

The

# Young Naturalist



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## Exploring Unknown Country



The old saying, "Far away fields look green", describes the thoughts of most of us when daydreaming about exciting things to do. The glamorous places and the fascinating animals and plants are usually somewhere else. Near home, well, that is everyday stuff. It is the distant places that beckon most.

I thought of this today as I cut my lawn. It did not seem very exciting to cut a suburban lawn on a hot day. As I mowed, I thought of some exciting places I have known. The mountain goats, I thought, still live by the glaciers tumbling down the back of Mount Robson in the Rockies, and the man-o'-war birds hang over the surf on tropical Mexican beaches. The killer whales still pass in packs by Cape Mudge on the Pacific Coast, and frightened rattlesnakes rattle warnings from the sagebrush and bunchgrass of the southern Okanagan. The Rio Grande valley still has herds of peccaries exploring the desert, and the cliffs of Bonaventure Island would at that very moment be white with thousands of nesting gannets.

I was enjoying these memories, and wishing too that I was in one of those greener pastures, when I realized that where I stood beside my lawn mower was really unknown country. My new lawn in a new suburb was totally unexplored. When I looked closely, there were clearly many mysteries to be solved.

I do not put much plant killer on my lawn, so it has a variety of living things

See **EXPLORING** — Page 2

*North shore of Lake Superior, Batchewana, Ontario.*

*Beautiful, isn't it? But a naturalist can make exciting discoveries in his own yard.*

# The World of Fireflies

"The lightning-bug is brilliant,  
But he hasn't any mind;  
He stumbles through existence  
With his headlight on behind."

Any observant person must be familiar with the lightning-bug or fire-fly. Most children capture them in order to find out where the light originates. Scientists study them to find out how and why they emit luminescence. How this is done is fairly well understood, but there is disagreement about the "why".

Fire-flies are actually soft-bodied beetles belonging to the family *Lampyridae*. The name is derived from the Greek word meaning "to shine", and it is an apt description of this group of insects. The ability to give off light is shared by many creatures but it is most strikingly displayed by fire-flies. The West Indian Cucujo beetle is the most brightly luminous creature known. It has two bright, eye-like organs at the front of the thorax, which give out a greenish light, and an orange-coloured organ on the lower surface of the abdomen that flashes only when the insect flies. Early travellers stated that the Carib Indians used these beetles in place of candles in their huts. Native girls, we are told, used the beetles for decorations in their hair, and tied them to their feet to light the way through the forests at night. These seem like tall tales by travellers, but entomologists who have visited the islands are amazed at the light emitted by these beetles. The eminent insect physiologist, Wigglesworth, writes: "The most elaborate flashing of this kind is seen in the fireflies of Burma and Siam (Thailand). These may collect in thousands on the leaves of every tree for a distance of several hundred yards, and then proceed to flash in unison." The flash-

ing may continue for several weeks, stopping only at daylight and on bright moonlight nights.

In our fire-flies, the ability to produce light is found only in the last two or three abdominal segments. The whole segment may be involved, or small areas along the edge only. They may be recognized, even when not glowing, by their yellowish-green colour. The light emitted is unique in that it is cold; nearly 100 per cent of the energy given off appears as light. By contrast, in the electric arc light, only 10 per cent of the energy is light, and the other 90 per cent is given off as heat. Sunshine, by the way, is only 35 per cent light.

The substance that gives rise to the light rays is called *luciferin*. The cells where it is found are abundantly supplied with trachae or breathing tubes; these open into spiracles along the side of the body. When air is admitted by the insect, oxidation of the luciferin takes place, under the influence of an enzyme called *luciferase*. This causes almost instant oxidation, which releases the energy as light. Many of the females are wingless and resemble the larvae. They do not emit flashes but in the dark are luminescent; they, and the larvae, are often called "glow-worms".

One associates fire-flies with early summer and roses, starlit nights and perfumed air; in short, they go hand in hand with romance. I don't like to shatter this picture, but in reality fire-flies are ferocious little creatures. They are ideal representatives of Kipling's phrase, "Nature, red in tooth and claw". Both adults and larvae are carnivores. In fact, I'm sorry to say, they are inclined to be cannibals. Still, from our standpoint, they conjure up pleasant memories, and they inflict no injury on our persons nor on our farms

and gardens. Also, they have learnt how to produce the cheapest and most efficient light known. Scientists are still struggling to emulate this.

H. B. WRESSELL

## EXPLORING — from Page 1

in it, both plant and animal. A clump of small white clover flowers was attracting a little orange butterfly. I must identify it some time; I must find also what its larvae feed on. A buttercup that had escaped my occasional war on leafy plants had a solitary flower. I must hunt down its full name (there are several kinds of buttercup) along with those of half a dozen unidentified plants that have been reappearing in the grass. I wondered if sowbugs lived there, and earthworms, and if so what kinds, and if the fat white grubs I found when planting a tree were those of June bugs. A close look at my lawn revealed a whole community of plants and animals that deserved my attention. Once a naturalist learns to see familiar things with an active mind, his voyages of discovery may be long, and happy, and full of adventures that take him no farther afield than his own back fence.

The dandelion is a good example of a familiar thing we overlook. If this species were rare, and hard to grow, and came from far away places, its sunny flowers would be cherished in our best rock gardens. But because it is a highly successful plant that we see often, we call it a weed, and we ignore it except to destroy it. It deserves closer attention. Do you know what tiny animals take shelter under the leaves that it presses to the ground? Do its flowers close at night? How are those flowers constructed? Are they most like a rose, or a violet, or a daisy? How are old leaves replaced so the new ones too lie on the ground? Is the milky juice sticky, and will it heal up small wounds in the stem?

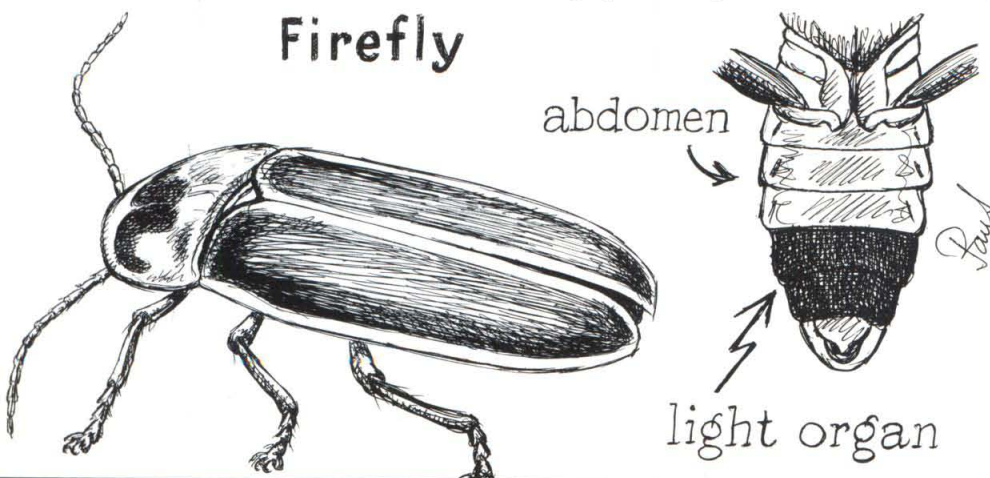
Every unpoisoned lawn and weedy field has its grassroot jungles. They are full of strange plants and wild animals. These places overflow with mysteries to be solved and discoveries to be made.

If you do not believe me, try exploring them some time.

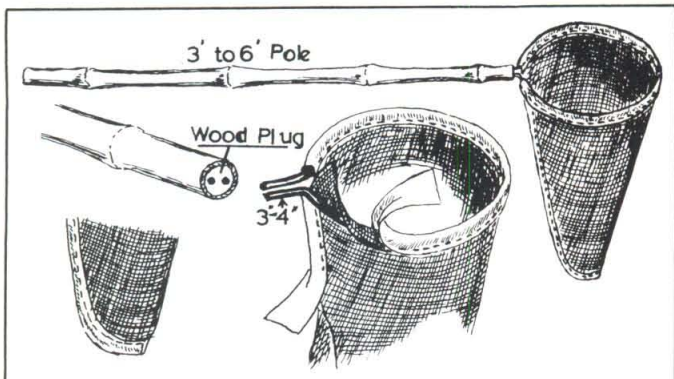
YORKE EDWARDS

The fire-fly produces light only in the last two or three segments of its abdomen.

Sketch by Paul Geraghty



# THIS MONTH: focus on SUMMER PROJECTS



**A COLLECTING NET**

Bend a coat hanger or length of heavy wire into a ring 12"-15" in diameter. Make a net bag with mosquito netting, nylon or good cheesecloth 24" deep. Slide the bag into the ring. Fasten ring to pole with soft copper wire. Bamboo makes a good light pole.

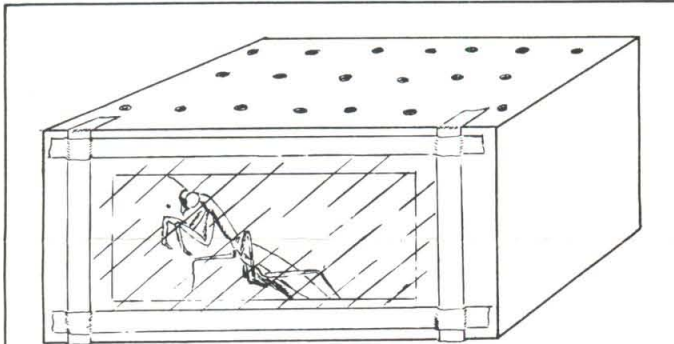
As Young Naturalists you do not have to spend the summer at a cottage or camp to enjoy all the things that nature has to offer for your interest and enjoyment. With a few pieces of homemade science equipment and some ideas, you can have the best natural science summer of your life!

**PROJECT #1 INSECT COLLECTION**

A collecting net will enable you to catch a wide variety of insects. Some of the more interesting species can be placed in cages for observation and then released or for safekeeping until you add them to your permanent collection. A killing bottle kills insects so that they do not suffer and no damage occurs to the delicate wings and bodies. The insect should be mounted as soon as possible after it is dead. A book from your school resource centre or library will illustrate the correct method of mounting insects. A cigar box with a few moth balls placed inside make excellent collection boxes for your mounted specimens.

**PROJECT #2 DISCARD COLLECTION**

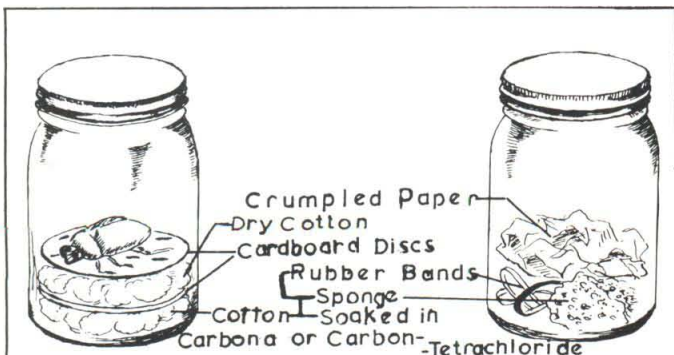
An interesting collection can be made from discarded objects in nature, cast skins of snakes and insects, abandoned nests, feathers, skulls, etc. Each item should have an information tag attached to it and can be kept neatly in a box or on a shelf. Close observation at the location of the find will provide information about the object. Be curious and see what you can find out.



**AN INSECT CAGE**

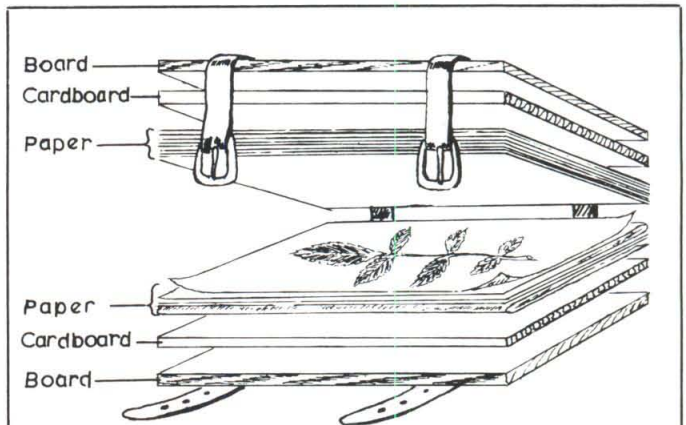
Cut windows in sides of plastic or cardboard food containers. Tape or glue cellophane over window openings. Small holes should be punched in top of container. Different size bottles with holes punched in lids are also satisfactory.

## ACTIVITY PROJECTS



**INSECT KILLING BOTTLE**

Soak pieces of rubber (bands, sponge) in cleaning fluid, carbon tetrachloride, overnight in tightly capped jar. Remove swollen pieces and place them in killing jar. Cover layer of rubber with crinkled paper or paper towelling. Cap tightly. Resoak rubber every five days.  
CAUTION: Avoid inhaling fumes. Keep bottle tightly capped.



**PLANT PRESS**

Obtain two boards 18" x 12" x 1/4" thick. Between these boards place many layers of folded newspapers and a few dozen sheets of corrugated cardboard and blotters. Place the plant between the layers of newspapers. Strap press tightly with two belts or rope for about four days. Each plant is pressed separately. Information should include the date, place collected, where it grew and the name of the plant. The plant can be mounted on plain paper with tape or glue and cover with cellophane for protection. If you collect plants, take only one and never without permission from the owner of the property. You should only collect a plant from a location where many are growing.

**EDITOR'S NOTE:** This continuing series is designed to provide information and activity ideas for teachers who want to encourage their pupils to become actively involved in nature study as an exciting feature of their outdoor education program. Text by Barry Griffiths and Gerald McKeating, sketches by Don Foxall.

# Birds of Canada

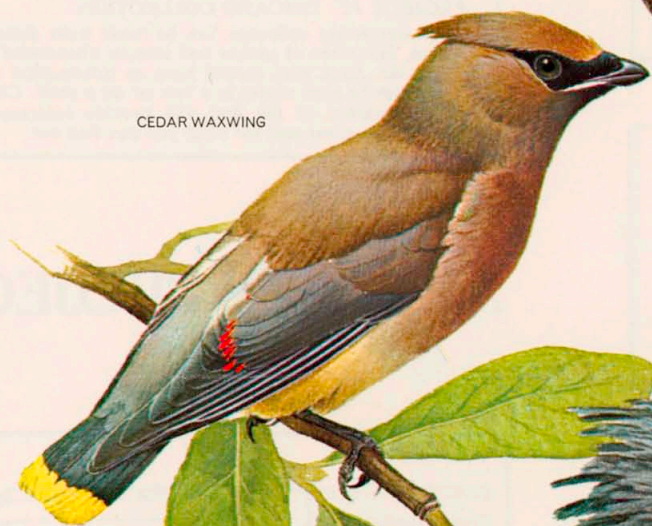


MIGRANT SHRIKE

All these birds belong to different families; they are not close relatives. But they do have at least one thing in common; they are all well-known migrants. Birds fly south in the autumn not because of the approaching cold weather; they move to wherever they can find the proper food. Well-fed, a bird can stand remarkably low temperatures.

Shrikes are songbirds that have taken up the meat-eating way of life of hawks or owls. The MIGRANT SHRIKE is the smaller of two members of this world-wide family that live in Canada. Although shrikes live on small mammals, little birds, and insects, unlike hawks, they do very little prey-catching with their weak feet. They hit the target with the stout, tough bill, which is also used for carrying the victim away. Often they "store" food by hanging it on a thorn or lodging it in the crotch of two twigs. The CEDAR WAXWING has been called our most "tailored" bird. Its smooth plumage is unlike that of any other native bird, except the related Bohemian waxwing of the west. The crest, brown plumage, and yellow-tipped tail identify it. Waxwings are fond of the orange berries of the mountain ash, which they will visit in great numbers in late fall and early winter. There are about 80 different kinds of kingfishers in the world, but only one in Canada, the BELTED KINGFISHER. This bird plunges headlong into the water after small fish, and nests in a long, deep burrow in a sand bank. The female is more brightly marked than the male—an exception among birds. Its rattling call is familiar almost everywhere in Canada. The NIGHTHAWK is not a "hawk" at all, but a member of the "goat-sucker" family, closely related to the whip-poor-will and the Old World nightjars. Its enormous mouth allows it to catch flying insects on the wing with ease. In the breeding season it has a spectacular aerobatic performance, complete with sound. In cities, it nests on flat rooftops.

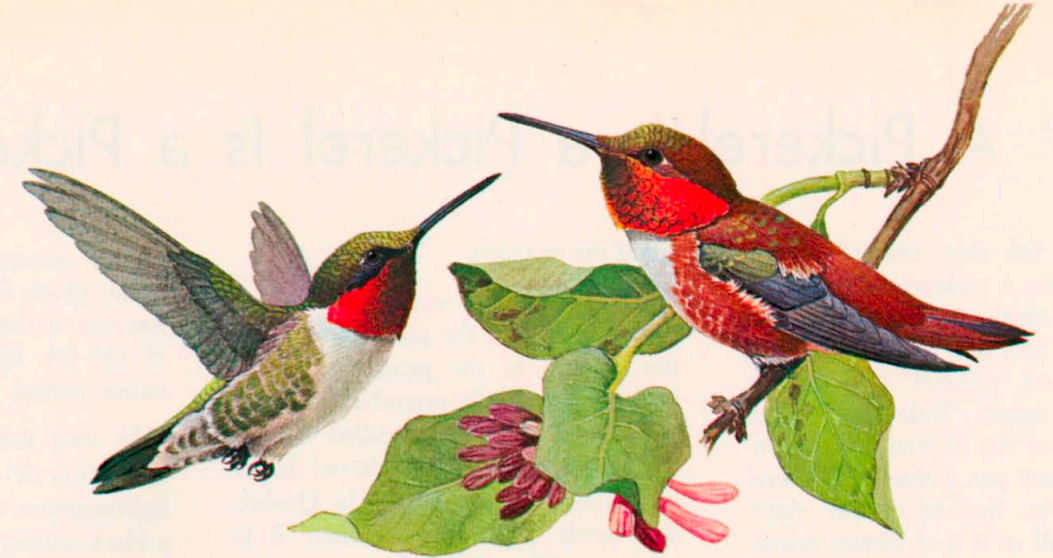
CEDAR WAXWING



BELTED KINGFISHER



NIGHTHAWK



RUBY-THROATED HUMMINGBIRD

RUFIOUS HUMMINGBIRD

Tanagers are sluggish, slow-moving birds that live in leafy tree-tops. They are so quiet that despite their bright plumage, they are difficult to see. The WESTERN TANAGER nests in the dense foliage of mountain oaks or evergreens. The female lacks the red face, but can be identified by her wing-bars. There is no more brilliant bird in Canada than the male SCARLET TANAGER (the female is a dull green color). It sounds like a robin with laryngitis. Hummingbirds are our smallest birds. There are hundreds of kinds of hummingbirds in the New World, but only two occur commonly in Canada. The RUBY-THROATED HUMMINGBIRD is an eastern species, and the RUFIOUS HUMMINGBIRD sticks to the west. In order to fly the way they do, with helicopter-like hovering and backing up, hummingbirds use up a great deal of energy, and have to eat almost constantly.



SCARLET TANAGER



WESTERN TANAGER

J.F. LANSLOWNE

# A Pickerel Is a Pickerel Is a Pickerel

No! The fish that most of us call Pickerel is not a pickerel despite what our parents taught us and our friends tell us. To add fuel to the bilingual fires, the word "pickerel" is of French origin and means "little pike". The etymologists of the Shorter Oxford English dictionary put it thusly: "pickerel (dim. of Pike. See rel.)" and under "rel." they tell us it is of French origin.

What is a pickerel? We have three fish called pickerel. The mud or grass pickerel (*Esox vermiculatus*), the chain pickerel (*Esox niger*) and pickerel (*Stizostedion vitreum*). The first two are properly called "pickerel" since they are small members of the pike family which seldom exceed 15 inches in length. It is probable that most of us have never seen them and if we did we would mistake them for small pike. They are most prevalent in the southeastern cor-

ner of the province.

The fish most of us call "pickerel" is not a member of the pike family at all but belongs to the perch family. In fact it most closely resembles an oversized perch. This fish is called *walleye* throughout most of the United States and some parts of Canada. In Quebec and much of northern Canada it is known as *doré*, a fitting name since the fish is a speckled yellow colour. "Walleye" is the official name adopted by the American Fisheries Society and its committee on the nomenclature of fishes. "Walleye" is certainly an improvement on "pickerel" since it eliminates a name that is both erroneous and confusing.

"Walleye" is appropriate because it places the emphasis on that most curious and interesting eye. You may have noticed the blank whitish eye and because

of this assumed that most walleye are blind. Quite the contrary. The walleye has one of the most light-sensitive eyes of the fish kingdom and perhaps the entire animal kingdom.

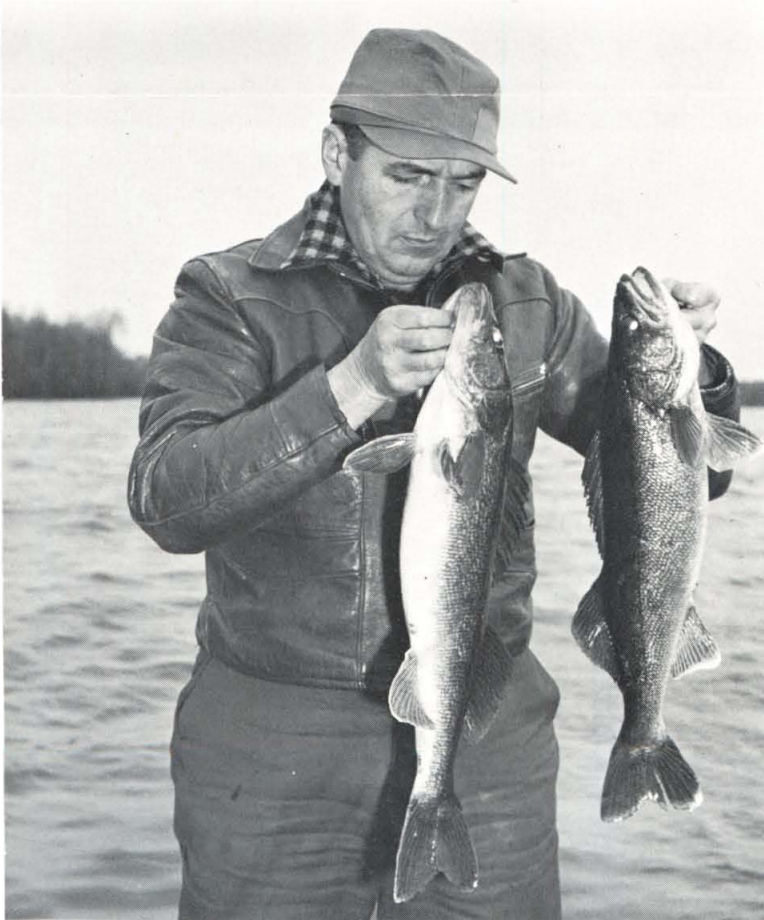
In most animals, humans included, the retina of the eye is composed of light-sensitive cells and behind this is a black coating that prevents light from reflecting or scattering inside the eye. Thus light enters the eye, stimulates the cells of the retina and is "soaked up" by the black-coloured coat. The walleye, however, has a white crystalline coat instead of the black one. This means that light entering the eye stimulates the retina, is reflected back out, stimulating the retina again almost at the same instant. Thus a given object appears much brighter to a walleye than it would to us.

This white layer, called a "tapetum lucidum", is what gives the walleye's eye that glassy blind look. It is a special adaptation for seeing in dim light. In fact, observations made by divers and fishermen show that walleye in clear lakes are inactive during the day. They usually stay where the light is dim, under rocks and logs or in weed beds. It is presumed that they would be dazzled out in open water. They are most active in the early morning and evening when light levels are lower. Of course, fishermen have known for years that these are the "best" times to fish for walleye.

It is interesting to note that in northern lakes where waters are very brown, or muddy, or both, walleye can be caught at any time of day. It is felt that the dark waters filter out some of the light in the first few feet and that the remaining light does not dazzle the walleye, thus enabling them to be active during the day. Research is presently being carried out to determine if this is true.

Whether it is true or not, a walleye is still a perch and a pickerel still a pike and therefore a "pickerel" is not a pickerel but a walleye.

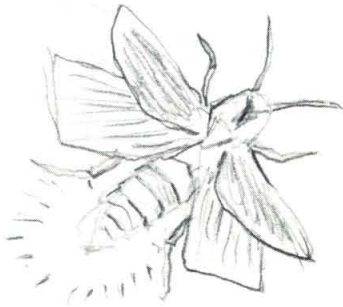
W. D. ADDISON



Department of Lands and Forests Photo

The retina is black in most animals, but it is white in the walleye. Thus the eye of this fish has a glassy look.

# NIGHT LIFE AROUND THE CAMP



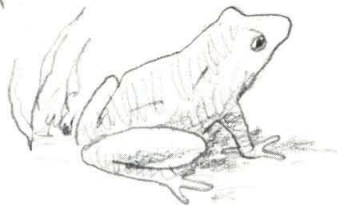
Fireflies (really not flies, but soft-bodied beetles) flash in the woods around the tent.



The barred owl's "hoo-hoo-hoo-hooaw" can be heard across the lake.

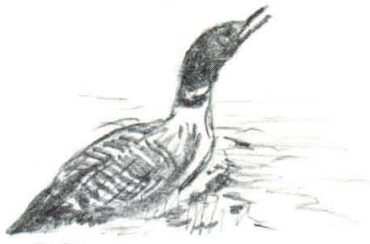


The raccoon forages for clams & crayfish.



The trill of the tree-frog, and

the wild cry of the loon, fill the night with sound.



The skunk does most of his hunting for food at night.



# WOODLORE

## FOR THE NATURALIST

John Macfie

### *Can You Outrun Lightning?*

Yes, you can, provided you give yourself a head start!

If you are caught out in a thunderstorm you can greatly reduce

your chances of being struck by lightning by taking shelter where a lightning bolt is not likely to go. An electrical charge generated in a thunderhead takes the course of

least resistance between cloud and earth. The tallest object in a given area, and metal objects, are the best conductors of electricity, so stay away from them. The fellow in the illustration has wisely kept a discreet distance from the tall elms and the wire fence. He is actually using them as a shield, for they are likely to draw any electrical discharge that occurs in his general area.

Low ground, where you will not be the tallest object in the area is the best place to be. An overhanging bank also keeps the rain off, but in a pinch an open ditch will suffice.

In a boat or canoe you risk being struck by lightning as well as being capsized in a sudden squall.

A metal fishing rod on an open expanse of water is an excellent conductor of lightning. So when you see a thunderstorm approaching, go ashore and take shelter in a grove of low evergreens — *not* beneath a tall pine, hemlock or elm, for these species of trees seem to be especially prone to lightning strikes.

You need not fear thunderstorms. Instead, relax and enjoy this most spectacular of nature's performances from a safe vantage point. All you need is a head start.



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