TREES

HOW TO STUDY TREES

GARDEN FLOWERS

ANNA COMSTOCK'S

HANDBOOK OF NATURE-STUDY

Handbook of Nature-Study:

Garden Flowers and Trees

ANNA BOTSFORD COMSTOCK, B.S., L.H.D

LATE PROFESSOR OF NATURE-STUDY IN CORNELL UNIVERSITY

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TREES

Garden Flowers

The Crocus

Teacher's Story

THE crocus, like the snowdrop, cannot wait for the snow to be off the ground before it pushes up its gay blossoms, and it has thus earned the gratitude of those who are winter weary.

The crocus has a corm instead of a bulb like the snowdrop or daffodil. A corm is a solid, thickened, underground stem, and is not in layers, like the onion. The roots come off the lower side of the corm. The corm of the crocus is well wrapped in several, usually five, white coats with papery tips. When the plant begins to grow the leaves push up through the coats. The leaves are grasslike and may be in number from two to eight, depending on the variety. Each leaf has its edge folded, and the white midrib has a plait on either side, giving it the appearance of being box-plaited on the under

The old and young corms of the crocus

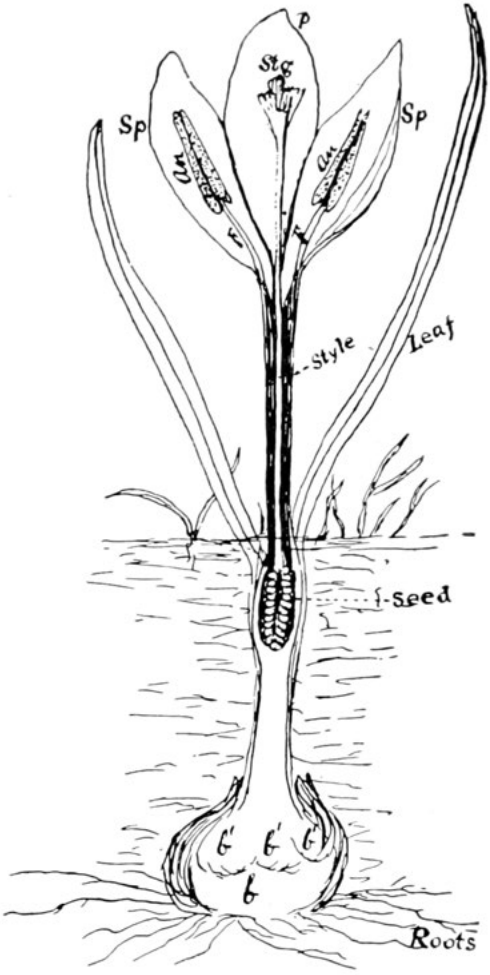
side. The bases of the leaves enclosed in the corm coats are yellow, since they have had no sunlight to start their starch factories and the green within their cells. At the center of the leaves appear the blossom buds, each enclosed in a sheath.

Dominicus Johannes Bergsma (cc by-sa 4.0)
A crocus close up

The petals and sepals are similar in color, but the three sepals are on the outside, and their texture, especially on the outer side, is coarser than that of the three protected petals. But sepals and petals unite into a long tube at the base. At the very base of this corolla tube, away down out of sight, even below the surface of the ground, is the seed-box, or ovary. From the tip of the ovary the style extends up through the corolla-tube and is tipped with a ruffled three-lobed stigma.

The three stamens are set at the throat of the corolla tube. The anthers are very long and open along the sides. The anthers mature first, and shed their pollen in the cup of the blossom where any insect, seeking the nectar in the tube of the corolla, must become dusted with it. However, if the stigma lobes fail to get pollen from other flowers, they later spread apart and curl over until they reach some of the pollen of their own flower.

Crocus blossoms have varied colors: white, yellow, orange, purple, the latter often striped or feather-veined. And, while many seeds like tiny pearls, are developed in the oblong capsule, yet it is chiefly by its corms that the crocus multiplies. On top of the mother corm of this year develop several small corms, each capable of growing a plant next year. But after two years of this second-story sort of multiplication the young crocuses are pushed above the surface of the ground.



The crocus.
p. petal; sp. sepal; an. anther; f. filament; stg. stigma; b. mother corm; b' b' b'. young corms.

Thus, they need to be replanted every two or three years. Crocuses may be planted from the first of October until the ground freezes. They make pretty borders to garden beds and paths. Or they may be planted in lawns without disturbing the grass, by punching a hole with a stick or dibble and dropping in a corm and then pressing back the soil in place above it. The plants will mature before the grass needs to be mowed.

Lesson

Leading thought— The crocuses appear so early in the spring, because they have food stored in underground storehouses. They multiply by seeds and by corms.

Method— If it is possible to have crocuses in boxes in the schoolroom windows, the flowers may thus best be studied. Otherwise, when crocuses are in bloom bring them into the schoolroom, bulbs and all, and place them where the children may study them at leisure.

Observations—

1. At what date in the spring have you found crocuses in blossom? Why are they able to blossom so much earlier than other flowers?

2. Take a crocus just pushing up out of its bulb. How many overcoats protect its leaves? What is at the very center of the bulb? Has the flower bud a special overcoat?

Liridon (cc y-sa 4.0)

A white crocus

3. Describe the leaves. How are they folded in their overcoats? What color are they where they have pushed out above their overcoats? What color are they within the overcoats? Why?

4. Do the flowers or the leaves have stems, or do they arise directly from the bulb?

5. What is the shape of the open crocus flower? Can you tell the difference between sepals and petals in color? Can you tell the difference by their position? Or by their texture above or below? As you look into the flower, which make the points of the triangle, the sepals or the petals?

6. Describe the anthers. How long are they? How many are there? How do they open? What is the color of the pollen? Describe how a bee becomes dusted with pollen. Why does the bee visit the crocus blossom? If she finds nectar there, where is it?

7. Describe the stigma. Open a flower and see how long the style is. How do the sepals and petals unite to protect the style? Where is the seed-box? Is it so far down that it is below ground? How many seeds are developed from a single blossom?

8. How many colors do you find in the crocus flowers? Which are the prettiest in the lawn? Which, in the flower beds?

9. How do the crocus blossoms act in dark and stormy weather? When do they open? How does this benefit them?

10. How do the crocus bulbs multiply? Why do they lift themselves out of the ground and thus need resetting?

11. Describe how to raise crocuses best; the kind of soil, the time of planting, and the best situations.

Out of the frozen earth below,
Out of the melting of the snow,
No flower, but a film, I push to light;
No stem, no bud—yet I have burst
The bars of winter, I am the first
O Sun, to greet thee out of the night!

Deep in the warm sleep underground
Life is still, and the peace profound:
Yet a beam that pierced, and a thrill that smote
Call'd me and drew me from far away;
I rose, I came, to the open day
I have won, unshelter'd, alone, remote.

—"The Crocus," Harriet E. H. King.

When first the crocus thrusts its point of gold,
Up through the still snow-drifted garden-mould,
And folded green things in dim woods unclose
Their crinkled spears, a sudden tremor goes
Into my veins and makes me kith and kin
To every wild-born thing that thrills and blows.

—"A Touch of Nature," T. B. Aldrich.

Crocus, the harbinger of spring!

The beautiful fall colors of the oak tree

The Oak

Teacher's Story

HE symbol of rugged strength since man first gazed upon its noble proportions, the oak more than other trees has been entangled in human myth, legend and imagination. It was regarded as the special tree of Zeus by the Greeks. Virgil sang of it thus:

"Full in the midst of his own strength he stands
Stretching his brawny arms and leafy hands,
His shade protects the plains,
His head the hills commands."

while in primitive England the strange worship of the Druids centered around it.

Although the oak is a tree of grandeur when its broad branches

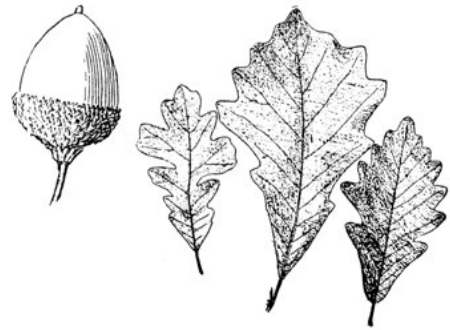
White oak leaves and acorn.

are covered with leafage, yet it is only in winter when it stands stripped like an athlete that we realize wherein its supremacy lies. Then only can we appreciate the massive trunk and the strong limbs bent and gnarled with combating the blasts of centuries. But there are oaks and oaks, and each species fights time and tempest in his own peculiar armor and in his own way. Many of the oaks achieve the height of eighty to one hundred feet. The great branches come off the sturdy trunk at wide angles, branches that may be crooked or gnarled but are ever long and strong; the smaller branches also come off at wide angles, and in turn bear angular individual spray—all of which, when covered with leaves, make the broad, rounded head which characterizes this tree. The oaks are divided into two classes which the children soon learn to distinguish, as follows:

White oak in winter

A. *The white oak group*, the leaves of which have rounded lobes and are

rough and light-colored below; the wood is light-colored, the acorns have sweet kernels and mature in one year, so that there are no acorns on the branches in winter. To this class belong the white, chestnut, bur, and post oaks.



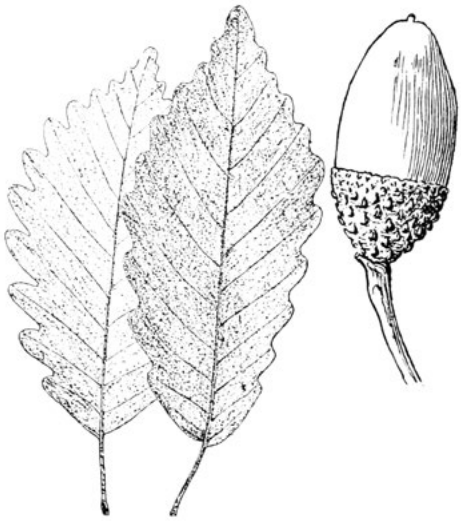
Leaves and acorn of the swamp white oak.

AA. *The black oak group*, the leaves of which are nearly as smooth below as above, and have angular lobes ending in sharp points. The bark is dark in color, the acorns have bitter kernels and require two years for maturing, so that they may be seen on the branches in winter. To this group belong the red, scarlet, Spanish, pin, scrub, black-jack, laurel and willow oaks.

Bruce Marlin (cc by-sa 2.5)
A swamp white oak

There is a great variation in the shape of the leaves on the same tree, and while the black, the red and the scarlet oaks are well-marked species, it is possible to find leaves on these three different trees which are similar in shape. Oaks also hybridize, and thus their leaves are a puzzle to the botanist; but in general, the species can be determined by any of the tree books, and the pupils should learn to distinguish them.

The acorns and their scaly saucers are varied in shape, and are a delight to children as well as to pigs. The great acorns of the red oak are made into cups and saucers by the girls, and those of the scarlet oak into tops by the boys. The white oaks turn a rich wine-color in the autumn, while the bur and the chestnut are yellow. The red oak is a dark,



Leaves and acorn of chestnut oak.

wine-red; the black oak russet, and the scarlet a deep and brilliant red. When the oak leaves first come from the buds in the spring, they are soft and downy and drooping, those of the red and scarlet being reddish, and those of the white, pale green with red tints. Thoreau says of them, "They hang loosely, flaccidly, down at the mercy of the wind, like a new-born butterfly or dragonfly."

The pollen-bearing flowers are like beads on a string, several strings hanging down from the same point on the twig, making a fringe, and they are attractive to the eye that sees. The pistillate flowers are inconspicuous, at the axils of the leaves, and have irregular or curved stigmas; they are on the same branch as the pollen-bearing flowers.

The oak is long-lived; it does not produce acorns until about twenty years of age and requires a century to mature. Although from two to three hundred years is the average age of most oaks, yet a scarlet oak of my acquaintance is about four hundred years old, and there are oaks still living in England which were there when William, the Conqueror came. The famous Wadsworth Oak at Geneseo, N.Y. had a circumference of twenty seven feet. This was a swamp white oak. One reason for their attaining great age is long, strong, tap-roots which plant them deep, also the great number of roots near the surface which act as braces, and their large and luxurious heads.

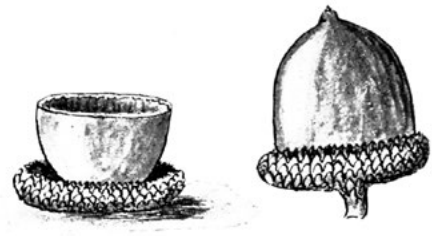
Oak wood is usually heavy, very strong, tough and coarse. The heart is brown, the sap-wood whitish. It is used for many purposes—ships, furniture, wagons, cars, cooperage, farm implements, piles, wharves, railway ties, etc. The white and live oaks give the best wood. Oak bark is used extensively for tanning.

Lesson

Leading thought— The oak tree is the symbol of strength and loyalty. Let us study it and see what qualities in it have thus distinguished it.

Method— Any oak tree may be used for this lesson; but whatever species is used, the lesson should lead to the knowledge of all the species of oaks in the neighborhood. The tree should be sketched, essays concerning the connection of the oak with human history should be written, while the leaves and acorns may be brought into the schoolroom for study. Use the leaf print lesson on page XXX for a study of leaves of all the oaks of the neighborhood.

Observations—



Cup and saucer made from the acorns of red oak.

1. Describe the oak tree which you are studying. Where is it growing? What shape is its head? How high in proportion to the head is the trunk? What is the color and character of its bark? Describe its roots as far as you can see. Are the branches straight or crooked? Delicate or strong? Is the spray graceful or angular?

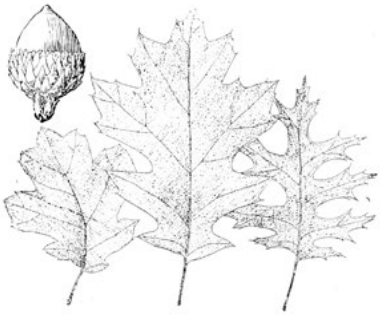
2. What is the name of your oak tree? What is the color of its foliage in autumn? Find three leaves from your tree which differ most widely in form, and sketch them or make leaf prints of them for your note-book. Does the leaf have the lobes rounded, or angular and tipped with sharp points? Is the leaf smooth on the lower side or rough? Is there much difference in color between the upper and the lower side?

3. Describe the acorns which grow on your oak. Has the acorn a stem, or is it set directly on the twig? How much of the acorn does the cup cover? Are the scales on the cup fine or coarse? Is the cup rounded inwards at its rim? What is the length of the acorn including the cup? The diameter? Are there acorns on your oak in winter? If so, why? Is the kernel of the acorn sweet or bitter? Plant an acorn and watch it sprout.

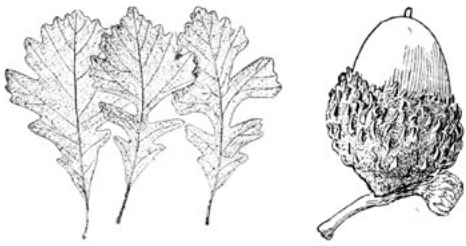
4. Read all the stories you can find about oak trees, and write them in your note-book.

5. How great an age does the oak attain? Describe how the country round about looked when the oak tree you are studying was planted.

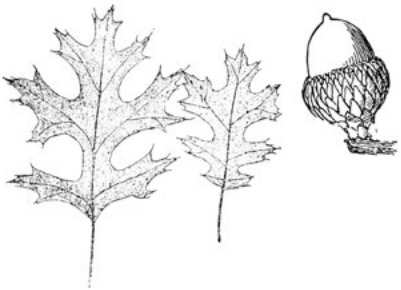
The leaves and acorn of red oak.



Leaves and acorn of black oak.



Leaves and acorn of bur oak.



Leaves and acorn of scarlet oak.

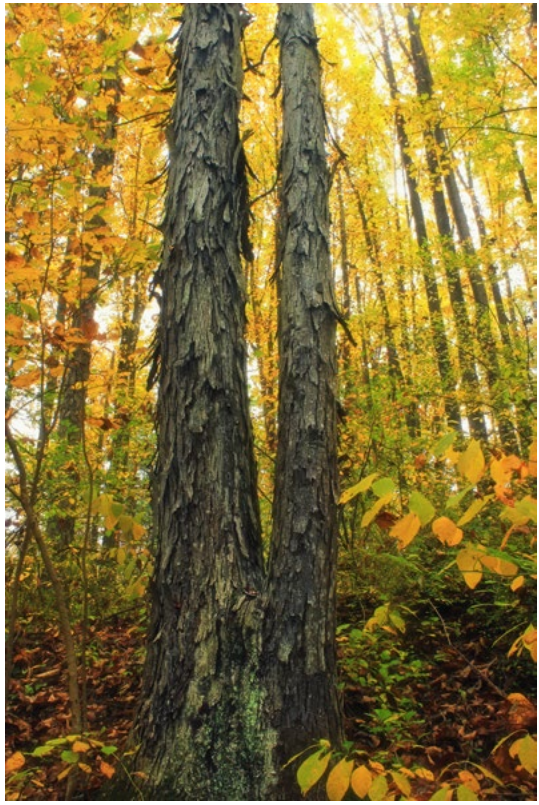
6. How many kinds of oaks do you know? What is the difference in leaves between the white and the black oak groups? What is the difference in the length of time required for the acorns to mature in these two groups? The difference in taste of the acorns? The difference in the general color of the bark? Why is the chestnut oak an exception to this latter rule?

7. How do the oak leaves look when they first come out of the bud in spring? What is the color of the tree covered with new leaves? When does your oak blossom? Find the pollen-bearing blossoms which are hung in long, fuzzy, beady strings. Find the pistillate flower which is to form the acorn. Where is it situated in relation to the pollen-bearing flower?

8. Make a sketch of your oak tree in the fall, and another in the winter. Write the autobiography of some old oak tree in your neighborhood.

9. For what is the oak wood used? How is the bark used?

Supplementary reading— Trees in Prose and Poetry, pp. 111-129.



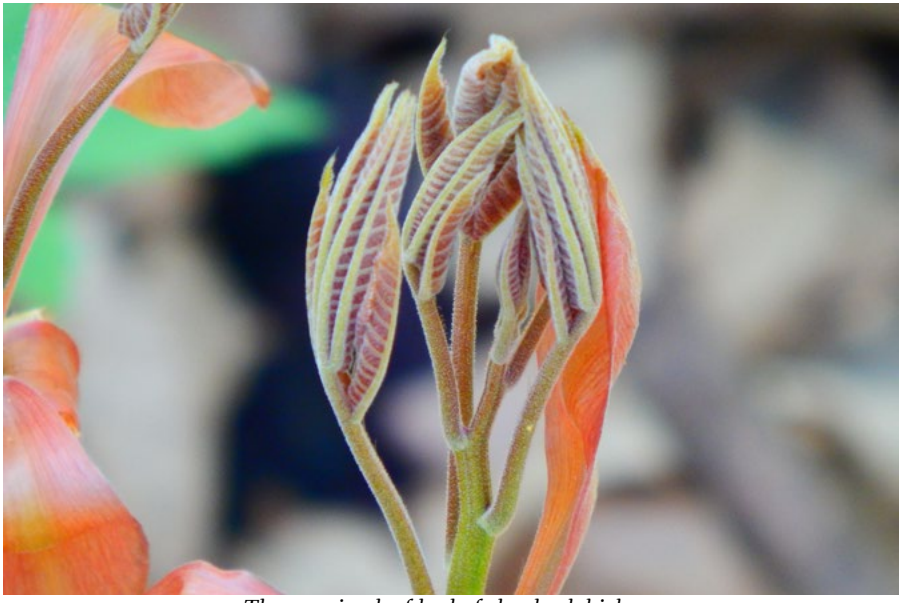
Nicholas A. Tonelli
Shagbark hickory. Note loose strips of bark

The Shagbark Hickory

Teacher's Story

How pathetically the untidy bark of this dignified tree suggests the careless raiment of a great man! The shagbark is so busy being something worth while that it does not seem to have time or energy to clothe itself in tailor-made bark, like the beech, the white ash and the basswood. And just as we like a great man more because of his negligence to fashion's demands, so do we esteem this noble tree, and involuntarily pay it admiring tribute as we note its trunk with the bark scaling off in long, thin plates that curve outward at the top and bottom and seem to be only slightly attached at the middle.

In general shape, the shagbark resembles the oak; the lower branches are large and, although rising as they leave the bole, their tips are deflected; and, for their whole length, they are gnarled and knotted as if to show their strength. The bark on the larger branches may be scaly toward their bases but above is remarkably smooth. The spray is angular and extends in almost every direction. The leaves, like those of other hickories, are compound. There are generally five leaflets, but sometimes only three and sometimes seven. The basal pair is smaller than the others. The hickory leaves are borne alternately on



The opening leaf bud of shagbark hickory

the twig, and from this character the hickory may be distinguished from the ashes, which have leaves of similar type, but which are placed opposite on the twigs. The shagbark usually has an unsymmetrical oblong head; the lower branches are usually shorter than the upper ones, and the latter are irregularly placed, causing gaps in the foliage.

The nut is large, with a thick, smooth, outer husk channeled at the seams and separating readily into sections; the inner shell is sharply angled and pointed and slightly flattened at the sides; the kernel is sweet. The winter buds of the shagbark are large, light brown, egg-shaped and downy; they swell greatly before they expand. There are from eight to ten bud-scales; the inner ones, which are red, increase to two or three inches in length before the leaves unfold, after which they fall away. The young branches are smooth, soft, delicate in color, and with conspicuous leaf scars.

The hickory bears its staminate and pistillate flowers on the same tree. The pollen-bearing flowers grow at the base of the season's shoots in slender, pendulous, green catkins, which occur usually in clusters of three swinging from a common stem. The pistillate flowers grow at the tips of the season's shoots singly or perhaps two or three on a common stem. In the shagbark the middle lobe of the staminate calyx is

nearly twice as long as the other two, and is tipped with long bristles; it usually has four stamens with yellow anthers; its pistillate calyx is four-toothed and hairy, and has two large, fringed stigmas.

The big shagbark, or king nut, is similar to the shagbark in height, manner of growth, and bark. However, its leaves have from seven to nine leaflets, which are more oblong and wedgelike than are those of the shagbark; they are also more downy when young and remain slightly downy beneath. The nut is very large, thick-shelled, oblong, angled, and pointed at both ends. The kernel is large and sweet but inferior in flavor to the smaller shagbark. The big shagbark has larger buds than has the other. Their fringy, reddish purple, inner scales grow so large that they appear tuliplike before they fall away at the unfolding of the leaves.

Hickory wood ranks high in value; it is light-colored, close-grained, heavy, and very durable when not exposed to moisture. It is capable of resisting immense strain, and, therefore, it is used for the handles of spades, plows and other tools, and also for spokes and thills in carriage-making. As a fuel, it is superior to most woods, making a glowing, hot and quite lasting fire.

Lesson

Ar rouz (cc by-sa 4.0)
The fruit of a shagbark hickory

Leading thought— The hickories are important trees commercially. They have compound leaves which are set alternately upon the twig. The shagbark can be told from the other hickories by its ragged, scaling bark.

Method— This lesson may be begun in the winter when the tree can be studied carefully as to its shape and method of branching. Later, the unfolding of the leaves from the large buds should be watched, as this is a most interesting process; and a little later the blossoms may be studied. The work should be taken up again in the fall, when the fruit is ripe.

Observations—

Winter study—

1. What is the general shape of the whole tree? Are the lower branches very large? At what angle do the branches, in general, grow from the trunk? Are there many large branches?

2. Where is the spray borne? What is its character—that is, is it fine and smooth, or knotted and angled? What is its color?

3. Describe the bark. Is the bark on the limbs like that on the trunk?

4. What is the size and shape of the buds? Are the buds greenish-yellow, yellowish-brown, or do they have a reddish tinge?

5. Count the bud-scales. Are they downy or smooth?

Spring study—

6. Describe how the hickory leaf unfolds from its bud. How is each leaflet folded within the bud?

7. Describe the long greenish catkins which bear the pollen. On what part of the twigs do they grow? Do they grow singly or in clusters?

8. Take one of the tiny, pollen-bearing flowers and hold it under a lens on the point of a pin. How many lobes has the calyx? Count the stamens, and note the color of the anthers.

9. Upon what part of the twigs do the pistillate flowers grow? How many points or lobes has the pistillate calyx? Describe the growth of the nut from the flower.

Autumn study—

10. Does the hickory you are studying grow in open field or wood?

11. Are the trunk and branches slender and lofty, or sturdy and wide spreading?

12. Note the number and shape of the leaflets. Are they slim and tapering, or do they swell to the width of half their length? Are they set directly upon or are they attached by tiny stems to the mid-stem? Are they smooth or downy on the under side? Are the leaves set upon the twigs alternately or opposite each other? How are the leaflets set upon the mid-stem?

13. Describe the outer husk of the nut. Into how many sections does it open? Does it cling to the nut and fall with it to the ground? Is the nut angled and pointed, or is it roundish and without angles? Is the kernel sweet or bitter?