# HALIFAX FIELD NATURALISTS NEWSLETTER

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C/O Nova Scotia Museum 1747 Summer Street MARCH - APRIL Halifax, N. S. 1978

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MARCH -APRIL 1978

NUMBER, 16

Meetings are held on the first Thursday of every month, at 8:00 p.m. in the Auditorium on the ground level of the Nova Scotia Museum, 1747 Summer Street, Halifax.

Field Excursions are held at least once a month.

Membership is open to anyone interested in the natural history of Nova Scotia. Membership is available at any meeting or by writing to Membership, Halifax Field Naturalists, c/o the Nova Scotia Museum. Individual membership is five dollars yearly; family membership is seven dollars. Members receive the newsletter and notice of all excursions and special programs.

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Halifax Field Naturalists, c/o Nova Scotia Museum, 1747 Summer Street, Halifax, N.S. B3H 3A6

HFN is a member organization of the Canadian Nature Federation. HFN is incorporated under the Nova Scotia Societies Act.

### PRESIDENT'S REPORT

## ECOLOGICAL RESERVES: Legislation has been drawn up, but not yet published, which would enable the creation of historical,

archaeological and ecological reserves. At the moment we have no Provincial legislation on the subject and without a lot of pushing the existing proposal may never get to the House.

What we do have is an incomplete list of proposed Ecological Reserves drawn up as a result of the work of the International Biological Programme (publ. 1974). Since then there has been no action except that one or two of the proposed sites no longer exist. Most upsetting of these is the felling of one of the best remaining old-growth forests in Nova Scotia at Quinan Lake, Yarmouth County. This had hemlock, yellow birch, red spruce, red oak and sugar maple in a virtually primaeval state. This impressive area is lost for ever since this type of forest does not regenerate when clear-cut. (A common fallacy in the public mind is that all forest types are renewable resources - this is not the case). The timber of course was valuable and has given a handsome short-term profit but I cannot help thinking that it may represent a long-term loss to the Province.

However while it will be only sensible to include a few areas of old growth forest in the Ecological Reserves system the majority of proposed sites do not contain especially valuable timber stands and are quite small. They are chosen to represent good examples of each of the habitat types found in Nova Scotia and should be distinguished from our currently existing recreational parks in that their function, while people will obviously enjoy visiting them, is to give precedence to the survival of the habitat. In this sense they will provide a valuable educational experience, allow for biological studies and preserve local gene pools (we normally chop down the best trees). In the case of archaeological sites they will hopefully lessen the activities of souvenir hunters in pillaging remains; there is nothing more annoying than to see a beautiful arrowhead and find that no details are known of its exact level or site. A large part of the value of an ancient specimen is the position in which it occurs.

The title of the proposed legislation is: An Act to Provide for the Preservation, Regulation and Study of Archaeological and Historical Remains and Palaeontological and Ecological Sites in Nova Scotia. A letter supporting the aim of the proposed Act has been sent to the Minister. If you feel that the legislation is worth having write a letter also; Ministers need to get some feeling of support and letters are a valuable way of expressing this. Write to:

> Hon. George Mitchell Q.C. Minister of Education Department of Education P.O. Box 578 Halifax, N.S. B3J 2F9

FUNDY TIDAL POWER: The Environmental Guidelines set by the Federal Government are still not yet published. Once they are we will allow about a month for them to be digested and then hold a public seminar. Expect an announcement.

M.J. Harvey

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Karl Karlsen Company of Halifax, who sends ships to the front, to the Magdalens, and is even paid a subsidy by the Federal Government to kill Grey Seals during the winter off Nova Scotia and in the Gulf of St. Lawrence.

vese bebeuml- doldw It is interesting to note that very little money is made by the sealers compared to what is made elsewhere. Perhaps even more telling, however, is that for all the noise about supporting Newfoundland and the sealers, no one has suggested the obvious. That is, that the pelts be processed in Newfoundland, where this coul create jobs and bolster the province's sagging economy. The reasons for this are obvious - the profiteers and politicia care not a whit for Newfoundland, or for the sealers. For the profiteers, both Canadian and European, a show of support for the sealers is good business, and for corrupt and/or incompetent politicians, the seal hunt is an opportunity to look like they are supporting the little guy, when in reality they are carrying on as usual and supporting big business.

The point that we should all be aware of is that THE BUSINESS COMMUNITY WILL ALWAYS SEIZE ANY OPPORTUNITY TO MAKE CONSERVATIONISTS THE VILLAINS. The Nova Scotia pulp industry has used this tactic for years in the spruce budworm issue. We should not allow ourselves to be led - and neither should the Newfoundlanders into believing that Greenpeace, Brian Davies or the American Conservationist movement are the enemies of the seal hunters. The real enemies of the sealers, and of all naturalists, are in the boardrooms of St. John's, Toronto, Ottawa, New York, London, Tokyo, Moscow etc. This is especially true in the case of the seal hunt, for without the rich, and the super-rich, a luxury industry like the fur industry could not even exist.

Ray Pierotti.

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"Justify it to the mainlanders". The writer asks the sealer if he feels exploited by the European fur industry, and when the sealer appears confused by the question, the reporter begins to explain his question more fully. At this point, the sealer's wife breaks in and exclaims, "Yes, me son, we knows what exploitation is." Unfortunately, the matter is dropped at that point and we never learn whether the man feels exploited by the fur industry or not, which is a shame, for this is an important point, and this production fails to deal with it.

The reporter from St. John's, however, quickly becomes the villain of the piece, which ends with the sealer's wife ordering the writer to leave her home. This last bit rings exceptionally false, since none of the Newfoundlanders I have ever met would even consider ordering a stranger from their house, especially for so trivial an act as asking one question too many. This is typical of the production, however, which continually creates false impressions to achieve momentary effects.

So - are the sealers exploited by the fur industry? The answer is almost certainly yes, the average sealer still makes less than \$1000 per season for risking his life on the ice (the figure of \$2300 is often bandied about by those in support of the hunt. This is the average amount earned by sealers aboard ships, of which there are less than 200 total, some of whom are not even Newfoundlanders). The wages paid to all the sealers combined comes to about two million dollars (with another 1.5 million or so being made in subsidiary industries in the Maritimes), yet many millions are made from the sale of seal fur. Where is this money being made? Well, most is made in Europe, but a considerable amount is being made by rich Canadians in Toronto, Montreal, and yes, even here in Halifax. One of the major profiteers from the seal hunt is the

#### BY HOOK OR BY CROOK -

Interested in the origins of some of our common expressions? The phrase "by hook or by crook" comes to us from feudal times. Peasants who were forbidden to cut trees for firewood in the lord's woodlot were allowed to gather dry wood from the forest floor and all the tree. branches that they could reach "by shepherd's crooke or by pruning hooke"! This practise benefited the feudal lords as well as the peasants since woods were cleared of dead superfluous limbs which presented a serious fire hazard and which impeded easy riding and hunting. eresting to note that very

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While pruning of lower tree branches is only practised to a limited extent today, the concept is still a useful one. Trees pruned early provide lumber of better quality since knots in the finished product are small or absent. Trees do self-prune to a certain extent - cathedral stands of trees where trunks are bare of branches for as much as two thirds of their height are common in mature forests. Due to the heavy shading effect of the upper canopy, leaves and branches in the trunk zone die since there is insufficient light to make function possible or useful to the exploitation is." Unfortunately, the

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Most species of wildlife and native plants are dependent upon forest land for their continued survival. The primary objective in the management of this land is fibre production. However, nature conservation and fibre production can be 

At the present time the provincial department of Lands and Forests is offering generous financial assistance to encourage better forest management. For example, 100 percent grant aid is available for silvicultural operations, subject to the preparation of a satisfactory operational forest management plan. If properly prepared this plan can improve wildlife habitat as well as increase fibre production. We therefore set out

creates false impressions to achieve

#### So - are the sealers exploited by the

below some of the wildlife considerations which could be taken into account by the interested woodlot ing his life on the yes owner or forester. S2300 is often band

#### The Importance of Habitat Diversity

In general, the greater the variety of habitats, the greater the variety and numbers of wildlife species. Patches of hardwoods as well as softwoods, some swamp and some clearings will increase the variety of food sources, shelter and breeding territory. Edges between habitats are especially useful to wildlife. Not only do trees and shrubs bearing wild fruit tend to frequent edge habitat, but birds such as Robins and Flycatchers prefer such areas.

#### Hardwood versus Softwoods

Hardwoods tend to be richer in . birds and plants than softwoods. For example, birds such as White-breasted Nut-hatches, Red-eyed Vireos, Ovenbirds, Brown Creepers and Rose-Breasted Grosbeaks are largely restricted to hardwoods. However, softwoods also have species that are more or less restricted to them -- Spruce Grouse, Finches, Siskins, Pine Grosbeaks and Crossbills. Some species of mammals such as Deer Mice and Flying Squirrels generally frequent hardwoods, whereas Red-backed Voles and Red Squirrels are more often found in softwoods. Finally, beautiful spring flowers such as Trilliums, Spring Beauties and Trout Lilies are all largely restricted to hardwoods.

Currently in the province the commercial demand is mostly for softwood fibre, but the real nature of much of the Acadian forest is an intimate mixture of hardwoods and softwoods. It is very important to realise that this mosaic exists, and work with it rather than To convert hardwood stands against it. or mixed stands to pure softwoods is expensive in terms of labour and/or chemicals, and if achieved, nature is constantly trying to reverse the process, necessitating further expense. Moreover, as mentioned above, the elimination of hardwoods reduces diversity and therefore the amount and kind of wildlife habitat.

In the future, we can expect the demand for hardwoods to steadily increase as their value for fuel becomes more widely recognised. There are currently local demands for high-quality, shadetolerant hardwoods such as Beech, Yellow Birch and Sugar Maple for furniture making and craftwood. Unfortunately, many of these tolerant hardwoods and their associated fauna and flora are disappearing due to poor cutting practices. Stands of intolerant hardwoods, for example Paper Birch and Red Maple, whilst being interesting ecologically, are almost certainly less biologically rich than tolerant hardwood forests. Demands for hardwood fuel will likely raise the commercial value of these hardwoods as well.

In terms of their effects on soils there are differences between hardwoods and softwoods. Spruce and fir produce a leaf litter which decomposes slowly and produces an organic and rather acid surface layer. The leaves of hardwoods break down rapidly, releasing their nutrients and because their root systems generally go deeper, they function as nutrient pumps tending to improve forest soils and making them less acid.

The importance of diversity to wildlife is not the only consideration. Mixtures of tree species and age classes tend also to be more resistant to disease and insect attack. Extensive clearcuts favour pure stands of species such as Balsam Fir and White Spruce. These tend to be less useful and more susceptible to insect and fungal attack.

#### Cutting Practises

It is a well established ecological principle that structural diversity of a forest increases wildlife populations.

What this means is that a dense stand of evenly spaced even-aged trees will have far fewer birds and mammal species than a stand with a mixture of age and size classes. This naturally leads to the question of cutting practises.

Selection or the shelterwood system of cutting are most appropriate in the case of tolerant hardwoods, and will ensure the survival of seedlings of these shade tolerant tree species. Allowing too much light to enter a tolerant hardwood stand will not only kill young . seedlings -- the future crop -- but could eliminate rare and attractive plant species.



In coniferous woods, small patch cutting ( 20 acres) will increase habitat diversity. Generally speaking, the smaller the patch, the greater the local habitat diversity, and the greater the amount of edge habitat created. It is important not to harvest areas until adequate regeneration of the desirable tree species (e.g. Red Spruce) has occurred. This will favour the development of Red Spruce rather than balsam fir.

Since owners are required to leave shelter belts along rivers, streams and roads, these shelter belts can be managed for maximum wildlife benefit. For example, few people like to see standing dead timber in these or other areas, but a few such trees provide important feeding and nesting habitat for hole-nesting birds such as Pileated Woodpeckers, Flickers and Sapsuckers. It has been estimated that 1000 species of animals live on dead and decaying wood! Therefore, standing dead trees can, by providing food and shelter, considerably increase the wildlife value of an area.

Cutting and skidding are best carried out during the winter when the ground is frozen and protected by snow. Not only are young trees and plants thereby protected from undue damage, but the soil is less disturbed. Minimising soil disturbance helps reduce the loss of valuable soil nutrients due to erosion. Since maritime soils are notoriously nutrient-poor and the region has high precipitation, any steps which minimise nutrient loss are economically valuable in the long run, and will pay off with increased growth rates in future crops.

Operators should ensure that road construction and improvement does not cause silt and clay to find its way into streams because trout, salmon and other aquatic life will be negatively affected or even eliminated. The careless operation of logging equipment adjacent to streams during spring run-off can cause vast amounts of silt to enter the stream.

Tennessee and Georgia. Now no respectable arctic-alpine grows at relatively low altitude in Georgia - not that there is anything wrong with Georgia - it just does not have a cool, damp climate.

#### As manhioned estiler, the natural Acadian forst is a mixture of some 20

It is important to avoid using heavy equipment during spring run-off if possible otherwise, at least avoid using it on steep hills or adjacent to streams.

#### Fruit-bearing Shrubs

Fruit-bearing trees and shrubs provide food for a great variety of birds and animals. Pin-cherry, Choke-berry, Elder-berry, Indian Pear, Huckleberry and Blueberry are but a few examples. They attract and support Waxwings, Blue Jays, Robins and no doubt the occasional bear! The value of apple trees to deer is also well known. Clearings, glades, and the edge of patch cuts are favoured habitats for many of these fruit-bearing trees and shrubs.

#### Pond Construction

To increase habitat diversity it is good to provide some open water. In much of Nova Scotia this occurs naturally, but elswhere 100 percent grants can be obtained to create fire ponds.

The margins of these ponds should be gently sloped to create plenty of habitat for shoreline plants. These plants will themselves provide food and cover for some fur-bearing species such as Muskrat and Beaver. In addition, they will attract other aquatic life such as Frogs and Salamanders which will furnish food for predatory furbearing animals and birds such as Herons. Water fowl may use the pond during migration, or even for breeding if suitable cover is available. Birds such as Woodcock also frequent bushy areas near water.

A shallow margin will also increase the production of aquatic life which support Minnows and many larger species of fish.

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#### Reforestation

As mentioned earlier, the natural Acadian forst is a mixture of some 20 tree species. The use of native species for reforestation has considerable advantages. Introduced species may at times have higher growth rates, but they are also often less resistant to disease and insect attack. Even within a species, material of local origin has been shown to be more resistant to apical damage and disease than material of the same species from other parts of North America.

Pond Construction

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The aim of this short paper is to present a few of the strange facts associated with <u>Minuartia groenlandica</u> - the Greenland Sandwort, and to appeal to members of the HFN to keep an eye open for it on their rambles during the next season.

Greenland Sandwort is a diminutive herb with small white flowers and is confusingly smilar to a host of other chickweed-like plants - hence the neglect of the species in the past. Not only is it genuinely rare but even when you are standing on it you can miss seeing it. Hence the instructions on what to look for are as follows :

#### Conclusion

We have discussed some commonsense principles of forest management. Some of them may run contrary to current recommendations about the cheapest way of operating in the forests. However, the cheapest method is not always the best from the point of view of protecting fauna and flora. Moreover, careful management, which may be more expensive in the short run, will ensure the long-term productivity of your woodlot. If you want your woodlot to be as productive for your children and to have a rich Nova Scotian flora and fauna, we suggest you consider the points raised above.

Why not also find out more about nature and woodlife from your local library, the Nova Scotia Museum, or the Department of Lands and Forests? If interested, why not form or join a local naturalist group? Your woodlot may well have a rare plant or animal, whose survival depends upon good forest management practises.

F.B. Goldsmith P.A. Keddy

Cutting and skidding are best arried out during the winter when the

## Greenland Sandwort-the Mystery Plant of Nova Scotia

thereby protected from undue damage, but Generally speaking the plant is an Arctic species which is guite common around Greenland, Labrador and into the Hudson's Bay area. Where it gets interesting is in the southern extensions of its range. Like many arctic-alpine plants it is found down the Appalachian mountain chain from the Gaspe through Maine down to South Carolina. Here it is a highaltitude, cushion plant existing alongside the other Arctic plants of similar habit and requiring cool, damp growing conditions. All this is quite normal and this form of distribution is shared with many other Arctic species; where the oddity starts is that parallel to the mountain populations is another chain of plants in the lowlands scattered through Nova Scotia, coastal New England, through Virginia and into South Carolina, Tennessee and Georgia. Now no respectable arctic-alpine grows at relatively · low altitude in Georgia - not that there is anything wrong with Georgia - it just does not have a cool, damp climate.

And then the real shocker, the next known locality in which it grows is southern Brazil - another non-Arctic place! The mountainside on which it grows in Brazil, while by no means tropical swamp forest (this is far south of the Amazon - Brazil is a big country), doesn't exactly get knee-deep in snow either. So the role of science is to explain how this unique, in fact weird, distribution came about. When the Brazilian discovery was first put about the reaction was that it must be either a hoax or a garden escape. However, more sober reflection has shown that it is unlikely to be a hoax and since it is not grown in gardens it is certainly not a garden escape. The conclusion in fact is that the distribution is a natural one and can be explained rationally - but that story is for some other publication.

So far as the botanical exploration of Nova Scotia is concerned, Greenland Sandwort has had a chequered story. The first record was by John Macoun, the Dominion Geologist (does anyone have evidence that he did any geology?) who found some and left us a set of specimens bearing the note "Arenaria groenlandica, on rocky ground North West Arm, Halifax, N.S., No.287, Macoun, 5/19/83".

Well, people tramped around the shoreline looking for sandwort but failed to find it, and in any case, the first part of this century was not exactly a vintage time for botany in Nova Scotia. So the record was either forgotten or it was assumed that Macoun had mixed up his specimens and had really got them from somewhere further north. After all, Halifax, despite what we may all think about the weather, is not exactly a good site for arctic alpine plants. But that is where people were wrong, although they had to wait 60 years for Eville Gorham, then a student at Dalhousie University, to wander across the granite barrens south of Kidston Lake behind Spryfield and come across a little white-flowered plant which was the missing species.

That was in 1943. This was followed in 1947 by R. Bidwell and S. Mason finding more on 'Flagmast Hill, west of Giezer Hill' (which latter appears to be the site of the radio and TV aerials at the top of Fairview). Then P.A.Bentley climbing to the top of Gibralter Rock in the Musquodoboit Valley, found more <u>Minuartia</u> in the lichens on the top. From what we now know about the habitat it seems likely that Macoun did not find it along the shoreline but probably was up on the barrens, probably by Kidston Lake, from which the Northwest Arm is visible.

All these localities are in Halifax County so the next discovery was a surprise because Bill Silver came across some quite accidentally on barrens near Big Tupper Lake in Queens County in 1975. This is some 120 km. from Halifax. This led to the suspicion that there may be patches of Sandwort in other places and in the past season (1977) Paul and Kathy Keddy found some near Lunenburg - another county record. Obviously there is a lot more yet to be found. Thus we have in the past 90 years gone from suspecting that there was a mix-up by Macoun to thinking that it may be, while not exactly thick on the ground, at least in a number of localities yet to be discovered.

#### What it looks like -

If you know what the chickweed family - Caryophyllaceae - looks like, then it is a typical small caryoph (pronounced "carry-off"), but then so are a number' of other members such as other sandworts, stitchworts and spurries, all more abundant members of our local flora. However if habitat (see below) is brought into account then there is only one other species with which it is likely to be confused, and that is knotted pearlwort -<u>Sagina nodosa</u>. A few differences are given in the table but it is pretty tricky telling one from the other.

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Shoots: flowering stems without tufts flowering stems with tufts read another of leaves in axils.

Habitat: rocky barrens among lichens. rocks by the sea. itches of Sandwort in other places and Keddy found some near Lunonburg - another

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#### Where to find it -

The conjectural history of Greenland Sandwort in Nova Scotia is that after the retreat of the ice at the end of the last glaciation, the treeless landscape was colonised by a typical tundra flora of grasses, sedges and other small herbs, including the Minuartia. During this phase it must have been a very common plant. As trees spread into the province about 9,000 years ago, they gradually shaded out the majority of these plants, confining them to open areas where the appropriate conditions of light, moisture and temperature were obtained. Sandwort cannot stand the least bit of shade from trees or bushes, nor any competition from other herbs. This we can deduce . from the fact that it grows only in shallow, lichen-dominated soils, on open rocky barrens. Presumably the areas where it now grows have been open rocky areas since the last ice age. Hence to find Minuartia groenlandica first look for rock barrens, i.e. undulating or more or less flat areas of exposed granite or other hard rock where the soil is too thin to support any but the most dwarfed spruce trees in cracks. The Sandwort grows among lichens in extremely thin soil (1-3 cm. deep) usually away from other vascular plants. If you want to know what the habitat looks like, go to the barrens south of Kidston Lake past the Rocking Stone. There are plenty of barrens of a similar nature in all regions of Nova Scotia and any extensive area of these stands a good chance of having Sandwort get out and look for this due top it starts flowering in May and

There is not even any need to go far from Halifax to search new territory; Blue Mountain by Kearney Lake looks likely and the barrens south of Susie Lake need more exploring although I think they may be the area called Flagmast Hill by Bidwell and Mason. In any case it would be nice to have confirmation that it still grows there. Then there is what can be called the Greater Halifax Peninsula, i.e. the area bounded by the St. Margaret's Bay Road and the

#### 11 too often the very knowledge

sea. The interior of this area is very rugged and rocky with multiple lakes; bogs and barrens. It is fantastic to find an area which is so inaccessible so near to a provincial capital. Just get hold of 1:50,000 map and look for areas marked as barrens (i.e. not shade as forest). Do take a compass.

## What to do if you find it -

Pick one or a very few specimens, press them between newspaper using a heavy weight, change the paper daily until they are dry (3-4 days) and send them to M.J. Harvey, Department of Biology, Dalhousie University, Halifax B3H 4J1. The following information is needed:

 The locality from a map, i.e. the distance and direction from the nearest settlement or named lake. Also the county.

 Brief notes on the appearance of the place in which they were growing, the type of rock, etc.
Who collected it.

4) The date on which it was collected

To establish a new record the rule of the game are quite simple, you have to produce a specimen. If there is no specimen then we can't believe you. On the other hand, there is no need for bucketsfull of the plants, which brings us to the question of conservation.

After a talk on the Minuartia in October 1977, a lady was overheard protesting somewhat indignantly that members were being encouraged to collect a rare plant, but where was the conservation aspect? Quite right! This is a very good point and members of the Halifax Field Naturalists should be some of the people most keenly consciou of the need for conservation. There i: no need, for instance, for any more Sandwort specimens from the Kidston Lake barrens. By all means go and look at the place, it is fascinating, but keep your hands in your pockets.

All too often the very knowledge that a plant is rare rather perversely encourages people to collect it. We have some terrible examples of this in Nova Scotia. For instance, there are sheets upon sheets of herbarium specimens of <u>Selaginella</u> rupestris from Sandy Cove on Digby Neck. In fact it strikes us that there is more dead material than there are living plants remaining in the wild. This form of destructive collecting can only be condemned. It does not forward our knowledge in the least.

Even more in danger are the rarer orchids of the province which contribute to their own destruction by their very beauty. They are the plants of the province most desperately in need of a spirit of conservation on the part of the public. This spirit can only be generated by years of campaigning on the part of groups such as the HFN. It certainly does not exist at the moment.

Back to Minuartia - you are on a stretch of barrens from which the plant has not been recorded; you are almost certainly the first naturalist on those barrens who knows even roughly what Greenland Sandwort looks like; at your feet is growing a minute white-flowered thing with fine leaves and a notch on each petal. What do you do? Do you pass on for the sake of conservation and tell one of us you saw it? We won't believe you and you know it. No, you pick a plant or two - no great quantity is needed as already mentioned. For all its rarity the plant usually grows in quite large masses and a specimen removes all possibility of confusion. It was after all the nagging existence of Macoun's specimens which eventually led to its rediscovery. After the initial record no further specimens are needed. It is collecting subsequent to the initial discovery which usually endangers species. We should add that there is an additional need for specimens in addition to merely establishing a new site record. There is a subtle series of morphological variations in the species.

sep your hands in your pockets.



So get out and look for the Sandwort; it starts flowering in May and is in full bloom in June and July. Summer drought may kill it off by the end of July or August but given a favourably damp season it often flowers again from September to November.

P. S. - <u>Minuartia groenlandica</u>, <u>Arenaria groenlandica</u>, Greenland Sandwort, and Mountain Sandwort all refer to the same species. M.J. Harvey, Elizabeth Hayes

### Forest Community Structure-Seeing the Forest for the Trees

The forest is a favourite haunt for many Nova Scotian naturalists; the variety in species, form, texture and colour can provide hours of discovery and enjoyment. However, often in the search for a new animal track or another kind of fern, we may forget to "see the forest for the trees". Seen as a unit in itself, a forest community has a structure as unique and interesting an the pattern of an oak or maple leaf.

The term, forest structure, refers to the distribution of the various species in three dimensional space; any given space in the forest community is defined in terms of what species are present, where they are located and their sizes and shapes. Position in time is also important since the structure of the community changes annually (growth), seasonally (onset of spring leaves and leaf-fall in the autumn) and even daily (loss of branches in a storm), and momentarily (a breeze changes the position of leaves in the canopy).

#### Figure 1.

Vertical layering in the forest 0 - overstory of hardwoods u - understory of two main layers, young conifers and an herbaceous layer (H)

The most obvious aspect of structure in most forests is stratification or vertical layering (fig.l.) Several levels are usually observable, although the boundaries between them are often indistinct; the overstory layer includes the largest, domineering tree species; the understory is composed of shrub layers (saplings and "short" trees like witherod and alder) and herbaceous layers (ericaceous shrubs like Blueberry and Lambkill, herbs such as Goldthread and Starflower, and a Moss-liverwort layer). Often each level is characterised by a particular species. A common sight in Hants County, for example, is a dense understory of Balsam Fir and Spruce growing beneath an overstory of Large-tooth Aspen and Red Maple. Vertical structure can also be described within the principal layers as in the overstory where trees are categorised as dominant (for example the huge solitary pines that tower above other forest trees in the Bedford- Bicentennial Highway area), codominant (the Aspens and Maples mentioned above) or suppressed (fig. 2). The latter are interesting since often smaller trees in the overstory or even shrub layers may be as old as overstory dominants; some genetic or environmental deficiency has made competition and attainment of species potential structure component. impossible.

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Forests also have a horizontal structure component. This is very evident on the ground where species may occur in clumps (Lambkill, certain species of fern) or more randomly distributed (Partridge-berry, Clintonia). Less obvious are the complex patterns of leaf distribution which occur in the canopy layers.

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The various structural features of a forest are complexly controlled by the characteristics of each plant's surrounding spaces; climatic (precipitation, solar energy), edaphic (nutritive characteristics of the soil, for example) and biotic (competition, predation) features of the environment

control the distribution and performance of plants in the forest according to their individual tolerances. One tree seedling for example, will be unable to survive or grow to potential if it requires more light than reaches the forest floor (a shade-intolerant species like Paper Birch) while another seedling (for example the shade tolerant Sugar Maple) may thrive under the shady conditions to eventually attain dominant status in the community.

While the environment controls forest structure, structure itself is responsible for modification of the various environmental parameters, by forming a large variety of different micro-climates in different parts of the forest. A good example of this

reciprocal relationship between structure and environment is seen in the effect of the canopy on layers beneath. In this case canopy is defined as any layer of leaves (and twigs, buds and branches) at any level in the community, from the dense canopy of the overstory trees to the canopies formed by Bunchberry and wild Lily-of-the-valley leaves in the herbaceous vegetation. Each layer of the canopy forms a kind of filter that alters the environment and creates new conditions for life, in layers below . Thus, light entering the upper layers is filtered and modified so that in lower layers it is different in both quality (wavelength or "colour" of light) and quantity. In the same way the quality (pH, dissolved nutrients) and quantity of rainfall is altered depending upon how the water collects in the leaves and branches and where the "holes" in the canopy "umbrella" occur. Wind, snowfall, temperature and evaporation rates are a few of the other parameters that are affected. In most cases, a denser canopy provides a more effective filter for environmental parameters, thus explaining why the herbaceous vegetation survives better in clearings where plenty of light can penetrate.

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Next time you walk in the forest, take some time to see the forest from a plant's point of view. By lying on the ground and looking upward you can get a good idea of how the plants "perceive" their surrounding and how well they may be able to survive (fig. 3). The percentage of sky you can see through the canopy from horizon to zenith (directly overhead) gives an indication of the diffuse light a plant receives; to the south a narrow band where the sun travels during the growing season will provide direct light through gaps of various sizes in the canopy. A small area overhead will modify the rainfall received, depending upon the tilt of the branches above that point. Trees trunks and branches all around will direct the flow of air, controlling rates of evaporation and transpiration, the distribution of windblown seeds and the extent of wind deformation of the trees. The amount of radiant energy reaching the ground can even control the rate of snowmelt in the spring, retarding the germination of seeds or protecting young plants from the damaging freeze-thaw cycles of the early part of the spring.

The distinctive micro-climates created by this canopy filtration system determine which plants become structural elements of the total community and which positions and forms they will take. The final structure is the assembled result of an extremely complex

Figure 3. Plant's-eye-view of its surroundings: - zenith

 sun track or the part of the sky through which the sun travels during the

growing season.

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In the Province contact: s/o Mrs. Yme Jacobs, R.R.#3, Westv211e, N.S., 752-1475.

interaction between structure and the environment. This relationship becomes very important when foresters wish to control the spacing of larger trees (hence canopy density) to allow regeneration of tree seedlings, or when a wildlife manager wishes to know which canopy conditions will provide good browse and cover for deer and other animals.

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Can you see the forest for the trees?

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#### "WILDSTUFF" - A.O.N.S. CONFERENCE

The Association of Outdoor Nova Scotians is holding its annual conference in Lourdes Church Hall, Stellerton, Nova Scotia, on May 5, 6, and 7th. The association encompassespeople from all walks of life, and thus covers a wide spectrum of interests. The objective of the conference, and the association in general, is to foster a deep appreciation and understanding of our natural environment through field trips, workshops and activity sessions. This year's conference features: a day field trip to Antigonish by bus to view the "Crystal Cliffs", osprey and bald eagle nesting sites, and various features of the community; a half day experience ocean canoeing and kayaking is being organized; a session on wilderness travel; environmental photography sessions; chances to learn about outdoor education; solar and wind power generation presentation and many more fascinating and stimulating activities abound. Saturday night concludes with a seafood dinner and dance.

Babysitting can be arranged for those registering early, so don't delay! In Halifax area contact: Mr. Andrew Paton, Kearney Lake Rd., Halifax, 443-3008, In the Province contact: c/o Mrs. Yme Jacobs, R.R.#3, Westville, N.S.,752-]475.

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Yvonne Rockwell of Timberlea Junior High School was awarded the HFN Book Prize for the best display in natural history at the 1978 Metro Area High School Science Fair. Her project was a collection of Nova Scotian rocks.

Huguette Mallet leaves us to return to Quebec. Bon voyage Huguette!

Membership in the Halifax Field Naturalists is open to anyone interested in the natural history of Nova Scotia. Former members are encouraged to renew their memberships and mew members are always welcome. Membership fee is five dollars annually, family membership seven dollars.

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Halifax Field Naturalists, c/o Nova Scotia Museum, 1747 Summer Street, Halifax.

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4 May	MONTHLY MEETING: <u>Cathy Keddy</u> and <u>Joe Harvey</u> will report on Progress on the Fern Project and An Enlarged Mapping Project for Nova Scotia. This will involve members of the Field Naturalists participating in the scheme on their trips around the Province. Nova Scotia Museum, 8:00 p.m.
7 Мау	HIKE to Big Indian Lake along the Old Annapolis Trail from Upper Hammonds Plains (the <u>Daphne</u> walk). Bring a lunch. The track is quite wet in places; total walking distance an easy 8 km. Meet at the N.S. Museum parking lot 10:00 a.m. Leader <u>Joe Harvey</u> .
14 May	The SPRING FLORA of the deciduous woodlot at Smiley's Intervale. This valley has a rich flora including bloodroot, trilliums, yellow violet and ostrich fern. Leader <u>Tim</u> <u>Randall</u> . Meet at the N.S. Museum parking lot 10:00 a.m. Bring a lunch.
28 May	ROCKING THE ROCKING STONE: This short trip to Kidson Lake above Spryfield may be combined with a picnic. The barrens beyond the Rocking Stone will be visited. This is a non-strenuous hike. Meet N.S. Museum parking lot 2:00 p.m.
l June	MONTHLY MEETING: What Does It Eat? A talk on seashore animals by Mike Burke. Nova Scotia Museum 8:00 p.m.
4 June	CAPE SPLIT: Hike to see the spring beauty, the zeolites and the gull colony - the total spring experience. Total walking distance over 15 km. Expect a long, tiring but satisfying day. Bring a BIG lunch. Cancel evening engagements. Meet N.S. Museum parking lot 9:30 a.m.
11 June	RHODODENDRON SUNDAY at Kentville Agricultural Research Station. Joint excursion with the Rhododendron Society of Canada. The day will be loosely structured but the general idea is to assemble in the picnic ground on the far side of the station, walk along the Kentville Ravine with its magnificent hemlock stand, have a picnic lunch (bring food and drink) and then wander around the flower displays. Meet at the N.S. Museum parking lot 10:00 a.m.
	(there may be another trip arranged for June)
2 July	PENNANT POINT HIKE: Pennant Point is the long rocky peninsula guarding the southern approach to Halifax Harbour and the site of many tragic shipwrecks. One aim of this trip is to view the remains of the Arethusa (keen photographers are warned that they must be prepared to get their feet wet). The trip is suitable for all ages since although the full hike is quite long, all intermediate lengths are possible. You may wish to picnic at Crystal Crescent beach. Meet at the N.S. Museum parking lot 10:00 a m

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