

# NATIVE PLANT SOCIETY OF NORTHEASTERN OHIO

Founding Chapter Of

THE OHIO NATIVE PLANT SOCIETY

6 Louise Drive  
Chagrin Falls, Ohio 44022  
(216) 338-6622

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Volume 3

May/June 1985

Number 3

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## MAY PROGRAMS AND EVENTS:

**4th (Saturday) 9:30 a.m.; Hogback Ridge Lake County Metropark.** Kent Scott will lead us to outstanding wildflower sites. Kent will begin by showing us the flora of the general area, then, those of us who would like a slightly more rigorous walk will cross Mill Creek and up to the Hogback. This promises to be a very interesting walk, so bring your boots or prepare to wade. Take I-90 east to Rt. 528, go about 2 miles south to Griswald Road, east (left) to Emerson Road, north (left) to park entrance. Bring a lunch and plan to explore new areas.

**Due to a variety of complications, we must CANCEL the May 11th field trip. Please mark your calendars accordingly.**

**11th (Saturday) 10 a.m.; Cincinnati Wildflower Society field trip to Shawnee State Forest** led by Bill Culbertson. This area is rich in specialized plant associations including orchids. After a brown bag lunch the group will visit Abner Hollow. Meet at intersection of Rts. 73 & 32.

**25th (Saturday) 10 a.m.; Cincinnati Wildflower Society visit to Cincinnati Nature Center** lead by a staff naturalist. This outstanding center is usually open to its members only on weekends. (See description and directions on p. 3 of March/April "On the Fringe").

## JUNE PROGRAM AND EVENTS:

**13th (Thursday) 7:30 p.m. at Holden Arboretum.** Jim Bissell, Senior Botanist with the Cleveland Museum of Natural History, will give us an illustrated talk on "Wetlands Ecosystems." Jim, as everybody knows, is the best authority in northeast Ohio on our plants and where they grow. Wetlands are **not** aquatic areas, nor are they bogs, fens or swamps. They are their own unique ecosystem, and have very specialized plant communities. Come and learn why it is so important to save these areas.

## **JUNE PROGRAM AND EVENTS: (Cont'd)**

**15th (Saturday) 9:30 a.m.; Rocky River Reservation channel pools.** Bob Bartolotta, whose speciality is the wetland ecosystem, will lead this trip. Take I-90 to I-71, south to I-480 west, Exit at Clague Road, left (south) on to Mastic Road, right (west) to Shepard Road, left (south) to Valley Park Road, right to Interpretive Center. Because of the fragile environment this trip will be limited to 20. For reservations call Ann Malmquist at 338-6622 or Laurel Giblock at 341-8833.

**29-30th (Saturday & Sunday) Cincinnati Wildflower Society weekend trip to Hocking Hills.** Meet at the Hocking Hills Lodge (614) 385-6841, located on St. Rt. 664 near Old Man's Cave, Saturday morning. Depart Lodge by 10 a.m. for Conkle's Hollow. This is a narrow sandstone rimmed gorge, small but rugged. We will hike along the Rim Trail as well as in the valley. Leader: Rick Queen, ODNR. The afternoon is your own and overnight accommodations may be made at the inn of your choice. *Hocking Hills State Park (614) 385-6841; Intowner Motel (614) 385-2465; Hocking Valley Inn (614) 753-3531.*

Arrange to meet Sunday morning at the Hocking Hills Lodge to caravan to Cranberry Bog State Nature Preserve. We have an Access Permit for our group on this date.

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## **BOOK REVIEW**

Why would a grown man chase hornets with a thermometer, paint whirligig beetles bright red, or track elephants through the night to fill trash bags with their prodigious droppings? Some might say - to advance science. Bernd Heinrich says - "because it's fun".

Heinrich has become one of the world's foremost physiological ecologists. With "In A Patch of Fireweed" he demonstrates that he has retained his sense of humor and his ability to keep the miracles he discovers in a sense of perspective. He reports not just the results of his arcane research, but the curiosity, humor, error, passion, and competitiveness that feed into the process of discovery. For the reader, it is simply a delight, a rare chance to share the perceptions of an unusual mind fully in tune with the inner workings of nature.

Dr. Heinrich is Professor of Zoology, University of Vermont. Born in Poland just prior to WW II, he was the son of an internationally recognized entomologist and ornithologist. The years spent fleeing from the Nazis forced the family to exist in primitive conditions in the deep forests, and here Heinrich embarked on his lifetime love affair with nature. The book is illustrated with his own charming pencil sketches. "In A Patch of Fireweed" by Bernd Heinrich is published by Harvard Univ. Press, 1984, \$18.50 or available at the libraries.

## A FEW FAVORITE BOOKS

by Donald S. Dean, Professor Emeritus, Baldwin-Wallace College

Once in a long, long time I discover a book so profound, or so amusing, or so timelessly wise that I wish for some means of letting everyone know about its virtues short of grabbing perfect strangers by the coat lapels and shouting, "You've got to read that book." This time Laurel Giblock gave me the perfect chance to tell a lot of people about a book so interesting that even the most obdurate reader will fall into the trap of loving plants. The book is Humanistic Botany by Tippo and Stern (W.W. Norton, 1979), a distillation of what the authors developed to interest non-major college students in botany. The book fills the gaps of the standard botany course by telling fascinating accounts of the human side of botany: Mendel smoking his 20 cigars per day, Captain Bligh's epic effort to get live breadfruit trees to the West Indies, the poet Goethe's splendid contribution to plant morphology, as well as discussion of food plants, hallucinogens, medicinal plants, spices, etc.

Anyone who thinks of botanists as quiche-eaters should read the breath-taking account of the American botanist "Chinese Wilson" on his quest to bring back the regal lily from its home in the wild mountains at the Mongolian-Chinese border. Ill with dysentery, Wilson and his bearers were following a narrow trail hung on the side of a mountain, a trail too narrow for two to pass, turn around, or back up. Part of the mountain gave way and the avalanche smashed his leg. He made a temporary splint from his tripod and was dragging himself along when he saw a mule train coming in the other direction. There was no choice but to lie down across the path and let each mule in succession step across his quivering body. He lived to get his precious lilies back to the United States and died in an auto accident at age 54.

Then there was the French botanist de Jussieu who spent 30 years looking for the cinchona tree and other plants in the jungles of South America. Quinine from the cinchona tree was known to be effective against malaria, but Europeans did not know where to find the tree. At last he found the marvelous fever tree and on the night of his triumphal return to France, a native stole his whole collection. Understandably, he went mad and was returned home completely deranged.

This account of the search for cinchona reminds me that the distinguished William Steere, my first advisor in graduate school, was sent to South America during World War II to find other related trees that might augment the desperately short supply of quinine. He would show untutored natives a specimen of cinchona and ask them to find similar trees. He was amazed that the plants they brought back were members of the same genus; natives seemed to recognize that taxonomic entity. Some of these trees were even better sources of quinine than cinchona.

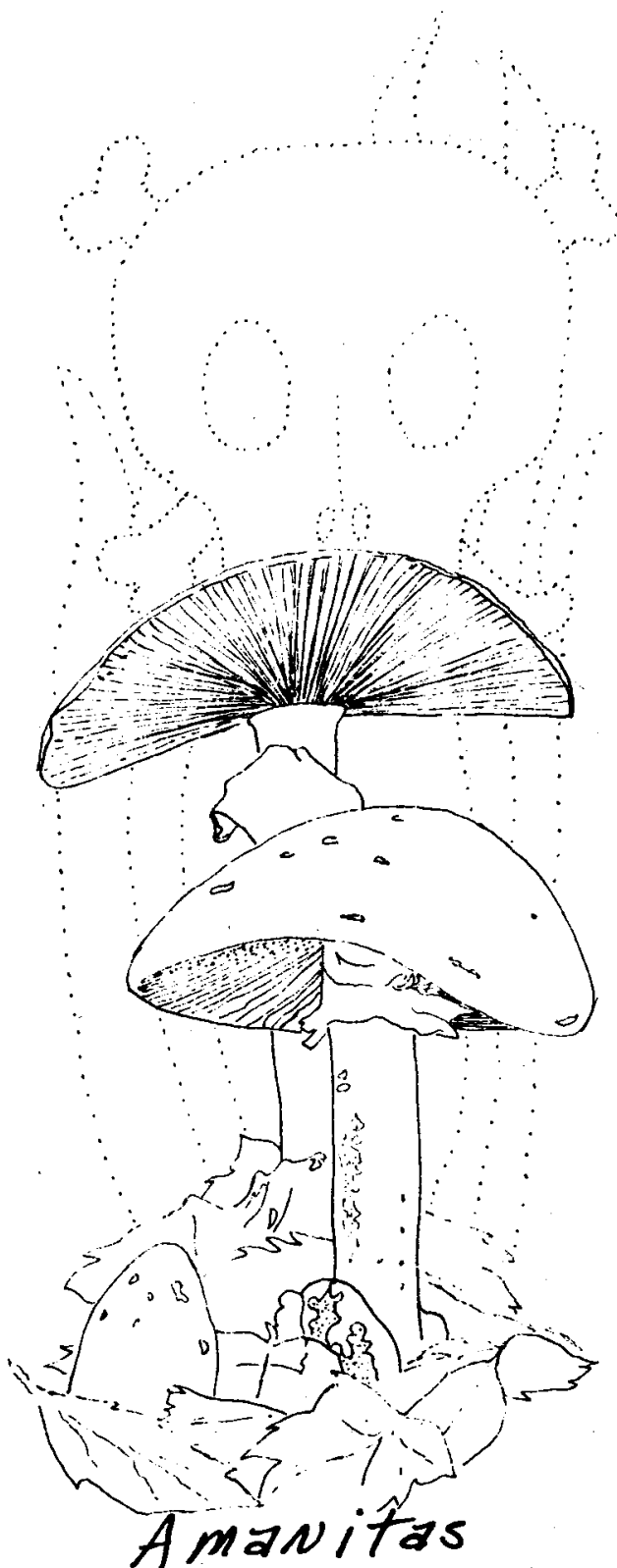
This book has many facts that are hard to believe. For example, I was amazed to learn of the lawsuit (no kidding): United States v. Forty Barrels and Twenty Kegs of Coca-Cola. The government actually sued the firm for false advertising because Coca-Cola no longer contained coca. Coca leaves are the source of cocaine, and Coca-Cola has not contained cocaine since 1904.

Instead of merely describing the cellular structure of wood, the authors enrich the account with the story of how a wood detective matched the grain of wood in the ladder that Bruno Hauptmann used to kidnap the Lindbergh baby.

The hallucinogenic effects of Amanitas are related to various religious and recreational practices, some amusing, some amazing. You will have to read this part yourself. It is rated PG.

The authors cite evidence to support the idea that the madness that resulted in the famous Salem witch trials was caused by an outbreak of ergotism resulting from an infection of the food grain with a fungus called ergot. The poor dames were not bewitched; they were spaced out with the alkaloid from which LSD was first made. The chemist who changed the alkaloid to LSD discovered that he was onto something new when the vapors in his lab led him on a fearful and wondrous trip.

In the chapter on spices, the authors point out that nutmeg and mace grow on the same tree. The nutmeg is the seed and the mace is from the aril around the seed. Professor Bartlett of the University of Michigan, a botanist of the old school, used to chuckle over what he cited as the ultimate in bureaucratic stupidity. It seems that a company executive in Holland, noting the high market value of nutmeg and the declining market for mace, wrote to



his plantation manager in the Dutch East Indies and told him to grow more nutmeg and to cut down the mace trees to make room.

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Another "people's botany" is The Green World by Richard M. Klein (Harper and Row, 1979). If I could only afford one of these books I would buy Humanistic Botany but this book also has its fascination. Klein tells that belladonna got its name because Spanish ladies put atropine-bearing extracts of belladonna (beautiful young lady) in their eyes to dilate the pupils and made the "donnas" seductively and languorously "bella". I wonder how their swains looked to them as they groped about.

Klein dwells extensively on the history of such important plants as the potato. I was amused by the story that Frederick William I took the straightforward approach to getting his peasants to eat the newly introduced potato: he ruled that those who would not plant or eat potatoes would have their ears and noses cut off. I have read elsewhere that the French were more subtle: they planted potatoes in the town square and kept them under a conspicuous and alert military guard, then quietly took away the guard one dark night and let the potatoes be stolen. It worked.

The author quotes the 17th Century herbalist Gerard about the efficacy of Solomon's-seal (Polygonatum). He quotes Gerard as saying that the roots will take away "any bruise gotten by falls or woman's willfulness in stumbling upon the hasty husband's fist." Polygonatum has fallen into disuse.

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By far the best book on the Creationism-Evolution controversy is Science and Creationism edited by Ashley Montagu (Oxford U. Press, 1984). This may not seem like every plant-lover's cup of tea, but every citizen who cares at all about the scientific integrity of what is taught in the biology classes of this nation's public schools or values our constitutional guarantees of separation of church and state has a responsibility to learn about this issue.

The Creationists believe that the earth is a few thousand years old and that all living creatures were created in one act of creation in essentially their present form, ignoring the mountains of evidence from geology, chemistry, molecular genetics, anatomy, embryology and astronomy that the earth is billions of years old and that plants and animals have evolved. In their efforts to promote their ideas of the origin of species, they have tried to forbid by law the teaching of evolution (the Scopes Trial) and more recently they have been able to get a state legislature and some boards of education to require that creationism be given equal time in the curricula and textbooks adopted.

The latter effort came to a head in Arkansas when U.S. Judge William Overton ruled that Creationism was not a science and that the effort to force it into the schools was a violation of the separation of church and state.

The essays in Montagu's book are by such luminaries as Isaac Asimov, Kenneth Boulding, Stephen Jay Gould and Gunther Stent but the most illuminating are those by philosopher Michael Ruse who was called as an expert witness in the Arkansas case and Judge Overton's actual ruling. Taken together they give one of the best discussions of the nature of a science, how a constitutional issue is decided, and the Creationism-Evolution controversy.

When you read in the Chronicle of Higher Education (April 3, 1985) that 80% of the students surveyed in 10 classes in biology, anthropology, linguistics, and genetics at Ohio State University believed that creationism should be taught in the public schools in addition to the theory of evolution, books like this seem urgently needed. I wonder if those same students would also require astrology to be taught in astronomy classes and the flat earth to be taught in geology classes.

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Once again, Don Dean has lent his knowledge and wit, and proved what an important part he plays in our Society and its existence.

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*"Many that live deserve death.  
And some that die deserve life.  
Can you give it to them?  
Be not too eager  
to deal out death...  
even the wise can not see  
ALL ENDS."*

J.R.R. Tolkien



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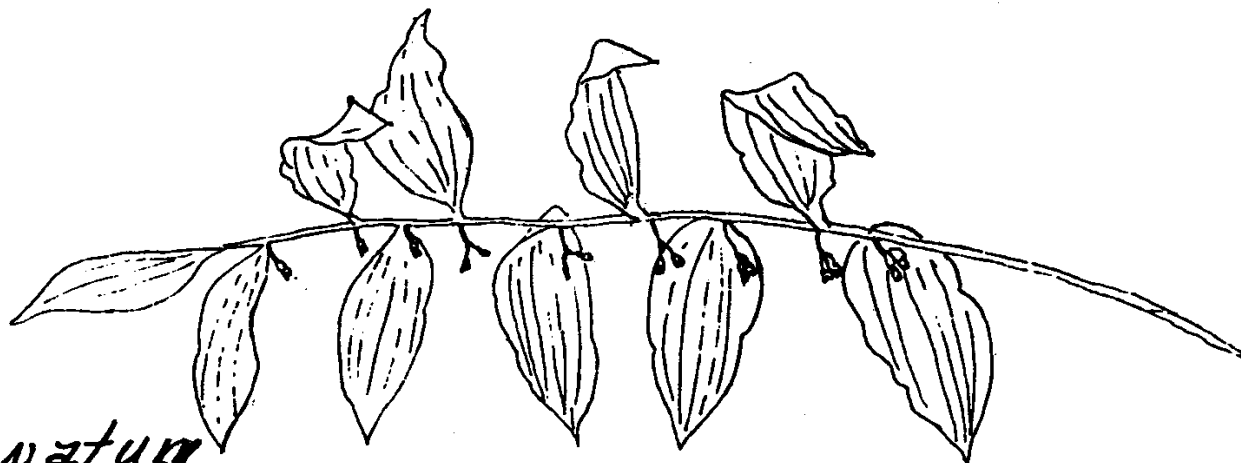
## PLACES TO GO

Within an easy one hour drive, The Wilderness Center in Wilmot is a marvelous place to visit. The Center has seven trails on 573 acres covering a wide range of environmental conditions. Sigrist Woods Trail is a short walk among some of the oldest trees in Ohio; Fox Creek Trail covers the demise of an old field and the birth of a forest; Sugar Creek Trail overlooks a flood plain and displays a bottomland habitat; Wilderness Walk encompasses 1.5 miles of forest, marsh, field and prairie; Pioneer Path is a diverse 1.7 mile walk thru a 10 acre demonstration prairie, woods, limestone rock outcrop, a spring and a low ridge of glacial gravel; and finally Pond Trail, a 1.2 mile walk past Wilderness Lake with a viewing tower and observation blind.

They have a fabulous interpretive building with a fine book selection and gift store. There is not a weekend day that several classes are not going on covering every conceivable facet of nature. Our Ohio Native Plant Society Chapter #2 is located here and they have an interesting program which our members are free to participate in. Their naturalists are very helpful and informative and will be glad to talk with you.

Take Route 21 to Route 93 south. Follow Route 93 to Beach City where you pick up Route 62 just south of the City. Route 62 takes you right into Wilmot where you pick up Route 250 west. The Wilderness Nature Center is just outside of Wilmot and a sign points the way. A neat place to go in any season of the year.

NEWS FLASH!!! Future field trips for the Wilderness Nature Center Plant Society Are: May 4th to the Beach City Wildlife Area; May 11th to Shade Creek in Wayne County (moderately strenuous); June 1st to Doughty Gorge (very strenuous). Meet at 11:00 a.m. and pack a lunch.



*Polygonatum*

## PRESIDENT'S COLUMN

We have just returned from a delightful field trip in the Rocky River Reservation. Don Altemus led us on a leisurely amble through hepaticas and scarlet cup and woodpeckers. We had a great turnout of interested and very knowledgeable people and it certainly was a day to restore one's faith in nature.

The Columbus chapter has had their organizational meeting and adopted "Silene regia" as their flower. Their first public meeting will be May 15th and anyone who might be in the area is invited to attend. They are going to be a very vital group and we will be listing their field trips in the future. The Cincinnati Wildflower Society already has the pink moccasin flower as their logo and some of their field trips are included in this newsletter. As a matter of fact, we are going to join the May 11th trip. Wilderness Nature Center in Wilmot is thinking about adopting the white trillium for their flower. What fun this is to have so many groups to share our interests with, and so many new and well-informed people to enlarge our knowledge!!! We are continuing to explore new areas for chapters, such as Marietta and Athens.

We are ready to begin work on the 1986 programs. **WE NEED SUGGESTIONS FOR SPEAKERS!!!** Please, give us your ideas. It is awfully hard to come up with good names and ideas year after year.

In addition, the time has come to seriously debate whether it is your wish for us to continue to engage top drawer speakers at some considerable expense when so few members attend. For example, the lecture of March 14 with Dr. Forsyth cost us \$190.00 in rent and fees. While we had 40 people in attendance, less than half were our members. Do you want us to continue engaging speakers as many times a year as we presently have or shall we cut back?? Not all of our speakers charge a fee, and some are only modest honoraria, but we **DO** have to pay rent wherever we go. There are those who are always at meetings and for them the expense is justified. How do the rest of you feel? Let me know. It will be discussed at the next Board meeting.

Larry Giblock has the Wade Oval Ravine project well in hand. On Saturday, April 20th he has 2 crews of volunteers scheduled for a massive clean-up and planting session. We have permission to dig shrubs and plants from a building site in Lake County which will be transported to the ravine and planted. Please contact Larry, 341-8833, if you can give a couple of hours to this important project. Just two or three hours from all of you would amount to a tremendous amount of progress.

Ann Malmquist



## BEAUTY AND THE BOG

by Marylee Stephenson

Bogs are a joke to a lot of people--but they're an exotic adventure to me. Four years ago I had little warning of the fascination they were to hold--or of the insect bites and soggy clothes. I knew only that bogs were the home of sundews and pitcher plants, and I wanted to see some of them.

My initiation began at a week-long naturalists' workshop that Queen's University offers at its Lake Opinicon Biology Station. As part of our survey of a variety of habitats we were taken to the Westport Bog. An exciting prospect, but one that rapidly dimmed as we slogged along a route whose only distinguishing mark was a disgusting mass of knee-deep brown sludge. Eventually the ground firmed up a little, and we threaded our way among dense low bushes and a few scrawny conifers. I felt uneasy, irritable, filthy and tired.

Suddenly the drudgery was over--we passed the last tree and bush and there spread before us was a red and gold carpet surrounding a small black pond--the classic kettle bog. A few steps out onto the wet (but clean) carpet and there they were--sundews with damselflies struggling to escape! Pitcher plants with tiny insects trying likewise! We walked a few metres and I was really into bogs--up to my hips, quickly handing my camera equipment to a rather surprised classmate standing on secure ground only a step away from me. Right then I learned I'd accidentally dressed right for the occasion--tennis shoes are fine; rubber boots would be an anchor.

That day started me on my bog quest, and I've never stopped. In the course of working on a book on the national parks of Canada I've been in bogs from Newfoundland to Vancouver Island. Each one is distinctive, yet each shares certain basic characteristics. A bog is a type of wetland that is highly acidic, where sphagnum peat has accumulated to a minimum depth of two metres. Bogs may have different shapes and sizes, but these are the basic characteristics. Right away a distinction has to be made between bogs and fens. In a fen, the peat builders are sedges, and the resulting peatland, instead of being acidic, is fairly neutral or mildly alkaline. Then distinctions have to be made between bogs and fens on the one hand, and swamps and marshes on the other. Swamps and marshes don't have a peat base, they have moving water and rich, muddy soil which grows characteristic plants like cedars or alders (in swamps) and cattails (in marshes).

### How bogs are made

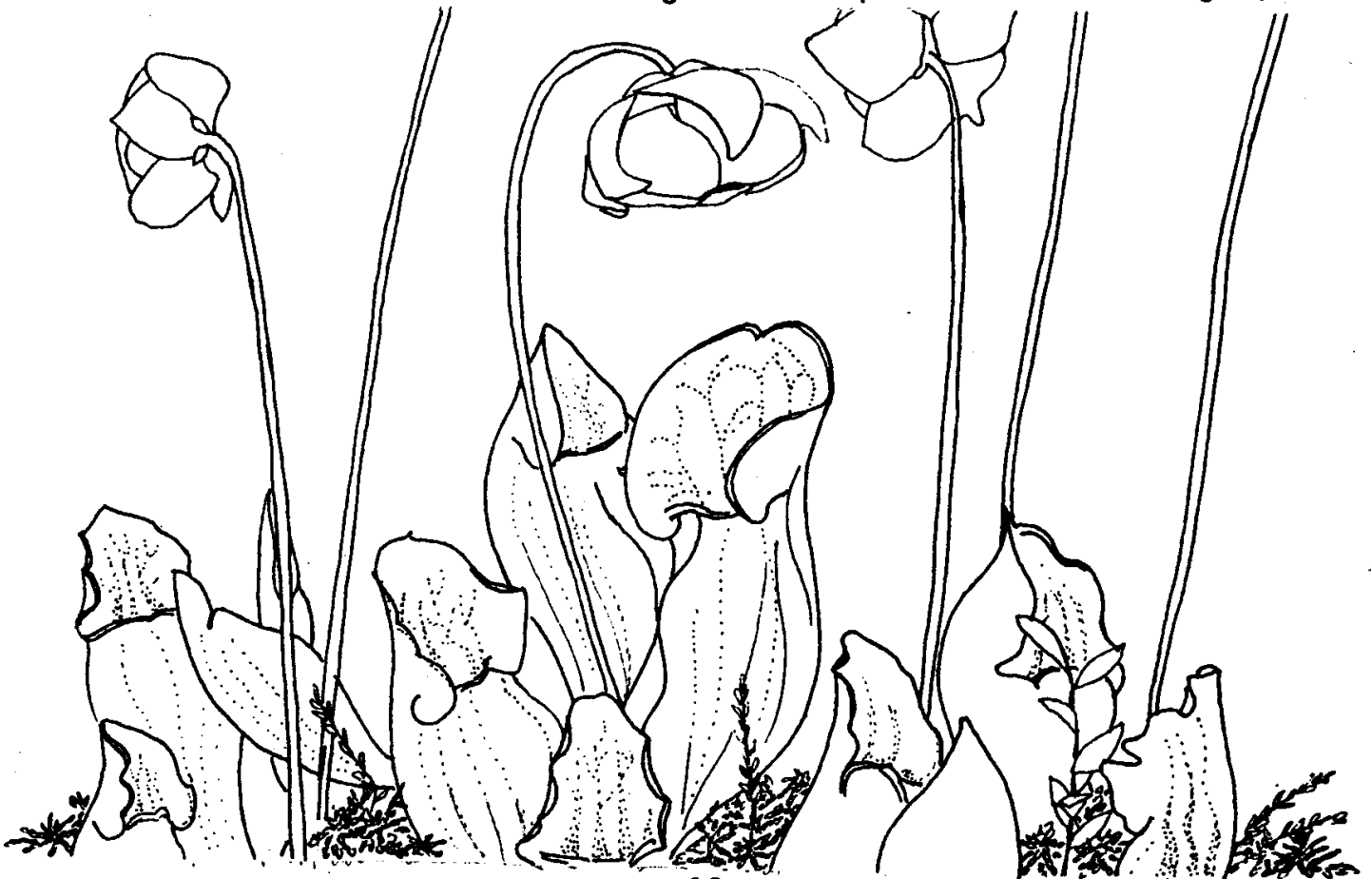
The key to sorting all this out is an understanding of how bogs are formed and sustained. Bogs can form where there is a simple com-

bination of factors working together: a cool and extremely moist environment; a location on a sterile surface (usually either exposed pre-Cambrian bedrock or glacial till); very poor drainage, because of the impermeability of the rock or till surface and because of a lack of entry or exit streams; and a moisture supply that is primarily rain or fog, both of which are low in minerals that are of nutritive value for plants.

This all adds up to an environment as extraordinary as that of the arctic or desert in terms of the constraints it puts on living things--it is low in nutrients, low in oxygen and, whether or not it starts out on an acidic surface, as sphagnum moss takes over, the moisture in true bogs will gradually develop into a highly acidic medium.

Sphagnum mosses are pivotal in the growth of a bog--they are easily able to colonize the glacier-gouged depression or mist-covered rock face which offers a home to few other life forms. Acidity is no problem for sphagnum. In fact, its ion exchange processes release inordinate amounts of hydrogen ions into its watery home and greatly increase the acidity. Even if the surface of a depression is limestone, and therefore alkaline, given enough time the acidity of the sphagnum can effectively cancel out the influence of the alkaline surface on the retained water and make it acidic.

Within these inhospitable conditions, sphagnum has several distinct physical and chemical characteristics that further shape the bog environment and contribute to the growth of peat. Peat is highly com-



pressed undecayed vegetable matter, not a true soil; but it is an excellent addition to soil, as any gardener knows, because of its use as a moisture-retainer and 'lightener' of heavy, compacted soil. Peat need not be composed largely of sphagnum--there are conditions, as mentioned previously, where sedges form the major component--but the vast majority of peatlands are sphagnum-based, because of the geological history of those areas where peat-forming conditions are right (ie the northern half of the northern hemisphere).

Another key to peat bog formation is the growth pattern of sphagnum. This moss (of which there are over 50 species in Canada) has short, feathery tendrils that grow upward and outward over themselves in layers, as seasons go by. The older layers die, but the cool, moist acidic environment retards or vitually stops the progress of decay. The coolness slows down chemical processes; the still water contains little oxygen, which is required for the slow 'burning' that decay actually is; and the acidity severely limits the population of decay-enhancing bacteria. So the living sphagnum builds up and up and the dead sphagnum settles down, eventually becoming firmly compressed from the pressure of its own weight.

The process of bog development is very slow, sometimes with just three or four centimetres of sphagnum expansion in a century. Temperature, moisture, variations in mineral resources, surface topography--all affect growth rates. Many bogs in southern Canada began 10,000-12,000 years ago, as soon as the way was paved for them by the retreat of the glaciers of the last Ice Age. It was the movements of these masses of ice that pitted the bedrock over half of our hemisphere. Particularly in the east of Canada, bogs rest directly on exposed pre-Cambrian granite. In much of the rest of Canada the base for bogs is deposits of glacial debris, or till. As the glacier retreated, chunks of ice would break off, forming debris-locked icebergs. When these pieces of ice eventually melted they left depressions in the vast expanses of glacial till. Sometimes hollows were formed when glacial debris blocked off a meltwater channel. Like the sheer bedrock depressions, these blocked channels had neither good drainage from below nor, when the glacier retreated, streams to bring fresh water in or to let it out. After the ice melted, the only water entering the depressions came from nearby rainfall, and the stagnant and sterile conditions for bog development were established.

Even though all true bogs share the dominance of sphagnum, the acidity of the water, and the poor nutrient status, there are several different types of bogs--distinguished by their location, structure and developmental history. Because bogs are a dynamic environment, the distinctions are often blurred, but in general there are three major types of bogs: the kettle, the raised and the blanket bog. (To be more

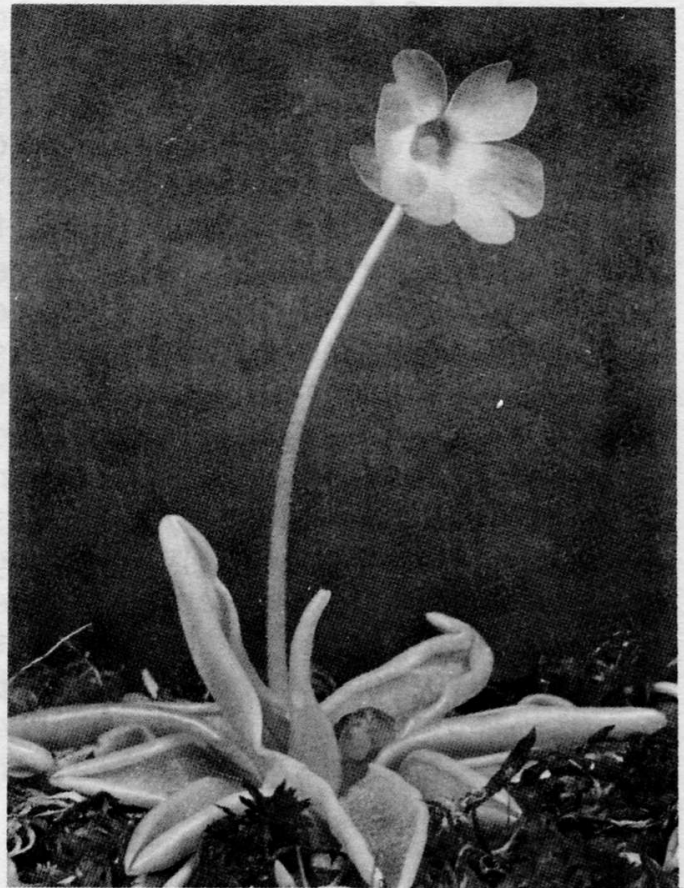
precise, there is a lot of debate as to the number of major types of bog and there are numerous sub-types described in the bog literature. But I'm staying with these three major types because they provide a good start to identifying for non-specialists the obvious features of most bogs that they are likely to see.)

### Kettle bogs

The kettle bog is probably the most familiar one to the public--if they are aware of bogs at all. The vast muskeg of northern Canada is replete with kettle bogs--small circular depressions slowly being encroached upon by sphagnum mosses. A kettle bog is a rough set of concentric circles of plant growth. Sedges begin the progression, forming a network at the edge of the water upon which the sphagnum can take hold. As the season's dead sphagnum drops below and begins to form a thicker and firmer edge, the sedges can move out a bit farther and then the sphagnum piggy-backs onto it. Slowly the moss reaches toward the centre, leaving enough compacted material behind and below that other plants can begin to establish themselves.

On the mat, scattered from its very centre to its edge, are found some of the most intriguing of all plants--the sundew, pitcher plant, bladder-wort and butterwort. Bogs are particularly poor in that most essential of elements--nitrogen, a basic building block of protein. Nitrogen does not exist in rain in a usable form and the bacteria which do make nitrogen available to plants in other circumstances cannot withstand the acidic environment. So these plants take their nutrients directly from animals, specifically from insects (which of course, have already built up their own protein in their tissues). They catch them in their pitchers, suck them into tiny underwater bladders, trap them on their sticky leaf surfaces--and ingest their nutrients with enzyme secretions.

Less dramatic, but by far more evident and numerous are the acid-tolerant ericaceous, or heath, shrubs such as Labrador tea, bog rosemary, leatherleaf, sheep laurel and blueberries which protrude through the sphagnum carpet to form a rough ring of bushy vegetation





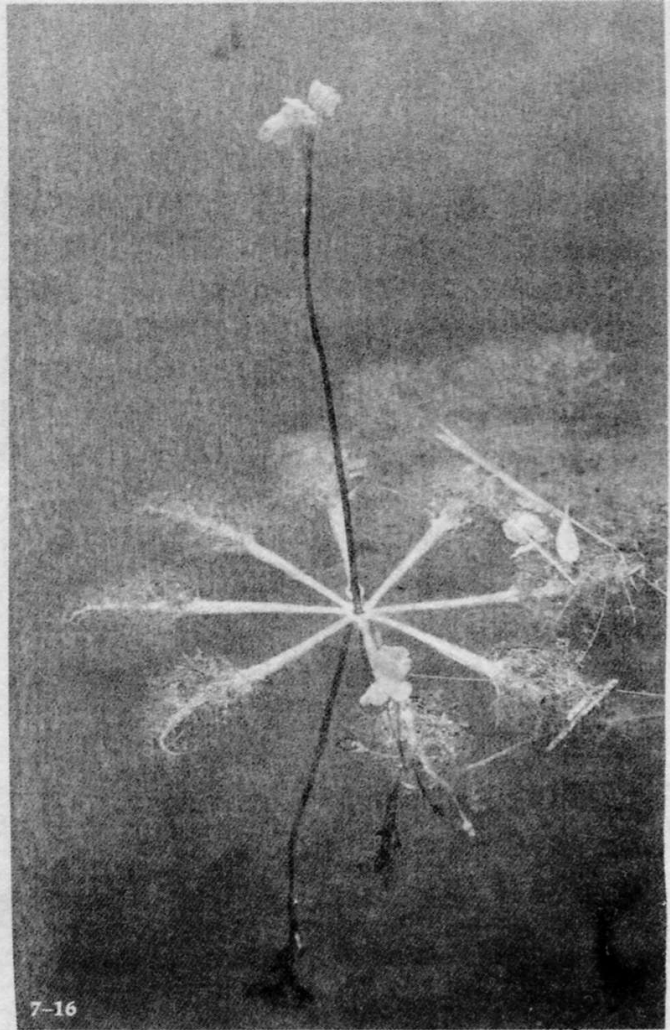
between the sphagnum pioneers and the more solid edges of the bog. At the very outer edges, moisture and acid-tolerant trees like the black spruce or tamarack (larch) can grow, though often in a stunted form. The part of the sphagnum mat that is farther toward the centre of the pond actually floats upon the water. It can be a metre or so deep, with living sphagnum near the surface and dead sphagnum lower down. Below the floating mat is perhaps several metres of water. Beneath this water will be the peat itself, constantly being replenished by the dead sphagnum that slowly falls upon it.

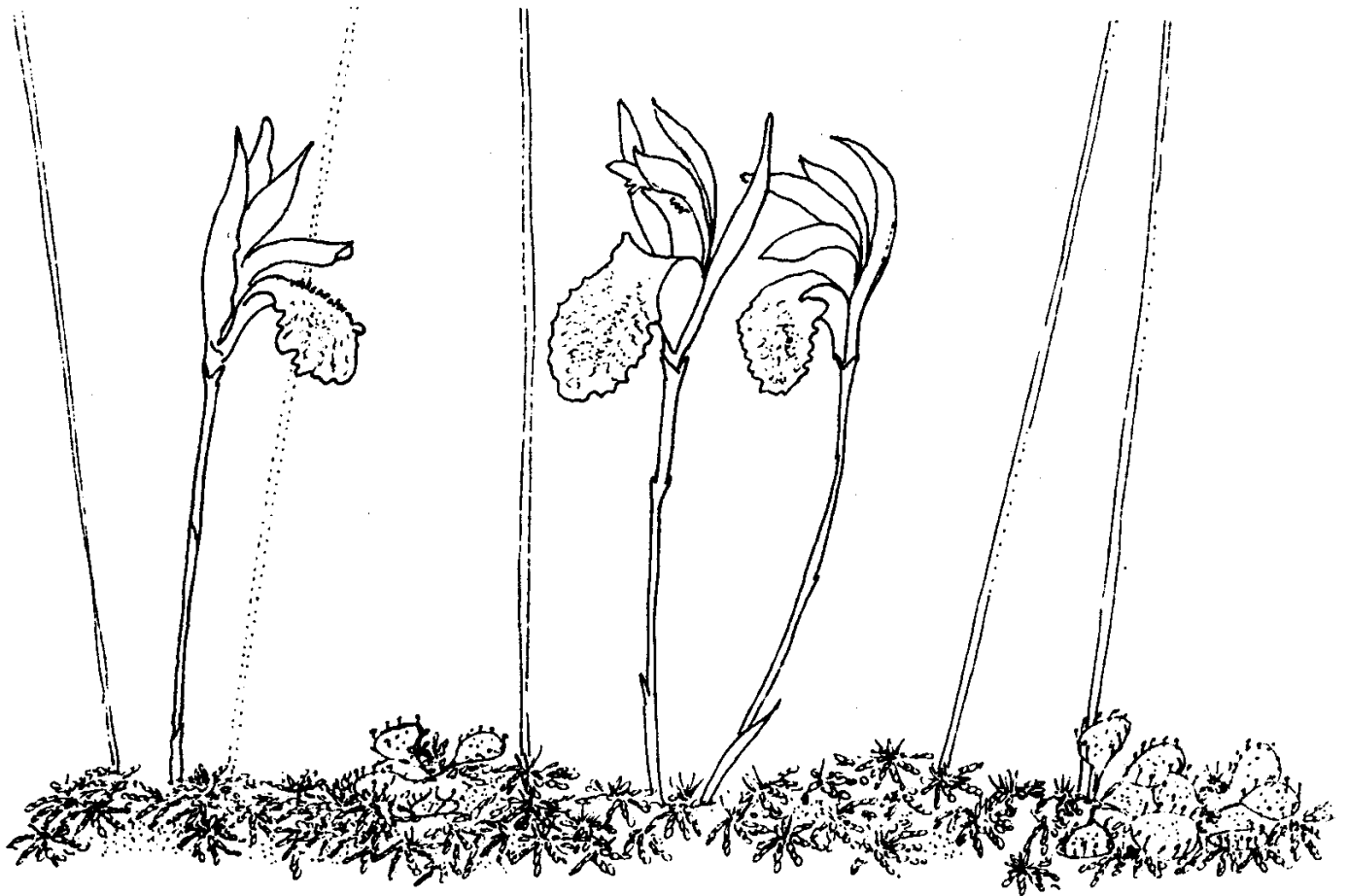
The Byron Bog in the centre of London, Ontario is a good example of a kettle bog, one that is easily accessible to the public.

There is another lovely one, with a good trail and boardwalk system, at Prince Albert National Park in north central Saskatchewan. It is possible for the central pond eventually to be filled in entirely, with the ericaceous shrubs increasing the stability and richness of the mat, and then the shallow-rooted tamarack or the black spruce filling in, finally giving way to red maple and birch as true soil develops. This succession is often hypothetical only, because many bogs simply have not developed fast enough to reach the final stage. Studies show that more often the succession is drastically retarded or reversed by fire, a regular and natural occurrence in the wild. It takes little time for the top few centimetres of sphagnum in a bog to dry to a tender fluff, and a few minutes of fire can destroy many years of slow growth.

### **Raised bogs**

The raised bog also started out as a depression that was filled in the sedge-sphagnum progression. Here the bog has escaped serious reversals (and may have been shallower in the first place) and there is no central open pond. The sphagnum continues to grow on itself, tending to grow more profusely in the centre. This development takes place because conditions are more acidic in the middle of the bog. The bog centre is farthest from any minerals that might be carried by rain run-off from the surrounding land and its plant life is almost





entirely the acid-enhancing sphagnum. Thus the centre has the thickest layering of sphagnum. Depending on the contours of the original bottom of the depression and other factors like moisture, temperature and time, the centre of the raised bog may be fairly flat and plateau-like, or domed in profile. In any case, the mass at the centre is surrounded at the very edge by a 'lagg' zone, a moat of water with a relatively thin covering of sphagnum and heath plants. This moat can make a trek onto the actual plateau or dome a very trying experience.

An easily visited raised bog is Kelly's Bog in Kouchibouguac National Park. It has a dome shape and the centre is six metres higher than the edge. The sphagnum mat itself is almost two kilometers in diameter and is surrounded by a black spruce forest. The park has built an excellent viewing tower at the edge of the forest and visitors can walk to the centre of the bog on a boardwalk. The occasional gaps of open water are easy to see, as are the carnivorous plants, including, the insectivorous bladderwort. There are orchids here and there on the open parts of the mat, and other areas are covered with ericaceous plants punctuated by little mounds with dwarfed tamarack. A metre-tall tamarack may have taken 100 years to grow in this nutrient-poor environment.

Raised or domed bogs can also have another interesting hydrological feature. When they have reached their maximum height, the bog mat tends to crack and crumple in rather regular patterns, due to the limits of capillary action (which ordinarily transports and maintains water at the top of the mat after a rain or fog) and nutritive factors. These cracks in the mat form 'lenses' of open water, interspersed by ridges of elevated sphagnum. At the Alfred Bog near Ottawa this pattern is evident. In Terra Nova National Park there is a view from the Ochre Hills of the Breadcove Meadow which is quite circular. It has these lenses in broken concentric circles and looks like the remains of a partially submerged Roman coliseum, with glimpses of the terraced benches showing through. Only in the bog the high point is the centre, not the edge.

### Blanket bogs

The third general bog type is the blanket bog. Unlike the other types of bogs it does not develop from a water source in a non-draining depression. It must have great amounts of moisture, however, and only our coastal regions can supply enough rain and fog to maintain a bog environment on flat or sloping bare rock or glacial till. The moist and sterile surface can be colonized most successfully by sphagnum with the eventual succession of heath plants and tamarack and black spruce. But--like the other bogs--this environment can be home to relatively few other plants. (In the far north caribou lichen and related species are prominent components of blanket bogs.) The blanket bogs of the east are found along the coasts of Nova Scotia, and there are wonderful ones on the Barrens at Cape Breton Highlands National Park, in New Brunswick, and in Newfoundland. Where they have accumulated on slopes, often seeming to start from a depression at the base of the slope, the blanket bog passes into the sub-type of 'slope' bog. They have the expected types of heath and insectivorous plants, along with various species of orchid. It was in a blanket bog in Cape Breton that I discovered a swath of white fringed orchids, nearly as numerous as hawkweed in a meadow!

On the west coast of Vancouver Island there is another version of the blanket bog, the 'shorepine' bog. This type develops over poorly drained glacial till which in turn rests on impermeable clay (once the ocean floor and now land). I walked over several of these at Pacific Rim National Park. They are small open areas which occur here and there and which have a moderately firm sphagnum surface. There are a fair number of trees, but they have the usual stunting. The name 'shorepine' comes from the characteristic bog tree, not the black spruce here, but the lodge-pole pine! It is *Pinus contorta contorta*, the same species that Rocky Mountain visitors know as a very straight and slender pine that covers the middle altitudes of the mountains.

In its bog environment it is small and contorted. The early botanists who landed on the coast named it aptly, and the scientific name stayed the same, though its montane variety doesn't fit the name at all.

It's easy to talk about bogs in terms of their plant life since it is so evident and plays such a role in actually creating the bog environment and in maintaining its character. But animal life is drawn to bogs as well.

The largest users of the bog environment are moose, deer, wolf, lynx and coyote. While many ericaceous plants have toxic chemicals that make them distasteful or harmful to grazers, there are some, like sweet gale, that are very appealing to moose and deer. I followed moose tracks for hours on and off the trail through slop bogs in Terra Nova National Park. The Alfred Bog near Ottawa has a population of 50 or so moose which spend winter and summer in the spruce lands and forage out on the bog mat.

At Kouchibouguac I had one of my best bog adventures, when my nephew and I decided to spend the night out in the middle of Kelly's Bog, wrapped in sleeping bags and doused in mosquito repellent. The signs had said moose fed there, so we would wait and see. Wait we did, and just before dawn we were terrified by explosive snorting and snuffing sounds. (Could bears frequent bogs--what *did* that brochure say?) It turned out to be deer, though it was too dark to know it then--we were told by a naturalist the next day. Otherwise, the bog itself was utterly silent (except for the mosquitoes)--no frogs, no spring peepers. Not enough food for them, in spite of all that water. But toward dawn coyotes howled from the spruce forest ringing the mat, and owls hooted. The sun rising over the gentle dome of the bog, with its black spruce in spiky profile, added another element of pleasure to the visit.

Few birds actually live in the open mat of a bog, though I did see a spotted sandpiper's nest in a Fundy Park bog. But the spruce forest is home to many species of warbler and some thrushes. And in a blanket bog on the Barrens in Cape Breton I was dive-bombed repeatedly by a yellow-legs, a shorebird far from shore, which obviously was nesting on the ground nearby. It had found one weathered snag and would return to this lookout post between sorties. (That same weathered tree trunk guided me back through the rapidly gathering mist that makes a trail through dense heath shrubs so difficult to follow. It all so quickly looks alike!)

So bogs can be fascinating, exotic, beautiful, and a lot of fun to visit--but what good are they?

### **Classic illustration**

In their natural state, bogs are a great place to learn. A kettle bog provides a classic illustration of plant succession, visible all in



one place and at one time. Stand in a climax forest of maple in the east, or giant fir in the west, and only the imagination can fill in the millenia of growth from lichens and mosses to shrubs, to space and light-loving trees, to shade tolerant ones that then give way to the final 'winners' in the wars of succession. But in bogs that succession goes from the edge to the centre, from the oldest, most mature band of trees to the latest growth of sedge and sphagnum creeping around the periphery of open water. This too goes on the stages, over millenia, but the relationship of time to growth is spread out for all to see-- at one time.

The very fact of the extremity of the bog environment, and its 'depauperate' vegetative character (relatively few plant species) means that a disproportionate number of those plants found in a bog are found nowhere else in the surrounding countryside. Rarities of plant and animal life are increasingly seen as valuable in themselves.

Thus, in the fight to save bog habitat, efforts are always made to discover the special plants found in a given bog, for example the white fringed orchid, southern twayblade (also an orchid) and the insectivorous twin-scaped bladderwort which grow in the Alfred Bog and Mer Bleue Bog in eastern Ontario. The Mer Bleue has been set aside for some protection, but there is a long and dispiriting battle being fought to save the Alfred Bog and its special plants and rare bog elfin butterfly from encroachment by proposed drainage and farming.

For the scientist there are a number of special uses of a bog environment. It is a good place to study the processes of pollination-- for the number of species of flowering plants is small, though the stretches of flowering kalmia, rhodora, Labrador tea and leatherleaf can cover huge areas. This situation greatly simplifies the problem of tracing which insects go to which plants, and when and for how long.

The ombrotrophic nature of bogs--their 'fed from the clouds' quality--makes them ideal places to study airborne pollution. Mosses and lichens take up dissolved metals very readily and since there is effectively no other source of water to contaminate the results, bog plants have been successfully used to measure the direction of pollution carrying winds (and rains) and to judge the amounts of such toxic materials as arsenic from the smokestacks of Sudbury.

### **Consumptive uses**

There is another set of uses of bogs that can occur only by changing the bog itself--by draining it and by cutting ditches and channels through it and around it and allowing the surface moss and deeper peat to dry.

Sphagnum moss is widely used for horticultural purposes. Its sterility; its lightness and yet its compressibility and concomitant ability to absorb many times its weight of water when needed; its constant pH level; its nearly totally organic composition--all of these

things make it an essential component of small and large-scale gardening.

The extraction of sphagnum peat is done by draining a bog, causing the top layers of sphagnum to dry out, then vacuuming off the top five centimetres of moss, a centimetre or so at a time. Canada supplies nearly half a million tonnes of horticultural peat moss a year to the United States alone. The Soviet Union produces 90 million tonnes of horticultural peat per year, entirely for its own use.

The peat of bogs is a fossil fuel--if it continued to be compressed over millions of years it could eventually become coal. As it is now, peat is a very clean, hot and efficient fuel--if it is dried correctly. It has been the standard home-heating fuel in rural Ireland from time immemorial. Records of its use in northern Europe go back at least 2000 years.

Now peat is used to fuel electrical generators in countries like Finland, the Soviet Union and Ireland (which has 25 per cent of its electrical supply fuelled by peat).

Peatlands are also used for qualities other than peat itself--they are seen by some as non-land, as an inconvenient cover over real land that could be farmed, once the peat is drained and stripped away. This is the basis of conflict over attempts to preserve a number of bogs on the edges of urban/rural boundaries. The ironies of this situation include the fact that most people agree that a stripped bog is of minimal agricultural use. The sterility that made it a bog means it is necessary to use prohibitive amounts of chemicals and physical manipulation of the remaining 'soil' to make farming viable. The poor drainage that made the bog stagnant remains just as poor--and as much a liability for farming.

But aren't there enough bogs to go around? It's true that Canada is well endowed with bogs. With 170 million hectares, 18 per cent of our land surface, we have more bog land than any other country in the world. The bogs in the Hudson Bay Lowlands cover an area larger than Great Britain!

But the muskeg of the north is too far away, too inconvenient to reach for study, vacuuming, draining or stripping. So the crunch comes for the accessible bogs--the ones near us, the ones under pressure from all sides. Shall we drain them for housing, drain them for farms, for peat? Or save them for learning, for their beauty, out of our own respect for complex, old and fragile environments? After all, we won't be around for the 10,000 years it will take to build another bog.

\* \* \* \* \*

Marylee Stephenson is the author of Canada's National Parks: A Visitor's Guide, recently published by Prentice Hall. When not on the job as a senior research officer with the Canadian Advisory Council on the Status of Women, she enjoys camping, backpacking and nature photography.

**Merci, Marylee**

## CONSERVATION ALERT

A proposal in Washington by Representative James Traficant of Youngstown, D-17, to revive the plans for the Lake Erie - Ohio River Canal has stirred major concern among local environmentalists, particularly from Jim Bissell of the Cleveland Museum of Natural History. The Canal would begin at Fairport Harbor and follow the Grand River Valley through the Mahoning River Valley to the Beaver River in Pennsylvania. It would be used to transport the materials necessary to make steel to the Pittsburgh area and then the finished products back to the Lake Erie area.

Such a project would seriously affect, if not completely destroy, Morgan Swamp, Beaumont Hemlock Swamp, Lake Cardinal Swamp, Armington Hemlock Swamp, and the Cleveland Museum of Natural History's Grand River Terraces. These areas all contain plants of state-wide significance. Some are endangered and threatened species, and all are plants of great rarity. The Ashtabula County areas harbor such species as Painted Trillium, Dalibarda, Hobble Bush, and Mountain Maple. The Grand River Wildlife Area in Trumbull County would be inundated as well.

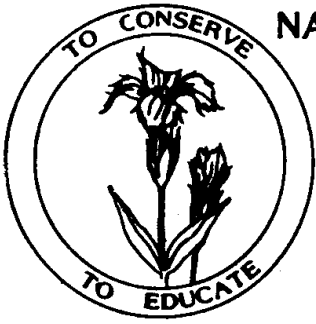
While it is not our purpose to lobby, it is important that all sides of this issue be considered so that any final decision will do the least amount of harm to the environment. Please contact your representatives and senators and let them know the seriousness of this situation. Representative Traficant's co-sponsors on the canal bill are Representatives Mary Rose Oakar, D-20 and Louis Stokes, D-21. Currently, Representative Dennis Eckart, D-11 is sitting on the fence. This is the time for a strong letter-writing campaign.

Ann Malmquist

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