaphila corymbosa* Pursh. and *C. occidentalis* Rydberg. (Fam. *PYROLACEÆ*.) The dried leaves yield *Chimaphila* (U.S.). They are collected when the plant is in flower.

Perennial herbs, almost shrubby, with creeping, underground stems. Erect stems 2 to 6 inches high. Leaves alternate, obovate, blunt at the tip, toothed, 1 to 3 inches long, dark green, and shining above. Flowers white or pinkish, in racemes. Sepals 5, petals 5 (separate), stamens 10. Fruit a five-celled,

rounded capsule about a quarter of an inch in diameter. Flowers June to August. The difference between the two species is slight, and both were formerly considered to be one species named "*Chimaphila umbellata* Nutt." Both species grow in dry woods, the former in eastern Canada—Nova Scotia to Ontario—the latter in British Columbia. (Fig. 25.) Price, 5 cents per pound.

**WINTERGREEN OR CHECKERBERRY.** *Gaultheria procumbens* L. (Fam. *ERICACEÆ*.) The dried leaves yield *Oleum Gaultheriæ* (U.S.). They should be collected in autumn.

Small aromatic shrubs 2 to 6 inches high, with creeping stems. Leaves mostly clustered at the tips of the branches, oval, with a white, drooping flower between the leaf and the stem. Fruit enclosed in the red, fleshy calyx, which resembles a berry. It occurs in woods, especially under evergreen trees, from Newfoundland to Manitoba. Price of leaves, 6 to 30 cents per pound.

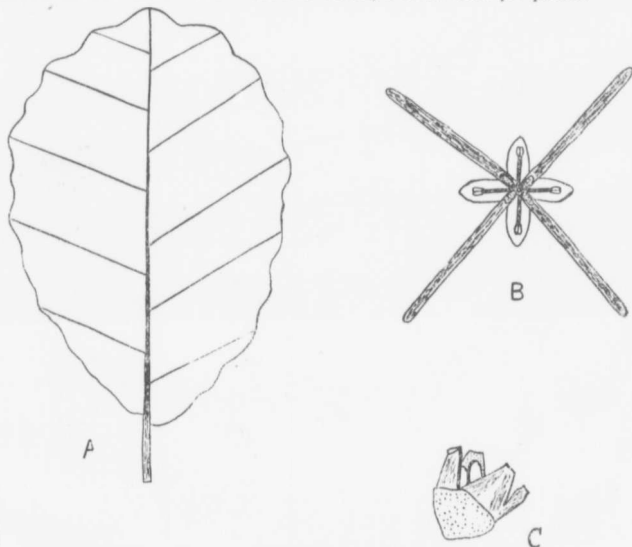


Fig. 23. WITCH HAZEL: A, Leaf; B, Flower; C, Open fruit.

**BEARBERRY, KINNIKINNICK.** *Uva-Ursi Uva-Ursi* Britton. [*Arctostaphylos Uva-Ursi* Spreng]. (Fam. *ERICACEÆ*.) The dried leaves yield *Uva Ursi* (U.S.) and *Uvæ Ursi folia* (B.P.). They are collected in autumn.

A trailing shrub with branches  $\frac{1}{2}$  to 2 feet long, and alternate, obovate, tough leaves. Flowers white in short racemes. Fruit a red drupe. It occurs in dry, sandy or rocky soil throughout Canada. Price, 4 to 6 cents per pound.

**BOG BEAN OR BUCK BEAN.** *Menyanthes trifoliata* L. (Fam. *MENYANTHACEÆ*.) The dried leaves yield *Menyanthes* (N.F.). They are collected mostly in spring.



Perennial herbs with rhizomes. Leaves bitter to the taste, long-stalked, compound, with three oval leaflets. Flowers white or pinkish, in racemes. Fruit a capsule. It occurs in swamps throughout Canada. Price, 8 to 30 cents per pound.

**BLACK INDIAN HEMP.** *Apocynum cannabinum* L. (Fam. *APOCYNACEÆ*) The dried rhizome and roots yield *Apocynum* (U.S.). It is collected in autumn.

Perennial herbs  $3\frac{1}{2}$  to  $5\frac{1}{2}$  feet high, with deep vertical roots and milky juice. Leaves opposite, lance-shaped, entire, 2 to 4 inches long. Flowers greenish-white, in a rounded, branched inflorescence. Sepals 5, petals 5 (united), stamens 5, carpels 2, united at the top only, but free later. Each carpel forms

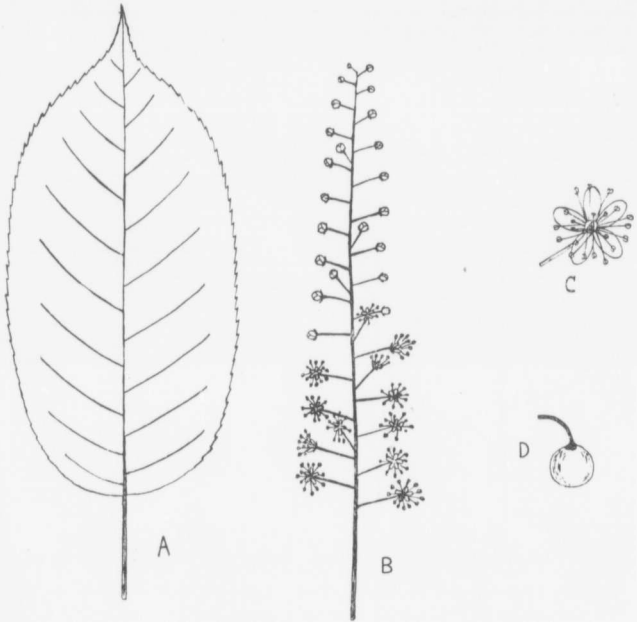


Fig. 24. WILD BLACK CHERRY: A, Leaf; B, Inflorescence; C, Flower; D, Fruit.

a long, cylindrical fruit 5 to 8 inches long, opening when ripe. Seeds numerous, provided with a tuft of hairs. Flowers June-August. Native in gravelly or sandy soil, mostly near streams, throughout Canada. (Fig. 26.) Price, 18 to 30 cents per pound.

**BUTTERFLY WEED OR PLEURISY ROOT.** *Asclepias tuberosa* L. (Fam. *ASCLEPIADACEÆ*.) The dried root yields *Asclepias* (Not official). It is collected in autumn and cut into slices to facilitate drying.

A hairy perennial herb 1 to 2 feet high, with thick roots, milky juice, alternate leaves, orange flowers, and a tuft of hairs on the seed. It occurs in dry and sandy soil in Ontario. Price, 10 to 18 cents per pound.

HOBBLEBUSH. *Marrubium vulgare* L. (Fam. LABIATÆ.) The dried leaves and tops yield *Marrubium* (U.S.). It should be collected just before the plant comes into flower.

Perennial herbs 1 to 3 feet high, strongly scented, covered with white, woolly hairs. Leaves opposite, rounded to ovate, wrinkled, bluntly toothed, 1 to 2 inches long. Flowers in clusters above the attachment of the leaves, white. Calyx teeth, ten in number, curved outwards. Corolla two-lipped. Stamens 4. Fruit separating into four one-seeded pieces. Flowers June-August.

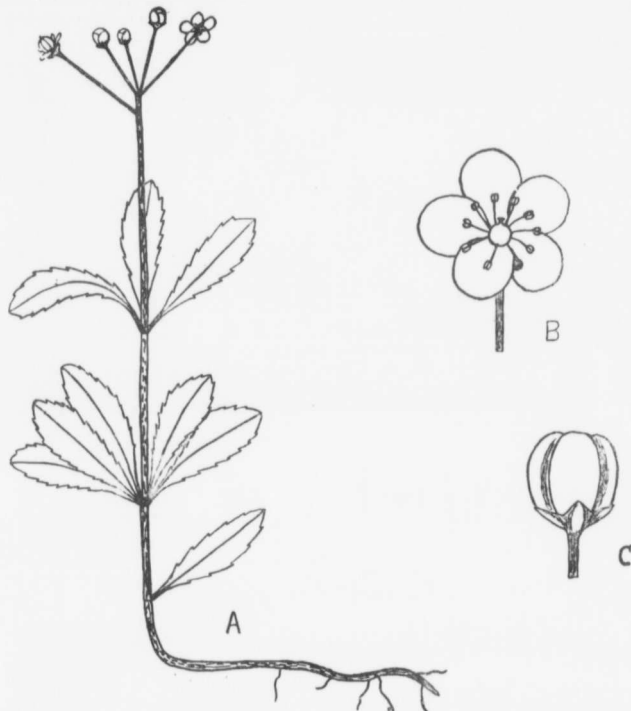


Fig. 25. PRINCE'S PINE: A, Stem, leaves and inflorescence; B, Flower; C, Fruit.

A native of Europe, but has escaped from cultivation on to waste ground in Ontario and British Columbia. (Fig. 27.) Price, 7 to 10 cents per pound.

MAD DOG SKULLCAP. *Scutellaria lateriflora* L. (Fam. LABIATÆ.) The dried tops collected when in flower yield *Scutellaria* (U.S.).

Bitter, perennial herbs, 8 inches to 2 feet high, with rhizomes, and opposite, lance-shaped, toothed leaves. Flowers in one-sided racemes with blue two-lipped corolla. It occurs in wet places throughout Canada. Price, 12 to 16 cents per pound.

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CATNIP OR CATMINT. *Nepeta Cataria* L. (Fam. LABIATÆ.) The dried leaves and flowering tops yield *Cataria* (not official). They are collected when the plant is coming into flower..

Strong-scented perennial herbs, with four-sided stems 2 to 3 feet high, covered with soft hairs. Leaves opposite, stalked, triangular, 1 to 3 inches long, toothed. Flowers in rather loose clusters at the top of the stem. Sepals 5 (united), corolla white with purple spots, two-lipped, stamens 4, two being longer than the others. Fruit separating into four pieces when ripe. Flowers July–November. A native of Europe, but has escaped from cultivation, and occurs in rather dry situations on waste ground from New Brunswick to Ontario. (Fig. 28.) Price, 7 to 8½ cents per pound.

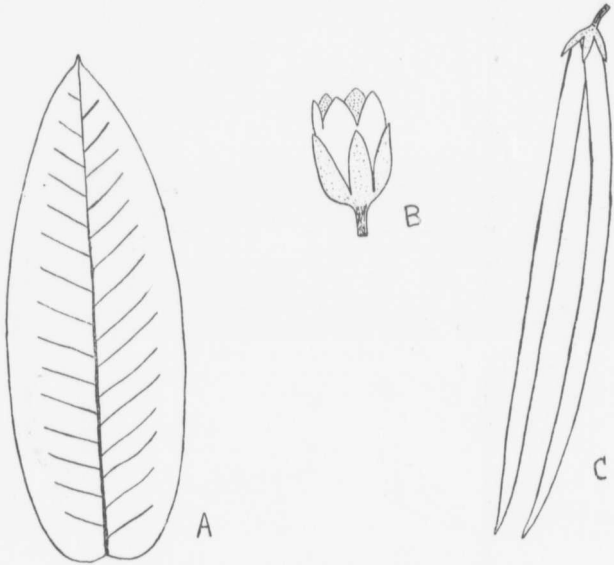


Fig. 26. BLACK INDIAN HEMP: A, Leaf; B, Flower; C, Fruit.

AMERICAN PENNYROYAL. *Hedeoma pulegioides* Pers. (Fam. LABIATÆ.) The dried leaves and tops collected when in flower yield *Hedeoma* (U.S.).

Annual herbs, one-half to 1½ feet high, strongly scented, with hairy stem and opposite leaves. Leaves oval, sparingly toothed, one-half to 1½ inches long. The flowers are in clusters around the stem just above the point where the leaves are attached. Calyx five-toothed, hairy. Corolla two-lipped, purple. There are only two perfect stamens. Fruit when ripe separating into 4 one-seeded pieces. Flowers July–September. It occurs in dry fields from Nova Scotia to Ontario. (Fig. 29.) Price, 4 to 6½ cents per pound.

BITTERSWEET OR WOODY NIGHTSHADE. *Solanum Dulcamara* L. (Fam. SOLANACEÆ.) The dried young branches yield *Dulcamara* (not official). They are collected when two or three years old, and after the leaves have fallen.

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A climbing or rambling shrub 2 to 8 feet high, with the leaves often three-lobed, purple flowers, and oval, red berries. A native of Europe, but has escaped and occurs in damp ground from New Brunswick to Ontario. Poisonous. Price, 3 to 10 cents per pound.

**THORNAPPLE OR JIMSON WEED.** *Datura Stramonium* L. (Fam. *SOLANACEÆ*.) The dried leaves yield *Stramonium* (U.S.) and *Stramonii folia* (B.P.). The dried ripe seeds yield *Stramonii Semina* (B.P.). The leaves are collected when the plant is in flower. The seeds are collected when the capsules are nearly ripe, but before they open. The seeds escape by beating.

Annual, strong-smelling herbs, 1 to 5 feet high, smooth. Leaves ovate, 3 to 8 inches long, deeply and irregularly toothed. Flowers borne singly in the forks, large, white in colour. Calyx tubular, angled, with five teeth. Corolla funnel-shaped, five-lobed. Stamens 5. Capsule about 2 inches

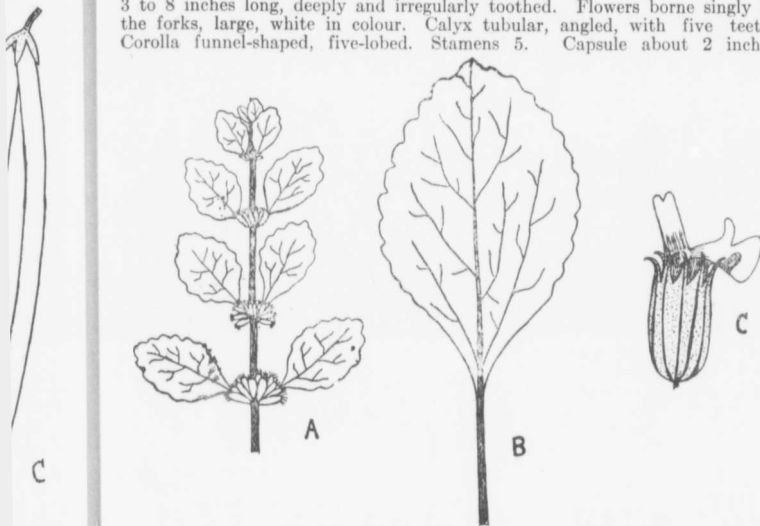


Fig. 27. HOREHOUND: A, Stem and inflorescence; B, Leaf; C, Flower.

long, covered with prickles. Flowers June-September. A native of Asia, but has escaped from cultivation and occurs on waste ground from Nova Scotia to Ontario. Poisonous. (Fig. 30.)

The easiest way to handle it is to cut it close to the ground when in flower and dry it in a tobacco-curing shed at a temperature of 100°-110° F. When the leaves are dry, they may be easily stripped off. Price of leaves, 16½ to 25 cents per pound. Price of seeds, 10 cents per pound.

**HENBANE.** *Hyoscyamus niger* L. (Fam. *SOLANACEÆ*.) The dried leaves and flowering tops of the second year's growth collected when in flower yield *Hyoscyamus* (U.S.) and *Hyoscyami folia* (B.P.).

A biennial, sometimes annual, herb 1 to 2½ feet high, covered with sticky hairs, with a very unpleasant odour. Leaves alternate, sessile, ovate, 3 to 7 inches long, very deeply toothed. Flowers in a one-sided spike. Calyx urn-shaped, five-toothed. Corolla funnel-shaped, yellowish, with purple veins.

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Stamens 5. Fruit a lid-capsule enclosed in the persistent calyx. Flowers June-July. A native of Europe, but has escaped and occurs in sandy soil from Nova Scotia to Ontario. Poisonous. The biennial plant only is official. (Fig. 31.) Price, 15 to 26 cents per pound.

**CULVER'S ROOT.** *Leptandra virginica* Nutt [*Veronica virginica* L.]. (Fam. *SCROPHULARIACEÆ*.) The dried rhizome and roots yield *Leptandra* (U.S.). It is collected in the autumn of the second year's growth.

Perennial herbs 2 to 7 feet high, with leaves in circles and flowers in dense spikes. The flowers are white or bluish, with 4 sepals, 4 united petals, and 2 stamens. It occurs in meadows and moist woods from Nova Scotia to British Columbia. Price, 12 to 14 cents per pound.

**FOXGLOVE OR FAIRIES' THIMBLES.** *Digitalis purpurea* L. (Fam. *SCROPHULARIACEÆ*.) The dried leaves of the second year's growth collected at the beginning of flowering yield *Digitalis* (U.S.) and *Digitalis folia* (B.P.).

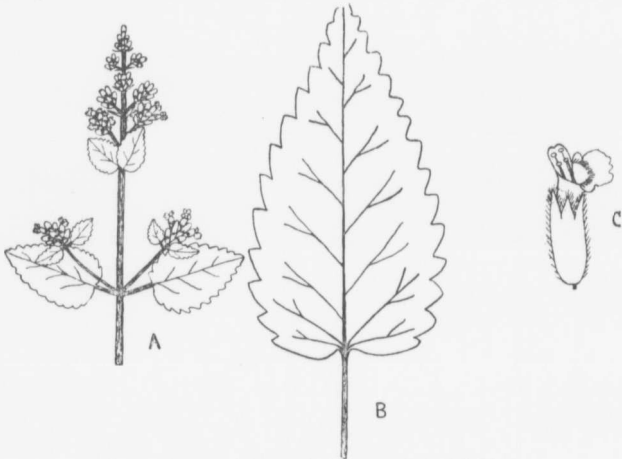


Fig. 28. CATNIP: A, Stem and inflorescence; B, Leaf; C, Flower.

A biennial herb, 2 to 5 feet high, with large purple, drooping, tubular flowers in a one-sided raceme, and 4 stamens. Native of Europe in sandy or stony ground, but occurs in various parts of Canada as a garden escape. In a wild state it usually avoids limy soils. Poisonous. Price, 14 to 20 cents per pound.

**AMERICAN ELDER.** *Sambucus canadensis* L. (Fam. *CAPRIFOLIACEÆ*.) The dried flowers yield *Sambucus* (not official).

A shrub 4 to 10 feet high, with opposite, unequally pinnate leaves, cream-coloured flowers in flat, branching inflorescences, and purple berries. It occurs in moist soil, at low elevations, from Nova Scotia to Manitoba. Price, 12 to 16 cents per pound.

**WILD GUELDER ROSE OR CRANBERRY TREE.** *Viburnum Opulus* L. (Fam. *CAPRIFOLIACEÆ*.) The dried bark yields *Viburnum opulus* (U.S.). It is collected in autumn.

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A shrub, with opposite, three-lobed leaves, which are as broad as long. Inflorescence flat and branched. Flowers white, the outer ones larger, with neither stamens nor carpels. The fruit is a nearly globular, scarlet drupe. It occurs in woods and along streams in low grounds throughout Canada. Price, 6 cents per pound

**NANNYBERRY OR SHEEPBERRY.** *Viburnum Lentago* L. (Fam. *CAPRI-FOLIACEÆ*.) The dried root bark yields *Viburnum prunifolium* (U.S.). It is collected in autumn.

A shrub or small tree reaching a maximum height of 30 feet, with long, narrow winter buds. Leaves opposite, ovate, toothed, rather pointed, 2 to 4 inches long. Inflorescence branched, flat-topped, with several rays. Flowers white. Sepals, petals, and stamens 5, the petals being united. Fruit, an oval bluish-black drupe, nearly half an inch long, with flat stone. It occurs in rich soil in woods and banks of streams from Quebec to Manitoba. (Fig. 32.) Price, 15 to 17 cents per pound.

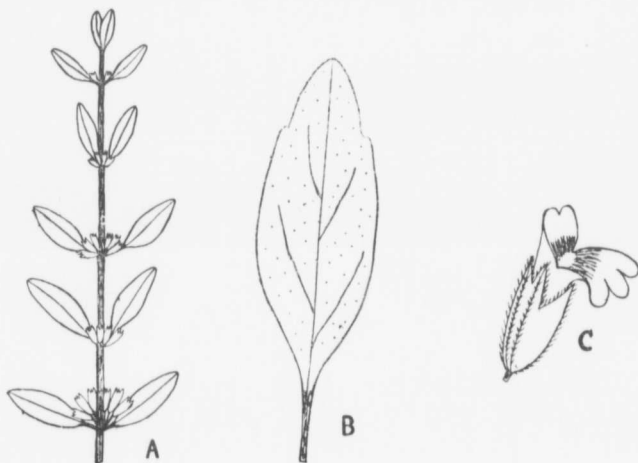


Fig. 29. AMERICAN PENNYROYAL: A, Stem and inflorescence; B, Leaf; C, Flower.

**INDIAN TOBACCO.** *Lobelia inflata* L. (Fam. *LOBELIACEÆ*.) The dried leaves and tops yield *Lobelia* (U.S. and B.P.). They are collected after some of the fruits have ripened.

Annual herbs, with milky juice, 1 to 3 feet high, with alternate, ovate or lance-shaped leaves. Flowers in a raceme, light blue in colour, with two-lipped corolla split down the back. Capsule inflated when ripe. It occurs in fields and thickets on dry soil from Labrador to Ontario and Saskatchewan. Poisonous. Price, 7 cents per pound.

**DANDELION.** *Leontodon Taraxacum* L. [*Taraxacum officinale* Weber]. (Fam. *CICHORIACEÆ*.) The dried roots yield *Taraxacum* (U.S.) and *Taraxaci radix* (B.P.). It should be collected in the autumn.

Perennial herbs with a thick, fleshy root sometimes a foot long, containing milky juice. Leaves all on the surface of the ground, pinnately lobed and toothed along the sides, 3 to 10 inches long. Flowers yellow, in heads, borne on a leaf-

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less, unbranched stalk 2 to 18 inches high. Fruit with a long, narrow beak and a tuft of hairs at the top, one-seeded and indehiscent. Flowers January–December. A European species, but is now a common weed in all parts of Canada. (Fig. 33.) Price 20 to 40 cents per pound.

**THOROUGHWORT, BONESET, OR INDIAN SAGE.** *Eupatorium perfoliatum* L. (Fam. *COMPOSITÆ*.) The dried leaves and flowering tops collected when the plant just comes into flower yield *Eupatorium* (U.S.).

Perennial herbs, 2 to 5 feet high, covered with fine hairs. Leaves opposite, ovate, united at the base round the stem, tapering to a narrow point, wrinkled, 4 to 8 inches long. Flowers white, in numerous heads with 10 to 16 flowers in each head. Fruits small, one-seeded, indehiscent, with a tuft of hairs at the top. Flowers July–September. It occurs in low, wet ground, from Nova Scotia to Manitoba. (Fig. 34.) Price, 5 to 6½ cents per pound.

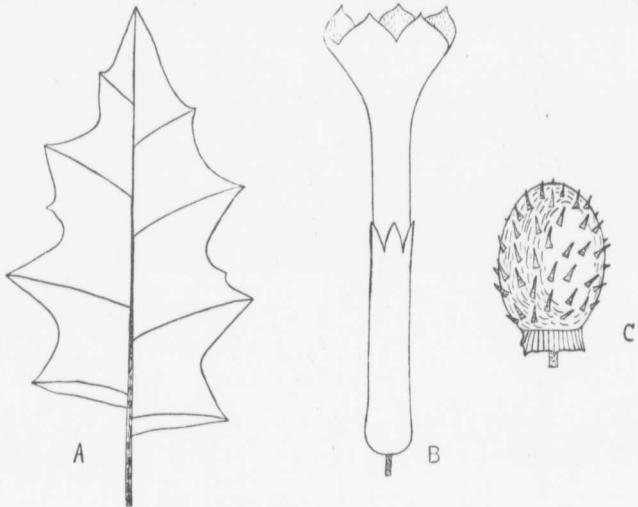


Fig. 30. JIMSON WEED: A, Leaf; B, Flower; C, Fruit.

**TAR WEED, BROAD-LEAVED GUM-PLANT.** *Grindelia squarrosa* Dunal. (Fam. *COMPOSITÆ*.) The dried leaves and flowering tops yield *Grindelia* (U.S.). They are collected when the plant is in full bloom.

Smooth, perennial, aromatic herbs, 8 inches to 2 feet high, with alternate leaves which are spiny on the edges. Flowers in sticky heads with recurved bracts, both central and ray flowers yellow in colour. Fruit crowned with two or three bristles when ripe. It occurs in dry soil in Manitoba and Saskatchewan. Price, 5 to 5½ cents per lb.

**TANSY.** *Tanacetum vulgare* L. (Fam. *COMPOSITÆ*.) The dried leaves and flowering tops yield *Tanacetum* (not official).

Strongly-scented, perennial herbs 1½ to 3 feet high. Leaves alternate, twice pinnately lobed and toothed, 6 to 12 inches long. Flower heads numerous button-like, yellow, one-third of an inch in diameter, with the ray flowers not conspicuous. Bracts occur under the whole head, but there are none below the

individual flowers. Fruit one-seeded, indehiscent, without a tuft of hairs on the top. Flowers July-September. A native of Europe, but escaped from cultivation, and occurring on waste ground from Nova Scotia to Ontario. (Fig. 35.) Price, 8 to 10 cents per pound.

**GREAT BURDOCK.** *Arctium Lappa* L. (Fam. *COMPOSITÆ*.) The dried roots yield *Lappa* (U.S.). The roots should be those of the first year's growth, collected in spring. They should be sliced lengthwise before drying.

Biennial herbs 4 to 9 feet high. Leaves alternate, broadly ovate, with cottony hairs, the lower leaves often 18 inches long. Leaf stalk furrowed. Flowers purple, in heads 1 inch in diameter, with hooked bracts underneath. Fruit indehiscent, one-seeded, with a tuft of hairs on the top. Flowers July-October. A European species, but has been introduced into Canada, and grows on waste ground from New Brunswick to Ontario. (Fig. 36.) Price, 10 to 12 cents per pound.

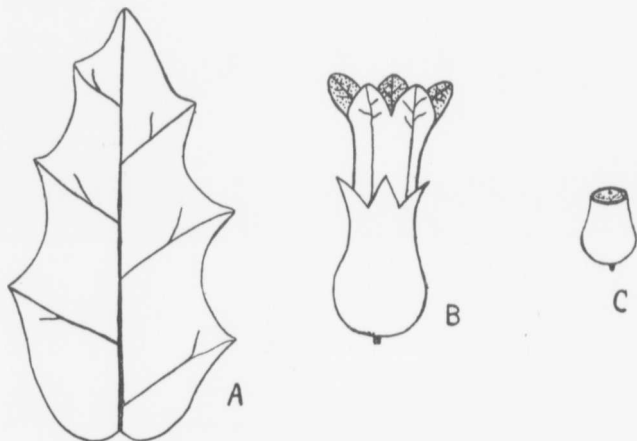


Fig. 31. HENBANE: A, Leaf; B, Flower; C, Fruit.

**HORSEWEED OR CANADA FLEABANE.** *Leptilon canadense* Britton [*Erigeron canadense* L.]. (Fam. *COMPOSITÆ*.) The dried leaves and flowering tops yield *Erigeron* (N.F.) and *Oleum Erigerontis* (U.S.). They are collected when the plant comes into flower.

Annual herbs a few inches to several feet high, with obovate leaves and numerous small flower-heads about one-sixth of an inch in diameter, with white flowers. It occurs in fields and waste places throughout Canada. Price, 6 to 8 cents per pound.

**ELECAMPANE.** *Inula Helenium* L. (Fam. *COMPOSITÆ*.) The dried root yields *Inula* (not official). It is collected in the autumn of the second year's growth, cut into slices, and dried. Older roots are liable to be stringy.

A perennial, herb, 2 to 6 feet high, with thick roots, large hairy leaves, and yellow flower heads, 2 to 4 inches broad, with prominent ray flowers. A native of Europe, but occurs in fields and on roadsides from Nova Scotia to Ontario. Price, 6½ to 7½ cents per pound.



**COLTSFOOT.** *Tussilago Farfara* L. (Fam. *COMPOSITÆ*) The dried leaves and rhizome yield *Tussilago* (not official). They should be collected about June or July.

It is a perennial herb with yellow flower-heads, which come above ground before the leaves. The leaves are about the size and shape of a horse's hoof, and cottony on the underside. Seeds with a tuft of hairs on the top. A native of Europe, but occurs in wet, clayey soil from Nova Scotia to Ontario. Price of leaves, 12 to 15 cents per pound; of rhizome, 6 cents per pound.

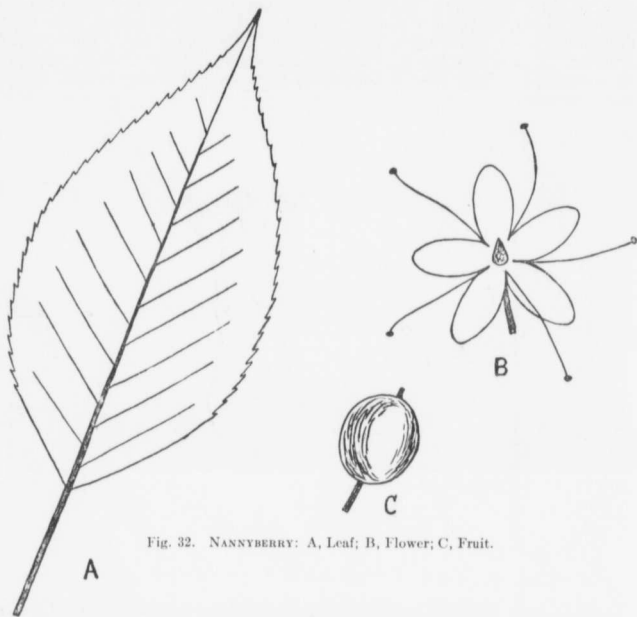


Fig. 32. NANNYBERRY: A, Leaf; B, Flower; C, Fruit.

## CHAPTER VIII.

### Foreign Medicinal Plants which might grow in Canada.

The drug-plants comprised in this chapter are not natives of Canada, but it is believed that a considerable number of them could be grown successfully in this country, especially in those parts where the winter is not too severe, such as the extreme south of Ontario and the western parts of British Columbia. There is a very fair demand for all those mentioned.

**ORRIS ROOT.** The dried rhizomes of three species of *Iris* (Fam. *IRIDACEÆ*), viz: *Iris germanica* L., *I. pallida* Lam., and *I. florentina* L., natives of countries bordering the Mediterranean, furnish the drug known as *Iris Florentina* (not official). The rhizomes are gathered in late summer, when two or three years old, soaked in water, and the outer skin peeled off. They are then carefully dried in the sun.

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Orris Root is used very slightly as a drug at present. It is much more extensively used as a perfume, and in tooth-powders. All the three species mentioned above have showy flowers and are hardy at the Central Experimental Farm, Ottawa. Price, 17 to 21 cents per pound.

**RHUBARB.** The drug known as *Rheum* (U.S.) and *Rhei radix* (B.P.) is obtained from two species of *Rheum* (Fam. *POLYGONACEÆ*) growing at high elevations in Central and Western China. These are *Rheum officinale*

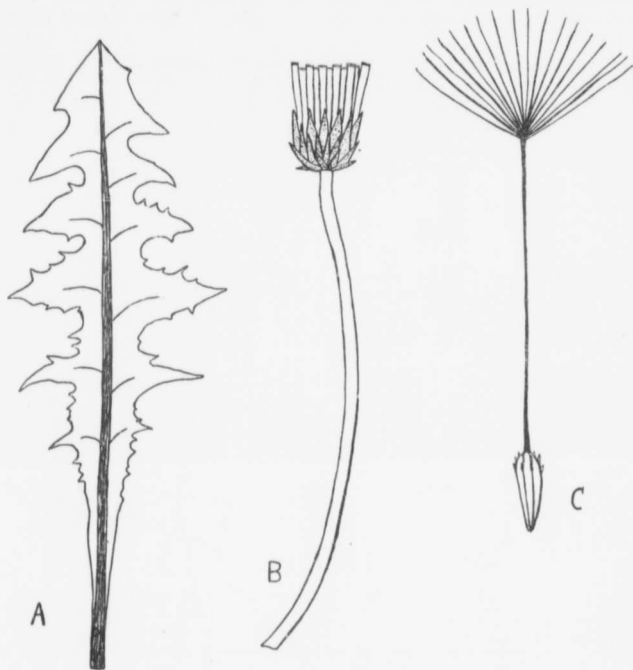


Fig. 33. DANDELION: A, Leaf; B, Flower-head; C, Fruit.

Baillon and *R. palmatum* L. and its variety *tanguticum* Maxim. [Ordinary Garden Rhubarb is *Rheum rhaponticum* L.] The thick rhizome, which should be several years old, is dug up in September, the roots are cut off, and the crown and rind removed. It is then cut into pieces, which are strung on a cord and hung up to dry. Both species are hardy at the Central Experimental Farm, Ottawa. Price, 30 to 50 cents per pound.

**BITTER ALMOND.** *Amygdalus communis* L. var. *amara*. (Fam. *AMYGDALACEÆ*.) The dried ripe seeds yield *Amygdala amara* (U.S. and B.P.).

**SWEET ALMOND.** *Amygdalus communis* L. var. *dulcis*. (Fam. *AMYGDALACEÆ*.) The dried ripe seeds yield *Amygdala dulcis* (U.S. and B.P.).

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The outer felt-like part of the stone-fruit splits and falls away, leaving the shell containing the seed still attached to the tree. The supply of almonds at present is obtained mainly from countries bordering the Mediterranean and California. It is probable that they would grow in those parts of Canada where the Peach is a success. The Sweet Almond grew well and flowered at Agassiz in British Columbia, but did not fruit, but this may possible have been due to causes other than climatic. The kernels of Peach, Plum, and other stone-fruits can be used for the same purpose as those of Bitter Almond. The seeds of Sweet Almond, besides their uses in medicine, are employed also very extensively as a food and in confectionery. Price of Bitter Almond, 40 cents per pound.

**LIQUORICE.** *Glycyrrhiza glabra* L. (Fam. *FABACEÆ* [*LEGUMINOSÆ*]). The dried rhizome and root yield *Glycyrrhiza* (U.S.) and *Glycyrrhizæ radix* (B.P.). It is dug up in autumn and according to the B.P., it should be peeled before

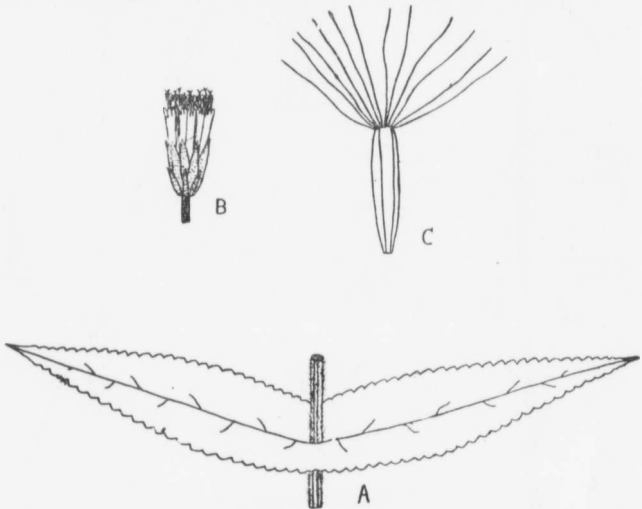


Fig. 34. BONESET: A, Stem and pair of united leaves; B, Flower-head; C, Fruit.

drying. It is a perennial herb with thick roots, and succeeds best in the rich soil of river valleys with a hot summer, but cannot endure severe freezing. It can be propagated by cuttings. The bulk of the present supply comes from countries around the Mediterranean. The annual import into the United States was formerly 100,000,000 pounds. It is hardy as far north as Pennsylvania, and might succeed in western British Columbia or southern Ontario. Price, 8 to 25 cents per pound.

**ANISE.** *Pimpinella Anisum* L. (Fam. *AMMIACEÆ* [*UMBELLIFERÆ*]). The dried ripe fruits yield *Anisum* (U.S.) and *Anisi fructus* (B.P.), and are imported from Mediterranean countries and Russia. It is an annual plant, and should be capable of cultivation in Canada. It grew fairly successfully at Brandon, Man., in 1903. Price, 9 to 16 cents per pound.

**FENNEL.** *Foeniculum Feniculum* Karst. [*F. vulgare* Mill.] (Fam. **AMMIACEÆ** [**UMBELLIFERÆ**]). The dried ripe fruits yield *Feniculum* (U.S.) and *Feniculi fructus* (B.P.). It is a native of countries around the Mediterranean, but has been grown as far north as Connecticut. It would probably succeed in southern Ontario or British Columbia. It is an annual or perennial herb according to the climate, with very finely-divided leaves, and is adapted to dry and sunny situations. From  $4\frac{1}{2}$  to 5 pounds of seed should be sown per acre, and should yield about 15 cwt. of fruits per acre. It should be cut before the seeds are fully ripe. Price, 10 to 18 cents per pound.

**YELLOW GENTIAN.** *Gentiana lutea* L. (Fam. **GENTIANACEÆ**.) The dried rhizome and roots yield *Gentiana* (U.S.) and *Gentiana radix* (B.P.). It is a native of the mountains of Central and Southern Europe and is collected in the autumn. It would probably succeed in the warmer parts of Canada. Price,  $7\frac{1}{2}$  to 15 cents per pound.

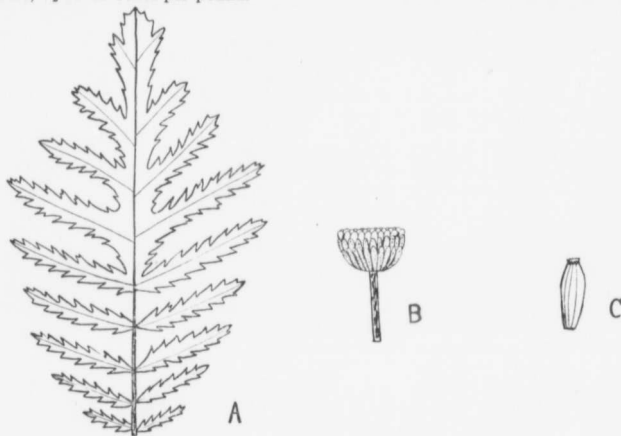


Fig. 35. TANSY: A, Upper leaf; B, Flower-head; C, Fruit.

**DEADLY NIGHTSHADE OR BELLADONNA.** *Atropa Belladonna* L. (Fam. **SOLANACEÆ**.) The dried leaves yield *Belladonna folia* (U.S. and B.P.), and the dried roots *Belladonna radix* (U.S. and B.P.). The leaves should be collected when the plant is in flower, the root in the autumn, when about three or four years old. It is a perennial herb, with purple, bell-shaped flowers and dark purple berries, and is poisonous. It grows well in a good garden soil, especially if limy. It has been cultivated successfully at Washington, D.C., and might succeed in the warmer parts of Canada. Seed should be sown in a specially prepared seed-bed in autumn, as it is found that frost accelerates germination. Price of leaves, 25 cents per pound for American, \$1.50 per pound for English. Price of root, 10 cents to \$1 per pound.

**GARDEN CHAMOMILE.** *Anthemis nobilis* L. (Fam. **COMPOSITEÆ**.) The dried flower heads of cultivated plants yield the drug *Anthemis* (U.S.) and *Anthemidis flores* (B.P.). It should be collected when the flower heads open. It is a perennial herb, with white double flowers, native of England and Europe in pastures and dry soils. It is hardy at the Central Experimental Farm,

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Ottawa. It is propagated usually by dividing an old plant into ten to twelve parts or "sets," which are planted in rows  $2\frac{1}{2}$  feet apart, with 18 inches between the plants in the row. If propagated from seed, some of the plants may have "single" flowers, and those with double flowers are preferred. The yield should be about 4 cwt. of dried flowers per acre. Price, 36 to 45 cents per pound.

**MOUNTAIN TOBACCO OR ARNICA.** *Arnica montana* L. (Fam. *COMPOSITÆ*.) The dried flower heads yield *Arnica* (U.S.), and the dried rhizome and roots collected in autumn furnish the drug *Arnica radix* (U.S.), and *Arnica rhizoma* (B.P.). It is a perennial herb and is native in Central Europe. It would doubtless succeed in some parts of Canada. Price of flowers, 17 to 20 cents per pound; of root, 40 to 45 cents per pound.

**INSECT FLOWERS.** These flowers, known as *Pyrethri flores* (not official) are derived from dried half-expanded flower heads of three species of *Chrysanthemum*. (Fam. *COMPOSITÆ*.) The plant should be about three years old before the flowers are gathered. Persian Insect Powder is obtained from

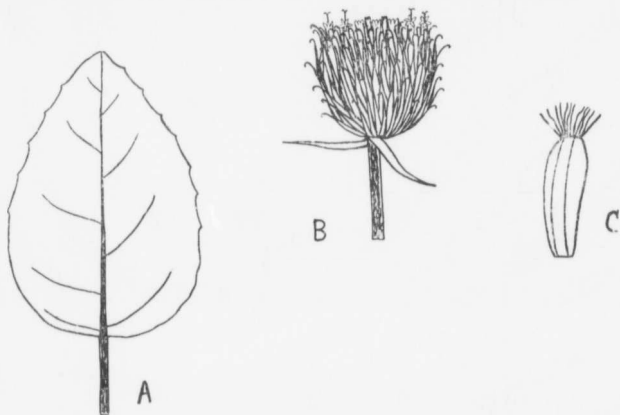


Fig. 36. GREAT BURDOCK: A, Upper leaf; B, Flower-head; C, Fruit.

*Chrysanthemum roseum* Web. et Mohr, and *C. Marshallii* Aschers., while Dalmatian Insect Powder is obtained from *C. cinerariifolium* Bocc. They are all hardy, perennial herbs, native in Western Asia, and have been proved capable of standing the winter in New York state. They are at present grown extensively in California, their principal use being as an insecticide. *Chrysanthemum roseum* is hardy at the Central Experimental Farm, Ottawa. Price, 60 cents per pound.]

## CHAPTER IX.

### BIBLIOGRAPHY.

Those who wish for further information regarding the plants mentioned in this Bulletin, and also concerning other plants not included, will find much that is of service to them in the various publications listed below. Those marked with an asterisk can still be had, while the supply lasts, at the price mentioned, from the Superintendent of Documents, Government Printing Office, Washington, D.C., but stamps or coin should not be sent in payment.

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