USEFUL PLANTS AND POISONOUS PLANTS

WILD EDIBLE PLANTS

Words of Caution

At least some parts of literally thousands of native and naturalized plants have been used for food and other purposes by Native Americans. Many were also used by the immigrants who came later from other areas of the world. A representative compilation of wild edible plants is shown in Table 4. This list has been compiled from a variety of sources; the author has had opportunities to sample only a fraction of these plants himself and cannot confirm the edibility of all of the plants listed.

The reader is cautioned to be certain of the identity of a plant before consuming any part of it. For example, cow parsnip (*Heracleum lanatum*) and water hemlocks (*Cicuta* spp.) resemble each other in general appearance, but although cooked roots of cow parsnip have been used for food for perhaps many centuries, those of water hemlocks are very poisonous and have caused many human fatalities.

As indicated in Chapter 21 of Stern, Bidlack & Jansky: *Introductory Plant Biology*, 9th ed., many species of organisms are now on rare and endangered species lists, and a number of them will become extinct within the next few years. Although the wild edible plants discussed here may not presently be included in such lists, it might not take much indiscriminate gathering to endanger their existence as well. Because of this, one should exercise the following rule of thumb: Never reduce a population of wild plants by more than 10% when collecting them for any purpose! If the population consists of less than ten plants, do not disturb it.

TABLE 4

Wild Edible Plants

Plant	***Scientific Name***	***Uses***
Amaranth	*Amaranthus* spp.	Young leaves used like spinach; seeds ground with others for flour
Arrow grass	*Triglochin maritima*	Seeds parched or roasted (**Caution:** All other plant parts are poisonous.)
Arrowhead	*Sagittaria latifolia*	Tubers used similarly to potatoes
Balsamroot	*Balsamorhiza* spp.	Whole plant edible, especially when young, either raw or cooked
Basswood	*Tilia* spp.	Fruits and flowers ground together to make a paste that can serve as a chocolate substitute; winter buds edible raw; dried flowers used for tea
Bearberry (Kinnikinik)	*Arctostaphylos uva-ursi*	Berries are edible but much more palatable when cooked
Bedstraw (Cleavers)	*Galium aparine*	Roasted and ground seeds make good coffee substitute
Beechnuts	*Fagus grandifolia*	Seeds used as nuts; oil extracted from seeds for table use
Biscuit root	*Lomatium* spp.	Roots eaten raw or dried and ground into flour; seeds edible raw or roasted
Bitterroot	*Lewisia rediviva*	Outer coat of the bulbs should be removed to eliminate the bitter principle; bulbs are then boiled or roasted
Blackberry (wild)	*Rubus* spp.	Fruits edible raw, in pies, jams, and jellies
Black walnut	*Juglans nigra*	Nutmeats edible
Bladder campion	*Silene cucubalus*	Young shoots (less than 5 cm tall) cooked as a vegetable
Blueberry	*Vaccinium* spp.	Fruits edible raw, frozen, and in pies, jams, and jellies
Bracken fern	*Pteridium aquilinum*	Young uncoiling leaves ("fiddleheads") cooked like asparagus; rhizomes also edible but usually tough. (**Caution:** Evidence indicates that frequent consumption of bracken fern can cause cancer of the intestinal tract.)
Broomrape	*Orobanche* spp.	Entire plant eaten raw or roasted
Bulrush (Tule)	*Scirpus* spp.	Roots and young shoot tips edible raw or cooked; pollen and seeds also edible
Butternut	*Juglans cinerea*	Nutmeats edible
Camas	*Camassia quamash*	Roasted bulbs considered a delicacy

Caraway	*Carum carvi*	Young leaves in salads; seeds for flavoring baked goods and cheeses
Cattail	*Typha* spp.	Copious pollen produced by flowers in early summer is rich in vitamins and can be gathered and mixed with flour for baking; rhizomes can be cooked and eaten like potatoes
Chicory	*Cichorium intybus*	Leaves eaten raw or cooked; dried, ground roots (roasted) make good coffee substitute
Chokecherry	*Prunus virginiana*	Fruits make excellent jelly or can be cooked with sugar for pies and cobblers
"Coffee" (wild)	*Triosteum* spp.	Berries dried and roasted make good coffee substitute
Common chickweed	*Stellaria media*	Plants cooked as a vegetable
Corn lily	*Clintonia borealis*	Youngest leaves can be used as a cooked vegetable
Clover	*Trifolium* spp	Roots edible
Cow parsnip	*Heracleum lanatum*	Roots and young stems cooked. (**Caution:** Be certain of identity; some other members of the family similar in appearance to cow parsnip are highly toxic.)
Cowpea	*Vigna sinensis*	"Peas" and young pods cooked as a vegetable (plant “naturalized” in southern U.S.)
Crab apple	*Pyrus* spp.	Jelly made from fruits
Cranberry (wild, bog)	*Vaccinium* spp.	Berries edible cooked, preserved, or in drinks; adding a small amount of salt while cooking significantly reduces amount of sugar needed to counteract acidity
Crowberry	*Empetrum nigrum*	Fruits should first be frozen then cooked with sugar
Dandelion	*Taraxacum officinale*	Leaves rich in vitamin A; dried roots make good coffee substitute; wine made from young flowers
Dock	*Rumex* spp.	Leaves cooked like spinach; tartness of leaves varies from species to species and sometimes from plant to plant—tart forms should be cooked in two or three changes of water
Douglas fir	*Pseudotsuga menziesii*	Cambium and young phloem edible; tea made from fresh leaves
Elderberry	*Sambucus* spp.	Fresh flowers used to flavor batters; fruits used in pies, jellies, wine. (**Caution:** Other parts of the plant are poisonous.)

Evening primrose	*Oenothera hookeri, O. biennis,* and others	Young roots cooked
Fairy bells	*Disporum trachycarpum*	Berries can be eaten raw
Fennel	*Foeniculum vulgare*	Leaf petioles eaten raw or cooked
Ferns	Most (but not all) spp.	Young coiled fronds (fiddleheads) may be cooked as a vegetable
Fireweed	*Epilobium angustifolium*	Young shoots and leaves boiled as a vegetable
Fritillary	*Fritillaria* spp.	Cooked bulbs are edible
Ginger (wild)	*Asarum* spp.	Rhizomes can be used as substitute for true ginger
Gooseberry	*Ribes* spp.	Berries eaten cooked, dried, or raw; make excellent jelly
Grape (wild)	*Vitis* spp.	Berries usually tart but can be eaten raw; make good jams and jellies
Grass	Many genera and species	Seeds of most can be made into flour; rhizomes of many perennial species can be dried and ground for flour
Greenbrier	*Smilax* spp.	Roots dried and ground; refreshing drink made with ground roots, sugar, and water
Groundnut	*Apios americana*	Tubers cooked like potatoes
Hawthorn	*Crataegus* spp.	Fruits edible raw and in jams and jellies
Hazelnut	*Corylus* spp.	Nuts eaten raw or roasted
Hickory	*Carya* spp.	Nuts edible
Highbush cranberry	*Viburnum trilobum*	Fruits make excellent jellies and jams
Huckleberry	*Vaccinium* spp.	Berries eaten raw or in jams and jellies
Indian paintbrush	*Castilleja* spp.	Flowers of many species edible. (**Caution:** On certain soils, plants absorb toxic quantities of selenium.)
Indian pipe	*Monotropa* spp.	Whole plant edible raw or cooked
June berries	*Amelanchier* spp.	Fruit edible fresh, dried, or preserved
Juniper	*Juniperus* spp.	"Berries" dried, ground, and made into cakes
Labrador tea	*Ledum* spp.	Tea made from young leaves
Lamb's quarters	*Chenopodium album*	Leaves and young stems used as cooked vegetable

Licorice	*Glycyrrhiza lepidota; G. glabra*	Roots edible raw or cooked
Mallow	*Malva* spp.	Leaves and young stems used as vegetable (use only small amounts at one time)
Manzanita	*Arctostaphylos* spp.	Berries eaten raw, in jellies or pies, or made into "cider." (**Caution:** Raw berries can be somewhat indigestible.)
Maple	*Acer* spp.	Sugar maples (*Acer saccharum*) well known for the sugar content of the early spring sap; other species (e.g., box elder—*A. negundo*, bigleaf maple—*A. macrophyllum*) also contain usable sugars in their early spring sap
Mariposa lily	*Calochortus* spp.	Bulbs edible raw or cooked
Mayapple	*Podophyllum peltatum*	Fruit good raw or cooked. (**Caution:** Other parts of the plant are poisonous.)
Maypops	*Passiflora incarnata*	Fruits edible raw or cooked
Miner's lettuce	*Claytonia perfoliata*	Leaves eaten raw as a salad green
Mint	*Mentha arvensis* and others	Leaves of several mints used for teas
Mormon tea	*Ephedra* spp.	Tea from fresh or dried leaves (add sugar to offset bitterness); seeds for bitter meal
Mulberry	*Morus* spp.	Fruits of the red mulberry (*M. rubra*) are used raw and in pies and jellies; fruits of white mulberry (*M. alba*) edible but insipid
Mushrooms	Many genera and species	**Utmost caution should be exercised in identifying mushrooms before consuming them.** Although poisonous species are in the minority, they are common enough. Edible forms that are relatively easy to identify include morels (*Morchella esculenta*), most puffballs (*Lycoperdon* spp.), and inky cap mushrooms (*Coprinus* spp.).
Mustard	*Brassica* spp.	Leaves used as vegetable; condiment made from ground seeds
Nettles	*Urtica* spp.	Leaves and young stems cooked like spinach
New Jersey tea	*Ceanothus americanus*	Tea from leaves
Nutgrass	*Cyperus esculentus* and others	Tubers can be eaten raw
Oak	*Quercus* spp.	Acorns were ground for flour and widely used by native North Americans; all contain bitter tannins that must be leached out before use

Onion (wild)	*Allium* spp.	Bulbs edible raw or cooked
Orach	*Atriplex patula* and others	Leaves and young stems cooked as a vegetable
Oregon grape	*Berberis aquifolia; B. nervosa*	Berries edible raw or preserved
Ostrich fern	*Matteuccia struthiopteris*	Young coiled fronds cooked as a vegetable
Pawpaw	*Asimina triloba*	Fruit edible raw or cooked
Pennycress	*Thlaspi arvense*	Young leaves are edible raw
Peppergrass	*Lepidium* spp.	Immature fruits add zest to salads; seeds spice up meat dressings
Persimmon	*Diospyros virginiana*	Fully ripened fruits can be eaten raw or cooked
Pickerel weed	*Pontederia cordata*	Fruits edible raw or dried
Pigweed (see Amaranth)		
Pines	*Pinus* spp.	Cambium, young phloem and seeds edible; tea from fresh needles rich in vitamin C
Pipsissewa	*Chimaphila umbellata*	Drink made from boiled roots and leaves (cool after boiling)
Plantain	*Plantago* spp.	Young leaves eaten in salads or as cooked vegetable
Poke	*Phytolacca americana*	Fresh young shoots boiled like asparagus. (**Caution:** Older parts of plants are poisonous.)
Prairie turnip	*Psoralea esculenta*	Turniplike roots cooked like potatoes
Prickly pear	*Opuntia* spp.	Fruits and young stems peeled and eaten raw or cooked
Psyllium	*Plantago ovata*	Seed husks widely used as a bulking laxative
Purple avens	*Geum rivale*	Liquid from boiled root has chocolate-like flavor
Purslane	*Portulaca oleracea*	Leaves and stems cooked like spinach
Quackgrass	*Elytrigia repens*	Noxious weed whose rhizomes can be used as emergency food
Raspberry (wild)	*Rubus* spp.	Fruits edible raw or in pies, jams, and jellies
Redbud	*Cercis* spp.	Flowers used in salads; cooked young pods edible
River-beauty	*Epilobium latifolium*	Young shoots and fleshy leaves can be cooked as a vegetable
Rose (wild)	*Rosa* spp.	Fruits (hips) exceptionally rich in vitamin C; hips can be eaten raw, pureed, or candied

Salal	*Gaultheria procumbens*, *G. shallon*	Ripe berries edible raw, dried, or preserved
Salmonberry	*Rubus spectabilis*	Fruits edible raw, dried, or cooked
Salsify	*Tragopogon* spp.	Roots edible raw or cooked
Saltbush	*Atriplex* spp.	Seeds nutritious. (**Caution:** On certain soils, plants can absorb toxic amounts of selenium.)
Sassafras	*Sassafras albidum*	Tea from roots. (**Caution:** Large quantities have narcotic Effect; leaves and pith used for Louisiana file.)
Serviceberry	*Amelanchier* spp.	All fruits edible (mostly bland)
Sheep sorrel	*Rumex acetosella*	Raw leaves have a pleasant sour taste; leaves can be used as seasoning in other dishes
Shepherd's purse	*Capsella bursa-pastoris*	Leaves cooked as vegetable; seeds eaten parched or ground for flour
Showy milkweed	*Asclepias speciosa*	Flowers eaten raw or cooked; young shoots cooked
Silverweed	*Potentilla anserina*	Cooked roots edible
Soap plant	*Chlorogalum pomeridianum*	Bulbs slow-baked and eaten like potatoes after fibrous outer coats are removed
Solomon's seal	*Polygonatum* spp.	Rootstocks dried and ground for bread flour
Sorrel	*Oxalis* spp.	Leaves mixed in salads
Spatterdock	*Nuphar polysepalum*	Seeds placed on hot stove burst like popcorn and are edible as such; peeled tubers eaten boiled or roasted
Speedwell	*Veronica americana* and others	Leaves and stems used in salads
Spring beauty	*Claytonia* spp.	Bulbs edible raw or roasted
Strawberry (wild)	*Fragari*a spp.	Fruits superior in flavor to cultivated varieties
Sunflower	*Helianthus annuus*	Seeds eaten raw or roasted; seeds yield cooking oil
Sweet cicely	*Osmorhiza* spp.	Roots have aniselike flavor
Sweet flag	*Acorus calamus*	Young shoots used in salads; roots candied
Thimbleberry	*Rubus parviflorus*	Fruits edible raw, cooked, dried, or preserved; dried leaves used for tea

Thistle	*Cirsium* spp.	Peeled stems edible; roots edible raw or roasted
Vetch	*Vicia* spp.	Tender green pods edible baked or boiled
Watercress	*Nasturtium officinale*	Leaves edible raw in salads or cooked as a vegetable
Waterleaf	*Hydrophyllum* spp.	Young shoots raw in saIads; shoots and roots cooked as vegetable
Water plantain	*Alisma* spp.	The bulblike base of the plant is dried and then cooked
Water shield	*Brasenia schreberi*	Tuberlike roots are peeled and then dried to be ground for flour or boiled
Winter cress	*Barbarea* spp.	Leaves and young stem edible as cooked vegetable
Yarrow	*Achillea lanulosa*	Plant dried and made into broth. (**Caution:** The closely related and widespread European yarrow—*A. millefolium*—is somewhat poisonous.)
Yellow pond lily (see Spatterdock)		
Yew	*Taxus* spp.	Bright red pulpy part of berries edible. (**Caution:** Seeds and leaves are poisonous.)

POISONOUS PLANTS

Literally thousands of plants contain varying amounts of poisonous substances. In many instances, the poisons are not present in sufficient quantities to cause adverse effects in humans when only moderate contact or consumption is involved, and cooking may destroy or dissipate the substance. Some plants have substances that produce toxic effects in some organisms but not in others. For example, ordinary onions (*Allium cepa*) occasionally poison horses or cattle, yet are widely used for human food, and poison ivy (*Toxicodendron radicans*) or poison oak (*Toxicodendron diversilobum*) produce dermatitis in some individuals but not in others. Table 5 and Table 6 include plants that are native to, or cultivated in, the United States and Canada.

TABLE 5
Plants Known to Have Caused Human Fatalities

Plant	***Scientific Name***	***Poisonous Parts***
Angel's trumpet	*Datura suaveolens*	All parts, especially seeds and leaves
Azalea	*Rhododendron* spp.	Leaves and flowers (however, poisoning is rare)
Baneberry	*Actaea* spp.	Berries and roots
Belladonna	*Atropa belladonna*	All parts, especially fruits and roots
Black cherry	*Prunus serotina*	Bark, seeds, leaves. (**Caution:** Seeds of most cherries, plums,

		and peaches contain a poisonous principle.)
Black locust	*Robinia pseudo-acacia*	Seeds, leaves, inner bark
Black snakeroot	*Zigadenus* spp.	Bulbs
Buckeye	*Aesculus* spp.	Seeds, shoots, flowers, leaves, roots. (Note: Even the honey bees make from buckeye flowers is poisonous.)
Caladium	*Caladium* spp.	All parts
Carolina jessamine	*Gelsemium sempervirens*	All parts. (Note: Even visiting honey bees can be poisoned.)
Castor bean	*Ricinus communis*	Seeds
Chinaberry	*Melia azedarach*	Fruits and leaves
Daphne	*Daphne mezereum*	All parts
Death angel (fly agaric)	*Amanita muscaria*	All parts (as little as one bite can be fatal)
Death camas (see Black snakeroot)		
Destroying angel	*Amanita verna*	All parts (as little as one bite can be fatal)
Dieffenbachia (Dumb cane)	*Dieffenbachia* spp.	All parts
Duranta	*Duranta repens*	Berries
Dutchman's breeches	*Dicentra cucullaria*	All parts
English ivy	*Hedera helix*	Berries and leaves
False hellebore	*Veratrum* spp.	All parts
Foxglove	*Digitalis purpurea*	All parts
Gloriosa lily	*Gloriosa superba* and other *Gloriosa* spp.	All parts, especially tubers
Golden chain	*Laburnum anagyroides*	Seeds and flowers
Jequirity bean	*Abrus precatorius*	Seeds
Jimson weed	*Datura stramonium* and other *Datura* spp.	All parts, especially seeds
Lantana	*Lantana camara*	Unripe fruits
Lily of the valley	*Convallaria majalis*	All parts

Lobelia	*Lobelia* spp.	All parts
Mistletoe	*Phoradendron* spp.	Berries
Monkshood	*Aconitum* spp.	All parts
Moonseed	*Menispermum canadense*	Fruits
Mountain laurel	*Kalmia latifolia*	Leaves, shoots, flowers
Mushrooms	Many genera and species, especially *Amanita* spp.	All parts
Nightshade	*Solanum* spp.	Unripened fruits. (**Caution:** A poisonous principle is produced in common potato, *Solanum tuberosum*, tubers exposed to light long enough for skins to turn green or greenish.)
Oleander	*Nerium oleander*	All parts
Poison hemlock	*Conium maculatum*	All parts
Poke	*Phytolacca americana*	Roots and mature stems
Rhododendron (see Azalea)		
Rhubarb	*Rheum rhaponticum*	Leaf blades. (**Caution:** Although young petioles are widely eaten, dangerous accumulations of a poisonous substance can occur in leaf blades.)
Rubber vine	*Cryptostegia grandiflora*	All parts
Sandbox tree	*Hura crepitans*	Milky sap and seeds
Tansy	*Tanacetum vulgare*	Leaves, flowers
Tung tree	*Aleurites fordii*	All parts, especially seeds
Water hemlock	*Cicuta* spp.	Roots
White snakeroot	*Eupatorium rugosum*	All parts
Yellow oleander	*Thevetia peruviana*	All parts, especially fruits
Yew	*Taxus* spp.	All parts except "berry" pulp

TABLE 6

Other Plants Producing Significant Quantities of Poisonous Substances

Plant	***Scientific Name***	***Poisonous Parts***
Amaryllis	*Amaryllis* spp.	Bulbs
Autumn crocus	*Colchicum autumnale*	All parts
Bittersweet	*Celastrus scandens*	Seeds
Bleeding hearts	*Dicentra* spp.	All parts
Bloodroot	*Sanguinaria canadensis*	All parts
Blue cohosh	*Caulophyllum thalictroides*	Fruits, leaves
Boxwood	*Buxus sempervirens*	Leaves
Buckthorn	*Rhamnus* spp.	Fruits
Bushman's poison	*Acokanthera* spp.	All parts
Buttercup	*Ranunculus* spp.	All parts; toxicity varies from species to species; mostly cause blistering
Buttonbush	*Cephalanthus occidentalis*	Leaves
Caladium	*Caladium* spp.	All parts
Carolina jessamine	*Gelsemium sempervirens*	All parts (even visiting honey bees can be poisoned)
Chincherinchee	*Ornithogalum thyrsoides*	All parts
Crown of thorns	*Euphorbia milii*	Milky latex
Culver's root	*Veronicastrum virginicum*	Root
Daffodil	*Narcissus* spp.	Bulbs
Desert marigold	*Baileya radiata*	All parts
Fly poison	*Amianthemum muscaetoxicum*	Leaves, roots
Four-o'clock	*Mirabilis jalapa*	Seeds, roots
Goldenseal	*Hydrastis canadensis*	Rhizomes, leaves
Holly	*Ilex aquifolium*	Berries
Horse chestnut	*Aesculus hippocastanum*	Seeds, flowers, leaves
Hyacinth	*Hyacinthus* spp.	Bulbs

Hydrangea	*Hydrangea* spp.	Buds, leaves
Jack-in-the-pulpit	*Arisaema triphyllum*	Roots, leaves
Jessamine	*Cestrum* spp.	Leaves, young stems
Jonquil (see Daffodil)		
Karaka nut	*Corynocarpus laevigata*	Seeds
Kentucky coffee tree	*Gymnocladus dioica*	Fruits
Larkspur	*Delphinium* spp.	Young plants, seeds
Lignum vitae	*Guaiacum officinale*	Fruits
Locoweed	*Astragalus* spp.	Location of poisonous principles varies from species to species; plants more of a problem for livestock than for humans
Lupine	*Lupinus* spp.	Location of poisonous principles varies from species to species; primarily in pods and seeds
Marijuana	*Cannabis sativa*	Resins secreted by glandular hairs among flowers
Mayapple	*Podophyllum peltatum*	All parts except ripe fruits
Mescal bean	*Sophora secundiflora*	Seeds
Narcissus (see Daffodil)		
Ngaio	*Myoporum laetum*	Leaves
Opium poppy	*Papaver somniferum*	Unripe fruits
Philodendron	*Philodendron* spp.	Leaves, stems
Pittosporum	*Pittosporum* spp.	Fruits, leaves, stems
Poinsettia	*Euphorbia pulcherrima*	Milky latex
Poison hemlock	*Conium maculatum*	All parts
Poison ivy	*Toxicodendron radicans*	Leaves
Poison oak	*Toxicodendron diversilobum*	Leaves
Poison sumac	*Toxicodendron vernix*	Leaves
Poke	*Phytolacca americana*	Roots, leaves, stems (uncooked fruits may be slightly poisonous)

Prickly poppy	*Argemone* spp.	Seeds, leaves
Privet	*Ligustrum vulgare*	Fruits
Rhododendron	*Rhododendron* spp.	All parts
Sneezeweed	*Helenium* spp.	All parts
Snow-on-the-mountain	*Euphorbia marginata*	Milky latex
Squirrel corn	*Dicentra canadensis*	All parts
Star-of-Bethlehem	*Ornithogalum umbellatum*	All parts
Sweet pea	*Lathyrus* spp.	Seeds
Tobacco	*Nicotiana tabacum*	Leaves (when eaten)
Water hemlock	*Cicuta* spp.	All parts

MEDICINAL PLANTS

Many modern medicines prescribed by Western doctors are synthetic or include synthetic substances, but a significant number still contain drugs naturally produced by plants. As recently as 50 years ago, the vast majority of medicines used in the treatment of human diseases and ailments were plant-produced, and both Chinese and Indian Ayurvedic medicine, practiced for thousands of years, are still today largely plant-based. Plants rarely, if ever, produce medicinal drugs in pure form, but the mixtures of drugs, vitamins, and minerals found in plants tend to work together synergistically. This often results in the combinations being more effective than they would be if the substances were each used medicinally in isolated form. Oriental medicinal practices carry the synergistic aspects farther by combining up to several different plants in prescriptions for given ailments. It should be noted that the amounts and potencies of medicinal drugs produced by plants can vary considerably from population to population or even from plant to plant. Accordingly, many reputable purveyors of plant medicines routinely have batches tested to ensure standardization and quality for the user. Table 7 includes a sampling of plants associated with past and some present medicinal uses. Some of the drugs concerned are prescribed for specific ailments by modern medical practitioners, while others are a part of folk medicine still practiced in rural areas. (**Caution:** Do not use any of the plants listed here for medicinal purposes without consulting a reputable, qualified health practitioner.)

TABLE 7

Plants Associated with Medicinal Uses

Plant	***Scientific Name***	***Uses***
Agrimony	*Agrimonia* spp.	High silica content makes aerial parts of plant useful as an astringent to stop bleeding
Alfalfa	*Medicago sativa*	Leaf concentrates shown to promote desirable balance between LDL and HDL cholesterol levels

Aloe	*Aloe* spp. (esp. *Aloe vera*)	Juice from leaves contains chrysophanic acid, which promotes healing of burns; used for relief of constipation
American mountain ash	*Pyrus americana*	Liquid made from steeping inner bark in water used as an astringent; tea of berries used as a wash for piles; berries eaten to prevent or cure scurvy

Anemarrhena asphodelioides (see Chinese lily)

Anemone	*Anemone canadensis*	Pounded boiled root applied to wounds as an antiseptic
Angelica	*Angelica archangelica*	Fruits used in treating colds and fevers; leaves used to stimulate appetite

Angelica dahurica (see Dahurian angelica)

Angelica polymorpha (see Chinese angelica)

Anise	*Pimpinella anisum*	Seed oil used to relieve indigestion, colds, and respiratory problems such as sinusitus

Apocynum androsaemifolium (see Dogbane, bitter)

Apocynum venetium (see Dogbane, venetian)

Apple	*Malus domestica*	Source of polyphenols and enzyme inhibitors that exhibit antioxidant and bactericidal activity (e.g., against gingivitis bacteria), especially when working in concert with bioflavonoids)
Apricot	*Prunus armeniaca*	Seed extract said to function as a bronchodilator
Astragalus	*Astragalus* spp.	Root extracts used to boost the immune system; said to be good for colds, flu, and immune-deficiency disorders. (**Caution:** Some *Astragalus* spp. sequester toxic amounts of selenium; should not be taken if a fever is present.)

Astragalus membranaceus (see Membranous milk vetch)

Arnica	*Arnica* spp.	Plants applied as a poultice to bruises and sprains
Asian epimedium	*Epimedium grandiflorum*	Plant extracts are said to have a stimulatory hormonelike effect on the prostate gland and testes
Asian skullcap	*Scutellaria baicalensis*	Plant extracts contain flavonoids and antioxidants; some components function together as a bronchodilator and bactericide; they also reduce blood pressure and LDL cholesterol levels
Astragalus	*Astragalus* spp.	Plant extracts said to boost the immune system; also lowers blood pressure

Atractylodes lancea (see Southern tsangshu)

Atractylodes macrocephala (see Southern tsangshu)		
Balm of Gilead	*Populus* x *gileadensis*	Buds used as an ingredient in cough syrups
Balsam poplar	*Populus balsamifera*	Buds made into ointment, which Native Americans placed in nostrils for relief of congestion
Barberry	*Berberis vulgaris*	Slows heartbeat rate
Beefsteak plant (see Perilla)		
Bifidobacteria	*Bifidobacterium bifidum, B. breve, B. infantis, B. longum,* and others	Bifidobacteria destroy the bacteria (*Helicobacter pylori*) that cause ulcers in humans.
Bilberry/Blueberry	*Vaccinium* spp.	Evidence that regular consumption of fruit, which contains more than a dozen anthocyanosides, increases oxygen flow to eyes, reducing progression of cataracts, glaucoma, and macular degeneration; helps to balance insulin levels
Bitter melon	*Momordica charantia*	Plant extracts promote increased insulin production and are believed to protect pancreatic cells from sugar damage
Bittersweet nightshade	*Solanum dulcamara*	Plant extracts used to treat skin problems such as acne, eczema, and boils. (**Caution:** The fruits and other plant parts are poisonous.)
Blackberry	*Rubus* spp.	Tea of roots used by northern California Native Americans to cure dysentery
Black cohosh	*Cimicifuga racemosa*	Dried rhizomes used in cough medicines and for rheumatism; counters effects of declining estrogen levels in women (e.g., hot flashes, sleep disturbances); alleviates urinary tract problems
Black currant	*Ribes nigrum*	Oil from seeds used to improve suppleness of skin and to reduce skin dryness
Black haw	*Viburnum prunifolium*	Bark used in treatment of asthma and for relieving menstrual irregularities
Bloodroot	*Sanguinaria canadensis*	Native Americans used rhizome for ringworm, as an insect repellent, and for sore throat
Blue cohosh	*Caulophyllum thalictroides*	Tea of root drunk by Native Americans and early settlers a week or two before giving birth to promote rapid parturition
Boneset	*Eupatorium perfoliatum*	Water infusion of dried plant tops widely used to treat fevers and colds
Borage	*Borago officinalis*	Oil from seeds contains gamma linoleic acid (GLA) and other oils beneficial in human nutrition

Boswellia	*Boswellia serrata*	Extract of resin from this east Indian tree prevents substances that cause joint swelling from forming
Broom snakeweed	*Gutierrezia sarothrae*	Navajo Indians applied chewed plant to insect stings and bites of all all kinds
Buckthorn	*Rhamnus catharticus*	Fruits used as a laxative
Bupleurum chinense (see Chinese thoroughwax)		
Burdock	*Arctium lappa*	Used as an insulin substitute in folklore; root extract used in seventeenth century for venereal diseases
Butcher's broom	*Ruscus aculeatus*	Plant extracts shown in clinical trials to strengthen capillaries and to relieve hemorrhoid symptoms to improve flow of blood to the hands and feet
Button snakeroot	*Eryngium* spp.	Natchez Indians inserted chewed stem in nostrils to arrest nosebleed
Cajuput	*Melaleuca leucadendron*	Oil obtained from leaves and twigs is used in treatment of muscular pain and as an antiseptic
California bay	*Umbellularia californica*	Yuki Indians put leaves in bath of hot water and bathed for relief of rheumatism; leaves used as an insect repellent
Camphor	*Cinnamomum camphora*	Oil from leaves and wood used in cold remedies and liniments
Camptotheca	*Camptotheca acuminata*	Extracts from flowers and immature fruits yield camptothecin, which has given evidence of being effective against certain forms of cancer
Cardamon	*Elettaria cardamomum*	Seed oil has antibiotic properties and is used in treatment of colds, coughs, and other respiratory problems
Cascara	*Rhamnus purshiana*	Bark extract widely used as a laxative
Catnip	*Nepeta cataria*	Leaf tea used for treatment of colds and to relieve infant colic
Cat's claw	*Uncaria tomentosa*	Root bark extracts used in treatment of intestinal problems, including diverticulosis and Crohn's disease; extracts also shown to have anti-inflammatory properties. Hirsutin component lowers blood pressure. Rhynchophylline (alkaloid) inhibits clumping of blood platelets and has been shown in animals to increase brain serotonin levels.
Cayenne pepper	*Capsicum frutescens*	Used to reduce mucous drainage (recent evidence, however, suggests it may be carcinogenic). Capsaicin extracts used in ointments to relieve pains of arthritis and neuropathy; aids digestion

Celery	*Apium graveolens*	Seed contains an essential oil that acts like an antioxidant that fights free radicals that attack joints. Oil believed to have sedative properties.
Chamomile	*Chamaemelum nobile*	Tea used as a digestive aid
Chaste tree	*Vitex agnus-castus*	Extract of berries reduces symptoms of premenstrual syndrome
Chaulmoogra	*Hydnocarpus* spp.	Seed oil used in the treatment of skin diseases such as eczema, psoriasis, and leprosy
Cherry (wild)	*Prunus serotina*	Tea brewed from bark used for coughs and colds
Chia	*Salvia columbariae*	Mucilaginous seeds used by Spanish Californians to make a refreshing drink; seeds contain a caffeinelike principle that enabled Native Americans to perform unusual feats of endurance; seed paste used in eye irritated by foreign matter
Chinese angelica	*Angelica polymorpha*	Root extracts used to suppress or relieve asthma
Chinese cinnamon	*Cinnamomum cassia*	Pulverized bark ingested to improve urinary flow and reduce more than normal frequencies of urination
Chinese club moss	*Lycopodium serratum*	Source of an alkaloid (huperzine A) that inhibits destruction of acetylcholine involved in nerve transmissions, and thereby enhances memory
Chinese lily	*Anemarrhena asphodelioides*	Plant extracts apparently can aid in controlling blood glucose levels, hay fever, dermatitis, and other allergic symptoms; rhizome extracts used to quench thirst caused by fevers
Chinese magnolia	*Magnolia officinalis, M. quinquepeta*	Bark extracts used to reduce nasal stuffiness and discharge, to drain sinuses, and to alleviate asthma and sinus headaches
Chinese rubber tree	*Eucommia ulmoides*	Bark extract improves circulation to the hands and feet; reduces high blood pressure; alleviates frequent urination problems
Chinese thoroughwax	*Bupleurum chinense*	Root extracts found to have general calming effect and to promote sound sleep; usually used in combination with other herbal extracts
Chlorella	*Chlorella* spp.	Green algae that boost the immune system, relieve constipation, and can remove heavy metals from food
Chocolate	*Theobroma cacao*	Seed extracts are good source of L-arginine and magnesium, and are believed (when combined with other chocolate constituents) to elevate serotonin levels. Chocolate also contains theobromin (somewhat similar to caffeine in action) and phenylethylene, which is believed to produce sustained elevation of mood. (Note: These attributes pertain primarily to chocolate to which milk, sugar, and other products have not been added.)

Chrysanthemum indicum (see Indian chrysanthemum)		
Cinchona	*Cinchona* spp.	Bark yields quinine drugs used in treating malaria
Cinquefoil (Eurasian)	*Potentilla erecta*	Dried rhizome used to control diarrhea
Club moss	*Lycopodium clavatum*	Spores dusted on wounds or inhaled by Native Americans to arrest nosebleeds
Coca	*Erythroxylon coca*	Cocaine from leaves used as a local anesthetic; South American laborers use it as a stimulant
Cola	*Cola nitida, C. acuminata*	Seeds contain up to 3.5% caffeine and 1% theobromine, which may lessen fatigue
Coleus	*Coleus forskolii*	Plant extracts used in treatment of hypertension, allergies, glaucoma, and psoriasis
Cordyceps	*Cordyceps sinensis*	This fungus, which parasitizes caterpillars, apparently alleviates respiratory problems and elevates phagocyte action
Cornsilk	*Zea mays*	Cornsilk extracts used for centuries as a diuretic
Corydalis	*Corydalis turtschaninovii*	One isolate of several produced by the plant has multiple anti-inflammatory and calming effects. (Note: This plant also produces poisonous alkaloids.)
Cotton	*Gossypium* spp.	Cotton root “bark” used by black slaves and Native Americans to induce abortions
Cranberry	*Vaccinium oxycoccum*	Fruit juice drunk to treat female yeast infections
Creosote bush	*Larrea divaricata*	Decoction from leaves used as a cure-all by Native Americans but especially for respiratory problems
Cubebs	*Piper cubeba*	Dried fruit best known as a condiment but also used in treatment of asthma
Cynanchum	*Cynanchum* spp.	Plant extracts of these relatives of milkweeds are said to reduce mucous congestion of the lungs
Dahurian angelica	*Angelica dahurica*	Plant extracts used to treat allergy symptoms
Damiana	*Turnera diffusa*	Dried leaves used for minor pain, as a laxative, a flavoring for a liqueur, and as a sexual stimulant; also said to improve blood circulation
Dandelion	*Taraxacum officinale*	Root extracts said to stimulate the liver and facilitate its natural functioning in detoxification
Deadly nightshade	*Atropa belladonna*	Belladonna, a drug complex extracted from leaves, contains the drugs

		atropine, hyoscyamine, and scopolamine; these are used as an opium antidote, for shock treatments, and for dilation of pupils; scopolamine is also used as a tranquilizer and for "twilight sleep" in childbirth
Devil's claw	*Harpagophytum procumbens*	Tuber extracts reported to have anti-inflammatory and pain-relieving properties
Di-huang (see Rehmannia)		
Dogbane, bitter	*Apocynum androsaemifolium*	Roots boiled in water and resulting liquid used as a heart medication (contains a drug similar in action to digitalis)
Dogbane, venetian	*Apocynum venetium*	Leaves smoked for bronchitis relief. Extracts lower blood pressure
Dogwood	*Cornus* spp.	Inner bark boiled in water and resulting liquid drunk to reduce fevers
Dong quai	*Angelica sinensis*	Root extracts (which contain flavonoids) used in the alleviation of Hot flashes and other menopausal symptoms; also used to treat premenstrual syndrome
Echinacea	*Echinacea purpurea*	Leaves and roots have antiviral and anti-inflammatory properties; used to boost the immune system
Elderberry	*Sambucus* spp.	Source of Sambucol, which is reported to have antiviral properties, especially in controlling those viruses involved in the common cold
Ephedra	*Ephedra* spp.	Drug ephedrine, widely used to relieve nasal congestion and low blood pressure, obtained from inner bark, berries, flowers, leaves (most ephedrine now in use is synthetic); also known as ma huang. (**Caution:** Stems contain toxic amounts of cyanide.)
Epimedium grandiflorum (see Asian epimedium)		
Ergot	Source: *Claviceps purpurea* on cereal grains	Used to treat migraine headaches and to control bleeding after childbirth
Eucalyptus	*Eucalyptus* spp.	Oil extracted from leaves used to alleviate bronchitis and coughs
Eucommia ulmoides (see Chinese rubber tree)		
European birch	*Betula pendula*	Oil distilled from bark and leaves used in treatment of kidney stones and urinary tract infections
Eyebright	*Euphrasia officinalis*	Plant extracts used as an eyewash and in the relief of allergic itching of the eyes
Evening primrose	*Oenothera* spp.	Seeds are source of GLA oils beneficial in human nutrition
Fennel	*Foeniculum vulgare*	Extracts of roots, stems and fruits used as an appetite suppressant and

		as an eyewash
Fenugreek	*Trigonella foenum-graecum*	Seeds used in bulking laxatives; reduces mucus resulting from asthma and sinus problems; reduces skin inflammation
Feverfew	*Chrysanthemum parthenium*	Dried flowers used in treatment of migraine headaches; to induce abortion and menstruation; and as an insecticide. Dilutes bronchial mucus. Keeps body from producing histamines.
Field mint	*Mentha arvensis*	Oil distilled from aerial parts of plants used to alleviate symptoms of colds, fevers, bronchitis; also used as an antiseptic.
Flax	*Linum usitatissimum*	Cold-processed seed oils are rich source of gamma linoleic acid (GLA), beneficial in human nutrition, and in suppressing or reversing atherosclerosis; crushed seeds used as a laxative and for treating bronchial problems
Flowering ash	*Chionanthus virginicus*	Bark used as a laxative and in treatment of liver ailments
Forsythia	*Forsythia suspensa*	Plant extract has anti-inflammatory properties; is used to relieve sinus congestion and headaches
Foxglove	*Digitalis purpurea*	Drug digitalis, widely used as a heart stimulant, obtained from leaves
Frankincense	*Boswellia serrata*	Used to reduce joint pain and stiffness
Garlic	*Allium sativum*	Evidence that allicin and other sulfur-containing compounds extracted from bulbs inhibit common cold and other viruses; decreases artery-plugging fibrin levels, and regular consumption appears to enhance general cardiovascular health, including the lowering of LDL cholesterol levels and the inhibition of blood platelet clumping. The risk of stomach cancer also appears to be lowered.
Gastrodia orchid	*Gastrodia elata*	Used in treating epilepsy and blood circulation problems; glucosides lower blood pressure
Gentian	*Gentiana catesbaei*	Catawba Indians applied hot water extract of roots to sore backs; liquid drunk as a remedy for stomachaches; aids digestion and boosts circulation
Geranium (wild)	*Geranium maculatum*	Dried roots used for dysentery, diarrhea, and hemorrhoids
Ginger	*Zingiber officinale*	Powerful antioxidant; aids digestion and reduces nausea (including that of motion sickness); helps promote normal bladder control
Ginger (wild)	*Asarum* spp.	Extract of rhizome used as a broad-spectrum antibiotic
Ginkgo	*Ginkgo biloba*	Concentrated leaf extract improves oxygen-carrying capacity of

		capillaries, especially those of the brain, and improves memory; used for treating vertigo and tinnitus.
Ginseng (see also Siberian ginseng)	*Panax* spp.	Considered a general panacea, especially in the Orient; strengthens the reproductive and adrenal glands; said to increase stamina
Globe artichoke	*Cynara scolymus*	Leaf and root extract used to inhibit gallstone formation and to alleviate digestion problems
Goldenrod	*Solidago canadensis*	Inflorescences used in the treatment of kidney stones and urinary tract infections
Goldenseal	*Hydrastis canadensis*	Rhizome source of alkaloidal drugs used in treatment of inflamed mucous membranes; also used as a tonic. (Note: Pregnant women should not use goldenseal.)
Goldthread	*Coptis groenlandica*	Native Americans boiled plant and gargled the liquid for sore or ulcerated mouths
Gotu kola	*Centella asiatica*	Shown in clinical trials to reduce swelling of ankles, generally improve blood circulation, and accelerate healing of wounds
Grape	*Vitis vinifera*	Seed extract source of powerful antioxidants (including quercetin) that also improve blood flow to the retina, thereby retarding macular degeneration. Red grapes in particular produce significant amounts of reservatrol, which has been demonstrated to enhance enzyme activity associated with the regeneration and stimulation of nerve cells
Grapefruit	*Citrus* x *paradisi*	Seed extract used to combat bacterial or fungal infections
Green hellebore	*Helleborus viridis*	Plant extract used to treat hypertension (drug now synthesized); Thompson Indians used plant in small amounts to treat syphilis
Green tea	*Camellia sinensis*	Unfermented leaves source of polyphenols, which appear to reduce incidence of cancers in regular users through neutralization of free radicals. Epigallocatechin gallate (EGCG) ingredient of green tea demonstrated by the Mayo Clinic to be particularly effective in control of prostate cancer.
Gum plant	*Grindelia camporum*	Liquid from freshly and briefly boiled plants effective in treating poison oak and poison ivy rashes; used in treatment of coughs
Gymnema	*Gymnema sylvestre*	Extracts used to stabilize insulin levels in diabetics
Gynostemma	*Gynostemma pentaphylla*	Chinese plant related to melons; extracts believed to stimulate the immune system and aid in metabolism of fats that contribute to strokes
Hawthorn	*Crataegus oxycantha*	Anti-inflammatory that lowers LDL cholesterol levels; dilates coronary blood vessels

Hemlock	*Tsuga* spp.	Native Americans made tea of inner bark to treat colds and fevers. (Note: Do not confuse this tree with poison hemlock [*Cicuta* spp.].)
Hops	*Humulus lupulus*	Extracts are sedative and used in treating insomnia and nervous tension
Horehound	*Marrubium vulgare*	Extract from dried tops of plants used in lozenges for relief of sore throats and colds; dilutes mucus in bronchial tubes
Horse chestnut	*Aesculus hippocastanum*	Seed and leaf extracts used to improve blood flow; night cramps of legs, reduce varicose veins and leg swelling. (**Caution:** Plant is poisonous, and only standardized extracts of demonstrated therapeutic value should be used. A coumarin component of horse chestnut leaves can interact adversely with aspirin and other anticoagulants.)
Horseradish	*Armoracia rusticana*	Roots used to treat infections of the urinary tract
Horsetail	*Equisetum* spp.	Plants boiled in water; liquid used as a delousing hairwash or as a gargle for mouth ulcers

Huperzia serrata = Lycopodium serratum (see Chinese club moss)

Hydrangea	*Hydrangea paniculata*	Essential oil from roots acts as diuretic. (**Caution:** Leaves contain toxic amounts of cyanide.)

Hypericum perforatum (see St. John's wort)

Indian chrysanthemum	*Chrysanthemum indicum*	Glucoside extract said to lower blood pressure
Indigo (wild)	*Baptisia tinctoria*	Native Americans boiled plant and used liquid as an antiseptic for skin sores
Ipecac	*Cephaelis ipecacuana*	Drug from roots and rhizome used to treat amoebic dysentery; also used as an emetic
Java plum	*Syzygium cumini*	Powdered seeds used to counter excessive thirst and excretion of sugar in the urine characteristic of diabetics
Jimson weed	*Datura* spp.	Drugs atropine, hyoscyamine, and scopolamine obtained from seeds, flowers, and leaves; drug stramonium used for knockout drops and in treatment of asthma. (**Caution:** Jimson weeds are highly poisonous [see Deadly nightshade].)
Joe-pye weed	*Eupatorium purpureum*	Dried root said to prevent formation of gallstones
Joshua tree	*Yucca brevifolia*	Cortisone and estrogenic hormones made from sapogenins produced in the roots
Jujube	*Ziziphus jujuba*	Fruit extracts shown to promote restful sleep and to aid in balancing irregular heartbeat

Juniper	*Juniperus* spp.	Tea of "berries" drunk by Zuni Indian women to relax muscles following childbirth. (**Caution:** Internal consumption can interfere with absorption of iron and other minerals.)
Kansas snakeroot	*Echinacea angustifolia*	Dried roots used as antiseptic in treatment of sores and boils, periodontal disease, and sinus drainage problems
Kava kava	*Piper methysticum*	Leaf tea used a sedative, a muscle relaxant, and as a pain reliever
Kirilow's cucumber	*Trichosanthes kirilowii*	Used to inhibit mucus production in the lungs
Lactobacillus	*Lactobacillus acidophilus, L. rhamnosus, L. salivarius,* and others	Lactobacilli normally populate the gastrointestinal tract, where they function in various ways to boost the immune system and destroy pathogenic bacteria. Antibiotics destroy these useful bacteria; repopulation is facilitated by ingestion of lactobacilli capsules or products such as yogurt, which contain the useful bacteria.
Lemon balm	*Melissa officinalis*	Leaf extracts and oils
Licorice	*Glycyrrhiza glabra*	Rhizomes source of licorice used in cough drops and for soothing inflamed mucous membranes; stimulates interferon production; relieves allergic symptoms; boosts immune system. Deglycyrrhizinated licorice increases protection of upper digestive tracts by augmenting the mucous coating. (**Caution:** Undeglycyrrhizinated licorice can elevate blood pressure.)
Ligusticum	*Ligusticum wallichii*	Extract has been demonstrated to relax blood vessels
Lily of the valley	*Convallaria majalis*	All parts of plant contain a heart stimulant similar to digitalis; used to control irregular heartbeat. (**Caution:** Plants are poisonous.)
Lilyturf plant	*Ophiopogon japonicus*	Root extracts said to aid in diluting thick mucous secretions in the lungs
Lobelia	*Lobelia inflata*	Drug lobeline sulphate obtained from dried leaves; drug used in preparations to aid in cessation of smoking and in treatment of respiratory disorders. (**Caution:** Has effects similar to those of nicotine; more than 10 grams (one-third ounce) of dried plant can produce a coma.)
Lycopodium serratum (see Chinese club moss)		
Maca	*Lepidium meyenii*	Root extracts said to elevate testosterone levels and improve sexual performance in men
Madagascar periwinkle	*Catharanthus roseus*	A semisynthetic extract (vinpocetine) derived from vincamine produced by this plant said to be a significant memory enhancer
Magnolia vine	*Schisandra chinensis*	Plant extracts contain a powerful antioxidant that appears to protect healthy tissues (liver in particular) from damage caused by higher than

		normal blood sugar levels. Synergistic effect when combined with ginseng.
Ma huang (see *Ephedra*)		
Maitake mushrooms	*Grifola frondosa*	A substance (beta-glucan) produced by these mushrooms evidently stimulates the production of cells that aid in the inhibition of cancer cells
Malabar kino	*Pterocarpum marsupium*	Leaf extracts contain epicatechin, which promotes oxygen uptake and better processing of sugar by body tissues
Mandrake	*Mandragora officinarum*	Extracts of plant used in folk medicine as a painkiller (drugs hyoscyamine, podophyllin, and mandragorin have been isolated; podophyllin used experimentally in treatment of paralysis)
Mangosteen	*Garcinia mangostana*	Fruit acid is believed to aid in weight reduction
Manroot	*Marah* spp.	Native Americans used oil from seeds to treat scalp problems and the crushed roots for relief from saddle sores
Marginal fern	*Dryopteris marginalis*	Rhizomes contain oleoresin used in expulsion of tapeworms from the intestinal tract
Marijuana	*Cannabis sativa*	Tetrahydrocannabinol obtained from resinous hairs in inflorescences; ancient medicinal drug of China
Mayapple	*Podophyllum peltatum*	Podophyllin obtained from rhizomes used experimentally in treatment of paralysis; dried rhizome powder used on warts. (**Caution:** Plant is poisonous, and extracts are very irritating to the skin.)
Maypop	*Passiflora incarnata*	Dried leaves used as sedative; Native Americans used juice as treatment for sore eyes
Membranous milk vetch	*Astragalus membranaceus*	Extracts strengthen the immune system, especially that of the upper respiratory tract; promote interferon production and repair of damaged bronchial tubes. There is evidence it can counter bone loss (osteoporosis) resulting from extended use of corticosteroids. (**Caution:** Some other *Astragalus* spp. also known as milk vetch are toxic.)
Mesquite	*Prosopis glandulosa*	Native Americans mixed dried leaf powder with water and used liquid to treat sore eyes
Mexican yam	*Dioscorea floribunda*	Tuberous roots produce up to 10% diosgenin, a precursor of progesterone and cortisone, and are a source of DHEA (dihydroepiandrosterone), a complex hormone naturally produced by humans; DHEA levels decline with aging; there is some evidence that controlled DHEA supplementation in older persons retards some aspects of aging.

Milk thistle	*Silybum marianum*	Silymarin extracted from plants has antioxidant properties that appear to be especially beneficial to the liver.
Milk vetch (see *Astragalus*)		
Milkweed	*Asclepias syriaca*	Quebec Indians promoted temporary sterility by drinking infusion of pounded roots.
Mistletoe	*Phoradenron flavescens*	Native Americans reported to use small amounts as a contraceptive and sedative. (**Caution:** Plants are toxic and should not be taken internally.)
Monkshood	*Aconitum napellus*	Source of aconite once used in treatment of rheumatism and neuralgia. (**Caution:** Plant is highly toxic.)
Mormon tea (see *Ephedra*)		
Muira puama	*Ptychopetalum olacoides*	Leaf extracts said to stimulate hormone production and improve circulation; considered to be an aphrodisiac
Mukul myrrh	*Commiphora mukul*	Resin from tree stabilizes cholesterol levels and reduces osteoarthritis pain
Mulberry (red)	*Morus rubra*	Rappahannock Indians applied milky latex of leaf petioles to scalp for ringworm
Mulberry (white)	*Morus alba*	Bark extract said to function as a bronchodilator
Mullein	*Verbascum thapsus*	Native Americans smoked leaves for respiratory ailments and asthma; flowers once widely used in cough medicines
Nettle (see Stinging nettle)		
Noni	*Morinda citrifolia*	Used in treatment of diabetes, high blood pressure, kidney disorders, and other ailments
Oats	*Avena sativa*	Extract from green oat seeds said to enhance both physical and sexual health
Olive	*Olea europaea*	Leaf extract contains oleuropein (calcium elenolate) that is a wide-spectrum bactericide and a virucide; it evidently enhances the production of phagocytes, thereby strengthening the immune system
Onion	*Allium* spp.	Cheyenne Indians applied bulbs in poultice to boils; juice and olive oil used to cure earaches; can lower blood pressure and help dissolve blood clots. The active principle, allicin, is also produced by garlic.
Ophiopogon japonicus (see Lilyturf plant)		
Opium poppy	*Papaver somniferum*	Morphine and codeine obtained from latex of immature fruits

Oregon grape	*Berberis aquifolium*	Bark tea drunk by Native Americans to settle upset stomach; used in strong doses for treatment of venereal diseases
Pacific yew	*Taxus brevifolia*	Taxol, a promising anticancer agent, is extracted from bark
Panax ginseng	*Panax pseudoginseng, P. ginseng*	Root extract strengthens respiratory immune system, resulting in reduction of respiratory infections; strong antioxidant
Pansy (wild)	*Viola* spp.	Plants ground up and applied to skin sores or inflammations
Papaya	*Carica papaya*	Exudate of scarified unripe fruit is source of papain (a protein that is used to digest ruptured back disks and to facilitate digestion of food; as a meat tenderizer; for termite control; and for reduction of cloudiness in beer). Papain, which is also believed to have antibiotic properties, may be used with bromelain from pineapples and trypsin to facilitate breakdown of cardiovascular plaque.
Parsley	*Petroselinum crispum*	Richer in vitamin C than citrus fruits; inhibits proliferation of tumor cells; suppresses halitosis; general organ tonic
Pau d'arco	*Tabebuia heptaphylla*	General immune system booster
Peanut	*Arachis hypogoea*	Reservatrol extracted from peanut and mulberry plants said to be effective in inhibiting several types of cancers
Pennyroyal	*Mentha pulegium*	Native Americans used leaf tea in small amounts for relief of headaches and flatulence and to repel chiggers. (**Caution:** Pennyroyal is toxic in larger amounts.)
Peppermint	*Mentha piperita*	Peppermint oil is used to alleviate symptoms of respiratory infections and inflammation
Perilla	*Perilla frutescens*	Seeds are the source of perilla oil, which is exceptionally rich in Omega-3 fatty acids essential to cardiac health
Persimmon	*Diospyros virginiana*	Liquid from boiled fruit used as an astringent; fruits with high beta carotene content; leaves have high vitamin C content
Peruvian balsam	*Myroxylon balsamum*	Resin obtained from scorched or incised tree trunks is used as an antiseptic on burns, wounds, and hemorrhoids
Peyote	*Lophophora williamsii*	Alcoholic extract of plant used as an antibiotic
Pine	*Pinus* spp.	Pycnogenols extracted from bark have powerful antioxidant properties
Pineapple	*Ananas comosus*	Bromelain extracted from pineapple decreases clumping of blood platelets and fibrin, thereby improving circulation; bromelain also accelerates healing and can relieve pain, all without the side

		effects of aspirin, which is widely used for the same purposes. Repeatedly chewing or holding fresh pineapple in the mouth may cure mouth ulcers.
Pinkroot	*Spigelia marilandica*	Powdered root very effective in expulsion of roundworms from intestinal tract
Pipssisewa	*Chimaphila umbellata*	Native Americans steeped plant in water and used liquid to draw out blisters
Pitcher plant	*Sarracenia purpurea*	Native Americans used root widely as smallpox cure (records indicate it was effective)
Plantain	*Plantago ovata* and other spp.	Seed husks (known as *psyllium*) absorb water and are widely used in bulking laxatives; said to lower LDL cholesterol levels. (Not related to banana-like plantains.)
Pleurisy root	*Asclepias tuberosa*	Liquid from roots boiled in water used in treatment of respiratory problems
Polypore fungus	*Grifola umbellata*	All parts enhance kidney and bladder function; also believed to have anti-cancer immune system-boosting properties
Prickly ash	*Zanthoxylum americanum*	Bark and berries widely used by Native Americans for toothache (pieces inserted in cavities); liquid infusion drunk for venereal diseases
Psoralea	*Psoralea corylifolia*	Flavonoids used in Chinese medicine to facilitate relief of urinary tract problems
Psyllium (see Plantain)		
Pumpkin	*Cucurbita pepo*	Seed oil used to promote prostate health
Puncture vine	*Tribulus terrestris*	Plant extracts believed to elevate testosterone level and promote muscle gain in men and to elevate estrogen levels in women
Purple coneflower	*Echinacea purpurea*	Plant extracts used to boost the immune system
Pygeum	*Pygeum africanum*	Bark extracts used to promote shrinkage of benign swelling of the prostate gland in men. There is evidence that a combination of pygeum and stinging nettle (*Urtica dioica*) can significantly reduce urgency for night urination.
Psyllium	*Plantago ovata*	Ground seed husks absorb water and function as a bulking laxative; lowers LDL cholesterol levels
Quassia	*Picraea excelsa, Quassia amara*	Wood extracts used as pinworm remedy and as insecticides
Rauvolfia (Frequently misspelled Rauwolfia)	*Rauvolfia serpentina*	Reserpine obtained from roots; drug used in treatment of mental illness and in counteracting effects of LSD

Rauvolfia yunnanensis (see Yunnan rauvolfia)		
Red-rooted sage	*Salvia miltiorhiza*	Plant extracts elevate blood oxygen content and are used to enhance blood circulation, particularly in the lungs; inhibits blood platelet clumping
Red yeast	*Monascus purpureus*	This yeast is cultured on rice; the combination improves circulation and balances cholesterol levels
Rehmannia	*Rehmannia glutinosa*	Experiments with animals indicates efficacy in strengthening kidney function and in lowering blood pressure
Rice (brown)	*Oryza sativa*	Inositol hexaphosphate (IP6), a B vitamin that is produced by rice, has been shown to control growth of cancer cells
Rye	*Secale cereale*	An Australian patented ryegrass extract known as Oralmat is proving to be effective in treating asthma, allergies, and other disorders, without the side effects of steroids
Saffron (meadow)	*Colchicum autumnale*	Drug colchicine from corms used in past for treatment of gout and back disk problems, but now used mostly for experimental doubling of chromosome numbers in plants
Salvia miltiorhiza (see Red-rooted sage)		
Sarsaparilla	*Aralia nudicaulis*	Cough medicines made from roots
Sassafras	*Sassafras albidum*	Tea of root bark used to induce sweating; used externally as a liniment
Saw palmetto	*Serenoa repens*	Berry extracts clinically demonstrated to aid in shrinkage of benign swelling of prostate gland, increase urine flow, and normalize frequency of urination in men
Schisandra chinensis (see Magnolia vine)		
Scutellaria baicalensis (see Asian skullcap)		
Self-heal	*Prunella vulgaris*	Native Americans applied plants in poultices to boils; plant glucosides said to tone blood vessels
Seneca snakeroot	*Polygala senega*	Liquid from bark boiled in water applied to snakebites; taken internally as an abortifacient; used in a cough remedy
Senna	*Cassia senna* and other spp.	Leaf extract used as a laxative or purgative
Siberian ginseng	*Eleutherococcus senticosus*	Liquid extract of rhizome and roots used as an immune system and stamina booster. Appears in some individuals to counteract chronic fatigue syndrome.

Sicklepod	*Cassia obtusifolia*	Plant extracts said to lower both blood pressure and LDL cholesterol levels
Skeleton weed	*Lygodesmia juncea*	Widely used by Native American women to increase milk flow
Skullcap	*Scutellaria laterifolia*	Dried plant used as an anticonvulsive in treatment of epilepsy and as a sedative (see also Asian skullcap)
Slippery elm	*Ulmus fulva*	Dried inner bark, which contains an aspirinlike substance, used to sooth inflamed membranes
Southern tsangshu	*Atractylodes lancea, A. macrocephala*	Plant extracts used as a diuretic; also used to balance blood sugar levels and promote spleen health
Soy	*Glycine max*	Isoflavones from plants (especially fruits) have medicinal value. Ipriflavone appears to ward off osteoporosis and increase bone density. Genistein apparently diminishes production of cellular stress protein, and inhibits the growth of human prostate cancer cells. Reduces symptoms of menopause.
Spicebush	*Lindera benzoin*	Berries, buds, and bark brewed for tea used to reduce fevers
Spruce	*Picea* spp.	Cree Indians ate small immature female cones for treatment of sore throat; spruce leaf oil and spruce shoots used in Europe to alleviate cold, bronchitis, and fever symptoms
Squills	*Urginea maritima*	Bulbs of red variety are source of a heart stimulant; bulbs of white variety are widely used as a rodent killer
St. John's wort	*Hypericum perforatum*	Extracts used in the treatment of depression; boosts serotonin production in the brain. The serotonin suppresses cravings for carbohydrates, and tends to promote normal sleep patterns. (Note: St. John’s wort can interfere with the normal metabolic activities of some prescription medications, and its use should be supervised by informed personnel.)
Stevia	*Stevia rebaudiana*	Stevia extracts are 30–100 times sweeter than sugar; used as a sweetener by diabetics and others needing to reduce their sugar intake
Stinging nettle	*Urtica dioica*	Used in treatment of allergic disorders and inflammatory conditions of the lungs. The roots are rich in vitamin C, which apparently inhibits breakdown of testosterone, consequently increasing testosterone levels in the body. (See also Pygeum.)
Stoneseed	*Lithospermum ruderale*	Shoshoni women reported to have drunk cold water infusion of roots daily for six months to ensure permanent sterility (experiments with mice suggest substance to the reports)
Strophanthus	*Strophanthus* spp.	Seeds are major source of cortisone and also source of a heart stimulant

Strychnine plant	*Strychnos nox-vomica*	Strychnine extracted from seeds widely used as an insect and animal poison and is the principal ingredient in blowgun darts used by South American aborigines; minute amounts stimulate the central nervous systems and relieve paralysis
Sumac	*Rhus* spp. (especially *R. glabra*)	Native Americans applied leaf decoction as a remedy for frostbite; fruits and liquid made from leaves applied to poison ivy rash and gonorrhea sores; root chewed for treament of mouth ulcers
Sweet flag	*Acorus calamus*	Boiled root applied to burns; root chewed for relief of colds and toothache
Sweet gum	*Liquidambar styraciflua*	Bud balsam used to treat chigger bites; balsam also used in insect fumigating powders
Sword fern	*Polystichum munitum*	Boiled rhizome used by Native Americans to treat dandruff; sporangia and spores applied to burns
Tamarind	*Tamarindus indica*	Fruit pulp used as laxative
Tomato	*Lycopersicon esculentum*	Rich source of lycopene, which is involved with health of the prostate gland and eyes
Tree peony	*Paeonia suffruticosa*	Bark extract said to reduce production of blood platelets

Trichosanthes kirilowii (see Kirilow's cucumber)

Turmeric	*Curcuma longa*	Rhizome extracts appear to lower LDL cholesterol levels, prevent blood clots, suppress cancer proliferation, and reduce joint pain
Uncaria	*Uncaria rhynchophilla*	Glucoside extracts used in China to lower blood pressure
Uzara	*Xysmalobium undulatum*	Root extracts used to control diarrhea. (**Caution:** Uzara glycosides may react with other glycosides; drug should be taken only at recommended doses and not with other medications.)
Valerian	*Valeriana septentrionalis*	Pulverized plant applied to wounds; extracts taken internally have sedative effect and are used to treat insomnia
Velvet bean	*Mucuna* spp.	Seeds contain L-dopa used in treatment of Parkinson disease
Virginia snakeroot	*Aristolochia serpentaria*	Native Americans used tea of plant for reducing high fevers
Wahoo	*Euonymus atropurpurea*	Bark steeped in water; liquid has digitalis-like effect on heart
Walnut (English)	*Juglans regia*	Extracts have been demonstrated to kill or inhibit a wide range of pathogenic microorganisms and to reduce LDL cholesterol levels
Watercress	*Rorippa nasturtium-aquaticum*	Some evidence that daily consumption retards development of lung cancer in smokers

Water plantain	*Alisma plantago-aquatica*	Rhizome extracts have diuretic properties; believed to improve bladder and kidney function
Western wallflower	*Erysimum capitatum*	Zuni Indians ground plant with water and applied it to skin to prevent sunburn
White mulberry	*Morus alba*	Fruit believed to improve kidney and liver function; also alleviates respiratory problems, including asthma and mucus production
Willow	*Salix* spp.	Chickasaw Indians snuffed infusion of roots as a remedy for nosebleed; Pomo Indians boiled bark in water and applied liquid for relief of skin itching; fresh inner bark contains salicin, an aspirinlike compound used to reduce fevers
Wintergreen	*Gaultheria procumbens*	Oil from leaves used as a folk remedy for body aches and pains
Witch hazel	*Hamamelis virginiana*	Oil distilled from twigs and leaves used primarily as an external astringent that staunches bleeding
Wormseed	*Chenopodium ambrosioides*	Oil from seeds used to expel intestinal worms
Wormwood	*Artemisia* spp.	Yokia Indians made tea from leaves to treat bronchitis; other Native Americans used tea as a cold remedy
Yarrow	*Achillea millefolium*	Native Americans used plant infusion for treating wounds, earaches, and burns; infusion drunk to relieve upper respiratory tightness; fresh leaf inserted in nostril to staunch nosebleed
Yellow lady's slipper	*Cypripedium calceolus*	Dried root used for relief of insomnia and as sedative
Yellow nut grass	*Cyperus esculentus*	Paiute Indians pounded tubers with tobacco leaves and applied mass in wet dressing for treatment of athlete’s foot
Yerba santa	*Eriodictyon californicum*	Native Americans smoked leaves or drank leaf tea for treatment of colds or asthma
Yucca	*Yucca* spp.	Plants produce saponins used in birth control preparations and to treat inflammation and other conditions that might otherwise be treated with steroids, such as cortisone
Yunnan rauvolfia	*Rauvolfia yunnanensis*	Plant extracts said to lower blood pressure

Zhi-mu (see Chinese lily)

Some Specific Problems for Which Medicinal Plants or Plant Derivatives Are Used

Memory Problems or Enhancement

Memory is associated with an adequate supply of oxygen to the brain and the proper functioning of chemicals involved in messages transmitted by nerves. The following plants or plant derivatives may improve blood flow to the brain and thereby increase the oxygen supply. In doing so, acetylcholine, which is the chemical involved in transmissions between nerve cells, may be either protected or augmented.

1. *Ginkgo biloba* (maidenhair tree)
   The leaves of *Ginkgo biloba* contain chemicals (e.g., specific terpenes, lactones, flavonoids) unknown in other plants. Numerous studies, particularly in Europe, indicate that *Ginkgo* extracts relax brain capillaries and thereby improve blood flow.

2. *Huperzia serrata* (= *Lycopodium serratum*)
   This Chinese club moss produces an alkaloid known as Huperzine A. Huperzine A inhibits an enzyme that destroys acetylcholine, which is essential to nerve impulse transmission.

3. Lecithin
   This well-known food product, which is commercially mostly derived from soybeans, is broken down and converted to acetylcholine in the brain. Lecithin granules appear to be the richest source of memory-enhancing nutrients.

4. *Centella asiatica* (gotu kola)
   Gotu kola is said to improve brain function, partly as a result of strengthening veins.

5. Phosphatidylserine
   This fatty acid, whose absorption by the brain requires vitamin B_{12} and bioflavonoids, tends to block stress hormones that impair memory. It is believed to have potential to reverse cognitive impairment in the elderly.

6. DMAE (Dimethylaminoethanol)
   DMAE plays a role in the production of acetylcholine and helps the brain function more efficiently.

7. Vinpocetine
   Vinpocetine is derived from an extract of rosy periwinkle (*Catharanthus roseus*) native to Madagascar. Experimental studies have shown that vinpocetine significantly improves short-term memory, evidently by enhancing blood flow to areas of the brain needing it most and by increasing the capacity of red blood cells to carry oxygen.

8. Other factors or nutrients involved in memory
   Higher than normal amounts of cholesterol and triglycerides in the blood can interfere with an adequate supply of nutrients to the brain (see Cholesterol-Lowering Plants or Plant Derivatives). Exposure to free radicals (see Antioxidants), low blood sugar, poor diet, and/or lack of exercise can also contribute to memory problems. It is important to have an adequate intake of manganese (5 mg daily), zinc (50 mg daily), and vitamins A, B, C, and E; other antioxidants, such as COQ_{10}, pycnogenol, SOD (superoxide dismutase), and grape seed extract; and the amino acids L-glutamine, L-phenylalanine, and L-tyrosine. Other plants believed to aid memory include blue cohosh, *Gymnostemma,* anise, and rosemary.

Heart Disease

Heart diseases encompass a variety of disorders including congestive heart failure, circulatory problems, ischemic disease (insufficient oxygen), heart enlargement, arrhythmia (irregular heartbeat), hypertension (high blood pressure), and several other related problems. High blood pressure can be reduced by including in the diet certain plant-derived vitamins (especially A, C, and E) and herbs or plant-derived materials such as evening primrose oil, flaxseed oil, borage oil, COQ_{10}, and certain mushrooms (e.g., maitake, shiitake). However, control of high blood pressure may also require measures unrelated to plants (e.g., cessation of

smoking, control of alcoholism), and problems such as irregular heartbeat may require a pacemaker or other remedies beyond the scope of this brief overview.

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Cholesterol-Lowering Plants or Plant Derivatives

1. *Allium sativum* (garlic)
   Allicin, which is produced by garlic and onions, has been demonstrated to have several beneficial effects on human health, including the capacity to significantly lower blood cholesterol levels. Deodorized garlic powder and tablets or capsules are available in health-food stores and from other sources. (**Caution:** Some deodorizing processes can signficantly lower the allicin content of garlic and onions.)

2. *Crataegus oxycantha* (= *Crataegus laevigata*) (hawthorn)
   Hawthorn plant extracts have been shown to regulate blood levels of cholesterol and lower blood pressure.

3. DHA (Docosahexaenoic acid)
   There is evidence that DHA can play a role in balancing cholesterol and triglyceride levels in the blood.

4. *Commiphora mukul* (mukul myrrh)
   This small tree, native to Arabia and India, produces a resin known as guggul that lowers LDL cholesterol and other fat levels in the blood by stimulating the thyroid gland while at the same time raising HDL (good cholesterol) levels.

5. *Cassia obtusifolia* (sicklepod)
   Extracts of this plant have been shown to lower cholesterol levels.

6. *Linum* spp. (flax)
   Flaxseed included in a person's daily diet has been shown to balance triglyceride and cholesterol levels in the blood. Freshly ground flaxseed can be added to breakfast cereals, juices, and other drinks.

7. *Monascus purpureus* (red yeast)
   Clinical trials involving the consumption of red yeast rice (rice on which red yeast has been cultured) have

demonstrated the preparation's capacity to significantly lower the total serum and cholesterol levels in humans.

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Antioxidants

Antioxidants are natural organic and inorganic substances that neutralize free radicals by bonding with them and, in so doing, protect bodies from damage. Free radicals are unstable atoms or molecules with which other atoms or molecules can easily cause a chemical reaction as they bond, forming a stable compound. When free radicals bond, they can cause considerable, sometimes irreversible damage. Free radicals are naturally produced during chemical reactions in the body, and some are useful in helping immune systems function normally, including preventing the development of cancer and other diseases. But the number of free radicals can become excessive, and if there are not enough antioxidants to keep them balanced and in check, even genetic damage can result.

Our bodies produce certain enzymes, such as glutathione peroxidase and catalase, as well as hormones and nutrient-derived free-radical neutralizers that keep the free radicals from becoming excessive. However, pesticides, industrial wastes, and a host of other pollutants cause the generation of so many free radicals that antioxidants naturally obtained from the food we eat often are not enough to combat free-radical damage. Health-conscious individuals may seek to counteract the problem by supplementing their diets with antioxidant-rich nutrients. Literally hundreds of fruits, vegetables, and herbs provide varying amounts of antioxidants. Some antioxidant sources may be suitable for people who do not have liver, kidney, heart, circulatory, respiratory, and other problems, but they can exacerbate existing maladies. In addition, pregnant women, elderly persons, and other people with allergies and various disorders should exercise caution and be advised by professional health-care providers before using herbal supplements.

Common antioxidants or sources of antioxidants include: vitamins A (and its beta-carotene precursor), C, and E; SOD (superoxide dismutase); pycnogenol; grape seed extract; alpha lipoic acid; bilberry (be aware that bilberry can reduce iron absorption); coenzyme Q_{10}; *Ginkgo biloba* extract; catechin and other flavonoids (from green tea); L-cysteine; glutathione; melatonin; ginger rhizome; licorice roots; elderberry fruits; milk thistle leaves, seeds and fruit; turmeric rhizomes; selenium; and zinc.

HALLUCINOGENIC PLANTS

Although a few hallucinogenic substances produced by animals have been isolated and some have been synthesized, the majority of known hallucinogens are produced by plants. Table 8 is not a complete list, but it includes the better-known sources.

TABLE 8

Hallucinogenic Substances Produced by Plants and Fungi

Plant	***Scientific Name***	***Part Used***	***Principal Active Substance***
Ajuca	*Mimosa hostilis*	Roots	Nigerine
Belladonna	*Atropa belladonna*	Leaves	Hyoscyamine, scopolamine
Caapi	*Banisteriopsis caapi*	Wood	Harmine
Canary broom (*Genista* of florists, but true *Genista* is a broom genus that differs from *Cytisus* in that *Cytisus* spp. have a seed appendage, whereas those of *Genista* do not.)	*Cytisus canariensis*	Seeds	Cytisine
Catnip	*Nepeta cataria*	Leaves	Unknown
Cohoba	*Piptadenia peregrina, P. macrocarpa*	Seeds, pods (snuff)	Tryptamines
Coral bean	*Erythrina* spp.	Seeds	Unknown
Cubbra borrachera	*Brugmansia* spp.	Leaves	Scopolamine
Ergot fungus	*Claviceps purpurea*	Rhizomorph	Ergine (LSD)
Fly agaric	*Amanita muscaria*	Mushroom cap	Ibotenic acid, muscimol
Henbane	*Hyoscyamus* spp.	Leaves	Hyoscyamine, scopolamine
Iboga	*Tabernanthe iboga*	Root bark	Ibogaine
Jimson weed	*Datura* spp.	All parts	Scopolamine
Kava kava	*Piper methysticum*	Root (large amounts of beverage produce hallucinations)	Myristicin-like compound
Mace	*Myristica fragrans*	Aril of seed	Myristicin
Mescal bean	*Sophora secundiflora*	Seeds	Cytisine
Morning glory	*Ipomoea violacea*	Seeds	Ergine
Nutmeg	*Myristica fragrans*	Seeds	Myristicin
Ololiuqui	*Rivea corymbosa*	Seeds	Turbicoryn
Peyote	*Lophophora williamsii*	Stems	Mescaline

Psilocybe and related mushrooms	*Psilocybe* spp., *Conocybe* spp., *Panaeolus* spp., and others	All parts	Psilocybin, psilocin
Rape dos Indios	*Maquira sclerophylla*	Dried plant (snuff)	Unknown
San Pedro	*Trichocereus pachanoi*	Stems	Mescaline
Sassafras	*Sassafras albidum*	Root bark (large amounts of tea)	Safrole
Sweet flag	*Acorus calamus*	Dried root	Asarone
Syrian rue	*Peganum harmala*	Seeds	Harmine
Vygie	*Mesembryanthemum expansum*	All parts	Mesebrine
Wood rose	*Argyreia nervosa*	Seeds	Ergoline alkaloids
Yakee (Parica)	*Virola* spp.	Resin from inner surface of freshly removed bark (snuff)	Tryptamine
Yohimbe	*Corynanthe* spp., *Pausinystalia johimbe*	Bark	Yohimbine

SPICE PLANTS

The word spice describes any aromatic plant or part of a plant used to flavor or season food; spices are also used to add scent or flavor to manufactured products (Table 9). Although spices have no nutritional value, they add a pleasurable zest to meals, and before food preservation was possible, they helped make palatable food that was still edible but unappealing.

The value placed on spice plants was responsible for changing the course of Western civilization as a principal motive behind the voyages of discovery.

TABLE 9
Plants Used to Season or Flavor

Spice	***Scientific Name***	***Parts Used***	***Principal Source***
Allspice	*Pimento officinalis*	Powdered dried fruit	Jamaica
Almond	*Prunus amygdalus*	Oil from seed used for flavoring baked goods	Mediterranean; U.S.
Angelica	*Angelica archangelica*	Stems candied; oil from seeds, roots used in liqueurs	Europe; Asia
Anise	*Pimpinella anisum*	Oil distilled from fruits used for flavoring	Widely cultivated

Arrowroot	*Maranta arundinacea*	Powdered root used in milk puddings, baked goods	South America
Asafoetida	*Ferula asafoetida*	Powdered gum from stems and roots used in minute quantities with fish	Middle East
Balm (Melissa)	*Melissa officinalis*	Oil from leaves used in beverages; leaves used as food flavoring	U.S.; Mediterranean
Basil	*Ocimum basilicum*	Leaves used in meat dishes, soups, sauces	Mediterranean
Bay	*Laurus nobilis*	Leaves used in soups, sauces	Europe
Bell pepper	*Capsicum frutescens*	Dried diced fruit used in chip dips, salad dressings	Widely cultivated
Bergamot	*Monarda didyma*	Leaves used with pork (Note: A perfume oil obtained from a variety of orange—*Citrus aurantium* var. *bergamia*—is also called bergamot.)	North America (*Monarda*); Italy (*Citrus*)
Black pepper	*Piper nigrum*	Dried fruits used as a condiment	India; Indonesia
Borage	*Borago officinalis*	Leaves used as a beverage flavoring	England
Burnet	*Sanguisorba minor*	Used in soups and casseroles	Eurasia
Calamus	*Acorus calamus*	Powdered rhizome used for flavoring	Europe; Asia; North America
Capers	*Capparis spinosa*	Flower buds used for flavoring relishes, pickles, sauces	Mediterranean
Caraway	*Carum carvi*	Seeds used in breads, cheeses; seed oil used in the liqueur kummel	North America; Europe
Cardamon	*Elletaria cardamomum*	Dried fruit and seeds used for flavoring baked goods (Note: Several false cardamons—*Amomum* spp.—are sold commercially.)	India; Sri Lanka; Central America
Cassia	*Cinnamomum cassia*	Powdered bark used as cinnamon substitute	Southeast Asia
Cayenne pepper	*Capsicum* spp.	Powdered dried fruits used in chili powder, Tabasco sauce	American tropics
Celery	*Apium graveolens*	Seeds used in celery salt, soups	Europe; U.S.
Chervil	*Anthriscus cerefolium*	Used as a parsley substitute	Europe; Near East
Chicory	*Cichorium intybus*	Ground, dried root added to coffee	Mediterranean
Chives	*Allium schoenoprasum*	Leaves, bulbs used with sour cream, butter	Widely cultivated
Chocolate	*Theobroma cacao*	Ground seeds used for flavoring	Africa; South America

Cilantro	*Coriandrum sativum*	Leaves used in avocado dip and with poultry	Europe
Cinnamon	*Cinnamomum zeylanicum*	Ground bark used for flavoring baked goods; oil from leaves used as flavoring, clearing agent	Seychelles; Sri Lanka
Citrus	*Citrus* spp.	Fruits, especially rinds, source of flavoring oil	Mediterranean; South Africa; U.S.
Cloves	*Syzygium aromaticum*	Dried flower buds used to flavor cooked fruits, toothpaste, candy	Moluccas (Spice Islands)
Coffee	*Coffea arabica*	Roasted seeds source of mocha-coffee flavoring	Tropics
Coriander	*Coriandrum sativum*	Ground seed used in German frankfurters, curry powders	Mediterranean
Costmary	*Chrysanthemum balsamita*	The leaves used sparingly in salads add a mint flavor	Europe, Asia
Cubebs	*Piper cubeba*	Dried fruits used as seasoning	East Indies
Cumin	*Cuminum cyminum*	Ground seed used with meats, pickles, cheeses, curry	Mediterranean
Curry	A blend of parts of plants of several different spp.	A spicy condiment containing several ingredients, such as turmeric, cumin, fenugreek, and zedoary	India
Dill	*Anethum graveolens*	Seeds used in pickling brines; leaves used for seasoning meat loaves, sauces	Europe; Asia
Dittany	*Origanum dictamnus*	Leaves used as seasoning for poultry, meats	Crete
Eucalyptus	*Eucalyptus* spp.	Oil from leaves used in toothpastes, flavoring agents	Australia
Fennel	*Foeniculum vulgare*	Seeds used in baked goods	Europe
Fenugreek	*Trigonella foenum-graecum*	Oil distilled from seeds used in pickles, chutney, curry powders, imitation maple flavoring	Widely cultivated
File (see Sassafras)			
Fruit-scented sage	*Salvia dorisiana*	Plant used with beef and fish; it adds a grapefruit-pineapple flavor to the meat	Honduras
Garlic	*Allium sativum*	Fresh or dry bulbs used for meat seasonings	Widely cultivated
Ginger	*Zingiber officinale* and others	Dried rhizomes used for flavoring many foods and drinks	India; Taiwan
Grains of paradise	*Afromomum melegueta*	Seeds used to flavor beverages and medicines	West Africa

Hops	*Humulus lupulus*	Dried inflorescences of female plants used in brewing beer	Europe; North America
Horseradish	*Rorippa armoracia*	Grated fresh root used as a condiment	Europe; North America
Juniper	*Juniperus* spp.	"Berries" used to season beef roasts, poultry, sauces	North America
Lemon balm	*Melissa officinalis*	Leaves give a lemon-mint flavor to stews and desserts	Southern Europe
Licorice	*Glycyrrhiza glabra*	Dried rhizome and root used to flavor pontefract cakes, candies	Middle East
Lovage	*Ligusticum scoticum*	Stems candied; seeds used in pickling sauces; celery substitute	Europe
Mace	*Myristica fragrans*	Aril of seed used for flavoring beverages, foods	Grenada; Indonesia; Sri Lanka
Marigold	*Tagete*s spp.	Petals substituted for saffron in rice dishes, stews	Widely cultivated
Marjoram	*Origanum hortensis*	Leaves used in stews, dressings, sauces	Mediterranean
Mugwort	*Artemisia douglasiana*	Fatty meat flavored with leaves	West Coast of North America
Mustard	*Brassica* spp.	Ground seeds used in meat condiment	Europe; China
Nasturtium	*Tropaeolum majus*	Flowers, seeds, leaves used in salads	Widely cultivated
Nutmeg	*Myristica fragrans*	Seeds used for flavoring foods, beverages	Grenada; Indonesia; Sri Lanka
Oregano	*Origanum vulgare* and others	Leaves used as seasoning with poultry, meats	Europe
Paprika (see Cayenne pepper)			
Parsley	*Petroselinum crispum*	Leaves used as meat garnish and flavoring in sauces	Widely cultivated
Peppermint	*Mentha piperita*	Oil from leaves used for food, drink, dentifrice flavoring. (Much commercial menthol is derived from *Mentha arvensis* grown in Japan.)	U.S.; Russia
Pimiento	*Capsicum* spp.	Bright red fruits of a cultivated variety of pepper used in stuffing olives and in cold meats, cheeses	Central and South America
Poppy	*Papaver somniferum*	Seeds used in baking	Widely cultivated
Rosemary	*Rosmarinus officinalis*	Oil from leaves used in perfumes, soaps	Mediterranean
Rue	*Ruta graveolens*	Flavoring for fruit cups, salads	Europe
Saffron	*Crocus sativus*	Dried stigmas used to flavor oriental-style dishes	Spain; India

Sage	*Salvia officinalis*	Leaves used in poultry and meat dressings	Yugoslavia
Salad burnet	*Poterium sanguisorba*	Leaves impart a cucumber-like flavor to salads	Europe; W. Asia
Sarsaparilla	*Smilax* spp.	Roots are source of flavoring for beverages, medicines	American tropics
Sassafras	*Sassafras albidum*	Bark and wood yield flavoring for beverages, toothpaste, gumbo	U.S.
Savory (summer)	*Satureia hortensis*	Leaves used in green bean and bean salads, lentil soup, with fish	Mediterranean
Savory (winter)	*Satureia montana*	Leaves used as seasoning in stuffings, meat loaf, stews	Europe
Scallion	*Allium fistulosum*	Leaves used in wine cookery, soups	Widely cultivated
Sesame	*Sesamum indicum*	Seeds used in baking	Asia
Shallot	*Allium ascalonicum*	Bulbs, leaves used in Colbert butter, wine cookery	Widely cultivated
Southernwood	*Artemisia abrotanum*	Leaves used to flavor cakes	Europe
Star anise	*Illicium verum*	Fruits used in candy and cough drops	China
Stonecrop	*Sedum acre*	Dried leaves (ground) used as pepper substitute	Europe
Sweet cicely	*Osmorhiza* spp.	Leaves have sweet, slight anise flavor; used to flavor dishes and baked goods that incorporate cooked fruits	North America; E. Asia
Sweet woodruff	*Galium odoratum*	Plants used to flavor fruit punches and strawberries	Europe; N. Africa; Asia
Tansy	*Tanacetum vulgare*	Leaves used in small amounts to flavor baked goods, pancakes, and puddings	Europe; Asia
Tarragon	*Artemisia dracunculus*	Leaves and flowering tops used in pickling sauces	Europe
Thyme	*Thymus vulgaris*	Leaves used in meat and poultry dishes, soups, sauces	Widely cultivated
Tonka bean	*Dipteryx* spp.	Seeds source of flavoring for tobacco; vanilla substitute (now largely synthesized)	American tropics
Turmeric	*Curcuma longa*	Rhizomes powdered and used in curry powders, meat flavoring	India; China
Vanilla	*Vanilla planifolia*	Flavoring extracted from fruits; used in foods, drinks	Malagasay Republic
Wintergreen	*Gaultheria procumbens*	Oil from leaves, bark used as flavoring for confections, toothpaste	U.S.

Zedoary	*Curcuma zedoaria*	Dried rhizome used in liqueurs, curry powders	India

DYE PLANTS

In the recent and the ancient past, dyes from many different plants were used to color cotton, linen, and other fabrics. Since the middle of the nineteenth century, however, natural dyes have been almost completely replaced in industry by synthetic dyes, and today the use of natural dyes is largely confined to individual hobbyists.

Any reader interested in experimenting with natural dyes is encouraged to try not only those plant materials included in Table 10 but any local plants available. The experimenter will soon find that quite unexpected colors may be derived from plants, since the colors of fresh flowers, bark, or leaves often bear little relationship to the colors of the dyes. For methods of dyeing, see the footnote under the heading "Lichens" in Chapter 19 of Stern: *Introductory Plant Biology*, 9th ed., and references in the Additional Reading on Spice Plants and Dye Plants list.

TABLE 10

Plant Sources of Natural Dyes

Plant or Dye	***Scientific Name***	***Plant Source***
Acacia	*Acacia* spp.	Brown dyes from bark and fruits
Alder	*Alnus* spp.	Brownish dyes from bark
Alkanet	*Alkanna tinctoria*	Red dye from roots
Annatto	*Bixa orellana*	Yellow or red dye from pulp surrounding seeds
Bamboo	*Bambusa* spp.	Light green dye from leaves
Barberry	*Berberis vulgaris*	Grayish dye from leaves
Barwood	*Baphia nitida*	Purplish dyes from wood
Bearberry	*Arctostaphylos uva-ursi*	Yellowish dye from leaves
Bedstraw	*Galium* spp.	Light reddish-brown dyes from roots
Birch	*Betula* spp.	Light brown to black dyes from bark
Black cherry	*Prunus serotina*	Red dye from bark; gray to green dyes from leaves
Black walnut	*Juglans nigra*	Rich brown dye from bark; brown dye from walnut hulls
Bloodroot	*Sanguinaria canadensis*	Red dye from rhizomes
Blueberry	*Vaccinium* spp.	Blue to gray dye from mature fruits (tends to fade)
Bougainvillea	*Bougainvillea* spp.	Light brownish dyes from floral bracts

Brazilwood	*Caesalpinia* spp.	Reddish dyes from wood
Buckthorn	*Rhamnus* spp.	Green dyes from fruits
Buckwheat	*Fagopyrum esculentum*	Blue dye from stems
Buckwheat (wild)	*Eriogonum* spp.	Dark gold, pale yellow, and beige dyes from stems and flowers
Buffaloberry	*Shepherdia argentea*	Red dye from fruit
Butternut	*Juglans cinerea*	Yellow to grayish-brown dyes from fruit hulls
Cocklebur	*Xanthium strumarium*	Dark green dye from stems and leaves
Coffee	*Coffea arabica*	Light brown dye from ground roasted seeds
Cudbear (Archil)	*Rocella* spp. (lichen)	Red dye obtained by fermentation of thallus
Cutch	*Acacia* spp.; *Uncaria gambir*	Brown to drab green dyes from stem gums
Dock	*Rumex* spp.	Light brown dyes from stems and leaves
Dogwood	*Cornus florida*	Red dye from bark; purplish dye from root
Doveweed	*Eremocarpus setigerus*	Light- to olive-green dye from entire plant
Dyer's rocket	*Reseda luteola*	Orangish dye from all parts
Elderberry	*Sambucus* spp.	Blackish dye from bark; purple, blue, or dark brown dyes from fruits
Eucalyptus	*Eucalyptus* spp.	Beige dyes from bark
Fennel	*Foeniculum vulgare*	Yellow dyes from shoots
Fig	*Ficus carica*	Green dyes from leaves and fruits
Fustic	*Chlorophora tinctoria*	Yellow, bright orange, and greenish dyes from heartwood
Gamboge	*Garcinia* spp.	Yellow dye from resins that ooze from cuts made on stems
Giant reed	*Arundo donax*	Pale yellow dye from leaves
Grape	*Vitis* spp.	Bright yellow to olive green dyes from leaves
Hawthorn	*Crataegus* spp.	Pink dye from ripe fruits
Hemlock	*Tsuga* spp.	Reddish-brown dye from bark
Henna	*Lawsonia inermis*	Orange dye from shoots and leaves

Hickory	*Carya tomentosa*	Yellow dye from bark
Hollyhock	*Althaea rosea*	Purplish-black dye from flower petals
Horsetail	*Equisetum* spp.	Tan dyes from all green parts
Indigo	*Indigofera tinctoria*	Bright blue dyes from leaves
Kendall green (see Woadwaxen)		
Larkspur	*Delphinium* spp.	Blue dyes from petals
Lichens	Many genera and species	Many lichens yield (with various mordants) brilliant shades of yellows, golds, and browns
Litmus	*Rocella tinctoria*	Widely used pink-to-blue pH indicator dye from thallus
Logwood	*Haematoxylon campechianum*	Dark blue purple dye from heartwood (widely used for staining tissues in microscope slides)
Lokao	*Rhamnus* spp.	Green dye from wood
Lupine	*Lupinus* spp.	Greenish dyes from flowers
Madder	*Rubia tinctorium*	Bright red dye from roots
Madrone	*Arbutus menziesii*	Brown dye from bark
Manzanita	*Arctostaphylos* spp.	Beige to dull yellow dyes from dried fruits
Maple	*Acer* spp.	Pink dye from bark
Marsh marigold	*Caltha palustris*	Yellow dye from petals
Milkweed	*Asclepias speciosa*	Pale yellow dyes from leaves
Morning glory	*Ipomoea violacea*	Gray-green dye from blue flowers
Mullein	*Verbascum thapsus*	Gold dyes from leaves
Oak	*Quercus* spp.	Yellow dye from bark
Onion	*Allium cepa*	Reddish-brown dyes from dry outer bulb scales of red onions; yellow dyes from similar parts of yellow onions
Oregon grape	*Berberis aquifolium*	Yellow dyes from roots
Osage orange	*Maclura pomifera*	Yellow, gray, and green dyes from fruits; yellow-orange dye from wood
Peach	*Prunus persica*	Green dyes from leaves

Poke	*Phytolacca americana*	Red dyes from mature fruits
Pomegranate	*Punica granatum*	Dark gold dye from fruit rinds
Prickly lettuce	*Lactuca serriola*	Green dye from leaves
Privet	*Ligustrum vulgare*	Yellow-green dye from leaves; deep gray dye from berries
Quercitron	*Quercus velutina*	Bright yellow dye from bark
Rhododendron	*Rhododendron* spp.	Tan dyes from leaves
Safflower	*Carthamnus tinctorius*	Reddish dye from flower heads
Saffron	*Crocus sativus*	Powerful yellow dye from stigmas
Sage	*Salvia officinalis*	Yellow dye from shoots
Sandalwood	*Pterocarpus santalinus*	Red dye from wood
Sappanwood	*Caesalpinia sappan*	Red dye from heartwood
Sassafras	*Sassafras albidum*	Orange-brown dye from bark
Scotch broom	*Cytisus scoparius*	Yellow dye from all parts of plant
Smoke tree	*Cotinus coggyria*	Orange-yellow dye from wood (dye sometimes called "young fustic")
Smooth sumac	*Rhus glabra*	Grayish-brown dye from bark
St. John's wort	*Hypericum* spp.	Light brownish dyes from leaves
Tansy	*Tanacetum* spp.	Yellow, green dyes from leaves
Toyon	*Heteromeles arbutifolia*	Reddish-brown dyes from leaves
Turmeric	*Curcuma longa*	Orange-ish dye from rhizome
Woad	*Isatis tinctoria*	Blue dye from leaves
Woadwaxen	*Genista tinctoria*	Yellow dye from all parts
Yerba santa	*Eriodictyon californicum*	Rich dark-brown dyes from leaves

Additional Reading on Spice Plants and Dye Plants

(See also the Additional Reading entries in Chapter 24 of *Stern: Introductory Plant Biology,* 8th ed., Dubuque, IA: McGraw-Hill Publishers.)

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TROPICAL AND UNCOMMON FRUITS

Following is a listing of the more important or interesting edible tropical and uncommon fruits. See Additional Reading on Uncommon Plants for a source of further information.

Acerola (*Malpighia glabra*) Acerolas, also known as Barbados cherries, are small, three-lobed acidic fruits that are said to have 60 times the vitamin C content of oranges. Commercially grown acerolas are thought to be hybrids between *Malpighia glabra* and *M. punicifolia.*

Avocado (*Persea americana*) The green to purplish-black, pear-shaped fruits of avocado trees are now found not only in the tropics but in supermarkets throughout most of the world. The leathery skin encloses a nutritious, buttery flesh that is rich in vitamins and iron. Protein content is about 2 percent, and unsaturated fat comprises up to 30 percent of the edible portion. The single large seed will germinate if suspended with toothpicks over a jar of water, but the seedling will not survive when planted outside in areas that freeze in the winter.

Asian pear (*Pyrus pyrifolia; P. ussuriensis*) More than 100 varieties known, including hybrids with other species of *Pyrus.* Most sold in North America are rounder, firmer, and contain more stone cells than common varieties of pears.

Banana (*Musa acuminata*) About 30 species known, with edible varieties often being hybrids with *Musa balbisiana* and other species. Most species produce fruits with small, hard seeds, but the fruits of edible varieties are seedless (parthenocarpic)

berries. Cooking bananas (plantains) are generally referred to as *Musa* x *paradisiaca*, which originates from crosses between *M. acuminata* and *M. balbisiana*.

Breadfruit (*Artocarpus altilis* and others) About 50 species of monoecious trees, with most breadfruit being derived from *A. altilis*. The fruits are slightly smaller than a volleyball in size and are usually cooked as vegetables. *A. heterophyllus* produces very large edible fruits (known as jackfruits) along the trunk or larger branches. The fruits can weigh up to 90 pounds (40 kilograms).

Cape gooseberry (see Ground cherry)

Carambola (see Star fruit)

Carob (see Tamarind)

Cherimoya (*Annona cherimola*) Also called custard apple (which see), cherimoyas are apple-shaped with a distinctive, dull green, scalelike skin. The flesh, which contains numerous black seeds embedded within, has the consistency, color, and flavor of a fruity vanilla custard. The fruits bruise easily and are sensitive to both cold and heat, making it difficult to ship them to temperate-area markets. The thicker-skinned *Annona scleroderma* is being used in hybridization experiments in an attempt to produce a less easily bruised fruit.

Currant, red (*Ribes rubrum*) Although red currants are cultivated in Europe, they are seldom grown in North America because many counties prohibit cultivation of any *Ribes* species. The prohibition stems from the fact that the plants (not the fruits) serve as alternate hosts to White Pine Blister Rust, which has decimated large stands of white pines. The fruits, which are intermediate in size between peas and small grapes, are tart and generally require the addition of sugar to be palatable by themselves. They do, however, serve as colorful enhancements for meat and vegetable dishes, and they make good preserves.

Custard apple (*Annona reticulata*) Similar in appearance and characteristics to cherimoya (which see). The names “custard apple” and “cherimoya” are often used interchangeably for both species.

Date (*Phoenix dactylifera*) Native to southwestern Asia, dates have been cultivated for more than 8,000 years. The species is dioecious, with male inflorescences being cut from the trees and then brushed against opened-up female inflorescences to pollinate. Date palms begin to flower when they are four years old. Dried date fruits contain about 2 percent protein, 2.5 percent fat, and 70 percent carbohydrate.

Durian (*Durio zibethinus*) Trees with bat-pollinated flowers, which develop into very large, spiny fruits that are highly prized in Malaysia and Indonesia but have not become popular elsewhere because they emit a foul odor that is overwhelming to those who have not acquired a taste for what is otherwise considered a delicacy. The seeds are covered with fleshy, edible arils that have the consistency of custard and a complex mix of flavors including those of caramel, almonds, banana, vanilla, and onion.

Feijoa (*Feijoa sellowiana*) The egg-sized and -shaped fruit is produced on bushes whose leaves and flowers (which have whitish petals and deep red stamens) are sometimes grown more as ornamentals than for their edible fruits. The flowers are slightly fleshy and are also edible, having a sweet taste. The fruits themselves have a slight taste of pineapple and are eaten fresh or in preserves.

Fig (*Ficus carica*) Many varieties of the common fig are cultivated throughout regions of the world having a Mediterranean climate. The fruit develops from an “inside-out” inflorescence, with the ovaries essentially coalescing into a single multiple fruit having a small opening at one end. Most are pollinated by tiny wasps that crawl in through the opening, but some varieties develop parthogenetically without pollinators. *Ficus carica* is by far the best-known species, but many of the 800 mostly tropical spp. of *Ficus* also produce edible fruits. The genus also includes the rubber plant (*F. elastica*)—not to be confused with commerical rubber trees (*Hevea brasiliensis*), which are in the spurge family, and banyan trees.

Gooseberry (*Ribes* spp.) Most of the 150 species of *Ribes* produce edible fruits that may either be smooth-skinned or have prominent spines. The exceptionally tart berries are not grown extensively in North America because of a ban on their cultivation due to the plants serving as alternate hosts for white pine blister rust. Gooseberries sold in supermarkets often are imported from New Zealand. Many gooseberries are made into jams and jellies, with preserves of wild forms with spines being prized by some as superior to preserves of any other fruits.

Granadilla (see Passion fruit)

Ground cherry (*Physalis peruviana*) Also known as Cape gooseberry (South Africa) and Poha (Hawaii), the marble-sized, orange-colored fruits are produced within a tannish, papery husk. The fruits are edible raw or cooked, and make excellent preserves.

Guava (*Psidium guajava*) The shrubs to small trees that produce the yellow-skinned, ellipsoidal fruits sometimes become weeds in the tropics. The flesh of the fruits, which has an attractive aroma, contains numerous small white seeds that are strained out when making the widely sold guava nectar. The ripe fruits tend to be short-lived, partly because their thin skins make them especially attractive to fruit flies, which lay their eggs just beneath the surface.

Jackfruit (see Breadfruit)

Jujube (*Ziziphus jujuba*) Common jujube trees originated in China, and a similar species (*Z. mauritiana*) originated in India. The fruits of both species are about the size of an olive, each containing a single seed. The fruits are consumed fresh, dried, or as preserves.

Kiwi (*Actinidia chinensis*) Originally introduced from New Zealand into the United States in the 1930s, kiwis are now grown extensively in California and in temperate areas around the world. The rough brown (but edible) skin of the ellipsoidal, egg-sized fruit belies the tender, greenish interior, which contains a cylinder of tiny, soft, black seeds. The slightly tart, but at the same time sweet, flesh has a unique, slightly citrus flavor and is rich in vitamin C.

Kumquat (*Fortunella margarita*) and others Although there are round varieties, the most readily available kumquats in North America have the appearance of small, elongated oranges (with which the species hybridize). The whole fruits, including the skin, have a distinctly citrus flavor and are eaten either raw or preserved.

Litch (*Litchi chinensis*) The plum-sized, slightly ovoid fruits have a pebbly “shell” (usually red to brown in color) enclosing translucent white flesh with the consistency of a firm grape. The flesh, which is relatively sweet and has the odor of a delicate perfume, is an aril surrounding a single large seed. Litchi trees are frost-intolerant and irregular in fruit production; the fruits are not marketed to any extent in the United States outside of Hawaii and Florida.

Loquat (*Eriobotrya japonica*) Loquat trees are sometimes grown for shade because of their dense, leathery, dark-green foliage. The fruits, which are produced in clusters, are usually about the size and shape of large grapes, although some cultivated varieties can reach lengths of 7 cm. When they ripen in early spring, they are generally pale orange in color, both within and without, and contain two or three brown seeds. The slightly fibrous but watery flesh can be a little tart but is sweet when fully ripe. Loquats bruise easily and are not frequently seen outside areas having mild to subtropical climates.

Malay apple (*Syzygium malaccense*) Malay apples are the size and shape of a small pear. The fruit, which is eaten raw or cooked, contains a large brown seed, and the flesh is sometimes made into preserves or wine. Several other spp. of *Syzygium* also have edible fruits.

Mammey (see Sapote)

Mango (*Mangifera indica*) A widespread tropical fruit, the mango is known in many cultivated forms that vary greatly in flavor and consistency. Most mangoes are about the size of an orange, but are generally asymmetrical in shape. The smooth skin

can vary from green to orange to red when ripe, and the fruits, which contain a single large, whitish seed adorned with hairs, usually have a distinctive aroma that hints of turpentine in some of the less desirable varieties. The flesh has the consistency of a melon, with some fibrous and often considerable juice content.

Mangosteen (*Garcinia mangostana*) Hailed by many as the world's most delicious fruit, mangosteens, which occur in Malaysia, would undoubtedly be found throughout the tropics were it not for the fact that fruit-bearing trees have thus far proved nearly impossible to cultivate outside their native habitat. The plum-sized fruits have a thick, purplish rind surrounding four to six seeds embedded within white arils of truly exceptional flavor.

Olive (*Olea europea*) Olives are grown throughout areas of the world with Mediterranean climates. The fruits, either green or ripe, are exceptionally bitter and are processed to render them palatable. Ripe olives are stored for a minimum of several weeks in a brine solution after picking. They are then treated with caustic soda, washed, stored in a weak brine, and pasteurized. The processing of green olives omits the initial storage in brine. Most olives contain between 15 and 35 percent oil, which is typically extracted by pressing the fruits up to four times. The oil from the first pressing, called virgin oil, is the most desirable. The last pressings yield an oil that is used to make soap or lubricants.

Papaya (*Carica papaya*)Papayas, known in English-speaking areas outside of North America as pawpaws, may be pear-shaped, nearly spherical, or variably elongated fruits produced along the upper trunks of short-lived trees that are really large, fast-growing herbs whose main support comes from phloem fibers. Some plants produce only male flowers; others produce only female flowers, and many plants produce a mixture of both male and female flowers. The shape of the fruit is related to the proportion of male to female flowers produced on the plant, with those having only female flowers developing spherical fruits and those with predominantly male flowers producing elongate fruits. Papayas are thin-skinned, melonlike fruits having a pale orange to reddish, somewhat soft and juicy flesh with an abundance of peppercorn-sized, blackish, wrinkled seeds within a central cavity. The fruits can vary in size from little more than a quarter kilogram (half pound) to nine kilograms (20 pounds). For shipping outside the tropics, papayas are picked green, and when they ripen, they do not have the prized flavor of tree-ripened fruits. When gashed with a blade, green fruits produce a latex containing papain, a digestive enzyme used primarily in meat tenderizers but also used in chewable tablets to facilitate human digestion.

Passion fruit (*Passiflora edulis* and other *Passiflora* spp.) Passion fruits are egg-sized fruits produced from striking purple and white flowers on vines with axillary tendrils. The fruits, which depending on the species, may be purple to orange to yellow when ripe, are filled with small, usually dark, edible seeds surrounded by pulpy arils. They are prized for their aroma and flavor, with the juice being used in a variety of drinks. Several species, including the purple passion fruit, are known as granadillas. The top of a granadilla may be cut off, and the pulp with its seeds scooped out and eaten with a spoon.

Persimmon (*Diospyros kaki* and other *Diospyros* spp.) Cultivated persimmons are thin-skinned, apple-sized fleshy fruits with high sugar and exceptionally high beta-carotene content. They may contain from one to several elongate, hard seeds, but seeds may also be absent from cultivated varieties. Most ripe fruits are deep orange in color and soft at maturity, but fuyu persimmons have a firmer flesh reminiscent of that of apples. Once they are ripe, persimmons are subject to fungal and bacterial attack, and they spoil easily. Many persimmons are eaten after they have been dried.

Pineapple (*Ananas comosus*) Grown thoughout the tropics and some subtropical areas, pineapples develop from a terminal inflorescence in which 100–200 ovaries grow together into a single, seedless multiple fruit with a tuft of leaves at the top. The tuft of leaves can be induced to grow into a new plant in a pot on a windowsill. Flowering can be triggered with ethylene when the leaves have grown to maturity by placing a ripe apple next to the plant and covering the plant and pot with a clear plastic bag for a day or two. Pineapples are propagated from sucker shoots in commercial plantations.

Pineapple guava (see Feijoa)

Poha (see Ground cherry)

Pomegranate (*Punica granatum*) Often grown as ornamentals in milder climates because of their striking, bright, reddish-orange flowers, pomegranate bushes produce grapefruit-sized (or slightly smaller) fruits with firm, leathery rinds enclosing a collection of translucent, semisoft, angular seeds surrounded by reddish, juicy pulp. The seeds and sweet pulp are separated by membranes into several sections. The pulp and seeds are consumed raw, as juice, in drinks, or in cooked dishes to which the pomegranate has been added.

Prickly pear (*Opuntia* spp.) Relatively bland fruits (berries) with soft flesh containing numerous black seeds. The skin, which may vary in color from purplish-red to pale green, is dotted with clusters of tiny spines that should be avoided because they break off easily into human skin where they can be very irritating. The flesh is sweet and has a faint odor reminiscent of a combination of pear and watermelon.

Quince (*Cydonia oblonga*) Quinces, which are the size and shape of an apple, are produced on bushes and are seldom eaten raw, despite an attractive appearance, the flesh usually being too hard or too tart to be palatable unless cooked. They make excellent jellies and jams.

Soursop (*Annona muricata*) Soursops are produced by small tropical American trees. The fruits are typically the size of a watermelon and are distinctly acid to the taste. The pulp, while directly edible, is more often used to make sherbets and fruit drinks.

Sapodilla (*Manilkara zapota*) Sapodilla trees are cultivated in the tropics for their edible fruit, but wild sapodilla trees are perhaps better known for the chicle (latex) they produce. Chicle was originally used as the base for chewing gum. The variably shaped fruits have a rough brown skin enclosing a sweet, brownish flesh within which are several glossy black seeds.

Sapote (*Pouteria sapota* and other *Pouteria* spp.) Sapote or mammey fruits, which have a green or brownish to pale yellow skin when ripe, are about the size of an orange. The sweet, mealy, yellow-to-orange flesh usually contains one to four seeds. Sapotes are related to sapodillas, from which latex (chicle), the original basis for chewing gum, is obtained. *Pouteria* sapotes should not be confused with white sapotes (which see) and black sapotes (*Diospyros digyna*),which are in different families.

Sapote, white (*Casimiroa edulis*) White sapotes are related to oranges, which they resemble in size only. The skin is yellow to bright green and encloses a sweet, juicy flesh with the consistency and color of fine, smooth custard. Two to five small seeds are embedded in the flesh. When cut in half, the fruits appear to have no core. White sapotes are sometimes confused with other sapotes, to which they are not related.

Star fruit (*Averrhoa carambola*) The somewhat juicy fruits, also known as carambolas, are produced along the trunks and larger branches of evergreen trees. Star fruits have a delicate, fruity aroma when fully ripened and are produced along the trunks and larger branches of evergreen trees; they have a shelf life of two or more weeks when kept in a refrigerator. The thin-skinned fruits are distinctively fluted, making them star-shaped in cross section. They have a shelf life of two or more weeks when kept in the refrigerator.

Tamarind (*Tamarindus indica*) The pulp of a tamarind legume, which has an exceptionally high acid and sugar content, is used for flavoring drinks, jellies, and sauces. The ground seeds of the related carob (*Ceratonia siliqua*) are used as a chocolate substitute.

Tomatillo (*Physalis ixocarpa*) *Physalis* spp. are known for the inflated papery calyces that surround the fruit. Tearing open a tomatillo fused calyx reveals a plum-sized, green, tomato-like fruit that can become purplish to yellow with age. Tomatillos are quite acid in flavor and are usually cooked and used in salsas and sauces; they can, however, also be eaten raw.

Tree tomato (tamarillo; *Cyphomandra betacea*) Tree tomatoes superficially resemble roma tomatoes to which they are related. Sectioning a tree tomato reveals an orange-red flesh with numerous purplish seeds. Although tree tomatoes can be eaten raw, they are more often cooked. Their high pectin content renders them ideal for making jelly. The erect plants grow rapidly and are sometimes used as ornamentals.

Tuna (see Prickly pear)

Additional Reading on Uncommon Plants

Schneider, E. 1998. *Uncommon fruits and vegetables.* New York: William Morrow & Co. Inc.