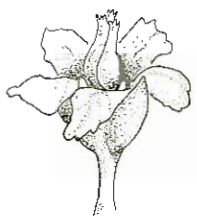
Highstead Log

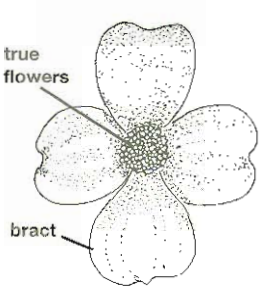
Autumn News 2001

the **staminate flower** *of Celastrus scandens (American bittersweet)*



the **pistillate flower** *of Celastrus scandens (American bittersweet)*

Dirca palustris has an **incomplete flower** *as it lacks petals*



The **bracts** *of Cornus florida are often mistaken for flower parts*

flower power: what's in a name?

As we wander through the fields of summer we are quick to point out the flowers we know by name: daisy, cornflower, black-eyed susan, queen anne's lace. An amazing set of names for a group of beauties we collectively refer to as flowers.

But, what is a flower? Many will define a flower simply as a bloom or blossom. Botanically it is so much more. It is the site of sexual reproduction in most higher plants, composed of parts which can be both necessary and decorative. But what are the parts? What are their functions? What does each blossom have in common that we collectively refer to them as flowers?

some of its parts

Flowers come in many shapes and sizes. Some so distinct we would struggle to recognize them as similar structures. A pansy flower and the flower of a grass plant bear little resemblance, but if we look again, we will find that they both have the same basic parts. We would also be surprised to find that all of these parts are modified leaves. Looking at the diagram in the center of this page, we can see the individual pieces as distinct forms.

The **sepals** are the outer whorl of flower parts and usually the most leaf-like in appearance. Collectively, the sepals are referred to as the **calyx.**

The **petals** reside just above or inside the calyx, and are usually the most decorative of all floral parts. Together, the petals compose the **corolla**, and are responsible for attracting pollinators through showiness, fragrance, and nectar.

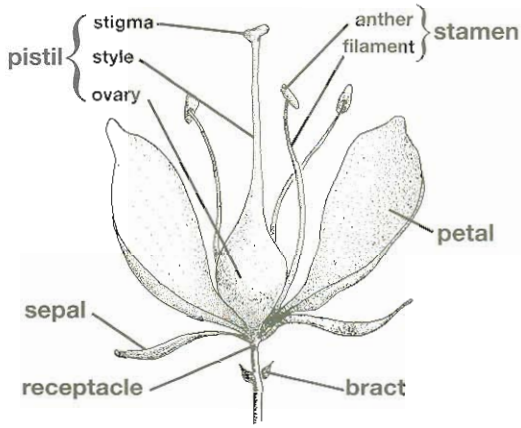
The two essential parts of the flower for reproduction of the species are the **stamen** (male) and the **pistil** (female), each composed of multiple elements.

The stamen consists of an **anther** and a **filament.** The anther bearing the pollen, and the filament a connective stem from the base to the anther.

The pistil is usually the most central part of the flower and is composed of the **stigma, style,** and **ovary.** The stigma is the pollen receptor, while the style is the connective tissue from the stigma to the ovary. The ovary itself is the enlarged basal portion of the pistil containing one or more **ovules,** that will, when mature, develop into the seed(s).

parts of a flower

partial flower pictured



Highstead *Arboretum*

All four of these basic flower parts are attached at or above the **receptacle,** which is the tip or apex of the floral axis.

If all four parts are present in a single flower (sepal, petal, stamen, and pistil), the flower is said to be **complete**. Otherwise, the flower is considered **incomplete.**

Regardless of the sepals and petals, if both pistil and stamen are present, the flower is said to be **perfect**. Using these new terms, the flower pictured in the center diagram is both complete and perfect. Removing any of the four basic elements would make it incomplete. Removing the stamens or pistil it becomes **imperfect** (and incomplete).

Why not avoid all this scientific language and simply enjoy the flower for its visual beauty? By all means, please do. But we explore these things so that we have a greater understanding of the process that brings such beauty to our landscape, and to be able to recognize those elements which may be missing. If you want your English holly or winterberry to put on a show of fruit, you have to be able to tell that you have plants with female **(pistillate)** flowers, and that nearby is a plant with male **(staminate)** flowers as a pollen source (see "living arrangements" inside). For although these flowers are botanically imperfect, the seasonal display of fruit can be anything but.

don't look bract

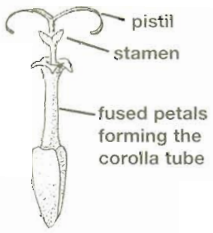
While learning the parts of a flower, we should also be learning what parts are not those of the flower. A mistake made by many occurs with plants such as poinsettia or our native flowering dogwood. The colorful and decorative portions of each, often referred to as the flower's petals, are actually **bracts.** Bracts, like flowers, are modified leaves, but they occur below the receptacle, and are therefore not part of the flower, so not considered petals. The true flowers of poinsettia and flowering dogwood are surrounded by the whorls of bracts, and although not inconspicuous, they are much less decorative and often overlooked.

The confusion does not end here. It is also easy to mistake bracts for sepals, and sepals for bracts. Again, placement is everything. Look again to see where this modified leaf falls in relation to the receptacle, and you will have your answer.

flower power continued

parallel veins,
typical of a monocot leaf

netted veins,
typical of a dicot leaf



individual **disk flower** *of a sunflower inflorescence, with a split pistil rising above the fused stamens*

sterile **ray flower** *from a sunflower inflorescence, which is often mistakenly referred to as a petal*

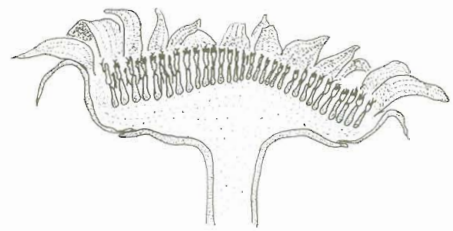
living arrangements

In the cover portion of "flower power," we quickly mentioned the need for two differently sexed plants of holly to ensure fruit production. This arrangement is common in the world of flowering plants. Staminate (male) flowers occur on one specimen, and pistillate (female) flowers occur on another. By having at least one male-flowering plant in an area of females of the same species, pollination will occur and the female plants will produce fruit.

Like holly, when a plant produces male and female flowers on separate plants (bayberry is another good example), it is said to be **dioecious**. This term comes from the Greek meaning "two houses," which describes the living arrangements of the flowers.

Another possible arrangement is to have staminate flowers and pistillate flowers on the same plant (like oak trees and corn). The term for this is **monoecious,** which, as you may have already guessed, comes from the Greek for "one house."

Also worth mentioning are those plants with the seemingly ultimate solution of perfect flowers (stamen and pistil present on each flower). This arrangement can have its drawbacks, for even though there are many plants like crabapples that have perfect flowers that can self-pollinate, an apricot's perfect flowers require cross-pollination for fertilization to take place.



cross-section of a sunflower head

petalling away

Now that we can identify the parts of a flower, how can we use this knowledge to identify plants during this period of active growth? Start by counting the petals. **Monocotyledons** (monocots) or plants with one cotyledon (*Highstead Log,* Spring 2001) have petals that occur in multiples of three. **Dicotyledons** (dicots) or plants with two cotyledons, have petals that occur in multiples of four or five. Beware of those cross-over multiples like twelve, fifteen and twenty-four. If you do hit a count like this, look at the leaf venation. Most monocots have parallel veins, and most dicots netted veins.

This is the beginning of the sorting and identification process used by scientists and botanists. As simple as counting petals! But, scientists and botanists go even further with their sorting. They group plants into families based on the similarity of their flower (sexual) parts. By understanding the structure of a flower, we can begin to see the reasons why certain plants have been grouped in this way.

A very basic example would be flowers of the rose family. They are perfect (in the botanical sense), which means they have both stamen(s) and pistil(s) present. Plants in the rose family contain five sepals, five petals, numerous stamens, and an arrangement of one or more pistils. By definition, they are therefore complete and perfect. This is a very simplified explanation and analysis, but a beginning for discovering the importance of structure, placement, and how to apply our knowledge of flowers. Look again at the flowers of an apple tree, a strawberry, a pear, a rose, a raspberry, and a hawthorn – all members of the rose family – and you will soon gain confidence in your ability to observe and sort, a great help in trying to identify unknown plants in bloom.

Not all flowers are constructed as simply as those in the rose family or as rendered in the cover illustration. A more complex and evolved arrangement can be seen in those plants containing multiple flowers forming an inflorescence such as a head. An example is the *Asteraceae* family which includes plants such as the ox-eye daisy and sunflower. How so evolved? Take a closer look at the inflorescence or flower head. Two types of flowers are present in a typical sunflower head. In the center area (where we will collect sunflower seeds at harvest time) reside the **disk flowers,** which are perfect flowers (stamen & pistil). On the outside edge of the inflorescence we see a number of yellow petals, each of which is actually a sterile **ray flower.** But these sterile flowers (imperfect and incomplete) are the showy part of the head, and are used to attract pollinators to the less showy disk flowers. You will soon learn more than whether (s)he loves you or loves you not as you pluck the flowers from an inflorescence.

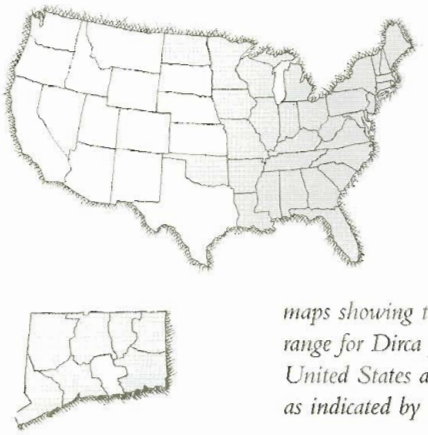
fused thoughts

Recognizing individual parts of a flower is even more important when viewing plants that do not clearly display the individual elements. Knowing what we are looking for, and then what we are looking at, will add to our experience with nature. We are all familiar with carnation and mountain laurel flowers. Look again. The carnation has fused sepals, and the mountain laurel fused petals. What about sweet pea and hollyhock? The former has united stamens, and the latter a compound pistil.

As you see, we can quickly build on our knowledge of flowers with each different species, rediscovering the complexities and fascination of the natural world. Witch hazel, honeysuckle, oak tree, or columbine, each gives us a unique perspective on the beauty and perfection of nature. There is perfection even in the imperfect, and completion in the incomplete.

Plant Profiles

Leatherwood, *Dirca palustris* L.



maps showing the distribution range for Dirca palustris in the United States and Connecticut as indicated by the shading

If there were a native shrub that many people would not be familiar with, it would most likely be *Dirca palustris.*

In the garden, leatherwood (also referred to as moosewood or wicopy) has a much branched habit, growing to a rounded or ovoid form to a height of three to six feet. A slightly more open habit of growth is found in its native and preferred siting of moist soil and shade.

Perfect but incomplete flowers appear in late March or early April before the leaves. Appearing in clusters of two to four, the attractive pale yellow flowers have short stalks and no petals. The four fused sepals surround the stamens and pistil (see illustration on front). The eight stamens of each flower eventually extend beyond the floral tube. But with alternating stamens elongated, many times all are not visible beyond this tube's edge at the same time. The pistil, on the other hand, is longer than any of the stamens.

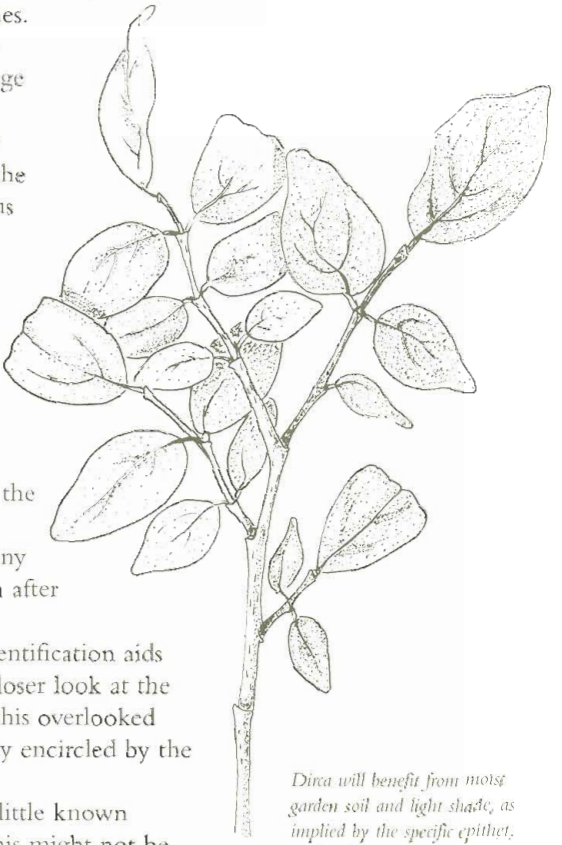
Unlike its cousin *Daphne,* leatherwood is not known for its flowers or fragrance, yet the timing of bloom, and the clear pale-yellow, hanging, funnel-form flowers makes a lovely statement in the landscape against the bare, jointed branches. Another noteworthy landscape attribute is *Dirca's* autumn foliage color, a clear yellow.

Perhaps the most remarkable overall feature of this shrub is the incredibly strong, stringy, fibrous bark. The branches will snap rather easily from this shrub, but the bark will take considerably more persuasion. This feature was put to use by native Americans for fishing line, stringing bows, basket lashing and more.

Best to be wary of stripping the bark of this shrub, as it is listed on the poisonous plant list. Many people develop a skin irritation after handling.

Beyond leaf and flower as identification aids during the growing season, a closer look at the winter bud is a clear guide to this overlooked native. The conical bud is nearly encircled by the leaf scar.

So take another look at this little known native, and consider whether this might not be suited to your own landscape. A must for a collector of the unusual, or a fan of native shrubs.



Dirca will benefit from moist garden soil and light shade, as implied by the specific epithet, **palustris,** *which is from the Latin for "marshy" or "swampy"*

A New Leaf

Book Reviews

A staff review of material available in the library at Highstead. Take advantage of this growing resource at the Barn.

Preliminary Checklist of the Vascular Flora of Connecticut (Growing Without Cultivation),

Joseph J. Dowhan

As the title implies, this small paperback book is a list of all the naturally growing plants in Connecticut. It has proven indispensible at the Arboretum as we identify new plants, and try to determine native or alien status, as well as commonality or rarity of a particular species.

Although the layout of the book can be difficult for the novice, since the plants are presented in division order, there are two indexes at the back of the book that allow you to quickly locate a plant by common or scientific name. Available through the DEP bookstore in Hartford at a cost of $5.00 plus shipping, this pocket-sized book is a worthwhile investment for the serious amateur and professional.

1000+ Wood Samples

Not a volume or tome, but literally 1,000 plus blocks of wood, this recent gift to the Arboretum is a fascinating testament to the world of trees. Each block is an accurate representation of the wood grain and color, and is labeled with the common and scientific name of the species. The Arboretum is working to add the few species growing at Highstead which are not represented. Please ask to see this remarkable collection during your next visit.

Autumn 2001

HighsteadArboretum
127 Lonetown Road
P.O. Box 1097
Redding, CT 06875

Highstead Saturday Programs

Come dressed to walk and plan to stay one to two hours. Reservations are requested: call ahead for weather-related rescheduling. For further information, call Highstead Arboretum at 203 938 8809, 9am-4pm Mon.-Fri. There is a non-member fee of $5 per program.

Autumn 2001

Measuring Twice

Saturday, September 8, 10am

A complement to last year's demonstration on tree measurement, this portion will deal with diameter-at-breast-height (DBH), as well as a review of height measurement techniques. Learn how to calculate the point total of champion trees, and see how your own asset trees measure up to the competition.

Who Grows There?

Saturday, September 22, 10am

Why is there a thicket of mountain laurel behind the Barn, or a stand of maples on the opposite hillside? More than a matter of chance seeding, a plants appearance depends on what lies below the surface. Learn how to identify the geography, bedrock, and soil types that support distinct plant communities.

In the Mix

Saturday, October 13, 10am

We all do our part to recycle at home and in the garden, but should we add just anything to that compost pile? If so, how much? Join David Bulpitt, co-owner of Brookside Nurseries and soil science instructor for the New York Botanical Garden, as we stir up the issues of compost, mulch and soil.

Autumn Walk

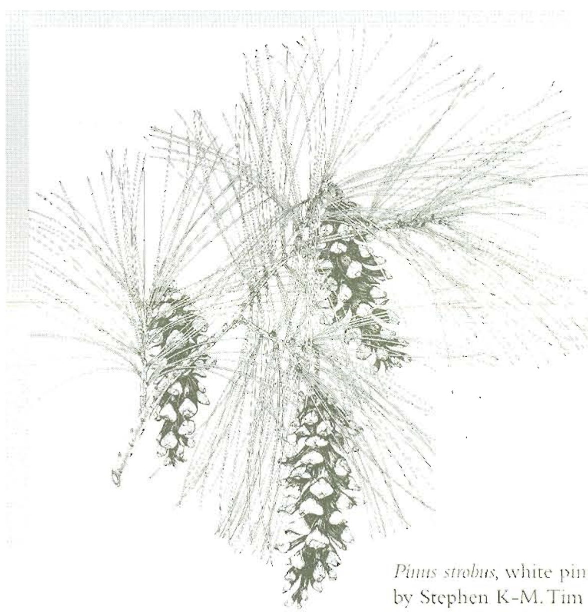
Saturday, October 27, 10am

Enjoy the morning light and color of late October with a guided tour of the Arboretum. Native trees and shrubs will be the focus of this walk, including the late flowering witch hazel.

Highstead Leaf Hunt

Saturday, November 10, 10am

Learn to identify some of our native trees while sharing an outdoor adventure with your child. After a brief orientation to leaf shapes and margins, parents and children will search the trails for fallen leaves. The child wins who matches the greatest variety of leaves to the Highstead Leaf Guide. Open to all ages. *Reservation required.*



Pinus strobus, white pine
by Stephen K-M. Tim

Botanical Art Exhibit
Dr. Stephen K-M. Tim

September 7 – October 30, 2001

A botanic art exhibit featuring the work of Dr. Stephen K-M. Tim will be on display during the months of September and October, with an opening reception during the late afternoon and early evening of September 20th (postcard to follow).