

The Carrot Family (Apiaceae)

Many members of the Carrot Family, which is abundantly represented in the Northern Hemisphere, have savory aromatic herbage. The flowers tend to be small and numerous and are arranged in umbels (see fig. 8.7). The ovary is inferior, and the stigma is two-lobed. The petioles of the leaves, which are generally dissected, usually form sheaths around the stem at their bases. Included in the 2,000 members of the family are dill, celery, carrot, parsley, caraway, coriander, fennel, anise, and parsnip. Anise is one of the earliest aromatics mentioned in literature. It is used for flavoring cakes, curries, pastries, and candy. Pocket gophers apparently are attracted by its aroma, and some poison baits are enhanced with anise. A liqueur known as *anissette* is flavored with it.

A water hemlock flower.



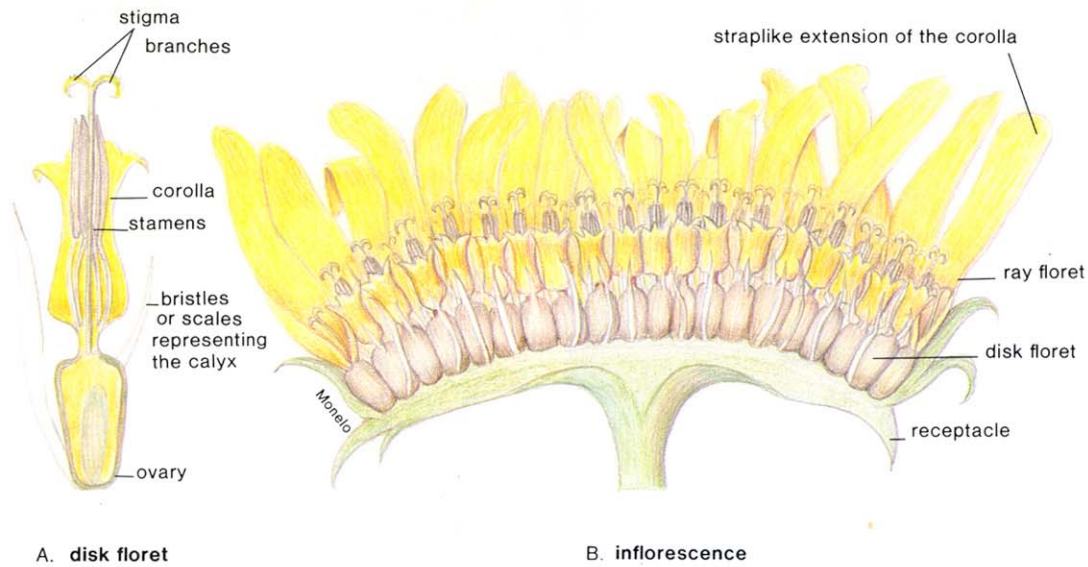
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Another liqueur, called *kümmel*, is flavored with caraway seeds, which are well known for their use in rye and pumpernickel breads.

A few members of the Carrot Family are poisonous. Water hemlock (fig. 24.21) and poison hemlock, which are common weeds in ditches and along streams, are deadly and have thus often been fatal to unwary wild-food lovers. Socrates is believed to have died as a result of ingesting poison hemlock, which should not be confused with cone-bearing hemlock trees.

Several members of the Carrot Family, such as cow parsnip, squawroot, and hog fennel, have edible roots and were used for food by Native Americans. The reader is advised, however, to be absolutely certain of the identity of such plants before experimenting with them.

Parts of a sunflower. A. A section through a single floret. B. A section through an inflorescence.



A. disk floret

B. inflorescence

The Sunflower Family (Asteraceae)

The Sunflower Family, with approximately 20,000 species, is the second largest of the flowering plant families in terms of number of species. The individual flowers are called **florets**. They are usually tiny and numerous but are arranged in a compact inflorescence so that they resemble a single flower. A sunflower or daisy, for example, consists of dozens if not hundreds of tiny flowers crowded together, with those around the margin having greatly developed corollas that extend out like straps, forming what appear to be the “petals” of the inflorescence (see fig. 24.23 for details). In dandelions, all the individual florets of the inflorescence have narrow straplike extensions.

Well-known members of this family include lettuce, endive, chicory, Jerusalem artichoke, dahlia, chrysanthemum, marigold, sunflower, and thistle.

Santonin is a drug obtained from flower buds of a relative of sagebrush that is native to the Middle East. It is used as an intestinal worm remedy. Tarragon, used as a spice in meat dishes and pickles, comes from another relative of sagebrush. Pyrethrum is a natural insecticide obtained from certain chrysanthemum flowers. Fructose, a sugar, is obtained from the tubers of Jerusalem artichokes and dahlias. Dahlias are also renowned for their huge showy flowers, while Jerusalem artichokes are often eaten as a vegetable.

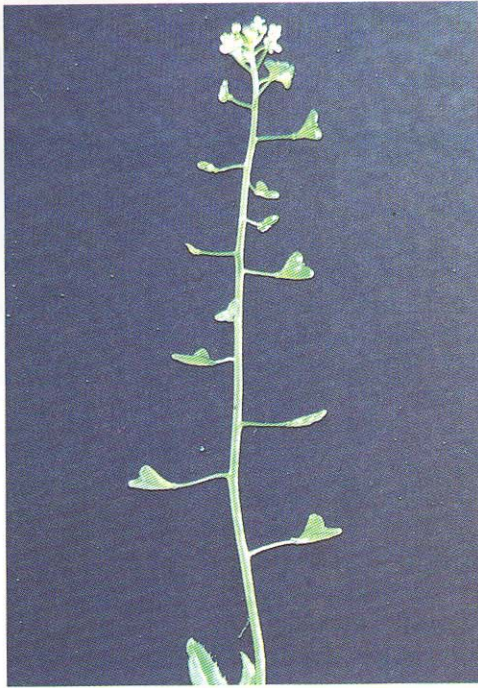
Marigolds are favorite plants of organic gardeners. Their roots are said to release a substance that repels nematodes, and the odor of the leaves repels white flies and other insects. Unfortunately, snails seem to be immune and voraciously consume the foliage.

Many members of this family were widely used by Native Americans for various purposes. The seeds of balsamroot and mule ears were used for food. Balsamroot plants as a whole were eaten raw or cooked, and in the West extracts of both mule ears and tarweeds were used to treat poison oak inflammations. Salsify and thistle roots were also used for food.

Young leaves and roots of dandelions have long been on lists of wild edible plants, and the flowers have been used to make wine. Roasted dandelion and chicory roots have been used as a coffee substitute. During World War II, chicory was grown as a crop specifically for use as a coffee adulterant.

The dried and boiled leaves of American yarrow are said to make a nourishing broth. The European yarrow, which has become naturalized in North America, contains a drug that has been used in suppression of menstruation. This plant is believed to have been used by Achilles in treating the wounds of his soldiers.

Sunflowers themselves were widely used by Native Americans for their seeds, which were ground into a meal for bread. They are grown commercially today primarily for the edible oil extracted from the seeds, but their use in seed form by modern Americans is increasing.



The Mustard Family (Brassicaceae)

The original Latin name for the Mustard Family, still in widespread use today, was *Cruciferae*. The name describes the four petals of the flowers, which are arranged in the form of a cross. The flowers also have four sepals, usually four nectar glands, and six stamens, two of which are shorter than the other four. All members produce siliques or silicles (see fig. 8.17), such fruits being unique to the family. All 2,500 species of the family produce a pungent, watery juice, and nearly all are herbs distributed primarily throughout the temperate and cooler regions of the Northern Hemisphere.

Many edible plants are found in the Mustard Family. Some are widely cultivated, particularly in cooler temperate climates. Such plants include cabbage, cauliflower, brussels sprouts, broccoli, radish, kohlrabi, turnip, horseradish, watercress, and rutabaga. Some edible members are also widespread weeds. The leaves of shepherd's purse (fig. 24.7), for example, can be cooked and eaten like cabbage, and the seeds can be used for bread meal.

Other wild edible members include several cresses, peppergrass, sea rocket, toothwort, and wild mustard. The latter can become a weed problem in row crop planting. Their leaves are sometimes sold as vegetable greens in markets.

The seeds of wild mustard, shepherd's purse, and several other members of this family produce a sticky mucilage when wet. Biologists at the University of California at Riverside discovered a potential new use for these seeds. They fed pelleted alfalfa rabbit food to mosquito larvae in water tanks, which they were using for experiments on mosquito control. They noticed that the larvae, which had to come to the surface at frequent intervals for air, often stuck to the pellets and suffocated. Curious, the workers examined the pellets under a microscope and found that they contained mustard seeds. Evidently the field where the alfalfa had been harvested had also contained mustard plants. The scientists then tried heating the mustard seeds to kill them and found that this did not affect production of mucilage by the seeds when wet. It was calculated that 0.45 kilogram (1 pound) of such seed could kill about 25,000 mosquito larvae. A few mosquito abatement districts are now using the seeds effectively, but experiments are needed to determine if there is a practical way to harvest many more seeds and control mosquitoes by such non-polluting means on a much larger scale.

Native Americans mixed the tiny seeds of several members of this family with other seeds and grains for bread meal and gruel. To prevent or reduce sunburn, Zuni Indians applied to the skin a water mixture of ground western wallflower plants. Water cress, which is widely known as a salad plant, has had many medicinal uses ascribed to it. During the first century A.D., for example, Pliny listed more than 40 medicinal uses. Native Americans of the west coast of the United States treated liver ailments with a diet consisting exclusively of large quantities of water cress for breakfast, abstinence from any further food until noon, and then resumption of an alcohol-free but otherwise normal diet for the remainder of the day. This was repeated until the disease, if curable, disappeared.

Dyer's woad, a European plant that has become naturalized and established in parts of North America, is the source of a blue dye that was used for body markings by the ancient Anglo-Saxons. Another member of the family, camelina, has been grown in the Netherlands for the oil that is obtained from its seeds. Camelina oil has been used in soaps and was once used as an illuminant for lamps.

The Legume Family (Fabaceae)

The Legume Family is the third largest of the approximately 300 families of flowering plants, being exceeded in numbers of species only by the Sunflower and Orchid Families. Its 13,000 members, which are cosmopolitan in distribution, include many important plants. The flowers range in symmetry from radial to bilateral. The latter have a characteristic *keel*, which is a boat-shaped fusion of two petals enclosing the pistil, two *wing petals*, and a larger *banner* petal (fig. 24.11). The stamens in such flowers are generally fused in the form of a tube around the ovary. The common feature that keeps the members together in one family is the fruit, which is a legume (see fig. 8.16).

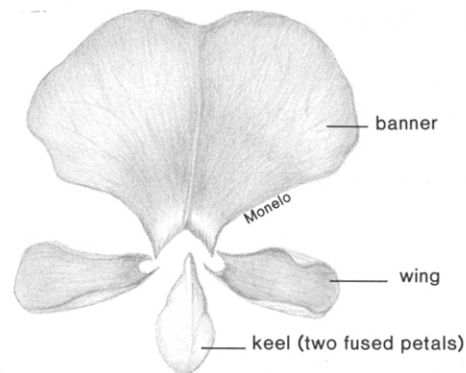
Important crop plants include peas, beans of all kinds (e.g., kidney, lima, garbanzo, broad, mung, tepary), lentils, peanuts, alfalfa, sweet clover, licorice, and wattle. The latter is an Australian tree that is grown commercially as a source of tannins for leather tanning. Carob, which is widely used as a chocolate substitute, is also a member of this family. Several copals (hard resins used in varnishes and lacquers) are obtained from certain legume plants, as are gum arabic and gum tragacanth, which are used in mucilages, pastes, paints, and cloth printing.

Important dyes, such as indigo, logwood (used in staining tissues for microscope slides and now scarce), and woadwaxen (a yellow dye), come from different legume plants. Locoweeds, which have been responsible for the death of many horses, cattle, and sheep, particularly in the southwestern United States, belong to a large genus of about 1,600 species. The poisonous principle in those species affecting livestock seems to vary in concentration according to the soil type in which the plants are growing. Other poisonous legumes include lupines, jequirity beans, black locusts, and mescal beans.

The sensitive plant (*Mimosa pudica*), which grows as a weed in the tropics and the deep south of the United States, is popular as a curiosity in temperate and colder areas because of the rapid manner in which its leaflets and leaves move in response to touch or other disturbances (see fig. 11.18). About 90% of the members of the Legume Family exhibit leaf movements, but few are as rapid as

those of the sensitive plant (*Mimosa pudica*). Many of the movements of legume plant leaves are correlated more with daylength than with other factors.

Wild clovers have been widely used for food in the past by primitive peoples. The leaves are not readily digestible in quantity, but the rhizomes were gathered and usually roasted or steamed in salt water, then dipped in grease before being eaten. The seeds of both clovers and vetches also were gathered and either ground for meal or cooked in a little water and eaten as a vegetable. Today seeds of several legumes, including alfalfa and mung beans, are popular for their sprouts, which are widely used in salads and Oriental dishes. A tropical bean called *winged bean* has unusually high levels of protein, and all parts of the plant are edible. It is presently being grown in several widely scattered tropical and subtropical regions, and also is being marketed on a limited scale in some temperate zones. It is believed to have great potential for malnourished peoples of all tropical areas of the world.



stamens (nine stamens are fused in a tube that surrounds the pistil; the tenth stamen is separate)

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FIGURE 24.15 Flowers of lamb's ears mint.



The Mint Family (Lamiaceae)

The 3,000 members of the Mint Family are relatively easy to distinguish from those of other families in having stems that are square in cross section, opposite leaves, and bilaterally symmetrical flowers (fig. 24.15). They also generally produce aromatic oils in the leaves and stems. The superior ovary is four-parted, with each of the four divisions developing into a nutlet. Included in the family are such well-known plants as rosemary, thyme, sage (not to be confused with sagebrush, which is in the Sunflower Family), oregano, marjoram, basil, lavender, catnip, peppermint, and spearmint.

Mint oils can be distilled in the home with ordinary canning equipment. Whole plants (or at least the foliage) are loosely packed to a depth of about 10 centimeters (4 inches) or more in the bottom of a large canning pot. Then a wire rack or other support is also put in the pot, and a bowl is placed in the middle on the rack. Enough water is added to cover the vegetation, the pot is placed on a range, and the lid is inverted over it. The water is brought to a boil, and as it does so, ice is placed on the inverted lid. The oils vaporize, and condense when they contact the cold lid, dripping then from the low point into the bowl (fig. 24.16). Of course, some moisture also condenses, but the oil, being lighter, floats on top. Peppermint oil is easy to collect this way and will keep for a year or two in a refrigerator.

Mint oils have been used medicinally and as an antiseptic in different parts of the world. Mohegan Indians used catnip tea for colds, and dairy farmers in parts of the midwestern United States use local mint oils to wash their milking equipment. As a result, mastitis, a common disease of dairy cattle, is seldom encountered in their herds. Horehound, a common mint weed of Europe, has become naturalized on other continents and is cultivated in France. A leaf extract is still used in horehound candy and cough medicines. In England, it is a basic ingredient of horehound beer. Vinegar weed, also known as blue curls, is a common fall-flowering plant of western North America. Native Americans of the area used it in cold remedies, for the relief of toothaches, and in a bath for the treatment of smallpox. It was also used to stupefy fish.

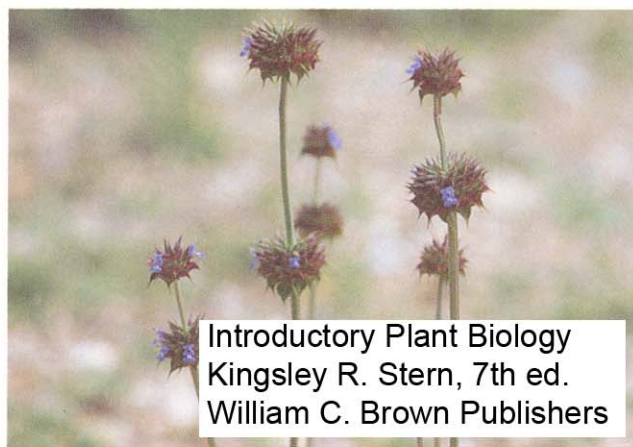
FIGURE 24.16 A simple apparatus for distilling mint oil at home.



Menthol, the most abundant ingredient of peppermint oil (fig. 24.17), is widely used today in toothpaste, candies, chewing gum, liqueurs, and cigarettes. The primary American source is the Columbia River basin of Oregon and Washington, where it is grown commercially. Geese are sometimes used in the mint fields to control both insects and weeds, since they do not interfere with the growth of the mint plants themselves.

Ornamental mints include salvias and the popular variegated-leaf coleus plants, neither of which has typical mint oils in the foliage. Another relatively odorless mint

FIGURE 24.18 Chia.



is *chia* (fig. 24.18), whose habitat is confined to the drier areas of western North America. Native Americans parched chia seeds and used them in gruel. The seeds, which become mucilaginous when wet, were also ground into a paste that was placed in the eye to aid in the removal of dirt particles. The paste was also used as a poultice for gunshot wounds, and Spanish Californians made a refreshing drink from ground chia seeds, lemon juice, and sugar. Chia seeds reportedly contain an unidentified substance that has effects similar to those of caffeine. Before the turn of the century, a physician by the name of Bard maintained that a tablespoon of chia seeds was sufficient to sustain a man on a 24-hour endurance hike. Since that time, backpackers have experimented with the seeds, and results tend to support the earlier claim. A thorough scientific investigation of the matter is needed.

The Lily Family (Liliaceae)

Although the 2,000 species of lilies are particularly abundant in the tropics and subtropics, they occur in almost any area that supports vegetation. The flowers are often large, and their parts are all in multiples of three, with the sepals frequently colored the same as and resembling the petals (fig. 24.26). The flowers of the related Amaryllis Family are similar. Lily flowers, however, generally have superior ovaries, while those of the Amaryllis Family are mostly inferior.

In addition to numerous types of lilies used widely as ornamentals, the family includes asparagus, sarsaparilla, squill, meadow saffron, bowstring hemp, and *Aloe*. Sarsaparilla, which was at one time widely used for flavoring soft drinks and medicines, is obtained from the roots of a genus of woody vines whose stems are often covered with prickles. The bulbs of squills are the source of a rodent poison and also of a drug used as a heart stimulant.

Meadow saffron is the source of *colchicine*, a drug once used to treat rheumatism and gout but now much more widely used in experimental agriculture to interfere with spindle formation in cells so that the chromosome number of plants may be artificially increased. This increasing of the chromosome number can result in larger and more vigorous varieties of plants. (Meadow saffron should not be confused with true saffron, a member of the Iris Family and the source of the world's most expensive spice and a powerful yellow dye.)

Bowstring hems are related to the familiar, seemingly indestructible houseplants called sansevierias (fig. 24.27) which have long, narrow, stiff leaves that stand upright from the base. The plants are cultivated in tropical



Africa for their long fibers, which are used for string, rope, bowstrings, mats, and cloth. New Zealand flax, a larger plant, is grown in South America and New Zealand for similar purposes but is also widely used in ornamental plantings.

Several *Aloe* species produce juices used to treat X-ray and other burns. African *Aloe* species are prized as ornamentals in areas with milder climates. Their thick fleshy leaves have short spines along the margins. The spines were once used for phonograph needles.

Many lily bulbs are edible and were widely used for food by Native Americans, but their use for food now should be discouraged, as such use to any great extent might render many species extinct. (*Caution: Lily bulbs should not be confused with those of daffodils and other members of the Amaryllis Family. Daffodil and related bulbs are highly poisonous.*)

One member of the Lily Family confined to California and southern Oregon, the California soaproot (fig. 24.28), had several uses in addition to being an important food item for Native Americans of the region. The large bulbs are covered with coarse fibers, which were removed and tied to sticks to make small brooms. The bulbs themselves produce a lather in water and were used for soap. Sometimes numbers of bulbs were crushed and thrown in a small stream that had been dammed. Fish would be stupefied and float to the surface. The bulbs were generally eaten after being roasted in a stonelined pit in which a fire had been made. While they were roasting, a sticky juice would ooze out. This was used for gluing feathers to arrow shafts.

A resin used in stains and varnishes exudes from the stem of dragon's blood plants. Grass trees of Australia yield resins used in sealing waxes and varnishes.



A buttercup flower.



DICOTS

The Buttercup Family (Ranunculaceae)

Flowers of the Buttercup Family have numerous stamens and pistils, and their petals are often variable in number. The ovary is superior (fig. 24.2). Most of the approximately 1,500 species, which are concentrated in north temperate and arctic regions, are herbaceous, often with dissected leaves that have no stipules and with petioles that are somewhat expanded at the base. A number of well-known representatives are ornamental plants (fig. 24.3), including buttercup, columbine, larkspur, anemone, monkshood, and *Clematis*.

The columbine, a species of which is the state flower of Colorado, receives its name from *columba*, the Latin word for dove. The name relates to the somewhat dovelike appearance of each of its five, spurred petals. Native Americans made a tea from boiled columbine roots for control of diarrhea, and members of at least two tribes believed the seeds to be an aphrodisiac. Men would pulverize the seeds, rub them in the palms of their hands and they would then try to shake hands with the women of their choice. Others crushed and moistened the seeds and applied them to the scalp to repel lice.

Most members of the family are at least slightly poisonous, but the cooked leaves of cowslips have been used for food, and the well-cooked roots of the European bulbous buttercup are considered edible. In its natural state, the European buttercup does, however, cause blistering on

the skin of sensitive individuals. East Indian fakirs are reported to blister their skin deliberately with buttercup juice in order to appear more pitiful when begging. Native Americans of the West gathered buttercup achenes, which they parched and ground into meal for bread. Others obtained a yellow dye from buttercup flower petals. Karok Indians made a blue stain for the shafts of their arrows from blue larkspurs and Oregon grape berries.

Goldenseal, a plant that was once abundant in the woods of temperate eastern North America, has become virtually extinct in the natural state because of relentless collecting by herb dealers. They sold the root for various medicinal uses, including remedies for inflamed throats, skin diseases, and sore eyes. At least one Native American tribe mixed the pounded root in animal fat and smeared it on the skin as an insect repellent. Another member of the Buttercup Family, monkshood, yields a drug complex called *aconite*, which was once used in the treatment of rheumatism and neuralgia. Although popular as garden flowers, the plants are very poisonous. Death follows within a few hours of consumption of any part of the plant. Most monkshood species have purplish to bluish or greenish flowers, but one Asian species, called wolfsbane, has yellow flowers. Wolf hunters in the past obtained a juice from wolfsbane root that they used to poison the animals.

The Rose Family (Rosaceae)

The Rose Family comprises a large number of trees, shrubs, and herbs distributed throughout much of the world. The flowers characteristically have the basal parts fused into a cup, with petals, sepals, and numerous stamens being attached to the cup's rim (fig. 24.8). The more than 3,000 species of the family are divided into subfamilies on the basis of flower structure and fruits. The flowers of one group have inferior ovaries and produce pomes for fruits (see fig. 8.11). Flowers of other groups have ovaries that are superior or partly inferior and produce follicles, achenes, drupes or clusters of drupelets.

The economic impact of members of the Rose Family is enormous, with large tonnages of stone fruits (e.g., cherries, apricots, peaches, plums), pome fruits (e.g., apples, pears), and aggregate fruits (see fig. 8.12) such as strawberries, blackberries, loganberries, and raspberries being grown annually in temperate regions of the world (fig. 24.9).

Members of this family have been relevant to humans in many other ways in the past, however, and still continue to be so. Roses themselves, for example, have been favorite garden ornamentals of countless numbers of gardeners for centuries, and the elegant fragrance of some delights many. In Bulgaria and neighboring countries, a major perfume industry has grown up around the production of a perfume oil known as attar (or otto) of roses from damask roses. In a valley near Sofia, more than 200,000 persons are involved in the industry, whose product brought more than \$2,200 per kilogram (\$1,000 per pound) during the 1970s. A considerable quantity of the oil is blended with less expensive substances in the perfume industry. It has been reported that perfume workers rarely develop respiratory disorders, thus suggesting that medicinal properties could be attributed to the plant extracts.

The fruits of wild roses, called *hips* (fig. 24.10), are exceptionally rich in vitamin C. In fact, they may contain as much as 60 times the vitamin C of citrus fruit. Native Americans from coast to coast included rose hips in their diet (except for members of a British Columbia tribe, who believed they gave one an "itchy seat"), and it is believed that this practice contributed to the fact that scurvy was unknown among them. During World War II when food supplies became scarce in some European countries, children in particular were kept healthy on diets that included wild rose hips. The hips also contain, in addition to vitamin C, significant amounts of iron, calcium, and phosphorus. Today many Europeans eat "Nypon Sopa," a sweet, thick puree of rose hips, whenever they have a cold or influenza.

After giving birth, the women of one western Native American tribe drank western black chokecherry juice to staunch the bleeding. Other tribes frequently made a tea

A Sitka rose.



A raspberry.



from blackberry roots to control diarrhea. Once it was reported that 500 Oneida Indians cured themselves of dysentery with blackberry root tea, while many white settlers in the vicinity died from the disease. Men of certain tribes used older canes of roses for arrow shafts (presumably after removing the prickles!). Wild blackberries, raspberries, salmonberries, thimbleberries, dewberries, juneberries, and strawberries all provided food for Native Americans and early settlers, and they are still eaten today, either fresh or in pies, jams, and jellies. A spiced blackberry cordial is still a favorite for "summer complaints" in southern Louisiana. Wild strawberries are considered by many to be distinctly superior in flavor to cultivated varieties.