



MAMMALS



DOMESTIC MAMMALS



FLOWERLESS PLANTS



FUNGI

ANNA COMSTOCK'S

HANDBOOK OF NATURE-STUDY

Handbook of Nature-Study: Mammals and Flowerless Plants

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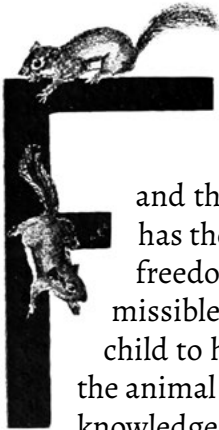
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MAMMALS



Human beings are mammals

MAMMALS



OR some inexplicable reason, the word animal, in common parlance, is restricted to the mammals. As a matter of fact, the bird, the fish, the insect, and the snake have as much right to be called animals as has the squirrel or the deer. And while I believe that much freedom in the matter of scientific nomenclature is permissible in nature-study, I also believe that it is well for the child to have a clearly defined idea of the classes into which the animal kingdom is divided; and I would have him gain this knowledge by noting how one animal differs from another rather than by studying the classification of animals in books. He sees that the fish differs in many ways from the bird and that the toad differs from the snake; and it will be easy for him to grasp the fact that the mammals differ from all other animals in that the young are nourished by milk produced for this purpose in the breasts of the mother; when he understands this, he can comprehend how such diverse forms as the whale, the cow, the bat, and human beings are akin.



The Cotton-Tail Rabbit

TEACHER'S STORY

*“The Bunnies are a feeble folk whose weakness is their strength.
To shun a gun a Bun will run to almost any length.”*

—Oliver Herford



IT IS well for Molly Cotton-tail and her family that they have learned to shun more than guns for almost every predatory animal and bird makes a dinner of them on every possible occasion. But despite these enemies, moreover, with the addition of guns, men and dogs, the cotton-tail lives and flourishes in our midst. A “Molly” raised two families last year in a briar-patch back of our garden on the Cornell Campus, where dogs of many breeds abound; and after each fresh fall of snow this winter we have been able to trace our bunny neighbors in their night wanderings around the house, beneath the spruces and in the orchard. The track consists of two long splashes, paired, and between and a little behind them, two smaller ones; the rabbit uses its front feet as a boy uses a vaulting pole and lands both hind feet on each side and ahead of them; owing to the fact that the bottoms of the feet are hairy the print is not clear-cut. When the rab-

bit is not in a hurry it has a peculiar lope, but when frightened it makes long jumps. The cotton-tails are night wanderers and usually remain hidden during the day. In summer, they feed on clover or grass or other juicy herbs and show a fondness for sweet apples and fresh cabbage; in our garden last summer Molly was very considerate. She carefully pulled all the grass out of the garden-cress bed, leaving the salad for our enjoyment.



The rabbits' ears are ever alert for any sign of danger

In winter, the long, gnawing teeth of the cotton-tail are sometimes used to the damage of fruit trees and nursery stock since the rabbits are obliged to feed upon bark in order to keep alive.

The long, strong hind legs and the long ears tell the whole bunny story. Ears to hear the approach of the enemy, and legs to propel the listener by long jumps to a safe retreat. The attitude of the ears is a good indication of the bunny's state of mind; if they are set back to back and directed backward, they indicate placidity, but a placidity that is always on guard; if lifted straight up they signify attention and anxiety; if one is bent forward and the other backward the meaning is: "Now just where did that sound come from?" When running or when resting in the form, the ears are laid back along the neck. When the cotton-tail stands up on its haunches with both ears erect, it looks very tall indeed.

Not only are the ears always alert, but also the nose; the nostrils are partially covered and in order to be always sure of getting every scent they wobble constantly, the split upper lip aiding in this performance; when the rabbit is trying to get a scent it moves its head up and down in a sagacious, apprehensive manner.

The rabbit has an upper and lower pair of incisors like other ro-



A dutch rabbit

dents, but on the upper jaw there is a short incisor on each side of the large teeth; these are of no use now but are inherited from some ancestor which found them useful. There are at the back of each side of the upper jaw six grinding teeth, and five on each side of the lower jaw. The split upper lip allows the free use of the upper incisors. The incisors are not only used for taking the bark from trees, but also for cutting grass and other food. The rabbit has a funny way of taking a stem of grass or clover at the end and with much wabbling of lips, fi-

nally taking it in, meanwhile chewing it with a sidewise motion of the jaws. The rabbits' whiskers are valuable as feelers, and are always kept on the *qui vive* for impressions; when two cotton-tails meet each other amicably, they rub whiskers together. The eyes are large and dark and placed on the bulge at the side of the head, so as to command the view both ways. Probably a cotton-tail winks, but I never caught one in the act.

The strong hind legs of the rabbit enable it to make prodigious jumps, of eight feet or more; this is a valuable asset to an animal that escapes its enemies by running. The front feet are short and cannot be turned inward like those of the squirrel, to hold food. There are five toes on the front feet, and four on the hind feet; the hair on the bottom of the feet is a protection, much needed by an animal which sits for long periods upon the snow. When sleeping, the front paws are folded under and the rabbit rests on the entire hind foot, with the knee bent, ready for a spring at the slightest alarm; when awake, it rests on the hind feet and front toes; and when it wishes to see if the coast is clear, it rises on its hind feet, with front paws drooping.



Wild rabbits on a lawn

The cotton-tail has a color well calculated to protect it from observation; it is brownish-gray on the back and a little lighter along the sides, grayish under the chin and whitish below; the ears are edged with black, and the tail when raised shows a large, white fluff at the rear. The general color of the rabbit fits in with natural surroundings; since the cotton-tail often escapes its enemies by “freezing,” this color makes the scheme work well. I once saw a marsh hare, on a stone in a brook, freezing most successfully. I could hardly believe that a living thing could seem so much like a stone; only its bright eyes revealed it to us.

The rabbit cleans itself in amusing ways. It shakes its feet, one at a time, with great vigor and rapidity to get off the dirt and then licks them clean. It washes its face with both front paws at once. It scratches its ear with the hind foot, and pushes it forward so that it can be licked; it takes hold of its fur with its front feet to pull it around within reach of the tongue.

The cotton-tail does not dig a burrow, but sometimes occupies the deserted burrow of a woodchuck or skunk. Its nest is called a “form,” which simply means a place beneath a cover of grass or briars, where the grass is beaten down or eaten out for a space large enough for the animal to sit. The mother makes a soft bed for the young, using grass and her own hair for the purpose; and she constructs a coarse felted coverlet, under which she tucks her babies with care, every time she leaves them. Young rabbits are blind at first, but when about three weeks old, are sufficiently grown to run quite rapidly. Although there may be five or six in a litter, yet there are so many enemies that only a few escape.



Washing up

Fox, mink, weasel, hawk, owl and snake all relish the young cottontail if they can get it. Nothing but its runways through the briars can save it. These roads wind in and out and across, twisting and turning perplexingly; they are made by cutting off the grass stems,

and are just wide enough for the rabbit's body. However, a rabbit has weapons and can fight if necessary; it leaps over its enemy, kicking it on the back fiercely with its great hind feet. Mr. Seton tells of this way of conquering the black snake, and Mr. Sharp saw a cat completely vanquished by the same method. The rabbit can also bite, and when two males are fighting, they bite each other savagely. Mr. E. W. Cleves told me of a Belgian doe which showed her enmity to cats in a peculiar way. She would run after any cats that came in sight, butting them like a billy-goat. The cats soon learned her tricks, and would climb a tree as soon as they caught sight of her. The rabbit's sound of defiance, is thumping the ground with the strong hind foot. Some have declared that the front feet are used also for stamping; although I have heard this indignant thumping more than once, I could not see the process. The cotton-tail is a hare, while the common domestic rabbit is a true rabbit. The two differ chiefly in the habits of nesting; the hares rest and nest in forms, while the rabbit makes burrows, digging rapidly with the front feet.

Not the least of tributes to the rabbit's sagacity, are the negro folk-stories told by Uncle Remus, wherein Br'er Rabbit, although often in trouble, is really the most clever of all the animals. I have often thought when I have seen the tactics which rabbits have adopted to escape dogs, that we in the North have under-rated the cleverness of this timid animal. In one instance at least that came under our observation, a cotton-tail led a dog to the verge of a precipice, then doubled



Rabbit Tracks



Rabbits must be alert for danger

back to safety, while the dog went over, landing on the rocks nearly three hundred feet below.

LESSON

Leading thought— The cotton-tail thrives amid civilization; its color protects it from sight; its long ears give it warning of the approach of danger; and its long legs enable it to run by swift, long leaps. It feeds upon grasses, clover, vegetables and other herbs.

Method— This study may be begun in the winter, when the rabbit tracks can be observed and the haunts of the cotton-tail discovered. If caught in a box trap, the cotton-tail will become tame if properly fed and cared for, and may thus be studied at close range. The cage I have used for rabbits as thus caught, is made of wire screen, nailed to a frame, making a wire-covered box, two feet high and two or three feet square, with a door at one side and no bottom. It should be placed upon oil-cloth or linoleum, and thus may be moved to another carpet when the floor needs cleaning. If it is impossible to study the cotton-tail, the domestic rabbit may be used instead.

Observations—

1. What sort of tracks does the cotton-tail make in the snow? Describe and sketch them. Where do you find these tracks? How do you know which way the rabbit was going? Follow the track and see if you can find where the rabbit went. When were these tracks made, by night or by day? What does the rabbit do during the day? What does it find to eat during the winter? How are its feet protected so that they do not freeze in the snow?

2. What are the two most noticeable peculiarities of the rabbit? Of what use are such large ears? How are the ears held when the rabbit is resting? When startled? When not quite certain about the direction of the noise? Explain the reasons for these attitudes. When the rabbit wishes to make an observation to see if there is danger coming, what does it do? How does it hold its ears then? How are the ears held when the animal is running?

3. Do you think the rabbit has a keen sense of smell? Describe the movements of the nostrils and explain the reason. How does it move its head to be sure of getting the scent?

4. What peculiarity is there in the upper lip? How would this be an aid to the rabbit when gnawing? Describe the teeth; how do these differ from those of the mouse or squirrel? Of what advantage are the gnawing teeth to the rabbit? How does it eat a stem of grass? Note the rabbit's whiskers. What do you think they are used for?

5. Describe the eyes. How are they placed so that the rabbit can see forward and backward? Do you think that it sleeps with its eyes open? Does it wink?

6. Why is it advantageous to the rabbit to have such long, strong, hind legs? Compare them in size with the front legs. Compare the front and hind feet. How many toes on each? How are the bottoms of the feet protected? Are the front feet ever used for holding food like the squirrel's? In what position are the legs when the rabbit is resting? When it is standing? When lifted up for observation?

7. How does the cotton-tail escape being seen? Describe its coat. Of what use is the white fluff beneath the tail? Have you ever seen a wild rabbit "freeze"? What is meant by freezing and what is the use of it?

8. In making its toilet how does the rabbit clean its face, ears, feet, and fur?

9. What do the cotton-tails feed upon during the summer? During the winter? Do they ever do much damage?

10. Describe the cotton-tail's nest. What is it called? Does it ever burrow in the ground? Does it ever use a second-hand burrow? Describe the nest made for the young by the mother. Of what is the bed composed? Of what is the coverlet made? What is the special use of the coverlet? How do the young cotton-tails look? How old are they before they are able to take care of themselves?

11. What are the cotton-tail's enemies? How does it escape them? Have you ever seen the rabbit roads in a briar patch? Do you think that a dog or fox could follow them? Do rabbits ever fight their enemies? If so, how? How do they show anger? Do they stamp with the front or the hind foot?

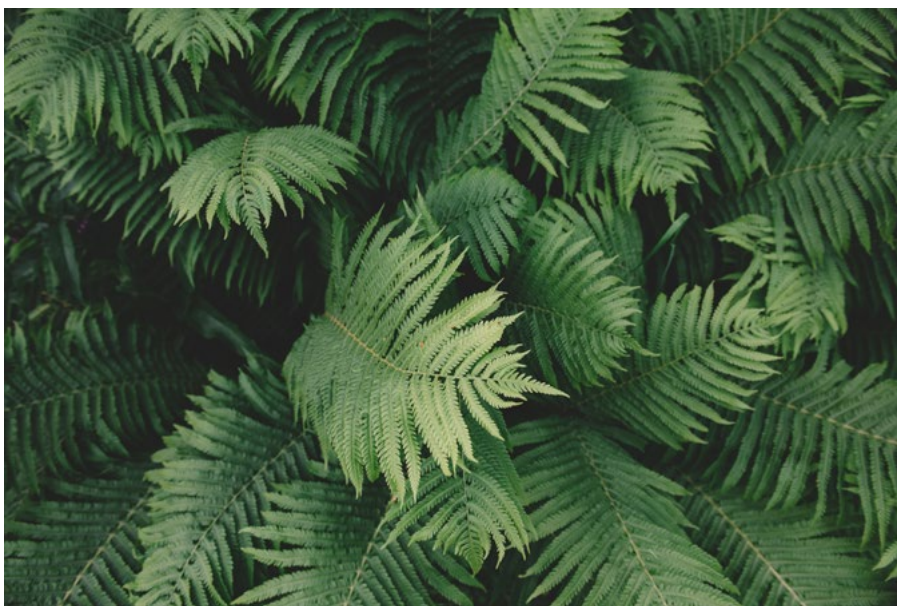
12. Tell how the cotton-tail differs in looks and habits from the common tame rabbit. How do the latter dig their burrows? How many breeds of tame rabbits do you know?

13. Write or tell stories on the following topics: "A Cotton-tail's Story of its Own Life Until it is a Year Old;" "The Jack-rabbit of the West;" "The Habits of the White Rabbit or Varying Hare;" "The Rabbit in Uncle Remus' Tales."



Supplementary Reading—“Raggylug” and “Little War Horse,” Thompson-Seton; *Squirrels and Other Fur-Bearers*, Burroughs; *Watchers in the Woods*, Sharp; *American Animals*, Stone & Cram; *Familiar Life in Field and Forest*, Mathews; *Sharp Eyes*, Gibson; *Neighbors with Claws and Hoofs*, Johonnot; *True Tales of Birds and Beasts*, Jordan; *Uncle Remus Stories*, especially *The Tar Baby*, which emphasizes the fact that the rabbits’ runways are in the protecting briar-patch.

FLOWERLESS PLANTS



Ferns



ANY interesting things about ferns may be taught to the young child, but the more careful study of these plants is better adapted to the pupils in the higher grades, and is one of the wide-open doors that leads directly from nature-study to systematic science. While the pupils are studying the different forms in which ferns bear their fruit, they can make collections of all the ferns of the locality. Since ferns are easily pressed and are beautiful objects when mounted on white paper, the making of a fern herbarium is a delightful pastime; or leaf-prints may be made which give beautiful results; but, better perhaps, than either collections or prints, are pencil or water-color drawings with details of the fruiting organs enlarged. Such a portfolio is not only a thing of beauty but the close observation needed for drawing brings much knowledge to the artist.

References.— *Our Ferns in Their Haunts*, W. N. Clute, (of greatest value to teachers because it gives much of fern literature); *How to Know the Ferns*, Parsons; *Ferns*, Waters; *New England Ferns*, Eastman.



WASP32 (CC BY 4.0)

The Christmas Fern

*“No shivering frond that shuns the blast sways on its slender chaffy stem;
Full veined and lusty green it stands, of all the wintry woods the gem.”*

—W. N. CLUTE.

The rootstock of the fern is an humble example of “rising on stepping stones of our dead selves,” this being almost literally true of the tree-ferns. The rootstock which is a stem and not a root—has, like other stems, a growing tip from which, each year, it sends up into the world several beautiful green fronds, and numerous rootlets down into the earth. These graceful fronds rejoice the world and our eyes for the summer, and make glad the one who, in winter, loves to wander often in the woods to inquire after the welfare of his many friends during their period of sleeping and waking. These fronds, after giving their message of winter cheer, and after the following summer has made the whole woodland green and the young fronds are growing thriftily from the tip of the rootstock, die down, and in midsummer we can find the old fronds lying sere and brown, with broken stipes, just back of the new fern clump; if we examine the rootstock we can detect behind them, remains of the stems of the fronds of year before

last; and still farther behind we may trace all the stems of fronds which gladdened the world three years ago. Thus we learn that this rootstock may have been creeping on an inch or so each season for many years, always busy with the present and giving no heed to its dead past. One of the chief differences between our ferns and the tree-ferns of the tropics, which we often see in greenhouses, is that in the tree-fern the rootstock rises in the air instead of creeping on,



DEREK RAMSEY (CC BY-SA 2.5)
Coiled immature fronds

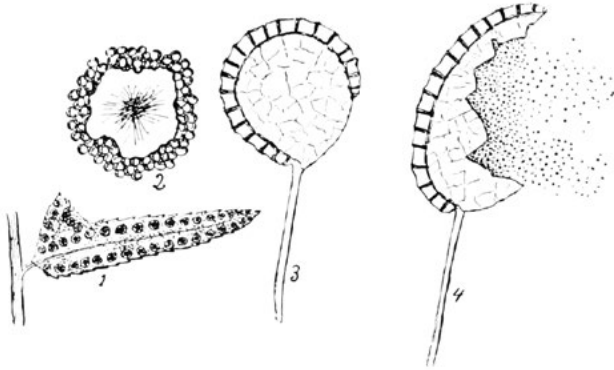
or below, the surface of the ground. This upright rootstock of the tree-fern also bears fronds at its tip, and its old fronds gradually die down, leaving it rough below its crown of green plumes.

The Christmas fern has its green stipe, or petiole, and its rachis, or midrib, more or less covered with ragged, brownish scales, which give it an unkempt appearance. Its pinnae, or leaflets, are individually very pretty; in color they are dark, shining green, lance-shaped, with a pointed lobe or ear at the base projecting upward. The edges of the pinnae are delicately toothed, each point armed with a little spine, and the veins are fine, straight and free to the margin; the lower pinnae often have the earlike lobe completely severed.

In studying a fertile fern from above, we notice that about a dozen pairs of the pinnae near the tip are narrowed and roughened and are more distinctly toothed on the margins. Examining them underneath, we find on each a double row of circular raised dots which are the fruit-dots, or sori; there is a row between the midrib and margin on each side, and also a double row extending up into the point at the base. Early in the season these spots look like pale blisters, later they turn pale brown, each blister having a depression at its center; by the middle of June, masses of tiny globules, not larger than pin points,

push out from beneath the margin of these dots. The blisterlike membrane is simply a cover for the growing spores, and is called the *indusium*; by July it shrivels into an irregular scroll, still clinging to the pinnule by its depressed center; and by this time the profusion of tiny globules covers the entire under side of the pinna like a brown fuzz. If we scrape off some of this fuzz and examine it with a lens, we can see that it consists of numberless little globules, each with a stem to attach it to the leaf; these are the spore-cases, or sporangia, each globule being packed full of spores which, even through the lens, look like yellowish powder. But each particle of this dust has its own structure and contains in its heart the living fern-substance.

Not all the fronds of the fern clump bear these fruit-dots. The



1. Fertile leaflet of Christmas fern showing indusia and spore-cases.
 2. An indusium and spore-cases, enlarged. 3. A spore-case, enlarged.
 4. A spore-case discharging spores, enlarged.

ones we select for decoration are usually the sterile fronds, for the fertile ones are not so graceful, and many ignorant people think the brown spore-cases are a fungus. The Christmas fern being evergreen

and very firm in texture, is much used in holiday decoration, hence its common name, which is more easily remembered than *Polystichum acrostichoides*, which is its real name. It loves to grow in well-shaded woodlands, liking better the trees which shed their leaves than the evergreens; it is indeed well-adapted to thrive in damp, cold shade; it is rarely found on slopes which face the south, and sunshine kills it.

LESSON

Leading thought—The fern has a creeping underground stem called the rootstock, which pushes forward and sends up fresh fronds each

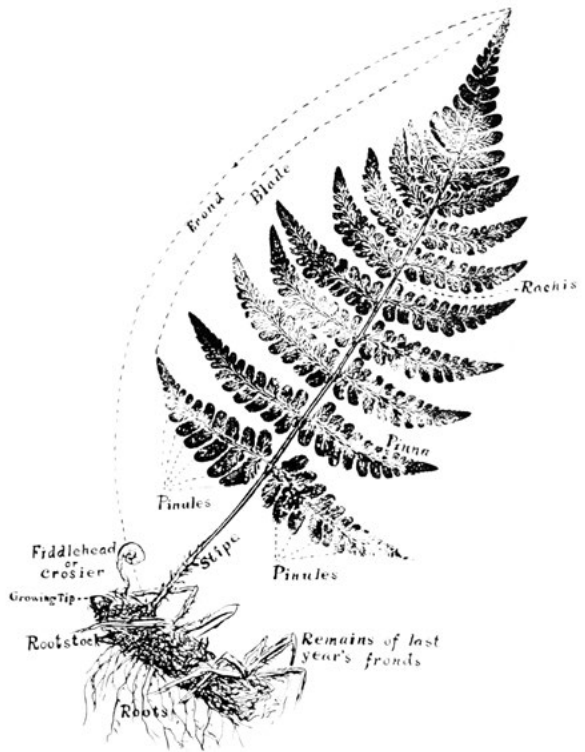
year. Some of the fronds of the Christmas fern bear spores on the lower surface of the terminal pinnae.

Method— This lesson should be given during the latter part of May, when the fruit-dots are still green. Take up a fern and transplant it, in a dish of moss, in the schoolroom, and later plant it in some convenient shady place. The pupils should sketch the fertile frond from the upper side so as to fix in their minds the contracted pinnae of the tip; one of the lower pinnae should be drawn in detail, showing the serrate edge, the ear and the venation. The teacher should use the following terms constantly and insistently, so as to make the fern nomenclature a part of the school vocabulary, and thus fit the pupils for using fern manuals.



JAKNOUSE (CC BY-SA 3.0)

Common polypody, often mistaken for the Christmas fern



Leaf-print of a fern with the parts named. This fern is twice pinnate.



DEREK RAMSEY (CC BY-SA 2.5)
Newly unfurled frond

A *frond* is all of the fern which grows on one stem from the rootstock; the *blade* is that portion which bears leaflets; the *stipe* is the stem or petiole; the *rachis* is the midrib and is a continuation of the stipe; the *pinule* is a leaflet of the last division; the *pinna* is a chief division of the midrib or rachis when the fern is compound; the *sori* are the fruit dots; the *indusium* is the membrane covering the fruiting organs; the *sporangia* are the tiny brown globules, and are the spore-cases; the *spores* make up the fine dust which comes from the spore-cases. It would be well to make a diagram on the black-

board of the fern with its parts named, so that the pupils may consult it while studying ferns.

Observations—

1. Study a stump of the Christmas ferns. Are there any withered fronds? Where do they join the rootstock? Do the green fronds come from the same place on the rootstock as the withered ones? Do the green ferns come from near the tip of the rootstock? Can you find the growing tip of the rootstock? Can you trace back and find where the fronds of last year and year before last grew? Does that part of the rootstock seem alive now? Can you find the true root of the fern?

2. Take a frond of the Christmas fern. Is the stem, or stipe, and the midrib, or rachis, smooth or rough? What color are the scales of the stalk? Do you think that these scales once wrapped the fern bud?

3. Does each frond of a clump have the same number of pinnae on each side? Can you find fronds where the pinnae near the tip are narrower than those below? Take a lower pinna and draw it carefully, showing its shape, its edges and its veins. Is there a point, or ear, at

the base of every pinna? Is it a separate lobe or a mere point of the pinna?

4. Take one of the narrow pinnae near the tip of the frond, and examine it beneath. Can you see some circular, roundish blisterlike dots? Are they dented at the center? How many of these dots on a pinna? Make a little sketch showing how they are arranged on the pinna and on the little earlike point. Look at the fruiting pinnae of a fern during July, and describe how they look then.



DEREK RAMSEY (CC BY-SA 2.5)
Mature sterile frond

5. Do all the fronds of a fern clump have these narrowed spore-bearing pinnae? Do you know what those fronds are called that bear the fruit-dots?

6. Where do you find the Christmas fern growing? Do you ever find it in a sunny place? Why is it called the Christmas fern?

FERN SONG

*Dance to the beat of the rain, little Fern
And spread out your palms again,
And say, "Tho' the sun
Hath my vesture spun,
He had labored, alas, in vain,
But for the shade
That the Cloud hath made,
And the gift of the Dew and the Rain."
Then laugh and upturn
All your fronds, little Fern,
And rejoice in the beat of the rain!*

—JOHN B. TABB.



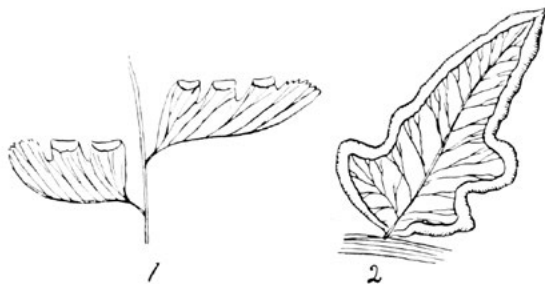
RASBAK (CC BY-SA 3.0)

The Bracken

TEACHER'S STORY

It is well for the children to study the animals and plants which have a world-wide distribution. There is something comforting in finding a familiar plant in strange countries; and when I have found the bracken on the coast ranges of California, on the rugged sides of the Alps, and in many other far places, I have always experienced a thrill of delightful memories of the fence corners of the homestead farm. Since the bracken is so widespread, it is natural that it should find a place in literature and popular legend. As it clothes the mountains of Scotland, it is much sung of in Scottish poetry. Many superstitions clus-

ter around it—its seed, if caught at midnight on a white napkin, is supposed to render the possessor invisible. Professor Clute, in *Our Ferns in Their Haunts*, gives a delightful chapter about the relation of the bracken to people.



1. Fruiting pinnules of the maiden-hair fern, enlarged. 2. Fruiting pinnule of the bracken, enlarged. In both these species the spores are borne under the recurved edges of the pinnules.

For nature-study purposes, the bracken is valuable as a lesson on the intricate patterns of the fern leaf; it is in fact a lesson in pinnateness. The two lower branches are large and spreading and are in themselves often three times pinnate; the branches higher up are twice pinnate; while the main branch near the tip is once pinnate, and at the tip is merely lobed. The lesson, as illustrated in the diagram of the fern, should be well learned for future study, because this nomenclature is used in all the fern manuals. The fact that a pinnule is merely the last division of a frond, whether it be twice or thrice pinnate, should also be understood.

The bracken does not love complete shade and establishes itself in waste places, living contentedly in not too shaded locations; it is especially fond of woodsides, and fence corners on high and cold land. As Professor Clute says, "It is found both in woodland and in the open field; its favorite haunt is neither, but is that half-way ground where man leaves off and nature begins, the copse or the thicket." With us it usually grows about three feet high, but varies much in this respect. The great triangular fronds often measure two or three feet across, and are supposed to bear a likeness to an eagle with spread wings. Its rootstock is usually too deeply embedded in earth for the study of any except the most energetic; it is about the size of a lead pencil and is black and smooth; in its way it is a great traveler, sending up fronds fifteen or twenty feet from its starting place. It also sends off branching rootstocks.

The fruiting pinnules look as if they were hemmed and the edges of the hems embroidered with brown wool; but the embroidery is simply

the spore-cases pushing out from under the folded margin which protected them while developing.

Much on which to base necromancy has been found in the figure shown in the cross-section of the stem or stipe. The letter C, supposed to stand for Christ, thus made is a potent protection from witches. But this figure has also been compared to the devil's hoof, an oak tree, or the initial of one's sweetheart, and all these imaginings have played their part in the lives of the people of past ages. It was believed in England that burning the bracken from the fields brought rain; the roots in time of scarcity have been ground and mixed with flour to make bread. The young ferns, or croziers, are sometimes cooked and eaten like asparagus. The fronds have been used extensively for tanning leather and for packing fish and fruit, and when burned their ashes are used instead of soap.

In Europe, bracken grows so rankly that it is used for roof-thatching and for the bedding of cattle. The name "brake," which is loosely used for all ferns, comes from the word "bracken;" some people think that brakes are different from ferns, whereas this is simply a name which has strayed from the bracken to other species. Its scientific name, *Pteris aquilina*, signifies eagle's wing.

LESSON

Leading thought— The bracken is a fern which has taken possession of the world. It is much branched and divided, and it covers the ground in masses where it grows. The edges of its pinnules are folded under to protect the spores.

Method— Bring to the schoolroom large and small specimens of the bracken, and after a study is made tell about the superstitions connected with this fern and as far as possible interest the pupils in its literature.

Observations—

1. Do you find the bracken growing in the woods or open places? Do you find it in the cultivated fields? How high does it stand? Could you find the rootstock?

2. Take a bracken frond. What is its general shape? Does it remind you of an eagle with spread wings? Look at its very tip. Is it pinnate or



Fronds of the bracken fern

merely lobed? Can you find a place farther down where the leaflets, or pinnules, are not joined at their bases? This is once pinnate. Look farther down and find a pinna that is lobed at the tip; at the base it has distinct pinnules. This is twice pinnate. Look at the lowest divisions of all. Can you find any part of this which is three times pinnate? Four times pinnate? Pinna means feather, pinnate therefore means feathered. If a thing is once pinnate, it means that it has divisions along each side similar to a feather; twice pinnate means that each feather has little feathers along each side; thrice pinnate means that the little feathers have similar feathers along each side, and so on.

3. Can you see if the edges of the pinnules are folded under? Lift up one of these edges and see if you can find what is growing beneath it. How do these folded margins look during August and September?

4. Cut the stem, or stipe, of a bracken across and see the figure in it. Does it look like the initial C? Or a hoof, or an oak tree, or another initial?

5. Discover, if you can, the different uses which people of other countries find for this fern.