Fairwood's Fabulous Fungi

Shrooms and Dooms

Being a VERY
Non-comprehensive Guide
to the Astonishing
Realm Beneath our Feet

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The Bold Mushroom Expert

Beloved of witches, elves and trolls
Oft championed by wayward souls.
The bounty from the forest floor
May open many a daunting door.

This compilation seeks to probe
The reticence of fungiphobe;
To analyse, perhaps lay bare,
Some prejudice that's lurking there.

Lockdown 2021
for Fairwood Fans

The Old Mushroom Expert

There are two sides to every story.
Fungiphiles have category.
The rash experimental *BOLD*
Contrast with cautious, seasoned *OLD*.

The *bold*, drawn to experiment,
Quest psilocybin merriment.
Enthralled by opportunity
These rash souls tempt impunity.

While intrepid seek expanding thrills
The prudent study cap and gills.
These veterans shake a hoary head
And scrutinise spore prints instead.

The former scoff what comes to hand
Pursuing lives much shorter spanned.
The latter study what's on plate
Remarking on intrepid's fate.

Introduction

The fungal world is everywhere; under our feet, within our bodies, critical to the production of many of the foods that we eat or the medicines that we administer to achieve healthy rebalance.

The fruiting bodies that appear in the form of mushrooms or polypores are only a momentary manifestation of huge and diverse networks of mycelium network hidden from observation. They broadcast spores that will interact with and diversify other mycelial networks. The union of different networks and the exchange and reinforcement of genetic materials, occurs in the conjunction of the phylae tendrils underground.

Mushroom identification and taxonomy is a very immature science. Experts are continuously reclassifying fungi and reassigning sub-species according to spore analysis , colourings and observation of attributes at the microscopic level. Mushroom identification guides refer to an ongoing development of classifications, recording many past classifications that are still in currency.

Confusing the classification, mushrooms of the same species can behave quite differently in different exposures and may adopt different colourings, shapes, and mycorrhizal dependencies with particular trees. These mycorrhizal interdependencies benefit both tree and fungus. They involve exchange of fungus harvested mineral nutrients conveyed over the mycelial network for sugars derived from tree and plant photosynthesis. The relationships are not exclusive, and fungi adapt to many different situations.

On Fairwood Island by far the most obvious fungal manifestation is in the many species of lichen which cover its granite surface. This collaboration between fungus, with its roots sunk into the granite rock mining minerals and the photosynthetic algae which are nurtured by the fungus, given stable rooting and protection from excessive sun, results in the creation of the mineral rich, somewhat acidic soil.

Many of the plants that grow on Fairwood island are partly parasitic on the fungal mycelial underlayer. Indian Pipe, which has enjoyed a spectacularly prolific year in 2021 is a non-photosynthetic plant containing no chlorophyll. It derives its nutrients parasitically from the russula mycelial network which, though present, may not manifest itself with fruiting bodies over the course of the season. Other plants, such as orchids and lady slippers are found in impoverished soil conditions on the edges of glades where they receive sunlight but must depend on mycelial networks to deliver other nutrients.

A major development in understanding of life has been an increasing awareness of the interconnections of all life. Fungi, one of the earliest of life forms on the planet have fused and enabled simple plant life such as liverworts to migrate to the land and collaborated with them to develop as rooted organisms. Three billion years after this initial collaborative migration many plants and trees are still very dependent on fungi to extend their rooting and to deliver mineral nutrients in exchange for the sugars that they derive from photosynthesizing the sun's energy. Recent publications such as Peter Wohlleben's *The Secret Lives of Trees* and Merlin

Sheldrake's *Entangled Life* have highlighted a growing understanding of how critical fungi are in participation in the 'wood wide web' which passes intelligence between growing organisms and allows them to anticipate imminent dangers from insect infestations or other blights. Adam Haritan on his website *Learn Your Land* has provided keenly observed information about the range of fungi encountered in the Great Lakes area.

Scientists are increasingly aware of how complex is the ecology of life and that all living things are a mixture of collaborative life forms.
Human beings have long used fungi to make bread, to brew beer, to cure disease or to alter psychological attitudes and behaviour. Wine growers today compete for the most nuanced botritus infections for their late harvest grapes. When he was murdered 5,000 years ago, Otzi, the Tyrolean iceman was found to be carrying birch polypore to remedy stomach complaints as well as a hoof fungus to transport fire.

Fungal networks have also helped to expand our understanding of 'intelligence'. Slime moulds have demonstrated that a collaboration of individual cells which can learn and exchange information along a network can achieve an intelligence that is not controlled by a central brain controlling a neural network and despatching information. Slime moulds have been employed to mimic desire lines and obstacles and have provided effective mirroring of human behaviour such as the actual configurations of the Tokyo underground subway system.

The understanding of ideas of Darwinism and the development of species has become much more complex than the simplistic idea of 'survival of the fittest'.
The following notes and observations include some fungal species from Fairfield Farm in Caledon which are noted as such. Fairfield Farm has soils the sustain an ash, oak, beech Carolinian forest growing on a limestone, calcium rich base, in contrast to the pine oak, birch, cherry forest of Fairwood Island on the Pre-Cambrian Shield in Pointe au Baril. These provide a foil in examining the slightly different fungal manifestations occurring on Niagara escarpment compared with the acidic soils encountered on Fairwood Island.

Don’t dally on a risky path
And spare no thought for aftermath!
Those embracing Nature’s thrills,
Alas! soon learn that Wilding chills.

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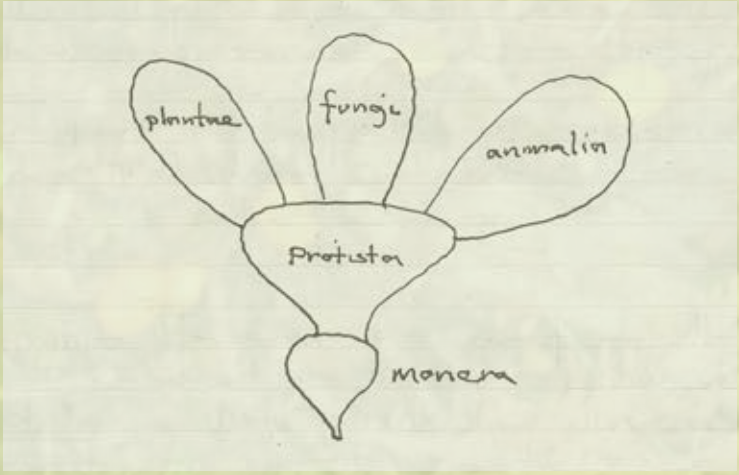
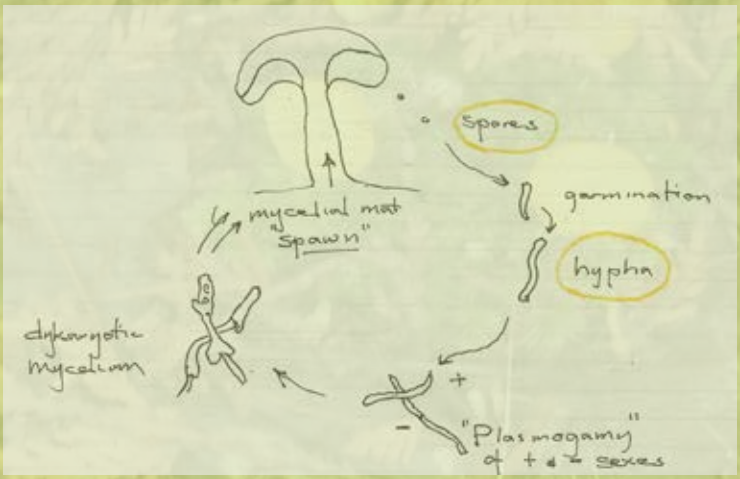
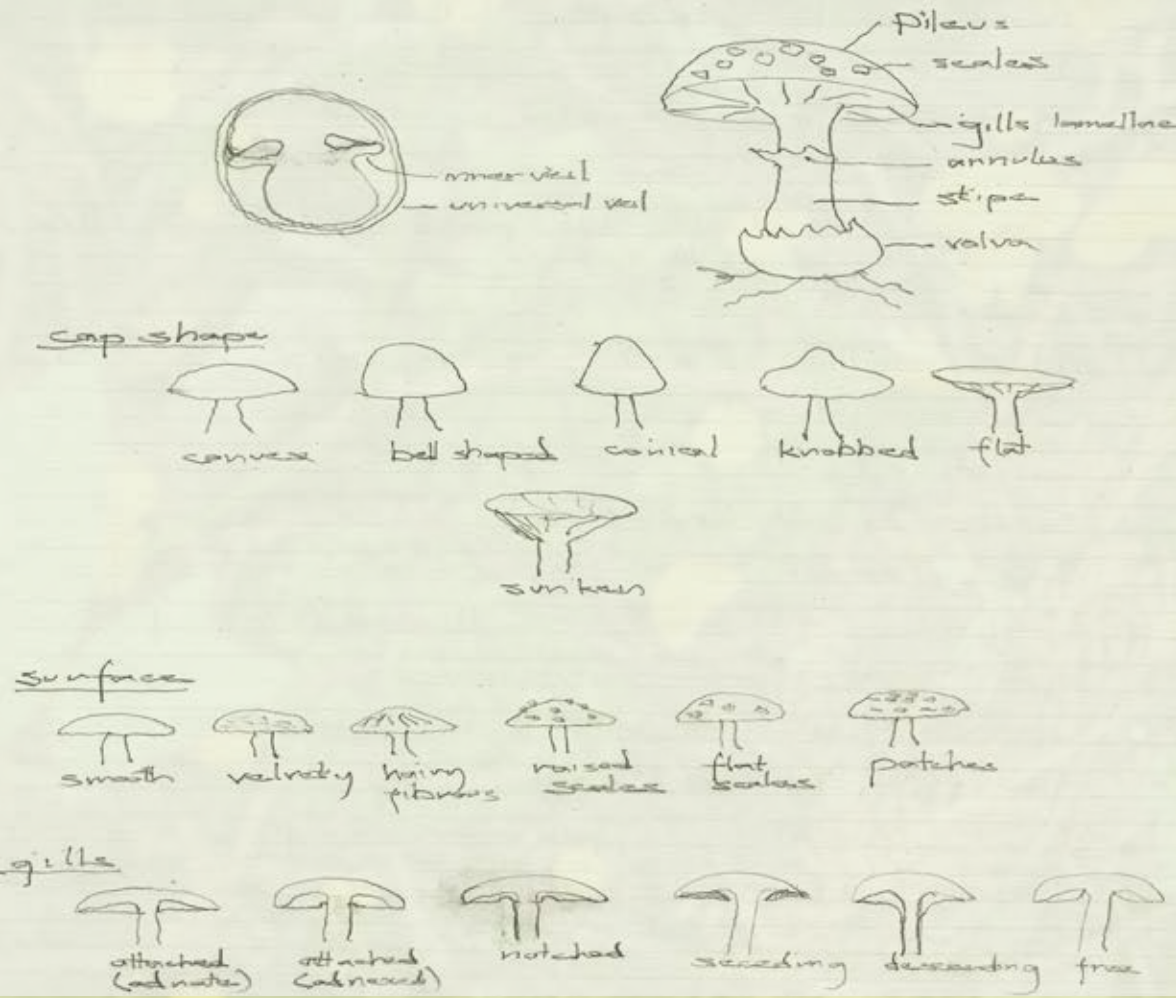
Key branch of *'Prickly Pear of Life'*
Thrives 'midst internecine strife.
Central of the living lobes
They collaborate around the globe.



Essentials

THey revel in inclement weather
Holding *wood-wide-web* together!
And show contempt for ‘catching rays’
Extending their chthonic maze,





Fungi are notoriously hard to categorise and prove a challenge to taxonomic systems. Too often the most visible aspect, the fruiting body, changes dramatically in appearance over a life cycle from first fresh appearance to rapid decay and release of spores. The fruiting body is only a small manifestation of a much larger organism. The pileus (cap) can change quickly from being ovoid or button shaped spreading out to flat, indented or concave. Colours of fruiting bodies change rapidly as well.

There are estimated to be between 2 and 6 million different species of fungus, of which approximately 140,000 or 3% have been classified at all. Scientists are continually reclassifying and reallocating species. Fungal fruiting cycles are being affected by climate change and have become increasingly unpredictable.

Spore colour and spore prints have been a common way of distinguishing between similar looking species, and many fungal identification guides group mushrooms according to their spore prints. Microscopic examination of spore shape has become increasingly important in this taxonomical reallocation.

Where and When to Look:

Early Spring: May

morels	around wild cherries
birch polypore	dead birch trees
dryad's saddle polypores	oaks and birches

Early Summer: June/July

amanitas	common around conifers
yellow patch amanitas	everywhere
russulas	everywhere
marasmius & collybias	on damp moss
gymnopus	

Mid Summer: July/August

boletes and painted suillus	common around conifers
entolomas	
leptonias	

Late Summer: August

blackening bolete nigriscans	Gam's Glade
lactarius lignyotus	South Shore path
bracket fungi - inonotus	shady woodland floors
chantarelles (black trumpets)	oaks on McLean Point / Yew Wood

Autumn/September:

suillus boletes	common around conifers
lactarius rufus	sphagnum bogs
lycoperdon puffballs / pearly lycoperdon	around oaks and fallen acorns
mycena	
jelly fungi and slime molds	anywhere / woods on North shore

Late Autumn: October/November

all of the above make reappearances	
bolete slippery jacks	everywhere
amanita death caps	abundant everywhere
lactarius, many varieties	
russula brevipes	everywhere, in Gam's Glade
oyster mushrooms	on hardwoods
honey mushrooms	Armak Point woods
deadly galerinas	on decaying wood

Fly Agarics, common mid island

The Fly Agaric (*Amanita muscaria*) is associated with the roots of pines, spruces and sometimes birches, where it performs a mycorrhizal role symbiotically united with the roots providing minerals in exchange for plant sugars.

Perhaps Fairwood's most spectacular mushroom, in the autumn the cap can grow up to 20 cm in diameter on a 25cm stipe. It may vary in colour from yellowish to an orange red which then fades to brownish orange as it ages.

The cap, often waxy or sticky, may remain convex or it may flatten out. It is usually covered with pyramidal cotton warts, the remnants of the universal veil.

Underside, the cap has white gills which are 'detached' from the stipe and crowded. This mushroom has a high, flamboyant annulus ring around the stipe.

The remains of the white volva that the mushroom emerged from can be observed clinging to base of the stipe. The spore print is white.

This mushroom was known as a 'fly agaric' because it was collected and used in a paste to kill flies.

Fly Agaric

Amanita muscaria

A delightful texture, warty, sticky
Appeals to those who favour *icky*.
When whipped into a slimy paste
They're very much to witches' taste.

But even witches may repent
A treat that flies deem esculent.
To such foul charms they oft succumb
Leaving them confused and numb.

Frosts Amanita - on path to West End

Frost's Amanita (*Amanita frostiana*) is a distinctively orange-yellow mushroom with a smooth, glabrous, shiny and slightly sticky cap (pileus) surface.
The stipe is often shaggy with remnants of the universal veil attached. There is an annulus ring around the stipe.

The remnants of the universal veil flecking the stipe have a bright yellow colouring.

Frost's Amaninta is similar to the Fly Agaric and to the *Amanita flavoconia*. It is distinguished from these by the distinctive ribbed perimeter of the pileus.

Underside the cap the gills are white or cream coloured.
The spore print is white.

Frost's Amanita is considered quite a rare mushroom. It tends to be identified with oak roots, and can be found from July to September.

It is considered poisonous and has psychoactive properties.

Frost's Amanita

Amanita frostiana

This cheerful blaze alighting wood
Is mushroom oft misunderstood.
Bedizened with eye-popping paste
It seems to promise candy taste.

But feckless souls drawn in to savor
Have little chance to praise its flavour.
For it conceals a daunting mission,
To exacerbate psychotic vision.

Death Caps emerging from their 'eggs'

The Death Cap (*Amanita phalloides*) is a highly toxic mushroom, blamed for most mushroom poisonings in the world. Once a native to Europe, death caps have now become quite common in Canada.

They can grow up to a 6 inch diameter cap, often sticky to the touch. This can be yellowish, brownish, whitish or greenish in color. The cap has white gills and grows on a stalk about 5 inches tall with a white cup or volva at its base.

Young death caps can resemble puffballs, spherical, compact with pure white flesh. They appear primarily in autumn, September to November and are found under pines, oaks, and other hardwoods..

Symptoms of poisoning do not develop until several hours after consumption. Then the person will experience vomiting, diarrhea and cramps. After several days, these symptoms will go away and the victim may feel relieved.

However deterioration is relentless and ongoing. Internal organs, liver and kidneys are being severely and irreparably damaged.

Death can occur suddenly, six to 18 days after ingestion.

Death Cap
Amanita phalloides

Phalloides sets its jaunty cap
While blithely laying cunning trap.
These fun-guys innocently beckoning
Are really plotting awful reckoning.

Pert skirt accents seductive pose
Beneath such semblance few suppose
So lithe, pure, polished, elegant
Comeuppance so extravagant.

Destroying Angels - O K Point, Archers swamp woods.

The Destroying Angel (*Amanita virosa*) is relatively common across the island in late summer and autumn.

It has a smooth and stark white cap and stipe which will brown a little with age. The caps can start out ovoid. They then flatten and ultimately may become indented. High on the stipe there is a white, skirt-like annulus, remnant of its universal veil. The gills are white, crowded and detached from the stype.

A distinctive feature is its volva sac which is below ground and evident on uprooting.

This mushroom gives off a distinctive odour of rotting meat in old age.

It tends to be found in mycorrhizal association with oak and hardwood roots.

Alpha amatoxins are among the most deadly naturally occurring toxins. A single small mushroom can prove fatal. Amatoxins inhibit the production of an enzyme, RNA polymerase, and this leads to kidney and liver failure.

It is not clear what or who the Destroying Angel is protecting itself from.

Destroying Angel

Amanita virosa

These Angels strive to look benign
Pretending to life anodyne.
But pristine gills, seductive beckoning
May well induce an awful reckoning.

Those who quest celestial mirth
Should give these cherubs widest berth.
The hallucination sometimes pleases
At least until all breathing ceases.

Deadly Amanita

Deadly Amanitas are similar to the Destroying Angel but tend to have a smooth, slender stipe and a more tanned cap colour. The cap often has a raised dome at its centre.

LIke the Destroying Angel, the Amanita bisporgera has a distinctive annulus ring high on the stipe, but somewhat less flagrant.

The spores are white and bifurcated, leading to its name ‘bisporgeria’.

Dug up it will reveal an distinctive ovulus ‘egg’ from which it has emerged.

Deadly Amanita

Amanita bisporigera

With soul that plumbs the lowest levels
In deepest shadow this shroom revels.
Relying on its winsome swell
It draws unwary, casts its spell.

With slender shank and tan. Alas!
It lacks Death Angel's gravitas.
Conspicuous, it stands aloof
To draw those passing 'on the hoof'.

Ckeft footed Amanita becomes common across the island in early Augus

The Cleft footed Amanita, *Amanita brunnescens,* is similar in colour to the *Amanita sinicoflavia* but without the distinctive runneling around the perimeter as seen in *A. Ceciliae* and *A. Sinicoflavia*.

The cap usually darkens towards the centre and like the stipe will brown with age.

The caps begin as ovoid, then flatten and ultimately may become indented.
High on the stipe there is a skirt-like annulus, remnant of its universal veil which is fused into the stem.
The gills are white, crowded and detached from the stipe.

A distinctive feature is the cleft in the stipe occurring below ground and evident on uprooting.

It is found in mixed hardwood and co niferous forest, usually on the mossy verges.

The Cleft-footed amanita is considered poisonous. Nevertheless it proved very attractive to slug infestation.

Cleft Footed Amanita

Amanita brunnescens

Beware unwholesome amanita
That might project intentions sweeter
With brown and healthy perma-tan
And jaunty air of 'Yes You Can!'

By such charms are many caught
As they consider 'Oh well! Why not?'
Despite chaste gills and demure skirt
Cleft foot reveals the Devil's work!

Amanita flaviconia is very common across the island after wet weather in July

Yellow Patches Amanita - *Amanita Flavicona*, with its distinctive yellow cap, is common across the island, appearing in July in wet weather.

Typically, the caps are 50-100mm in diameter and smooth yellow, sometimes glossy, with a very slight striation around the perimeter. The caps may be flecked with remnants of the universal veil, but these soon wash off or blow away so that the caps are usually smooth and slightly slippery.

The gills are white and free of the stipe. They are quite closely set and soon attract slugs.

The stipe is pale yellow or cream. generally smooth and has a distinctive annulus ring. Orange flecking is evident in the volva at the base of the stipe. The yellow orange colour is even evident in the 'egg' stage.

This is one of the most common of the species Amanita in July particularly.

A. elongata is similar to *A. flavicona* but tends to have a smoother cap (pileus) with less flecking on the cap.

Yellow Patch

Amanita flaviconia & Amanita elongata

Most mushrooms cannot hope to match
The splendour of the Yellow Patch
While others slump in gloom and mire
Pyrotechnics light the glade afire.

Always cheerful, fresher, keener
With fulsome majorette demeanor.
A forwardness that some deplore
With taunts. They've seen this ruse before!

Brown Amanita - *Amanita sinicoflava is common throughout July*

The Brown Amanita - *Amanita sinicoflava* is very common across the island from July onwards. They are usually found on the verges of pine stands or near oaks. They tend to succumb very quickly to slug depredation.

The cap which grows up to 75mm diameter, has a brown or low lustre copper/ maroon colour and has distinctive runnels around the perimeter. It rises to a slightly darkened knob at the centre. The flesh of the cap is quite thin and these mushrooms are vulnerable to wind damage of accidental contact.

The stipe is smooth and velvety on the outer surface. There is no annulus ring. The stipe is slightly hollow inside and vulnerable to damage. Slugs are quick to riddle this mushroom, especially the stipe. The volva at the base of this mushroom is minimal.

This amanita is very similar to *Amanita ceciliae*. The latter usually has remnants of the universal veil displayed as brownish warts on the pileus cap.

This amanita also resembles *A. clariflava* which also has a brown/maroon cap but without the distinctive perimeter runnel markings.

Purple Brown Amanita

Amanita Porphyria

This mushroom's soul is less than joysome
Devious, distilling poison.
But festering proves curse perhaps
By triggering its own collapse.

For slugs converge keen to enthuse
And wood-wide-web soon spreads the news.
Theirs is indeed a lifestyle fragile
Its survival skills are hardly agile.

above - Amanita citrina on South Shore Path

below: Yellow Patch and Amanita strangulata

The Many Faces of the Amanita

above: Amanita muscaria

below: Amanita cecilia

HYgrophorus Erubescens in mossy bank on North Shore at McHatties Inlet

Hygrophorus erubescens is a large, slimy, pink coloured mushroom with a pileus of up to 125mm diameter. It is found growing under conifers. The smooth pileus cap is slightly knobbed and darker towards the centre. The pileus has a lustrous sheen when dry. Its perimeter is smooth and non-striated.

The gills underside are white, medium spaced and clearly detached from the stipe. They are slightly waxy and quick to attract myriad tiny slugs.

The interior of the stipe is more fibrillose, woody, brownish and slightly hollowed out.

Adjacent examples at earlier stages of development were noted to be more ovoid with the cap flattening out as it ages.

This mushroom grouping found opposite McHatties Bay was eaten shortly after emerging, probably by deer.

Poison Pie

Hygrophorus erubescens

The refulgence of the poison pie
May well attract a jaundiced eye.
But putrid swamp holds scant allure
And rarely tempts the epicure.

Its slimy cap, decayed slug crust
Is recipe that few would trust.
Yet some to admonitions deaf
Won't check credentials with the chef.

Russula paludosa growing in moss on verge of pine forest

Russula decolorans or *Russula paludosa* are common in July and are mycorrhizal with pine forest.

There are over 200 species of Russula mushrooms and exact identification can be confusing. All of them share certain characteristics – pale brittle gills, white/cream coloured spores and squat crumbly white stipes. Most have colourful caps ranging from yellow to reds to greens to blues and purples.

The cap of *Russula decolorans* can grow up to 15 cm in diameter, though usually they are around 5cm before voracious animals consume them. The *Russula decolorans* varies from salmon pink to orange red. *R. paludosa* tends to be brighter orange red. Both have a dense white flesh. The surface may be slightly mottled lights and darker areas. The centre of the cap is becomes slightly depressed, and the edges turn down to protect the gilled underside.

The stipe is white and swelling to bulbous. The flesh of this mushroom is solid and heavy. Gills are white, regular, very closely spaced and attached to the stipe. The gills are continuous and not forked. The *R. cyanoxanthus* has distinctively forked, densely packed gills.

Rosy Russula

Russula Paludosa

With rosy face and chubby cheek.
A succulence that's never meek,
A brazen mien, aspect bright
Draws greedy souls to take a bite.

The impetuous will prove pathetic
For it revels in its strong emetic.
And sampling god promised ichor
Results in getting sicker quicker.

Russula nigricans in Gam's Glade

Russula nigricans is on of the most substantial mushrooms found on Fairwood. It is characterised by a substantial stipe of 3-5cm diameter that erupts from the ground and supports wide spaced, creamy white decurrent gills that are exposed curling upwards.

The pale cream gills are medium spaced and quite fragile though the mass of the mushroom is robust and well rooted. They do not seem to be as attractive to slugs as other Russulas and Amanitas. The spore print is white.

The brown pileus cap can grow up to 20cm across and become bowl or funnel shaped, collecting debris and slimy deposits.

The cap begins to blacken as the mushroom ages and develops a distinctly skunky aroma. The deer leave them alone.

Russula brevipes is similar, with slightly finer gill spacing. It too grows to a large size with decurrent gills supported on a very short stalk. This Russula does not blacken but turns brown,

Blackening Russula

Russula nigricans

Bursting with redounding vigour
These blackguards believe better's bigger.
Erupting with unbridled force,
They are by nature rather coarse.

Alas! Too soon their charms depart
Revealing wizened, blackened heart.
Impetuosity proves ill-boder,
Steeped in putrefying odour.

Russula brevipes in Gam's Glade

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The brown pileus cap can grow up to 20cm across and become bowl or funnel shaped, collecting debris and slimy moisture.

The cap begins to blacken as the mushroom ages and develops a distinctly skunky aroma which pervades areas such as Gam's Glade.

The deer leave them alone.

Short Stalked Russula

Russula brevipes

Though Brev-i-pes is short of limb
It nurtures prospects somewhat dim
To sweep the stage as ballet star
A ‘plus sized’ diva raising bar.

She throws her mighty tutu high
And hopes to draw the startled eye
Determined, heaving hulk ‘en pointe’.
Though, sadly, oft applause is scant.

Sickener, near Stone Henge

The Sickener (*Russula emetica*), is known as the emetic russula, or vomiting russula. It is often found in moist locations, on sphagnum bogs and amidst moss.

The Sickener has a red, convex to flat cap up to 8.5 cm in diameter, with a cuticle that can be peeled off almost to the centre. (peeling back the caps of russulas is one of the common methods for identifying them)

Typically the Red Capped Russula is found on humus or well rotted wood in well-drained areas around the roots of both hardwoods and conifers.

The gills are attached directly to stipe, white and brittle. The flesh is white. It is widespread from July to September. The taste is hot and acrid.

This is a very common mushroom across the island found nestled in deep moss in moist late summer/fall weather.

Despite the difficulty in positively identifying russula specimens, the possibility to spot the toxic species by their acrid taste makes some of the mild species, such as *R. cyanoxantha* and *R. vesca*, popular edible mushrooms. The russula family is mostly free of deadly poisonous species, and mild-tasting ones are all edible.

The Sickener

Russula emetica

Chaste flesh, deportment not uncouth
A morsel right to pop in mouth!
But *Sickener's* name soon proves prophetic
It conceals within a strong emetic.

Red Russulas flaunt ruby cap
And pristine gills quite de-li-cat.
They promise innocence and glee
And almost shriek '*Come! Look at Me!*'

Russulas, mid island, Gam's Glade

Russula decolorans is an orange to copper-red capped russula which often has a slippery cap that later dries out. It is found from July to September around conifers and in boggy areas. The caps, approximately 5-12 cm in diameter, may have striation lines around the perimeter. The flesh of the cap is white and blackens with age. The gills underside are creamy, darkening to ochre and the spore print is ochre.

Russula claroflava is similar to *R. decolorans* except that the cap tends to be yellower. The gills of this russula stain to a charcoal grey with age rather than the ochre brown of the *decolorans.*

Russulas tend to produce a white to dark yellow spore print. They have brittle, attached gills, an absence of latex, and absence of partial veil or volva tissue on the stem. Russulas are a common mushroom with about 750 species around the world. They tend to be colourful and stand out in the woods. Most russulas appear to establish mycorrhizal entanglements with other species.

Some russulas can bioaccumulate high levels of toxic metals from their environment. For example, *Russula atropurpurea* is capable of concentrating zinc. *Russula nigricans* can accumulate lead to a level up to five times more concentrated than the soil it grows in, while *R. ochroleuca* concentrates environmental mercury.

Swamp Russula

Russula decolorans & caroflava

Russulas have different ploys
To advertise prospective joys.
Some Russulas act prim and proper
With others you can come a cropper.

Some sport spots and warts sublime
Or slather on enticing slime,
Favouring an orangey hue
Such charms as Nature can endue.

Russula crustosa appearing in late August in Gam's Glade and West End

Russula Crustosa has a cracked pileus surface of yellow brown colour. which can grow up to 12 cm in diameter.

The flesh is white and brittle. The stalk is firm and snaps when flexed.

The gills are close, regular and attached. They tend to bruise brown instantly.

It appears later in the summer and is associated with oak and mixed forest.

Crusty Russula

Russula Crustosa

Plumped, o'erbearing and officious
Crustosas know they are delicious
They revel, being upper crust
And pose as someone you can trust.

Self-esteem chock to the gills
Well distanced from all others' ills
But sadly, when the chips are down
Those pristine gills bruise quickly brown.

Honey Mushrooms North Shore beyond the Giants' Causeway

Honey Mushrooms (*Armillaria mellea*) tend to grow in large clusters on living or on dead wood usually fruiting in late autumn. They are honey coloured and are often confused with the Deadly Galerina (following page).

They usually grow in bouquet-like clusters with the stipes tapering to the base. Underside they have white gills and produce a white spore print. The caps spread out quite large, 4-12 cm wide, and have stiff black hairs on top. They usually have very evident vestiges of an ring around the stipe, the remnants of a partial veil

They have a bitter taste which disappears when cooked. They are mildly poisonous if eaten raw. Cooked they are considered a delicacy, but general advice is not to combine their consumption with drinking of alcohol.

They are reputed to have anti-carcinogenic properties and have been used medicinally against lung cancer.

The largest known organism (of the species *Armillaria ostoyae*) covers more than 3.4 square miles in Oregon's *Malheur National Forest* and is more than 2,400 years old.

Honey Mushrooms

Armillaria mellea

With demeanor that would grace apostle
These honeys stand their ground and jostle.
They love to nestle in a throng
And thrive on rot round billabong

But remnants of a virgin's veil.
Will sometimes make disciples quail.
Advice to all prospective diners
Distinguish these from gallerinas.

Deadly Gallerina growing on decayed pine stump in Tulgey Wood

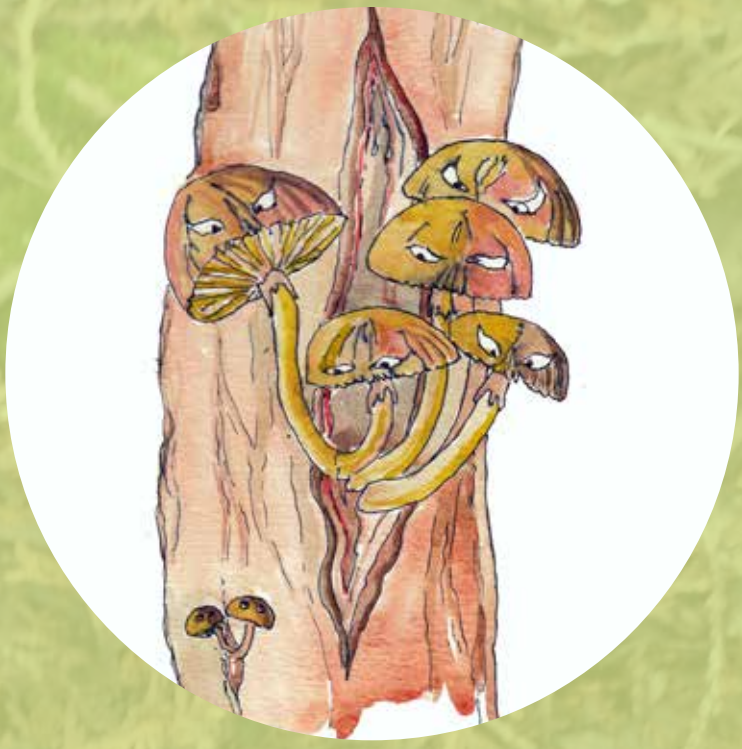
Deadly Galerina (*Galerina marginata*) is often confused with the honey mushroom. It grows in clusters on fallen logs and well rotted fallen hardwood and conifer. It is very widespread and common from June to November.
The cap is an orangy brown and the interior flesh is brownish, unlike the white flesh of the similar looking Armillaria.

The caps tend to be smaller than Honey Mushrooms, starting convex and spreading out to flat or indented. The cap can be slightly sticky and translucent.
The gills underside are yellow to rusty brown and they release rusty brown spores.
Thw stipe is smooth and translucent. Most often there is evidence of an annulus, though not on the example above. A major distinction from Honey Mushroom *Armillaria* is that Deadly Galerina lives up to its name and is intensely poisonous.

learn to differentiate!

Deadly Galerina

Gallerina marginata



Delighting in an actor's role
These look-alikes wreak awful toll
Thriving on mistook identity,
They promise health and wealth and plenty.

They set their stage on fallen trees
And every poisoned moment seize.
Alas! Within, their core is brown
That actor's smile conceals a frown.

Laccarias on South Shore path

Laccaria is a genus which includes about 75 different species. They are mycorrhizal providing nourishment to tree and plant roots in both coniferous and broad leaved forests.

These reddish brown Laccaria mushrooms, thought to be *Laccaria striatula*, have smooth waxy caps and smooth stipes.

The thickish, separated pink gills are fleshy and waxy. They terminate in the centre at the top of the stipe in a solid fleshy ring.

Initially the gills are overlaid in a whorl which then unwraps to reveal the open gill structure.

The stipe, of similar colour, is hollow and fragile, and prone to wind damage.

These mushrooms are quite common in moist mossy areas and may be mycorrhizal with the white pine root systems.

Laccarias

Laccaria striatula

Knowing well how some disparage
A mushroom's buxom undercarriage
They claim a taste for chaster thrills
While blushing pink to waxy gills.

Preferring life that's lived vicariously.
They never flaunt themselves hilariously.
If they to lower instincts stoop
Exhausted quickly, they soon droop.

Amethyst Deceiver photographed by Susan Wilson

The Amethyst Deceiver (*Laccaria amethystina*) is a small brightly colored mushroom, that grows mycorrhizally associated with trees in both deciduous and coniferous forests.

Because its bright amethyst coloration fades with age and weathering, it becomes difficult to identify, if not indistinguishable from several very poisonous 'little brown mushrooms' - hence the common name "deceiver".

This common name is shared with its close relation *Laccaria laccata* that also fades and weathers.

The cap is 1–6 cm in diameter, and is initially convex, later flattening, and often with a central depression. When moist, it is a deep purplish lilac, which fades upon drying out. It is sometimes slightly scurfy at the center.

As with other members of the genus Laccaria, this species is edible, though generally not considered a choice edible. While not inherently toxic, in soils that are polluted with arsenic, it can bioaccumulate a high concentration of that element.

Amethyst Deceiver

Laccaria amethystina

O! the amethyst deceiver!
A sneaky, dodgy, interweaver!
Cloaked in regal purple hue
As if expecting royal due.

Though palatable its sometimes toxic
Gleaning heaping dose of arsenic.
How like so many two-faced leaders
Raised on high by bottom feeders!

Lactarius mushrooms on South Shore Path, Spratts Park

Lactarius is one of the most prominent genera of mushroom-forming fungi in the Northern hemisphere.

Lactarius or MIlk Cap Mushrooms are gilled and look similar to many Russulas such as *Russula brevipes*. A distinctive difference is that Lactarius mushrooms bleed a milky latex when bruised. Like the russulas, the flesh has a brittle consistency, the gills are fragile and bleed easily.

Lactarius vinaceorufescens is one of several species that have latex which is white at first, changing to yellow when exposed to the air.

This mushroom is buff to cinnamon-pink in colour and stains dark red, especially on the gills. In fact, *vinaceorufescens* means “becoming wine red”. It grows under conifers, especially pines.

There are over 200 species of milk caps in Ontario, however, not all of them are edible. Lactarius species are considered late-stage colonizers, that means, they are generally not present in early-colonizing vegetation, but establish in later phases of succession associated with the arrival of specific trees and plants.

Milk Mushroom

Lactarius

Even cows deem quite hilarious.
Pretensions of the poor Lactarius!
So many might look down the nose
Rejecting creamy gifts they pose.

Because they lack boletes' blue blood.
They often feel misunderstood.
Yet pray maintain your open-mindedness
For they ooze the milk of fungal kindness.

Lactarius Lignyotus on South Shore Path

Lactarius lignyotus is one of the most splendid and rarely encountered fungi found on the South Shore Path. Appearing in late July/August, it is characterised by a rich velvety suede brown cap 2-10 cm in diameter, slightly depressed in concentric circles with a rise in the middle.

This lactarius is mycorrhizal with pine and spruce and is found in dense shade.

The stipe is pinkish, slender, smooth, slightly waxy and dense. The gills underside are well spaced and interwoven in a well-structured pattern. The gills are attached, waxy, white with a slight blush of pink as they age. At the point where they are attached to the stipe there is a delicate beading of darker brown. The spore print is pink to brown.

The north American *Lactarius lignyotus* tends to have a greater variability of features than its European counterpart. The versions found on Fairwood are a velvet brown almost black. They are more regularly pictured is a medium brown in guide books.

For unknown reasons this mushroom does not seem to attract slugs and other predators. It is considered edible but not recommended.

Brown Velvet Lactarius
Lactarius lignyotus

This Lactarius enthroned sits
Among the fungal exquisites!
With velvet crown and ermine fringe
Designed to make mere lackeys cringe.

Her pristine gills, pink, lush, inviting
Realms of promise most exciting.
This queen presides in solemn glory
And perhaps conceals another story.

spore print comparison
lignyotis - right
brown amanita - left

Lactarius Rufus near Saegert Park

Lactarius rufus has a distinctive brick red cap and red brownish gills. The cap grows to around 3cm in diameter and the perimeter is rolled down protecting the gills underside.

The centre of the cap is slightly depressed and the surface is semi-glossy, slightly reflective and glabrous. Its overall appearance is neat and well structured.

The gills are brown/buff, regular, close spaced and decurrent to the stalk.

The stalk or stipe is 5-7 cm tall, smooth and reddish brown with just a hint of striation.

Lactarius rufus appears in moist sphagnum locations around mid September.

Red Lactarius
Lactarius Rufus

Concentric zoned and cap like silk
That seems to promise chocolate milk.
With diligence beyond compare
These milks will pop up everywhere.

In marshalled lines they form array
As if rehearsing power play,
But beneath their helmets gills blush pink
It's confusing really what to think.

Blewitts, *Clitocybe nuda,* have a distinctive pale mauve colour to both cap and gills when they freshly emerge.

The convex cap ranges from 6-15cm diameter. It gradually flattens out and becomes undulating and brownish with age.

Blewitts are saprotrophic and are found rooted in leaf litter or decaying wood in cedar swampy areas. They appear grouped in bouquet like clusters.

THe gills are fine, close and detached from the stipe.

The stipe is chunky and bulbous, appearing almost swollen at the base.

The spore print is pinkish and they have a pleasant 'mushroomy' odour.

Blewitts are thought to emerge when the temperature drops below 17 degrees and they can survive frosty conditions.

Blewit

Clitocybe nuda / Tricoloma nudum

Exclusive, clubby, pert and proud
Blewits preening in a crowd!
The luscious, fruity, fulsome blewit
Flaunts all that nature can endue it.

Rejecting modest camouflage,
It displays its pink-mauve maquillage.
Knowing nothing can compete
With their niche as mushroom elite.

Entolomas growing in West End woods

The Straight Stalked Entoloma (*Entoloma strictius*) differs from the preceding *Laccaria striatula* in that the mycelial network lines are clearly evident on its stipe and the gills are directly 'attached' to the stipe.

It has similar colouring and waxiness to the Laccaria but the gills are not bifurcated. The cap flattens out and then becomes recessed with the waxy gills tapering off to the edge of the cap. There is no evidence of an annulus ring or of a volva. The entoloma leaves a distinctive, pinkish spore print.

Entoloma is a large genus of terrestrial pink-gilled mushrooms, with about 1,000 species. Most have a drab appearance, pink gills which are attached to the stem, a smooth thick cap, and angular spores. Many entolomas are saprobic but some are mycorrhizal.

This species is often found parasitizing another mushroom (a species of *Armillaria*) and, as a result, lumpy masses of tissue are often found alongside. It was once believed that the lumpy masses of tissue represented an "aborted" form of the Entoloma. But more recent research suggests that Entoloma is the parasite, and *Armillaria mellea* its victim!

Straight Stalked Entoloma

Entoloma strictius

Righteous, upright, somewhat wearying,
Are attributes of Presbyterian.
So too the Entoloma strictiius
May well induce a stifled rictus.

Pre-emptive perky proselytes
Missionaries that set their sites,
Forgoing footling airs and graces.
They seek out God-forsaken places.

Tricholoma vacinium or myomyces on OK Point

Tricholomas are a large genusd with over 100 species. They appear late in the season, even after the first frosts. They are large fleshy mushrooms that fruit on the ground and have a mycorrhizal relationship with conifers.

The cap appears a a bell shape that flattens out. Some species of Tric like the Tricholoma virginatum which appear on Fairwood retain a pointed knob on the cap.

Tricholoma portentosum has a distinctive grey colouring and like many trichs tends to split and break up around the perimeter.

The gills are fleshy, attached to the stipe with a distinctive notch. The stipe can grow quite tall, up to 12 cm and 4 cm in diameter. THe surface is slightly hairy and there is no ring.

Trichs

Tricholomas

Erupting on the waiting world
With parasols too soon unfurled
Glistening in morning light
Trichs seem to promise a deep delight.

But the hearty semblance of the trich
Belies its lifestyle, brief and quick.
Sadly ere the end of day
Such promises turn cracked and grey.

Leptonias growing in mosses near Caravanserai

Leptonias are similar in appearance to the Entolomas with their convex caps, often slightly depressed in the middle and covered with fine silverish hairs.

There are over 100 species of Leptonia in the *genus* all of which have pink spores. They are saprotrophic and thrive on rotten material in the ground soil. Occasionally they are found growing directly off wood.

Their slightly rubbery looking gills are pale grey at first and eventually turn fleshy pink.
The long slender tubular stipes, widening only a little at the base, are a distinctive feature of the various types of leptonia found on Fairwood.

They are usually found in late summer, in mixed conifer and hardwood areas, often on swampy sphagnum ground.

The spore prints of all the Leptonia species are a distinctive pinkish colour.

Modern taxonomists now tend to group Leptonias within the Entoloma genus (previous page) Little is known about their edibility. Some are poisonous.

Yellow Leptonia
Leptonia encana

Some may campaign to drain the swamp
Just where Leptonias choose to romp,
Midst moist mosses, indiscreet,
They thrive on ooze beneath their feet.

With perma-tans and fleshy gills
They're inclined to favour sordid thrills.
When life is lacking moral structure
Their naughty ways are prone to rupture.

Rosy Leptonia in sphagnum moss on North Shore

The Rosy Leptonia grows a delicately blushing pink cap from 1-4cm in diameter which opens out like a parasol. The centre of the cap may retain a raised knob.

It generally thrives in limestone base habitats, but in this case it has been found in a damp sphagnum moss area near decaying hardwood.

The gills are pinkish, waxy and medium spaced, attached to the stipe. They are slightly brittle.

The stipe is smooth and waxy, faintly translucent and 5-9cm high.

There is a wide variety of these delicate mushrooms, usually found embedded deep in moss on the verges of forested areas. The stipes are elongated and the surrounding moss gives these delicate mushrooms stability and a critical well watered rooting.

Rosey Leptonia
Leptonia rosea

Not for her world's knocks and thrills
She blushes deep pink to the gills.
While others crave a social blur
Demure Leps shrink back with pudeur.

Adjusting her pink parasol
She knows her beauty will enthrall.
With slender waist and dainty stalk
She imagines all their jealous talk.

Waxcaps found growing in mosses in Archers swamp, Troll Bridge

Waxcaps (*Hygrocybe*) appear in damp mossy areas under hardwoods and conifers. These mushrooms appear from July to November and are brightly coloured red and red-orange.

Hygrocybe means 'watery head'. They have smooth, waxy, almost translucent caps of 2-4 cm width. The flesh appears thick and fatty. The gills underside are coarse, blunt and attached to the stipe and similar in colour, or slightly lighter, than the cap. The stipe is smooth and may be more strongly coloured than the cap.
The gills are interleaved. There is no evidence of annulus or of a volva. at the base of stipe.

The ecological role of this mushroom is not determined. (whether mycorrhizal, symbiotic, saprobic or parasitic)

There are several types of waxcaps to be found on Fairwood. Illustrated is (thought to be) the *Hygrocybe reidii*, the Honey waxcap. The *Hygrocybe miniata* which is a more highly coloured scarlet is also common.

Some waxcaps are considered edible. None are thought to be deadly poisonous.

Waxcaps

Hygrocybe miniata

With honeyed, rather fleshy, wiles
Shining face and winning smiles
They cock their cheerful, cocktail caps
And flaunt their succulent dewlaps.

Though keen to draw a sideways glance
They then contrive to look askance
Pretending amour propre fragile
Is vulnerable, and hardly agile.

Above: Vermilion Waxcaps are abundant in October below: Hygrosybe flavescans

October Variety of Waxcaps

Hygrocybes

With wax-shone face and bright complexion
Pert, not prone to introspection
They try to hide their luscious gills
That suggest a taste for unchaste thrills.

Waxies sport a coloured bonnet
Fancy's feast! They're quick to don it.
But languid stipe suggests a soul
And lack of backbone, few extol.

Left: Gliophorus laetus - gills

Right: Gliophorus laetus

Below Left: Vermilion waxcap

Below Right: Hygrocybe flavescens on Armak Point

Hygrocybes are a sub-group of the large genus Hygrophorus. They are often extremely colourful with waxy caps ranging in colour from orange, yellow and startling purple. As a sub-group they tend to be smaller, more colourful and etiolated compared with Hygrophori.

Hygrocybes do not grow on wood but appear on the forest floor or tucked into mosses.

Hygrocybe pura stands out in contrast to these other hygrocybes. It is albino white with slightly translucent flesh a long, very slimy stalk. The gills are waxy, attached and medium spaced with a slightly coarse appearance.

Hygrocybes appear in moist, mossy beds and on leaf litter.

White Hygrocybe

Hygrocybe pura

With waxy flesh and deathly pallor
Suggesting very modest valour
One might dismiss the hygrocybe
As slimy, wet and low on vibe.

Self-effacing, mere side show,
Bending as the winds may blow.
Yet safely nestled in its moss
For earthly whims it gives no toss!

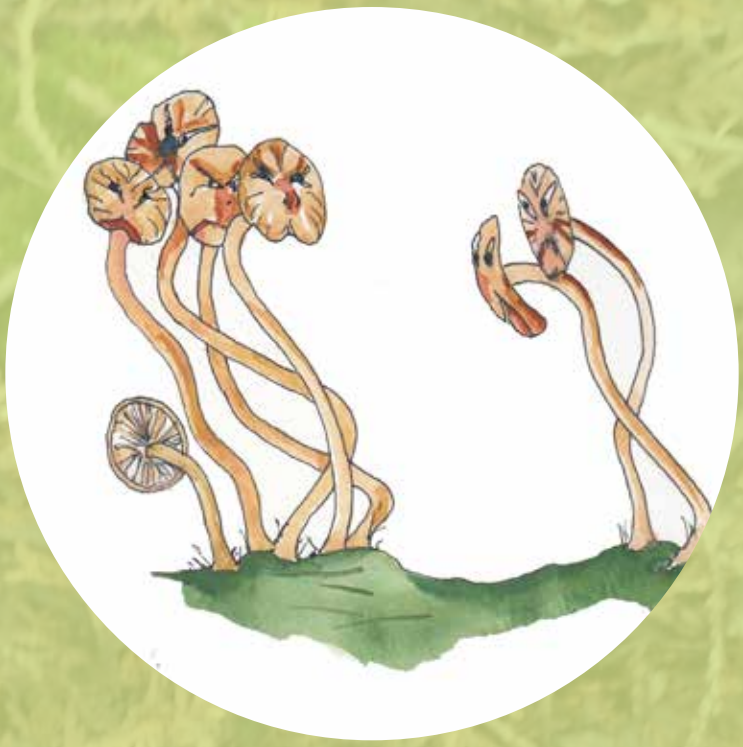
Collybia found growing in moss on verge of pine forest

Tuberous Collybia (Collybia Tuberosa) These tiny pale caps are convex, or cushion shaped and range from 3 – 10 mm in diameter. They appear individually and in small groupings popping up through green mosses during wet conditions. Collybia are parasitic or saprobic, and colonise the decaying remains of old mushrooms, particularly decomposing russulas, lactarius and boletes, which have a long residual life in the soil. Underside these tiny caps are closely spaced white gills, which are 'adnate' or close fused to the stipe. The spore print is whitish.

The stipe is buff or whitish coloured and more substantial than the wiry stipes of the tiny Marasmius. They are often twisted and intertwined and composed of thin-walled cylinders of hyphae which are pliable and resilient. The stipe terminates underground in a shiny brown nut-like 'scelerotum' or corm which has a tap root that extends into a fine mycelial network.

The scelerota, appearing like oversized apple seeds, are hollow and interlaced by fine stands of mycelia within. They are interconnected within a fine stranded mycelial network. They are resting reservoirs which allow the mushroom to overwinter in the host fungus.
Collybia appear in mid-summer and have a very short life-span before disappearing, or being consumed by animals.

Tuberous Collybia
Collybia Tuberosa



In coteries and rival camps
They cluster round their favoured champs.
Their posturing makes little sense
When hysterically they take offence.

Here reputations are unmade
Midst busybodies of the glade
Only when they catch their drift
Do wiser give them shorter shrift.

Cone Baeospora emerges from fallen white pine or spruce cones in moist conditions late in the season or on rotting cones in early springtime. It is closely related to Collybia found in moist conditions on the forest floor.

The tiny caps of 1/2-2cm in diameter are convex, cinnamon in colour, fading towards the margins.

The gills are white, fine, crowded and attached to the stipe.

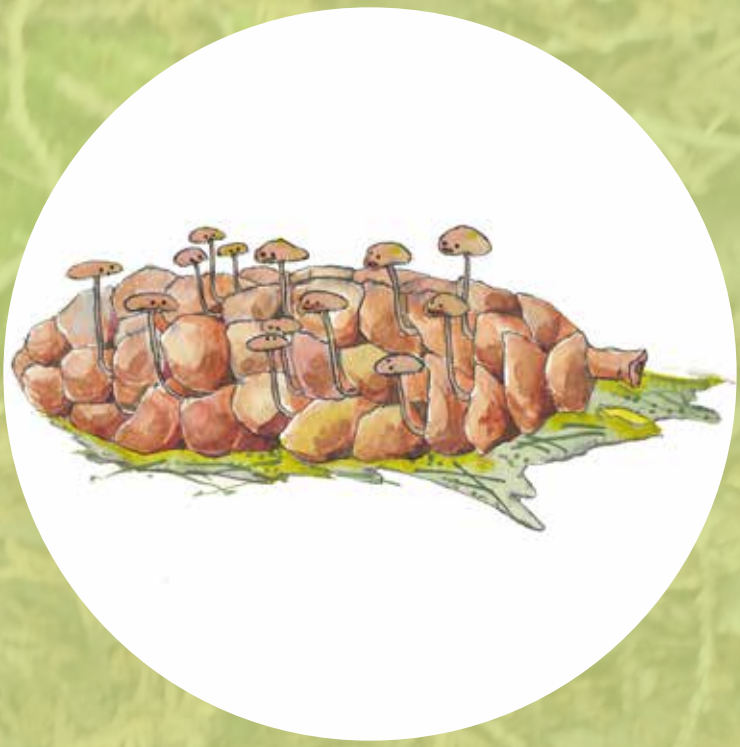
The stipe, emerging from under the cone fronds, is long and regular and from 1.5 to 5cm long, cream coloured becoming brown with age. It is waxy in appearance and very finely haired.

The spore print is white.

Cone baeospora will only appear in wet weather when the grounded cone has become sufficiently waterlogged, an insight into the nature of the cone in absorbing and retaining water to nurture its own seeds.

Cone Baeospora

Baeospora mysura / Collybia myosura



Cossetted by pine cone petal
Baeospora displays no mettle.
It tends to act like headstrong child
That's not by other feasts beguiled.

Other food! - They will not try it,
And won't diversify their diet.
With tastes so narrow, pine specific
All else is shunned as too horrific.

Pale-headed Marasmius on Maclean Point

Pale-headed Marasmius *(Marasmius pallidocephalus)* is a tiny mushroom fungus which appear in clumps and drifts in shaded mossy areas following prolonged wet periods. They are often found growing directly out of the green mosses.

Marasmius tends to fruit on pine needles or under hardwood trees, such as the oak area on Maclean Point (adjacent to the chanterelle site area) and they form mycelial mats with caps emerging in clusters over extended areas.

The caps, 3-10mm, are pinkish and slightly waxy with few and widely spaced gills on the underside. The pinkish/buff colouring of the caps is slightly more intense towards the centre.

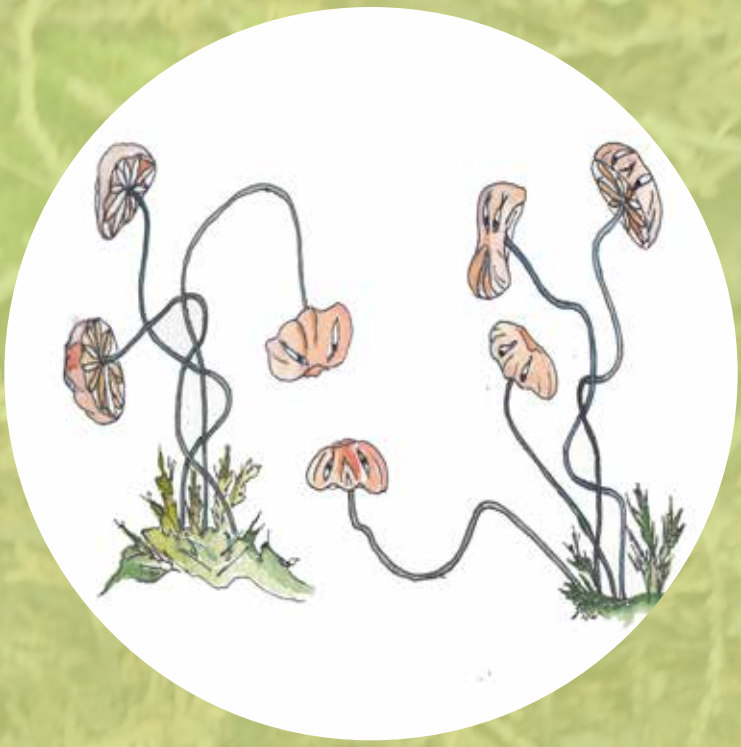
The maroon to black coloured stipes are thin, long and wiry. They are resilient to damage, often kinked and intertwined, elevating the caps well above the mossy bed.

The gills are buff coloured, distant spaced and attached and brown with age. The spore print is white.

There are several closely related species of Marasmius. *M. pallidocephalus* is similar to the *M. androsaceous* which has a more grooved, pinkish brown cap and a more pronounced darkening towards the centre of the pileus. *M. capillaris* is also similar but with a slightly more parasol shaped pileus.

M. oreades grows a larger pileus, up to 5cm in diameter and is known as the 'Fairy Ring Mushroom'.

Pale Marasmius
Marasmius pallidocephalus



Pale faced and blushing red to heart
With dreadful hearsay to impart
These gossips revel in miasma
O'ercome by rumour and phantasma.

Feasting on each sordid angle
Their wire-like stalks soon come a'tangle
With salacious blather they are fed up
No wonder they scarce keep a head up.

Marasmius sulivantii on South Shore Path

There are many small gilled mushrooms in the Tricholoma group, including a wide assortment of Marasmius fungi. Generally these have stipes that are slender and wiry, surprisingly strong, like the *Marasmius rotula* which is found usually on decaying hardwood stumps.

Marasmius fungi can be found in wet weather throughout the season from May until November. Many Marasmius tend to shrivel into invisibility during dry weather and then instantly revive and 'bloom' when the weather changes.

Other Marasmius and Little Brown Mushrooms (LBM's)

There are many small gilled mushrooms in the Tricholoma group, including a wide assortment of Marasmius fungi. Generally these have stipes that are slender and wiry, surprisingly strong, like the *Marasmius rotula* which is found usually on decaying hardwood stumps.

Marasmius fungi can be found in wet weather throughout the season from May until November. Many Marasmius tend to shrivel into invisibility during dry weather intervals and then instantly revive when the weather changes.

Some marasmius have more substantial, pale coloured and 'horn-like' stems.

Marasmius sullivantii have a beautiful orange or ochre cap covering delicate, close aligned non-attached gills. They have slightly waxy, non fibrous stipes.

Other Marasmius have detached, wide spaced gills. The caps are often parasol shaped with striated 'ribs' showing through on the top surface.

Some, like *Xeromphalia campanella*, have desurrent gills that run down into the stipe.

Vermilion Hygrophorus growing in moist sphagnum moss near Spratts Park

Vermilion Hygrophorus (*Hygrophorus or Gliophorus Laetus*) is a small brilliant red wax cap usually found growing in sphagnum moss in boggy areas. They begin to appear after wet weather in July.

The shiny caps can grow up to 3 cm in diameter and curl down protectively over the gills.

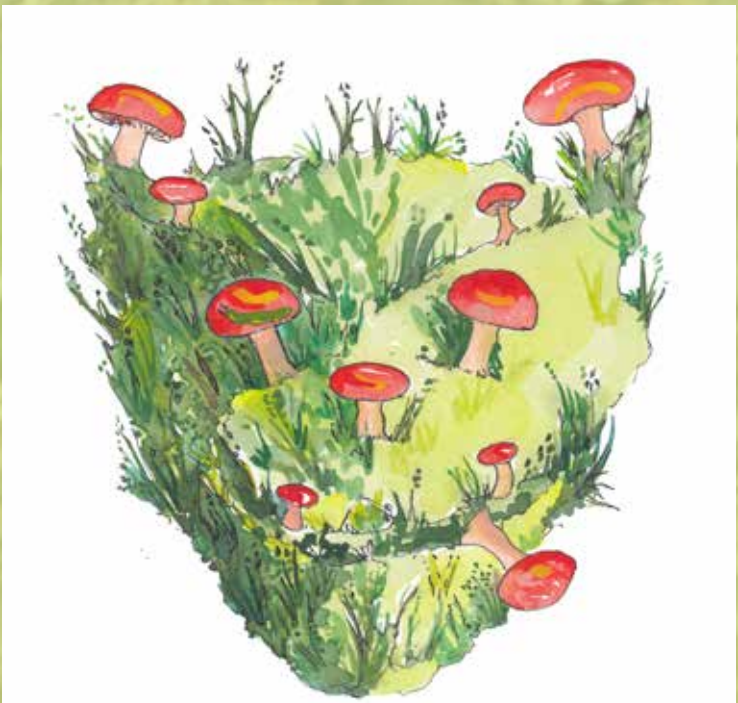
The gills underside are white, regular, attached and slightly waxy. The spore print is white.

The stipe is also smooth and waxy and terminates in a curious and substantial 'club foot' also white and waxy. The stipe is surprisingly strong and tensile.

There are many varieties of Hygrophorus encountered on Fairwood. All are smooth, well formed and waxy. The colours range from pale orange to flesh-coloured.

Hygrocybe mushrooms are also common and grow in similar wet locations. THey tend to have wider spaced, decurrent waxy gills which rund down and blend into the stipe.

Vermilion Hygrophorus
Hygrophorus or Gliophorus Laetus



Some maintain that there is nuttin'
Cuter than this fungal button.
A bright red barnet, pristine stalk
Come hither smile leads few to baulk.

But many are the souls misled
Unschooled in distrust of red-head .
Gleefully they pop in mouth
And then confront the awful truth.

The Many Faces of the Bolete

Suillus found in Gam's Glade and Spratts Park

Suillus Boletes are found in mycorrhizal association with white pine roots and appear from June to November. *Suillus Granulatus* is a distinctive bolete with a substantial bulbous stipe. The convex cap is orangey-brown and viscid or slimy when wet and shiny when dry. It grows up to 15 cm across and flattens out with age.
As the cap ages it sustains depredations from slugs and maggots. The red squirrels are often observed eating these large mushrooms.

Underside the cellular pores are pinkish in hue, turning brown with age. The pores are finer grained than in the Painted Bolete (following) When young they display oozing milky droplets underside. The stipe is distinctively bulbous in comparison with the Painted Bolete. It tends to be dotted with tiny dots on the upper stalk. Unlike the Painted bolete, there are no remnants of the protective veil evident on the stipe.

Bioleaching is the industrial process of using living organisms to extract metals from ores. Typically where there is only a trace amount of the metal to be extracted. Suillus granulatus is efficient at bioleaching and can extract trace elements (Titanium, Calcium, Potassium, Magnesium and Lead) from wood ash.
They are considered edible, though the accumulations of toxic metals may be undesirable in most diets.

Suillus Bolete

Suillus granulatus

One of Nature's feasts that gratis
Is offered by the *Granulatus*
Projecting might and fulsome zeal
A hearty, somewhat tasteless meal.

These boisterous boletes crowd some glades
Alas! Soon *gloria mundi* fades!
Then malodorous suillus
Has savor less designed to thrill us.

King Boletes found in front of cottage, OK Point

Boletes like the *Suillus* and *Boletus edulis* are distinctive with their spongy cellular spore emitting surface under their caps.
King Boletes *(Boletus edulis)* are robust and grow to large size (10-20cm across) The caps are ochre to brown and convex, occasionally with raised perimeters. . The stout stipe, or stem, is white or yellowish in colour, up to 25 cm tall, 10 cm thick, and partially covered with a raised network pattern, or reticulations.

The tubes underside are yellowish, tinged with green. The flesh is white and does not stain with age. Mycelial filaments are often evident on the surface of the stipe. *Boletus edulis* is found in conifer woods where it forms mycorrhizal relations with pines in particular. A European variation tends to have a more substantial stipe that its North American counterpart. The spore print is olive brown.

Many species in this group are edible, only some being poisonous. The poisonous boletus species have red or deep orange pores.

Prized as a culinary ingredient, *B. edulis* is low in fat and digestible carbohydrates, and high in protein, vitamins, minerals and dietary fibre. Although sold commercially, it is difficult to cultivate. It is usually dried and packaged, and then reconstituted and used in cooking. *B. edulis* is one of the few fungi sold pickled.

King Bolete

Boletus edulis (uncertain)

While many ‘fun-guys’ prove effete -
Not so refulgent King bolete.
Aggressively it takes a stance
Majestic girth, imperious glance.

All hail Boletus Edulis!
A shroom by nature truly sedulous.
It dominates most everything
Just what’s expected of a king.

Painted Suillus in Gam's Glade and Saegert Park

The Painted Suillus Bolete *(Suillus spraguei)* is unusual for the Suillus genus in that it does not have a slimy cap (pileus). It can be found from June to November and provided mycorrhizal support to the roots of white pine. The caps grow up to 12cm across. Unlike the slimy *Suillus granulatus*, they are covered in red hairy scales. The caps start convex and flatten out. The stipe too is likely to be mottled red.

The underside of the cap is cellular, yellowish and spongy. It is initially protected by a veil which rips as the cap expands. Remnants of this cottony veil remain evident as a greyish ring at the top of the stipe. The stipe tends to be less bulbous than *Suillus granulatus*. It produces an olive / brown spore print.

Suillus spraguei forms ectomycorrhizal relationships with five-needled (white) pine species. This is a mutually beneficial relationship where the hyphae of the fungus grow around the roots of the trees, enabling the fungus to receive moisture, protection and nutritive byproducts of the tree, and affording the tree greater access to soil nutrients. The fungus has 'ecological host specificity', and can only associate with white pine.

This is considered by some to be an edible mushroom. Though its taste is not distinctive, it has a fruity odour.

Painted Suillus Bolete

Suillus spraguei

Laced through forests densely pined
Broadcasting what is on who's mind.
This news network of netherworld
Where latest gossip is unfurled.

In truth, the painted cap Suillus.
Though poxy, is not prone to kill us
Red mottled hat and orange beneath
Such fashion faux-pas don't spell death.

.

Bitter Bolete in Gam's Glade

The Bitter Bolete (*Tylopilus ferrugineus or felleus*) is a bolete with a smooth, matte, reddish-brown cap growing up to 14 cm across. The pores underside and the flesh are whitish at first, later turning a rusty brown.

The stipe is 4-10 cm high and whitish at base. The base tends to be slightly ovoid. When sliced, the pore structure underside is revealed to be pinkish. This bolete does not stain blue which distinguishes it from *Boletus badius*.

Strands of mycelium are evident on the stipe. Like most boletes, it lacks an annulus around the stipe.

The closely related *Felleus* bolete is also mycorrhizal and is found from July to September. *Ferrigineus* is found around conifers and *ferreus* around hardwoods, particularly oak.

Tylopilus felleus has been the subject of research into anti-tumour and antibiotic properties. Although not poisonous, it is generally considered inedible due to its overwhelming bitterness.

The Bitter Bolete

Tylopilus ferrugineus or felleus

When Nature's blueprints are apprised
Some attributes seem ill-advised.
The Bitter Bolete claims a virtue
Its taste is foul but it won't hurt you.

Like sneaky snakes of the cadeusis
Such medicine may have its uses,
For gagging may prove good for you
Relief lets better health ensue.

Slippery Jacks *(Suillus luteus)* and Slippery Jills *(Suillus subluteus or salmonicolor)* become common in the cool, wet, autumn weather.

These boletes are characterised by a slimy cap surface. The pale brown caps grow up to 125mm in diameter and are often clumped together and over layered in mounds.

The close-pored surface on the underside is yellow brown in colour.

The stipes are of similar colour. Slippery Jacks are distinguished from 'Slippery Jills' by a persistent ring which Slippery Jills often lose. Slippery Jills have prominent brown dots on their stipes.

Both are considered edible but may induce stomach upset.

Slippery Jacks

Suillus luteus

Most are rightly taken aback
By oozing charms of slippery Jack.
These reprobates seem squalid sight
Abjuring face of life upright.

In slimy mounds they mugger round
While fairer Jills court upper ground.
For Jills know well they're not the thing
So oft they seem to lose their ring.

Bay Bolete in Gam's Glade

The Bay Bolete (*Boletus badius*) grows on rotted wood and or on the ground in white pine woods. It appears in late summer and autumn.

It has a smooth reddish-brown cap, which starts as almost spherical and then flattens out. The pileus is slightly slick and shiny when wet and minutely woolly covered when dry. The cap starts almost spherical but then flattens out and grows up to 15 cm across. The stipe is 4-10 cm high and the same colour as the cap.

The pores underside are pale yellow and very densely packed. The spore print is an olive brown. The Bay Bolete bruises blue when it is sliced into.

Though not poisonous it can cause gastric upset. Its mushrooms are less often infested by maggots than other boletes. Studies have indicated that the mushroom can bio-accumulate some trace metals from the soil, such as mercury, cobalt, and nickel. After the 1986 Chernobyl disaster, several studies showed *I. badia* had bio-accumulated significant levels of radioactive caesium.

The mushroom has potential as a bio-remediation agent to clean up contaminated sites.

The Blue Staining Bay Bolete

Boletus badius

Aristo boletes, blue of blood
Aggrieved, so oft misunderstood
They're bruised by tussles, nips and bites,
Susceptible to merest slights.

Noblesse oblige that others lack
With dignity they stand well back
Stiff upper lips, they preen and pose
And hope their blue blood breeding shows.

Black Chantarelles, late August, on South Shore path beyond Yew Wood

Black Chanterelles, Horn of Plenty, (*Craterellis fallax*) appears in large groupings in decaying leaf litter in hardwoods. On Fairwood they are usually associated with oaks and they appear annually in considerable numbers tracing the roots of the oaks in the dells on Maclean Point.

These vase-like 'horns of plenty' grow to 3-15cm high. They are grey-brown to black fading to grey or coral brown with age. They tend to split as they dry out. The outer surface is lightly wrinkled and has no gills, the mycelial hyphae being evident as vein-like strands on the surface. The interior trumpet surfaces are covered with velvety fibrils.

C. fallax leaves a pink spore print. A very similar chanterelle, the *Craterellis cornucopioides* produces a white spore print. Both are edible.

The trumpets appear from July to October usually following a period of damp weather.

The black trumpet has a pleasant mushroom odour. It is a much sought-after gourmet speciality, often dried out for storage and later rehydrated.

Black Trumpet Chantarel

Craterellus fallax

Emissaries from realms chthonic
These trumpets sound a call sub-sonic.
Emerging from deep underground
They pose, but ne'er emit a sound.

Yet with in-built telegraphy,
They broadcast message tree to tree
They're confident and free of fretwork
Such mycelia know how to network.

Poison Pigskin found north of tennis courts

The Earthball or Poison Pigskin Puffball (*Scleroderma citrinum*) is commonly found singly or clustered among mosses. It feeds on well decayed hardwood and conifer, flourishing on old stumps or in wet spots. Scleroderma establishes a special relationship with deciduous trees, especially oak, beech and birch. It is unclear whether this relationship is mycorrhizal or saprophytic or both at various times. It appears between July and November.

It grows a globose or ellipsoid fruiting body 2-10 cm across. The skin is yellow-brown to golden-brown with a mosaic-like covering of raised warts. In an immature specimen you will find a solid blackish spore mass (the gleba) with a subtle marbled effect. The smell is quite a strong and unpleasantly metallic. At maturity this spore mass turns into fine power and the outer surface will open randomly to release its spores, unlike the common puffball trait of opening at the apex. It is easily distinguished from the pure white flesh of the edible puffball by its dark flesh.
The name 'scleroderma' alludes to the hardness of its skin.

The Earthball, which is closely related to the Bolete family, is often parasitised by *Boletus Parasiticus*, a small white or pale yellow bolete with an olive brown spore print. This grows directly out of the pileus skin.

Earthball or Poison Pigskin Puffball

Scleroderma citrinum

The Poison Pigskin lives apart
Concealing core, a murky heart.
With yellow skin and brownish warts
Little gusto it exhorts.

Cut in half and you will see
Its well-disguised malfeasancy
Demonstrating moral dearth.
This puffball's soul is black as earth.

Lycoperdon Grouping in Champlain Park

Puffballs *(Lycoperdons)* In contrast to the poisonous scleroderma with its black interior, the common puffball has white flesh which is edible. On aging this desiccates into brownish spores which are emitted when the outer skin is ruptured. The distinguishing feature of the puffball is that spores are produced internally. There are no mushroom gills or spore channels of polypores.

Puffballs can appear wherever their spores have landed. Unlike Chanterelles and other mushrooms they are not associated geographically with particular trees and established mycelial networks.

Lycoperdons are stemless and tend to be smaller and more pear-shaped that the Giant Puffball, *Calvatia gigantea.*

Native Americans used burnt puffball to anaesthetize bees when harvesting honey comb. Attempts were made in the nineteenth century to use puffball smoke as a primitive anaesthetic in medical operations.

Note: Young puffballs can look very similar to the volvas of emergent Deadly Amanitas!

Puffball

Lycoperdons

Puffballs love the orotund
They roll their ‘R’s, throw weight around
Swelling is the puffball meme -
Sheer o’er inflated self-esteem.

But pompous airs may soon wear thin
When one must take them on the chin.
And challenged, once you’ve had enough,
They tend to prove just empty puff.

Pearly Puffball on South Path near Spratt's Park - September

Also known as the Gem Studded Puffball, *Lycoperdon Perlatum* grows to between 2-6cm in diameter with a distinctive turban shaped hear studded with glistening spines. These spines detach leaving scars that become spore emission openings.

The flesh is pure white and dense when young and this turns olive brown as the spores form in a fibrous mesh within.

The stipe gives a distinctive inverted pear-shaped form.

It grows in mixed hardwood and conifer forests, usually appearing in autumn.

When young and fresh it is considered a choice edible.

Pearly Puffball

Lycoperdon perlatum

Here nestles a true glamour queen,
Neath *'gems of purest ray serene'*.
Each spangle bespeaks silver dew
All beauty nature can endue.

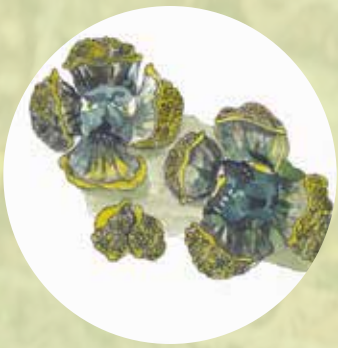
Oft pulchritude is surface skin
All outward show hides rot within,
But pearly puffballs nothing lack,
They're plump and firm and fully packed.

tiny tree bark puffballs

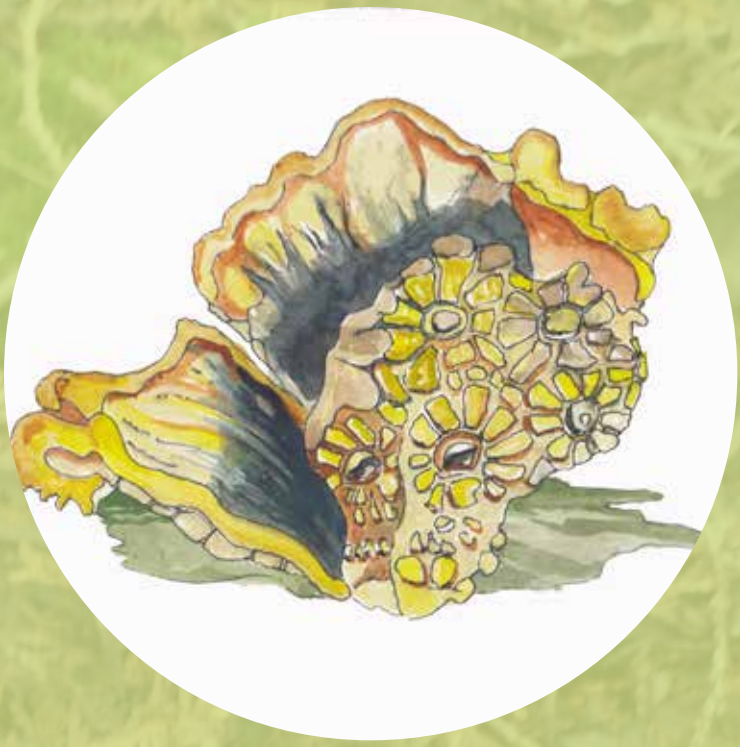
Earthstar Puffball in Champlain Park - late September

This puffball appears to be related to the Earthstar family. It has a distinctive surface characterised by hexagonal pattern rosettes. The rosettes have broken along a seam which reveals a blackish gooey interior. This gradually dries out and black spores are broadcast. .

This astonishing fungus appears to be parasitic. It was found attached and apparently feeding on a Poison Pie mushroom in a moist mossy area of Champlain Park near clumps of slippery jacks.



Earthstar Puffball



Some stars bedizen the night sky
(Or else to Hollywood they hie)
But earth stars choose the barren ground.
Where no paparazzi cluster around.

On blasted rock in windswept cold
Demurely golden doors unfold
To reveal at heart, a black abyss,
(Sure nothing good can come of this!)

May Morel at Fairfield Farm

Morels (*morchella americana or diminutiva*) can be found in early spring, April and May, mainly associated with mixed hardwoods or in recently burned over areas. They tend to be very well camouflaged among dead leaves.

Possibly saprophytic and mycorrhizal at different points in their life cycle, morels can appear singly or in gregarious groups in a variety of ecosystems, under hardwoods, especially white and green ash, dead or dying American elm, but also with many other hardwoods, under apple trees in old, untended orchards, and occasionally under conifers. They frequenty appear around the roots of cherry family (*Prunus*)

They have conical caps laced with sponge-like ridges.

The stipe and cap are hollow inside and slightly brittle. It can range from 2 to 12 cm high and 1.5 to 10 cm in diameter, usually swollen at the base, whitish to pale yellowish or brownish, bald or finely encrusted with granules and hollow.

Morels are to be distinguished from the poisonous 'False Morel' which looks very similar but is generally smaller and amorphous, less defined structurally. The False Morel does not have a hollow stipe and pileus.

Morel

Morchella diminutiva & americana

Flushed by early season rains
Morels proudly show their brains.
With intelligence quite life affirmin'
They precede insects, other vermin.

They stand in clumps and so discuss
Why early birds are ever thus!
They revel in their springtime glory
Take heart in morel of their story!

Oyster on dead hardwood, McLean Point, beyond Yew Wood on South Shore

Oyster Mushroom (*Pleurotus ostreatus*) is one of 200 species in the pleurotus family. This fan shaped growth appears in dense clumps, often growing out of the bark wounds of living trees. *Pleurotus* refers to 'sideways' in Latin, *Ostreatus* refers to an oyster-like appearance.

The Pleurotus varies from tan-brown to bluish grey with distinctive gills underside that radiate without annulus from an attachment point on predominantly hardwood hosts. The flesh is white and firm. The gills are also white to cream, and descend on the stalk. The spore print of the mushroom is white to lilac-grey. The mushroom's stipe is often absent.

It is usually found in jumbled clusters or tongue-like over layers. It tends to turn yellow and then brown with age.

The oyster mushroom is one of the few known carnivorous mushrooms. Its mycelia can kill and digest nematodes. This is believed to be a way by which this fungus obtains nitrogen.

This fungus is a prime edible, considered a delicacy in oriental cuisine, and has citrus smell. It was cultivated in Germany during WW1 as a subsistence crop.

Oyster Mushroom

Pleurotus ostreatus

It's hard to claim you didn't notice
The complexion of this bright pleurotus.
In jocund coteries they roister
Mimicking gregarious oyster.

Busy bodies to the gills
Not for them life's solo thrills
Confabulation is their modus
True chumocracy they've showed us.

The Jack O'Lantern (*Omphalotus olearius*) is named because it glows in the dark. The caps are a distinctive orange yellow with 'decurrent' (detached) gills. This mushroom can grow to a large size with caps up to 15 cm in diameter and stipe to 20 cm high. The cap surface can range from moist and greasy to dry and glabrous. They start convex and flatten out and may later become indented and funnel shaped. The Jack O'Lantern fruits in dense clusters on the stumps of dead trees.
Also known as *Omphalotus illudens*, this is a deadly poisonous mushroom. The conical shape can be confused with the edible Golden Chantarelle.

At night the gills glow with a soft greenish bioluminescence similar to the light emitted by fireflies. Bioluminescence is the production of visible light through a chemical reaction taking place within living organisms. Bioluminescent fungi emit a greenish light at a wavelength of 520–530 nm. The light emission occurs only in living cells. Bioluminescence occurs in both mycelia and fruiting bodies, as in *Panellus stipticus* and *Omphalotus olearius*, (Jack O'Lanterns) or in mycelia and young rhizomorphs, as in *Armillaria mellea*. (Honey Mushrooms) These mushrooms use a class of molecules called luciferins, which paired with an enzyme and oxygen, release light. *Panellus stipticus* (Bitter Oyster) is one of the brightest-glowing examples of bioluminescent fungi, found throughout Asia, Australia, Europe, and North America. These flat mushrooms grow around birch, oak, and beech trees.

Jack O'Lanterns

Omphalotus olearius

The luciferins found in bioluminescent mushrooms are the same compound found in fireflies, jellyfish and other deep sea creatures.
Attracting insects is essential for fungi allowing bugs to spread their spores to sheltered places in the forest.

Oxyluciferin was a mystery until quite recently. Though bioluminescent mushrooms have long been studied by scientists, they weren't sure why the fungi glowed until 2015, when a team of researchers discovered that mushrooms use luciferins, light-emitting compounds found in other glowing animals and plants, to attract insects.

Hen of the Woods on South Shore Path

Chicken of the Woods or Sulphur Shelf (*Laetiporus sulphureus*) is a bracket polypore composed of superimposed fanning shelves and is usually found on wounds on hardwood trees, especially oak. The ruffled, lumpy fronds have distinctive lighter yellow outer edges. Old fruit bodies fade to pale beige or pale grey.

This is a parasitic fungus that spreads brown rot in the trees that it feeds on. Enzymes dissolve the lignins in the wood rendering host trees brittle and prone to wind damage.

It may develop to a large mass (40Kg) with rubbery fronds and a velvety texture that hardens with age.

Laetiporus when it grows on hardwoods is prized as an edible dish. However when *Laetiporus* grows on confers, it is reputed to produce adverse effects.

Hen of the Woods *(Maitake)* is related to the boletes and grows directly on the ground usually parasitic on oak and hardwoods. Their brown or grey fronds are ruffled and overlapping

Maitake is a prized edible and is considered to have medicinal properties.

Hen of the Woods (Maitake) *Boletus Frondosus*
& *Chicken of the Woods* *Laetiporus sulphureus*

Hen of the woods - maitake

These toothsome morsels, groovy chicks
Can be devoured to last drumsticks.
Nature's plan may seem incredible
Designing chickens quite so edible.

Ruffled feathers, frilly fronding
Toothsome masses closely bonding!
Alas! considered down on lucks
Scoffed at, and up, as dumber clucks.

Chicken of the woods

Dyers Polypore in Gam's Glade

Dyers Polypore (*Phaeolus schweinitzii*) is a woolly surfaced polypore, with concentric fanning circles of orange browns with a distinctive bright yellow outermost margin. It tends to grow in a bouquet-like formation or in overlapping fronds on the ground near the trunks of conifers, pine, spruce, larch and hemlock, or growing off a decaying white pine.

The fronds are soft and flexible at first and up to 30mm thick and these have polypore tubes underside. The spores are colourless. Eventually the fronds harden with age.

This polypore is a pathogen of old pine trees and causes rot (butt rot) at the base where the roots meet the trunk.

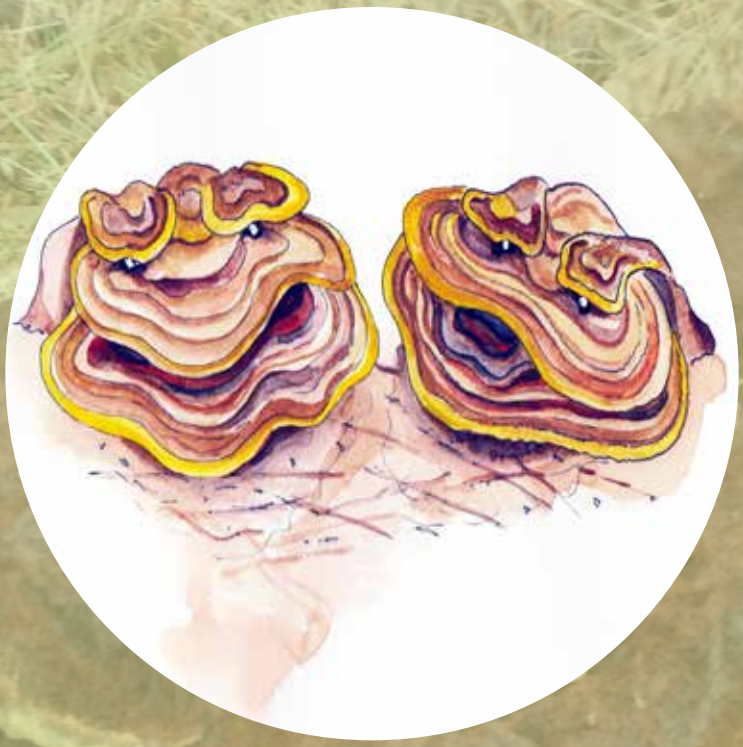
Though this polypore has a fragrant odour, it is inedible.

It has been used as a dye which will produce a wide range of colours, green yellow, brown and gold dyes in combination with various mordants.

P. schweinitzii is named after Lewis David de Schweinitz, a Pennsylvania-born Moravian minister and important early American mycologist.

Dyers Polypore Fungus

Phaeolus schweinitzii



Phaeolus is a frightful gossip.
With shocking tales to churn and toss up!
In tongues they chatter in the woods
Revelling on rotten goods.

Of tittle-tattle always full
These busy bodies dyed in wool,
Free of scrupled, moral stricture
They paint a dreadful, lurid picture

Mustard Polypore on Woodholme Point

Mustard Yellow Polypore *(Inonotus tormentosus)* is a large velvety surfaced polypore which appears so swiftly that it can incorporate the blades of grass and twigs that stand in its way within its soft pliable fronds.

It fruits directly on the ground, usually under conifers, particularly white pine root systems.

Centrally stalked, the caps can reach up to 30 cm in diameter. It grows with astonishing rapidity, almost overnight, and the soft velvety upper surface becomes convoluted by all the minor obstacles absorbed. The polypore undersurface is orange and the flesh is distinct orange which blackens quickly when broken and exposed to air.

This polypore darkens quickly to a soft suede like brown surface. The porous underside is bright orange with deep and well defined pores.

In many aspects Inonotus is similar to the Dyers Polypore, noted previously. However it erupts in a distinctive amber colour and the surface, though tortured, is less overlapped.

Mustard Polypore

Inonotus tormentosus

So many months of lying dormant
Tend to stoke its inner torment
Such pressures erupt in confusion
A multifoliate contusion!

Convoluted, amber, rust!
A fashion sense that none should trust
Such fungi do perspective lack
Too quickly will their moods turn black.

Sheep Polypore, *Albatrellis ovinus*, gives the appearance of several mushrooms that have been fused together with its tortured, over layered top surface. However it has only one stipe and is 'terrestrial', growing on the ground, unlike most polypores.

It grows on the forest floor, preferring very moist conditions and is generally found feeding on very rotted pine branches or roots.

The top surface is smooth and glabrous. In this example it is elongated and extends out as many overlapping ruffles. These tend to brown with age.

This polypore has quite a long shelf life and remains soft and pliable for some weeks.

Underside the pores are shallow and very fine, the flesh is very dense and succulent. The tubes are slightly decurrent to the stalk.

The stipe is fibrous, shaggy and 3-10 cm high and quite wide at 3.5 cm.

The spore print is white.

Sheep Polypore

Albatrellis ovinus

Ill-formed, tortured, convoluted
This polypore seems hardly suited
While lurking in the forest deep
To draw attention of a sheep.

Chaotic overlapping fronds
Suggesting fewer pros than cons,
It's hard to see how such a massing
Would ever please a sheep in passing.

Artists Conk on dead maple in Yew Wood on South Shore

The Artists' Conk *(Ganoderma aplanatum)* is an often quite large, stemless, fan-shaped, hard-bodied fungus that is found commonly on dead hardwoods.

Its fans range up to 30 cm across and tend to be brown / grey fading to a pale grey at the perimeter margin. The upper surface can be quite lumpy. The underside is a whitish, polypore surface and marks dark brown when bruised by an artist's stylus.

Ganoderma is a saprobic wood-decaying fungus, causing a rot of heartwood in a variety of trees. It can also grow as a pathogen of live sapwood, particularly on older trees that are sufficiently wet. It is a common cause of decay and death of poplar, maple, oak, willow, hemlock and spruce.

The Artists Conk can develop over several years, producing a new pore surface underside each year, building up layer upon layer. An incised section through a bracket will reveal its age through the annual layers of growth.

Like the 'Hoof Fungus' or 'Tinder fungus' (following), it is recorded that indigenous peoples used these brackets, hollowed out, as convenient receptacles to sustain burning charcoals and transport them for starting fires anew.

Artists' Conk Shelf Fungus

Ganoderma aplannatum / Reishi

The Artists' conk sets out its wares
Enticing those with arty flares.
When artists pass there are but few
Resist incising smart tattoo.

But old tattoos last years and years.
Too soon old hat! Just as one fears!
Tastes change, move on, for good or ill
Both gone! who cares if 'Jack Loves Jill.'

Birch Polypore on dead birch stump near path leading to Jurassic Park

Birch Polypore (*Piptoporus betulinus*) is a smooth white or pale tan polypore fungus. It is a saprophyte that is found on dead birch trees. The shelf opens out from a rounded nob that erupts through the swelling birch bark in late summer. It develops a smoothly rounded margin, which surrounds the porous underside, a distinctive feature of this shelf polypore,. This under surface is grey or a darker brown. The cap, often kidney shaped and convex can grow up to 30 cm. The flesh within has a white and of a corky consistency. It has a pleasant mushroom odour and produces a white spore print.

This polypore is quick growing. Emerging in late August to November, it causes a brown, yellow rot which disintegrates the dead birch trunk. It will overwinter, but unlike other shelf polypores it begins to disintegrate during the following spring.

It has been known for medicinal properties since prehistoric times. 'Otzi', the Tyrolean 'Iceman' murdered 5300 years ago, was carrying three pieces of birch polypore strung on a thong around his neck. It is thought that he was using it as an antibiotic to treat an intestinal parasite, Whip Worm. Siberian folk still collect it and consume it as an antibiotic. Boiled slices of the polypore produce a very bitter tea which can be sweetened with ginger and honey. Cut into strips it can also be used as an antibacterial wound dressing.

Birch Polypore

Piptoporus betulina

Its lily hue gives naught away,
This fungus thrives on birch decay.
Though not a creature of the night
This polypore is saprophyte!

The Iceman's salve for aches and pains
And stimulant for idle brains
Old Otzi's ma'am called out the door
'Please DON'T forget your polypore!'

Maze Polypore on dead birch at west end of OK Point

Maze Polypore,also known as Multi-colour Gill Polypore is distinguished by its fan-shaped top surface of concentric zones of colours ranging from blue-greys to cream, oranges and pinks. The outer fringe is white.

It grows quickly, late in the season in cool wet weather. It has been found growing on dead birch and on bog willow.

Underside the gills are cream to ochre coloured and fork in from the outermost margin.

The cap can grow up to 8 cm in diameter and 5 cm deep.

Maze Polypore

Lenzites Betulina

Once lost within this polypore
You're sure you've tread this path before.
Thus tortured, convoluted maze
Thwarts all desire to stop and graze.

All caught within grow pale and tense
And with a rising terror sense
That deep within this polypore
Must lurk a fearsome minotaur.

Hoof Fungus on decayed stump on Maclean Point

Hoof fungus, Tinder Fungus *(Fomes fomentarius)* is a large shelf fungus widespread across the boreal belts of Europe and North America. It is stemless, and shaped like a horses hoof with a hard shell which varies in colour from silver grey to black. It establishes itself on a wide variety of deciduous and coniferous trees as a parasite, causing brown rot. It continues as a saprophyte after the tree's demise.

The shelf can grow up to 45 cm in diameter and is distinctively deeper than other shelf polypores. The top surface has concentric rings under a lumpy, hard shell. The interior flesh is fibrous and cinnamon brown in colour.

Otzi the Iceman was also carrying four pieces of *F. fomentarius* likely intended for fire starting. The fibrous interior can be cut into strips and pulverised to provide readily flammable tinder, which would have been ignited by capturing the sparks generated by striking flint against iron pyrites. Once ignited a dry Horse's Hoof Fungus can smoulder for a considerable period of time and be readily transported in Otzi's travelling kit.
Still used as a natural desiccant in modern times, it can be transformed into a material known as *Amadou* by a process of boiling, pounding and treatment with wood ash, salt peter and urine. It is used to create Amadou hats, which are the height of fashion in Transylvania.

Hoof Fungus or Tinder Fungus

Fomes fomentarius

Ancient wisdom knew the proof
Transporting fire when on the hoof.
A neatly smouldering tinder box
Avoided endless smashing rocks.

Modern homecraft oft effuses
On fungus with so many uses.
Like amadou, a substance that
Is fashioned into Dracu-hat.

Split Gill growin on pine killed by Rust disease on O K Point (near Tree Specimen #2)

Split Gill Polypore (*Schitzophyllum commune*) is a very common decomposer of wood and is found on standing dead pines and fallen logs. It works in tandem with White Rot crust fungus.

It is considered to be the most widespread fungus in existence. The caps are small (1-2cm) and white to grey in colour. They are permanent and will dry out and rehydrate according to weather conditions. The undersides appear to be gilled but these apparent gills split down the centre to reveal a polyporous surface which emits spores. The gills produce basidiospores on their surface and split when the mushroom dries out, earning this mushroom the common name of 'split gill'.

It is commonly found on rotting wood, but is adaptable to diverse substrates. It can also cause disease in immuno-compromised humans. (toenail infections, lung infections and brain lesions)

The split gill mushroom, *Schizophyllum commune,* is a species that has been genetically sequenced to discover that it has 23,328 distinct sexes or mating types. This allows it to find multiple mating opportunities. It is considered the most sexually diverse of all living organisms.

Split Gill Polypore

Schitzophyllum commune

Polymorphous to a fault
Onto any species it will vault
It finds what foothold it can gain
Be it in toes or lungs or brain.

Self-restraint would be a bore
For a polysexual polypore.
Perhaps the challenge sometimes vexes
Assuming quite so many sexes.

Turkey Tail found growing on shaded stump of maple cut 2 years previously

The Turkey Tail Polypore (*Trametes versicolour*) is a common polypore found on dead hardwood stumps and fallen trees, particularly decaying oak and maple. It is saprobic and helps to break down the lignins in wood.

The bracket fans display concentric zones of contrasting colours, browns, greys and algal blues. These zones have velvety upper surfaces which contrast with bands of smoother surfaces in between. The thin fan fronds often grow in overlayered tiers. They harden with age.

It is a slow growing fungus and may take 1-2 months to form. The pore surface underside is white to light grey. If the underside surface is smooth, without visible pores, the specimen is likely to be a 'false turkey tail'.

Turkey tail is used as a health remedy for respiratory problems in Chinese medicine. It has also been mooted as a possible anti-carcinogen. Polysaccharide-K (PSK or krestin), extracted from *T. versicolor*, is used as an adjunct therapy for cancer treatment.

Caterpillars, moths and maggots are often found attacking this fungus.

Turkey Tail Fungus

Trametes versicolour

This polypore has found a way
To trump the turkey's daft display.
Such falsehood jealousy begotten
Thrives zealously on wood that's rotten.

It undercuts the preening male
Who turns its fan on Turkey Tail.
Turning tail may seem a snub
But it likely wants to join the club.

Purple Toothed Polypore on decaying hardwood - Maclean Point - South Shore path

Purple Tooth Fungus *(Trichaptrum biforme)*
Aside from the very distinctive *Hericiums*, there are several other types of tooth fungus. *Trichaptrum* is a common saprophytic bracket fungus which feeds on dead hardwood. The fruiting bodies are layered and in this case 2-4 cm across.

The brackets are soft and supple but become leathery as they age. The topside of the bracket is 'zonate' with distinct concentric growth rings of contrasting tone and texture. The *Cerrena unicolor* has lighter elongated pores , labyrinthiform, rather like fused teeth.

Unlike most bracket fungi which have a smooth pore surface on the underside of each shelf, *Trichaptrum* is fissured with pendant 'teeth' which are covered in spores.

Each tooth is covered with a layer of mother cells which produce the spores to be shed. Many tooth fungi species comprise tiny stalactites pendant from the underside of a mushroom cap.

The fungus has a pleasant mushroom odour but unlike the toothsome *hericiums*, it is considered inedible.

Purple Toothed Polypore

Trichaptrum biforme

Fortified, defiant clumps
Gnash their teeth from rotting stumps.
Shunning health and gilded youth
They favour old or long-in-tooth.

With undersurface labyrinthine
They inveigle slugs to come and dine.
A lacuna of the misbegotten
Desire to revel in the rotten.

Fibre Vase Fan found growing in sandy soil of septic bed behind main house on O K Point

Fibre Fan or Fibre Vase Fungus (*Thelephora terrestris*) is an ectomycorhyzal fungus that grows in sandy soils and often forms a symbiotic relationship with pine species.

The fungus has fan-shaped fronds that emerge directly from the ground and an extensive mycelial network that can draw water and nutrients from afar.

The fronds are fuzzy, covered with shaggy hairs, and have a distinctive fluffy white fringe. Initially they tend to be fawn or purplish brown, fading to darker brown. The underside of the fronds is grey brown with radial wrinkles. The spores are purple-brown. Earth Fans have a moldy odor and a mild taste.

Its mycelia are often present in nursery plant soils and may have arrived on the island via this means. After a forest fire it re-establishes itself quickly and is very stress tolerant.

There are several related species of *Thelephora* which assume rosette or pagoda like shapes.

Due to the mycotoxins that the fungi produces, it protects pine species from the root pathogen *Phytophthora cinnamomi*.

Fibre Vase or Fibre Fan Fungus

Thelephora terrestris

Fibre Fans seek shady bosques
Where modestly they shield proboscis.
Sotto voce quips they mutter,
Setting chinwags all a'flutter.

This modest fan adroitly grows
A fuzzy fringe to tickle nose.
But, since sneezing tends to lower tone
True ladies leave this fan alone.

Wood tongues adjacent to recently cut white pine behind main cottage on Woodholme Point

There are many closely related species of Wood Tongues *(trichoglossum farlowii)* They tend to be small and discreet, emerging from decaying matter on the shady forest floor and usually associated with dying roots or decaying hardwood matter.

Wood tongues tend to be 3-4 cm high, though they are reputed to grow up to 10 cm. They are purple black in colour. Each tongue is bounded by a fleshy perimeter edge, rounded at the top.

The surface tends to be slick and slippery in wet weather.

They grow in small communities and are well rooted in the decayed soil, possible attached directly to decaying root material.

Wood Tongues
Trichoglossum farlowii

When the zephyrs cease cavorting
When the song birds' spirits sag
Hark rising murmur, naught importing
Listen as the Wood Tongues wag.

Exchanging shock at moral mayhem
You scarce detect their busy hum
Censuring the world around them
As the woods stand still and glum.

Jelly Roll Fungus on decaying aspen (?) Armak Point woods.

Jelly Roll Fungi (*Exidia recisa*) and Wood Ear (*Auricularia angiospermarum*) feed off fallen hardwood sticks, particularly oaks or bog willow. They can also be found on cherries and other members of the prunus family. The Black Jelly Roll fungus is small, 1-2cm across. The Amber Jelly Roll can be somewhat larger. (4cm)

They range in colour from brown to purple and have concave surfaces with ridges. The fruiting bodies are discrete little pillows, attached directly to the substrate. They tend to appear late in the season and into the winter. The fruit bodies typically grow in gregarious groups, the upper, spore-bearing surface being smooth and shiny, whilst the undersurface is smooth and matt. Fruit bodies are attached to the wood at a single point, and do not have a stem. The spore print is white.

In dry weather, they become dormant, flattened and crust-like, almost invisible, only to rehydrate and re-plump when moist weather returns.

The fruiting bodies are considered edible. Poisonous jelly fungi are rare. It has been considered a year-round survival food. Witches butter mushrooms are also medicinal, said to have anti-tumor properties and have been used to treat respiratory conditions.

Wood Ear

Auricularia angiospermarum

Just exactly as one fears.
These sylvan denizens have ears!
That eavesdrop everything you say
And store it up for rainy day.

Such gossips may leave many peeved,
With tittle tattle scarce believed.
They stoke and fuel salacious quibbling.
Such burning ears aren't made for nibbling.

Amber Jelly fungus on decaying pine log - OK Point.

Amber Jelly Roll Fungus fruits on decaying softwood, particularly white pine. It is very common and appears rapidly, flourishing within hours of a rainfall. However as soon as dry conditions resume, it desiccates into almost invisible flattened blemishes in the bark and awaits the next wet period.

The fruit bodies can grow up to 2 1/2" (6 cm) long and have a slimy, jellied appearance glistening in the rain. The structure is many-lobed and becomes convoluted.

Unlike coral fungi, some of which look remarkably similar, the jelly fungi do not rapidly decay and break apart. Instead they shrivel quickly into an inconspicuous scab on the bark, and await the next wet period.

Witches Butter *(Tremella mesenterica)* is similar in appearance but more fan-like in structure and tends to flourish on hardwood. It is less common than Amber Jelly Roll.

Amber Jelly Roll & Witches Butter

Exidia recisa / Dacrymyces palmatus

When the woods are bleak and grey
Foul spirits revel in decay
Pervasive is the horrid mutter
As witches gorge on witches' butter.

They revel in the jelled excrescence
Delighting in the orange putrescence
But when the sun bursts forth to play
Their orgy quickly melts away.

Crown Tipped Coral in a moist mid island location (August)

Crown Tipped Coral (*Artomyces pixidatus*) is a cream or tan coloured branching coral with cup shaped crowns at the end of each branch with 4 - 8 conical points around the rim of each crown. It is found on decaying hardwood logs in moist and mossy areas. Found throughout northern Canada, it is less uncommon elsewhere.

Artomyces is saprobic, growing alone or in small clumps on the dead wood of hardwoods (especially aspens, willows, and maples). It appears from early spring to late fall.

The fruiting Body is 4-13 cm high; 2-10 cm wide; repeatedly branched. The branches are smooth, whitish to pale yellowish at first, darkening to pale tan or developing pinkish hues. The flesh is whitish, tough and pliable. Aging they become brownish. The spore print is white.

These fungi are considered edible when raw, but are better cooked. It is usually found in quantities too small to make a meal. When fresh, it has a peppery aftertaste.

Note: there is a similar branching white coral called *Ramariopsis kunzei*. This coral branches out more loosely than *Artomyces*, and does not have the distinctive crowned tips. Both are found on Fairwood.

Crown-Tipped Coral Fungus

Artomyces pyxidatus

Many seek celebrity
Aspiring to crowned royalty,
Jostling for a lordly throne
Striving to be a king alone.

For crown and scepter they aspire
Amidst the challengers' wildfire.
Alas! so many branches vie
For regal crest, enthroned on high.

Below: Frond Tipped Coral variation

Below: Ramariopsis kunzei variation

Comb Tooth Coral on Armak Point

Comb or Coral Tooth Coral (*Hericium coralloides*) is saprobic and grows solitary or in clumps on dead hardwood trees, appearing from August through October. The fruit body can reach up to 35 cm width, though generally 2-10cm on Fairwood. It is composed of individual spines averaging about 1 cm in length.

This intricately branched species forms an irregularly shaped cluster of spreading, whitish fronds bearing spines. The branches originate from a common point. The spines hang more or less evenly in rows (like a comb). With age, the branches turn yellow to brown.

There are four or five closely related species of *Hericium* coral fungus in Ontario.

They are considered edible when young, but on aging the branches and hanging spines become brittle and turn shade of yellowish brown becoming bitter. In their prime *Hericium* mushrooms excel for their seafood-like taste and texture.

Research being conducted on therapeutic applications of *Hericium* species, in particular a study of *H. erinaceus is* focussed on its potential to address neurodegenerative disorders.

Comb Tooth Coral

Hericium coralloides

Peering deep among the fronds
Of lissom branching coral bonds,
You may detect a naughty gnome
Desperately, in need of comb.

Midst tangled, low-life, laden lair
A mass of swirling unkempt hair
You may find other well-hid faces
Embodying more fractal graces.

Fan Coral in Yew Wood

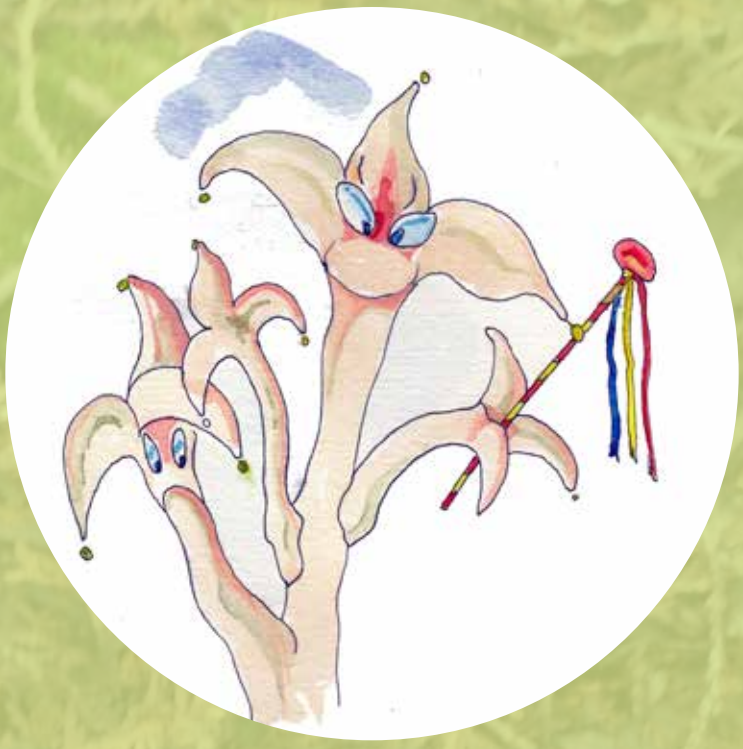
There is a wide range of coral fungi that can be found on decaying wood, particularly during wet periods.

Fractal structured corals, often brilliantly coloured, can be observed feeding on hardwood debris.

Cockscomb Coral is a variation on *Artomyces Pixidatus* with its distinctive 3 cornered cap instead of the many pointed crown. This specimen was found in an extensive grouping on the forest floor in Yew Wood.

The black coral fungus illustrated opposite was found on decaying white pine lignin. It has similarities to a tooth fungus with drooping cylindrical tendrils. During dry weather it dries out into an inconspicuous network but then quickly revives when wet weather returns.

Cockscomb Coral and Miscellaneous Coral and Drum Fungi



Nature's fevered mind devises
Corals of all shapes and sizes.
While artomyces sports its regal crown
The cockscomb likes to play the clown.

It pops up blithely, unexpected,
With raucous humour deep infected.
Meanwhile brown coral glumly munches
On stodgy barks and rotten branches

Bears Head Tooth Fungus - Woodholme Point, North Shore (September)

Bears Head or Bearded Tooth Fungus (*Hericum americanum*) is another saprobic fungus closely related to the *Hericium coralloides.* It grows out of wounds in deciduous hardwood such as maple, ash and wild cherry.

From a common base it forms a ball shaped mass covered with fleshy hanging teeth which are tightly packed and over-layered. It is also known as Lion's Mane fungus. Its spore print is white.

The over-layered pendant strands are initially white or cream and gradually turn brown with age.

Hericiums don't look like anything else (other groups of tooth fungi have very different structures). But they do resemble each other, especially when young. Field identification generally depends on branching structure and spine length, but very young specimens lack branches and have underdeveloped spines.

All four *Hericiums* are considered choice edibles, especially when young and relatively bug free. They reportedly taste similar, a taste that is considered reminiscent of fish or shellfish.

Bears Head (or Bearded Tooth) Fungus

Hericium americanum

Luminous on gloaming walks
It gently wafts its ghastly locks.
Baleful eyes peer through the fringe
Seeking victims to unhinge.

Night wanderers it loves to scare
By conjuring up a grizzled bear.
With dreadlocks and a hirsute mane
Impersonation is its game.

Ochre Spreading Tooth on a decaying log near north side of Beaver Lake

Ochre Spreading Tooth Fungus (*Steccherinum ochraceum*) is an orange to ochre coloured toothed fungus. This is a widely distributed decomposer of dead hardwoods, fairly common in oak woods on fallen sticks and small logs in late spring and early summer.

The fungus is composed of little, often scalloped shells with whitish fringes, typically attached directly to a dead log without a stalk. It is saprobic, feeding on the dead hardwoods and occasionally on decaying conifers. It can grow alone or gregariously on sticks, logs and stumps causing white rot. It tends to appear in the late spring.

A 'toothed mushroom', its top surface appears hairy / velvety with concentric zones of colour and texture, and with a white scalloped margin at the outer edge. This surface is composed of densely packed spines, orange to yellow brown in colour. The under surface is composed of densely packed spines up to 3 mm long; orange, fading to yellowish or brownish when old. The whitish flesh is tough, leathery and inedible.

A fruiting body up to 3cm across, appears as a patch of densely packed spines with folded-over edges.

Ochre Spreading Tooth fungus

Steccherinum ochraceum or Junghuhn nitida

A visage framed by cheerful fringe
Distracts from rot on which they binge.
On surface they're all cute and feathery
But this belies souls cold and leathery.

Those victims where they sink their tooth
Are sadly well past prime of youth
Here fuzzy, cute, are incidentals
It's underside they hide their dentals.

Lobster Fungus on a Bolete - north side of Beaver Lake

The Lobster Fungus (*Hypomeces lactifluorum*) is a parasitic growth which forms on the surface of other host mushrooms, particularly lactarius and russulas, and deforms their growth.

This flat firm orangy or purple coating skin covers the mushroom with a thin sheath of alien fungal material.

The skin is flecked with tiny bumps of fruiting bodies which are flask shaped and release white spores.

As a parasite, it preys particularly on Lactarius and Russulas, which are generally associated with hardwood forest, birch and oak.

The lobster fungus is considered a choice edible. However the covering fungus attacks so swiftly and comprehensively that it is difficult to identify confidently the underlying host mushroom. This can make harvesting them somewhat perilous.

It is not known whether *H. lactiflorum* could parasitise a toxic host.

They are commercially available nonetheless.

Lobster Fungus

Hypomyces lactifluorum

Contrary to what some cite
This fungus is a parasite.
Its orange cloak jackets the host fungus
Distorting it to shape humongous.

Encasing with Houdini skills
This scrounger seals its victim's gills.
Though many relish it in soup
I, for one, won't join that group.

Hypomyces chrysospermus transform Boletus edulis

Bolete Mould *(Hypomyces chrysospermus)* is common on *Boletus edulis*, and *Suillis Spraguei* and can transform these boletes into unrecognisable forms often melding them together..

This parasite fungus starts as a powdery dusting of the pore surface but soon engulfs the whole mushroom.

This fungus is very prevalent in wet weather, late summer and early autumn.

Eventually the coating turns a golden yellow and then begins to brown. In this state It can be confused with the orange parasitic fungus of the 'lobster mushroom'.

More often the bolete host has rotted away before the mould enters these final stages.

Bolete Mould

Hypomyces chrysospermus

This grisly phantom stalks its prey
Inducing Boletes deep dismay,
Enveloping host's hearty hue
With pinkish veil of ecto-spew

With gnashing teeth, contorted lour
This foul fiend penetrates their bower.
Monstrous shapes compound the terror
Sad! Mother Nature is not fairer!

Fruiting Bodies of Slime Mould on maple stump under back stoop

Slime Moulds provide an insight into intelligence without a brain. There are many types of slime mould encountered on Fairwood Island. They are very discreet and permeate the moist under bedding of the forest floor. They thrive in warm wet weather conditions and can grow very rapidly. They are most often encountered as a white rot evident under decaying bark on the forest floor or in the greyish dusting on the bark surface of the pine trees, usually on a northern, sunless exposure.

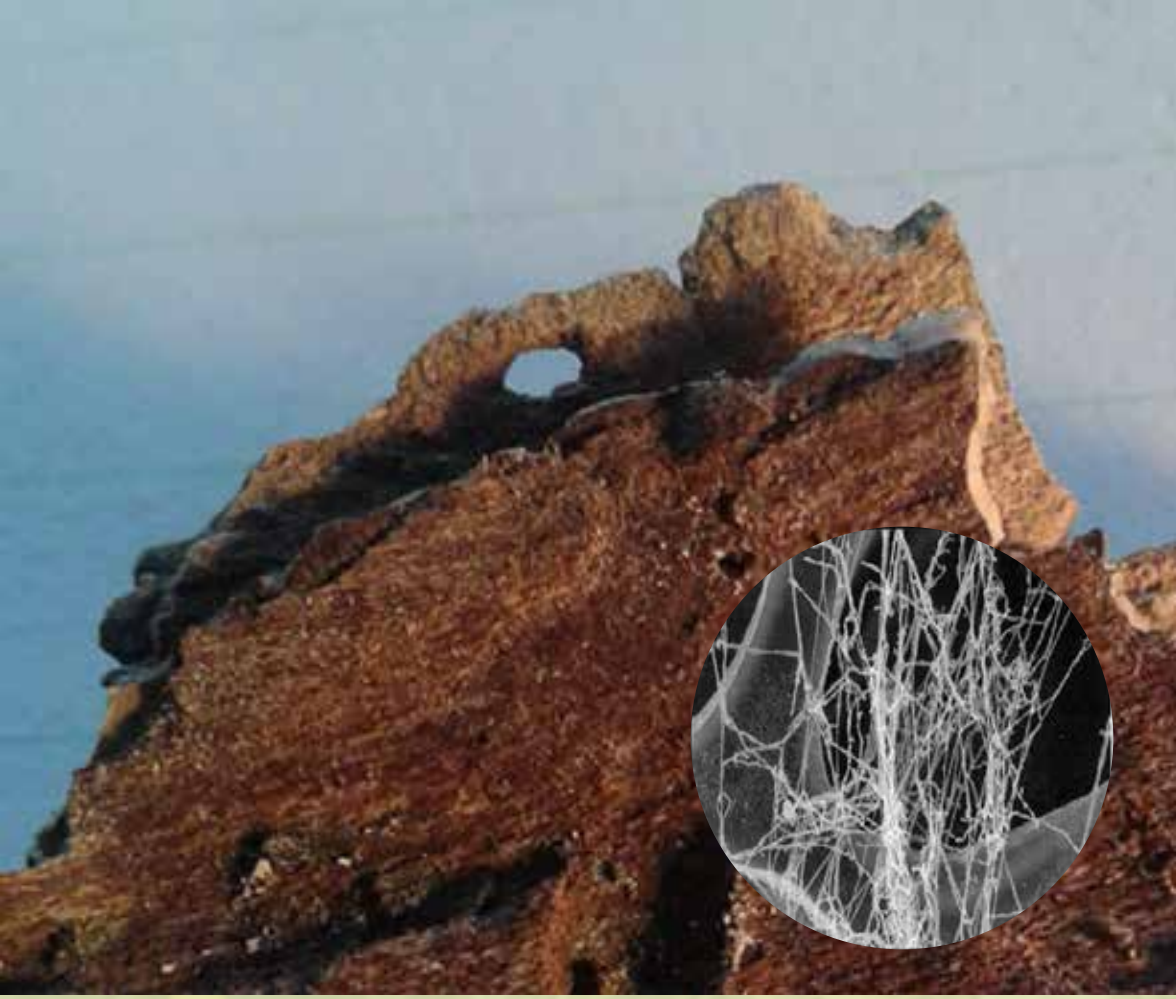
The behaviour of Slime moulds gives insight into the nature of intelligence. They are a curious combination of animal and plant like behaviours. Like an animal a slime mould can learn about an obstacle or a reward and pass this information on to other strands of moulds that become temporarily fused with it and then are subsequently detached. The other mould will then adjust its growth pattern to reach the nutrient or to bypass the obstacle that has been encountered.

Slime moulds have been used in experiments in urban engineering. They are used to map 'desire lines' or interconnections within a complex urban structure. This experiment has allowed the development of a model which reasonably accurately mirrors the growth pattern of Tokyo Subway system. This is a demonstration of intelligence in an organism that has no central brain directing a neural network. yet where cells act singularly to enable a multi-cellular collaboration.

Slime Mould

Adding to its great distress
Slime tends to suffer dreadful press.
Considered common, spineless, low
It hides in places few dare go.

But to compensate for lowly bent
Slimes are quite intelligent.
They find solutions, waste no time.
Don't underestimate the *nous* of slime.



White Rot fungus on decaying North Shore pine log, common in damp locations everywhere.

The White Rot Crust Fungus (*Phanerochaete chrysosporium*) never forms a mushroom-like fruiting body for reproduction, but produces very flat, fruiting bodies that appear as no more than a crust on the underside of a log. The genus name is derived from the Greek words φανεφός ("distinct") and χαίτη ("hair").

Wood consists primarily of cellulose, which is white, and lignin, which is brown. The lignin degrading enzymes of this fungus make it a very efficient decomposer of wood by degrading the woody polymer lignin into carbon dioxide.

This fungus has also been employed to remove the lignin from wood pulp in the making of white paper.

It has proven effective in decomposing PCB's and PCP's. This fungus can remain active at temperatures of up to 40 degrees C and so is able to thrive at composting temperatures.

There are 46 different species of *Phanerochaete* and their bioremediation potential is still being discovered. Phenol-formaldehyde is degraded by *P. chrysosporium*, while *P. sordida* breaks down the neonicotinoid pesticides that have been implicated in bee colony collapse.

White Rot Crust Fungus

Phanerochaete chrysosporium

O! armas longas, vita brevis!
Infiltrating every crevice!
From comfortably moist, mossy lair
It tendrils probing everywhere!

O what a tangled web we weave
When first we practice to de-leave!
When stealing what another's got
You end up wallowing in rot.

Black Knot on chokecherry on path to West End

Black Knot (*Apiosporina morbosa*) is a parasitic fungus that appears on trees of the 'Prunus' family such as wild cherries and pin cherries. A version of this affliction is also found on bilberries and Rowan trees (mountain ash).

The gall is not the actual fungus but the tree's reaction to the fungus. Knobby black corky growths form on stems and cut off all flow of nutrients to the branch beyond. The fungus induces an irregular to spindle-shaped knot-like growth; black, corky and very tough. The fruiting structure, 3 - 15 cm long, is embedded in the surface of this gall. This releases *ascospores* in early spring and these are transferred by blustery rains to nearby locations where they settle on tree wounds or tender shoots. The fungus is not systemic but grows locally inside the host, spreading from the initial infection site. Throughout the summer, *conidia* are produced which are dispersed by wind and rain. The conidia are fungal spores which germinate without sexual interaction.

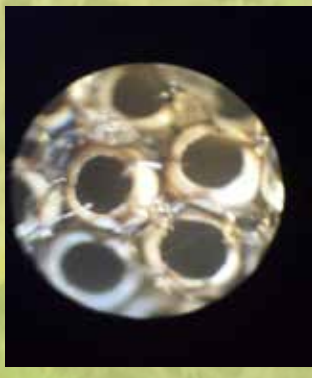
This disease may take several years to develop and generally proves fatal to the tree. There are several variations: *Dibotryon morbosum* infects *Prunus serotina* (wild cherry trees), *Prunus Persica* (peach trees), P*runus Domestica* (plum trees), and *Prunus cerasus* (sour cherry trees)

Black Knot

Apiosporina morbosa

The Prunus family lives in fear
Of vampire fungus lurking near
That sinks deep fangs into doomed branches
And flow of vital juices stanches.

Desperate to fate forestall
The afflicted victim grows a gall
But ruthless fungus fast prevails
Until at last its victim's fails.



Blister Rust can be found afflicting Trees #5, #11 and near Dog House

White Pine Blister Rust (*Cronartium ribicola*) is a fungus that affects White Pine. It is invasive in North America, thought to have been introduced from Asia around 1914. The blister rust alternates between two hosts during the course of a complex cycle moving from *Ribes* species like wild currant and gooseberry to the white pine and back again. The infection of the pine occurs in late summer and fall when fungal spores (*basidiospores*) are released from the undersides of ribes species leaves and settle on pine needles where it germinates as a fungus turning the needles brown. Gradually it grows into the twigs and branches. Swellings or cankers become evident on the trunks and in early spring these develop orange blisters.

After a period of about 3-6 years white blisters begin to erupt through the bark of the tree stem which rupture and release orange spores (aeciospores) which find their way back to the Ribes species and re-colonise the leaves during the late season and the cycle is repeated. The pine blisters become noticeable swellings in the trunk releasing resins which streak the trunk and drip around the base of the tree. It has been noted on some of Fairwood's pines recovering from pine rust that the branches suddenly become distinctively dense and disorganised in the areas of the cankers. Seedlings and young trees are most vulnerable to pine rust. Older trees may have the rust only on smooth barked branches and remain unaffected at least until the fungus girdles the trunk and kills the tree.

White Pine Blister Rust

Cronartium ribicola

A complex character defines
This dread Rust fungus, bane of pines.
Abaft of Ribes leaves it lurks
And plots its esoteric quirks.

When spores reach pines, infection jumps
To deep embed within their stumps.
Eruptions then both orange and fruity
Soon curtail the *pinus* beauty.

Tar Spot is common on Fairwood's maples, here photographed on Tree # 9

Maple Leaf Tar Spot (*Rhytisma acerinum*) is an affliction of black, roughly circular spots on the leaves. These can be very small or up to ½ an inch across. Each black circle is surrounded by a yellow margin. There may be one or several spots on each leaf and leaves with a lot of spots may turn yellow and fall prematurely. This common fungal infection afflicting the leaves of maples is cosmetic and is not fatal to the tree. However, *equine atypical myopathy* has been associated with horses' ingestion of large quantities of tar spot infected maple leaves. This disease causes the degeneration of muscle fibres and eventual death of the animal.

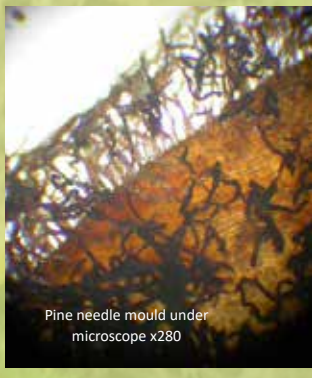
Cherry Leaf fungus, (*Blumeriella jaapii*) These fungal leaf spots on cherry trees are circular and start as red to purple in tone. The disease first appears on upper parts of leaves. These spots measure 1/8 to 1/4 inch in diameter. As the disease develops, the spots become rusty brown and begin to appear on the undersides of the leaves. Whitish downy material appears at the centres of the spots, which sheds the spores of the fungus. When the spores drop out, tiny shot holes are left in the leaves. The causal fungi overwinter on infected fallen leaves. In the warming temperatures of spring with accompanying rainfall, the fungi start to grow again and produce spores. These are transmitted through rain splash and wind to land on new non-infected foliage.

Black Spot & Other Common Tree Fungi

White Spot on Maple was very prevalent in late 2021

Black spot, white spot, brown or pink!
More afflictions than you think!
But most spots hardly ever kill you
Being more like pesky case of mildew.

But such spots thrive in realm of fiction
Where they portend a dire conviction,
Augmenting sorely pirate's dread
When safe at home tucked up in bed.



Pine needle mould under microscope x280

Orange fungal growth on under side of Ribes - wild currant leaves

Two different species come together symbiotically in a partnership to form a lichen. One or more fungal partners (*mycobionts*) provides a stable structure and acquire nutrients by dissolving rock minerals. An algal partner (*photobiont*) harvests light and CO2 to provide energy.

Cyanobacteria take nitrogen out of the air and fix it. The blackish colours of some lichens seen particularly at the waters edge, are due to the cyanobacterial that is being held within the fungus.
Lichens mine minerals from rock by penetrating any tiny fissures between rock crystals. They deploy a range of powerful acids/enzymes and mineral binding compounds to dissolve the rock

Lichens reproduce in two different ways: They reproduce asexually by releasing tiny fragments of fungal/algal material which are dispersed in the wind. They also produce sexually by producing sac like cells, shaped like cups or conical flasks, asci, which produce spores that are blown around by the winds.

Lichens 'extremophile' ability to survive very adverse, high radiation exposures in space has favoured the idea of 'panspermia', the concept that certain life forms have been able to migrate through space to seed the universe.

Fungus mycorrhizal tendrils can infiltrate into tiny cracks between rock crystals providing sound moorings for the organism in hostile, windswept environments. Enzymes dissolve the rock and derive mineral nutrients. The symbiosis results in a collaborative organism that can survive in extreme conditions including incursions into outer space withstanding extreme solar radiation. This symbiotic organism can be exceptionally long lived in very extreme conditions.

Lichens are often a first step in establishing a succession that will eventually transform a landscape. Examples in arctic lichens have been found, thought to be over 8,000 years old. They tend to grow at steady rates (approximately 5mm or 1/4" year) and can prove useful in dating exercises. Cyanobacteria take nitrogen out of the air and fix it. The blackish colours of some lichens are due to the cyanobacteria that is being held within the fungus.

Lichens reproduce in two different ways: They reproduce asexually by releasing tiny fragments of fungal/algal material which are dispersed in the wind. They also produce sexually by producing sac-like cells, shaped like cups or conical beer flasks, which produce spores that are blown around by the winds.

Lichen

Rhizocarpum

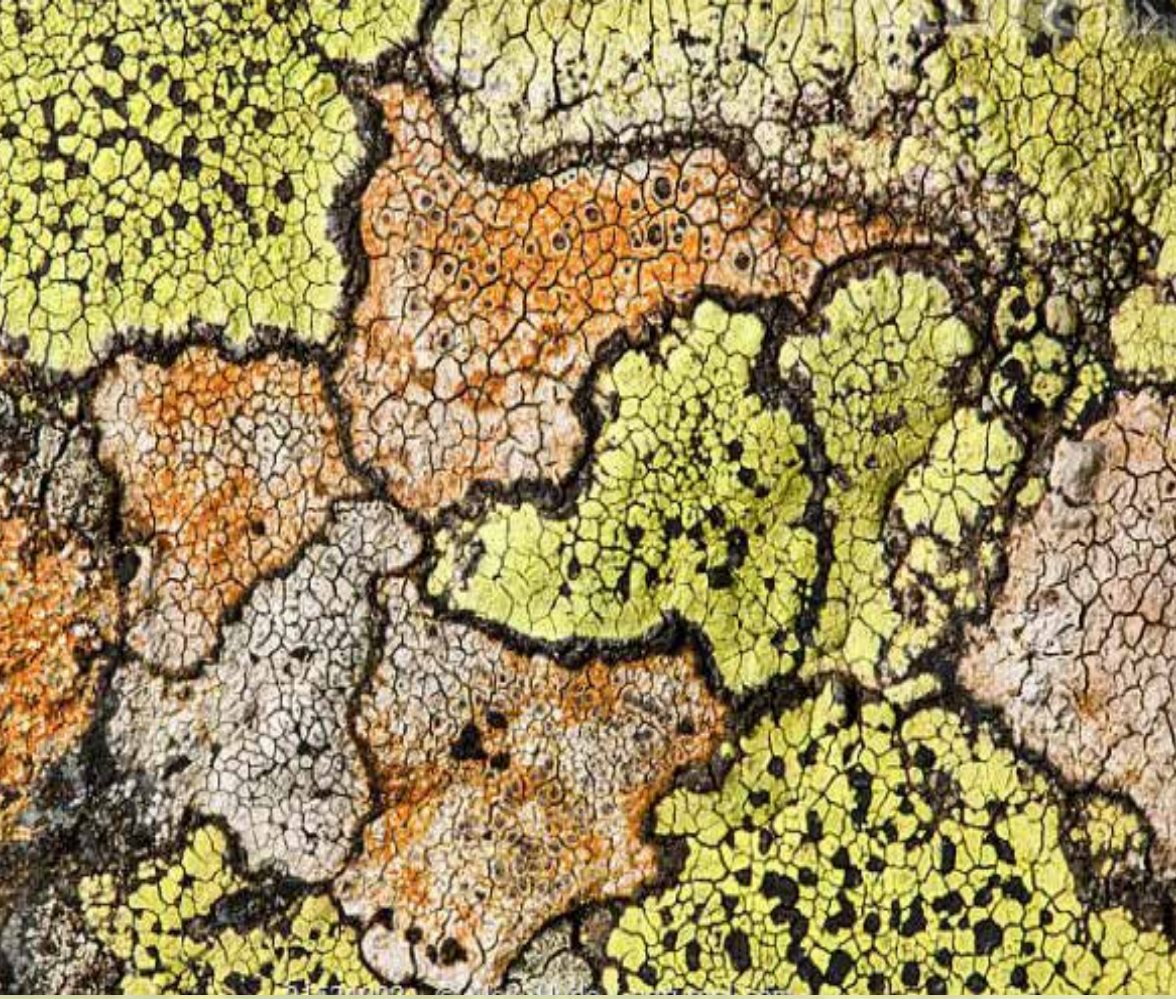
Lichens are like you and me
All flavours, shapes, variety.
Some content with microscopic,
Others court the Macrotropic.

Crustose lichens cleave to rock
Tenacity and no small talk
With risk-aversion some deem sapping
They spend their days close plotting, mapping.

A tendency to adipose
Is the downfall of the ***Fruiticose***.
Toasting one another's sins
They throw discretion to the winds.

A talent of the ***Foliose***
Is pollution it can diagnose
For all excess of nitrogen
Sends them into full tailspin.

The 'Crusties' raise a hearty cheer
When 'Folies' wail 'We're outta here'.
Hunkered down and inter pares
Contemplating trip to Mars.



Map Lichen – Rhizocarpum geographicum

Map Lichen *(Rhizocarpum geographicum)* These very green patches have strands of the black fruiting bodies separating them and look like an aerial photo map or a landscape of green fields. Map lichens grow on basalt or acidic rock and thrive in cold climates.

Lichens are not plants. Nor are they mosses or liverworts that rely on photosynthesis to convert the energy from sunshine into carbon and sugars.

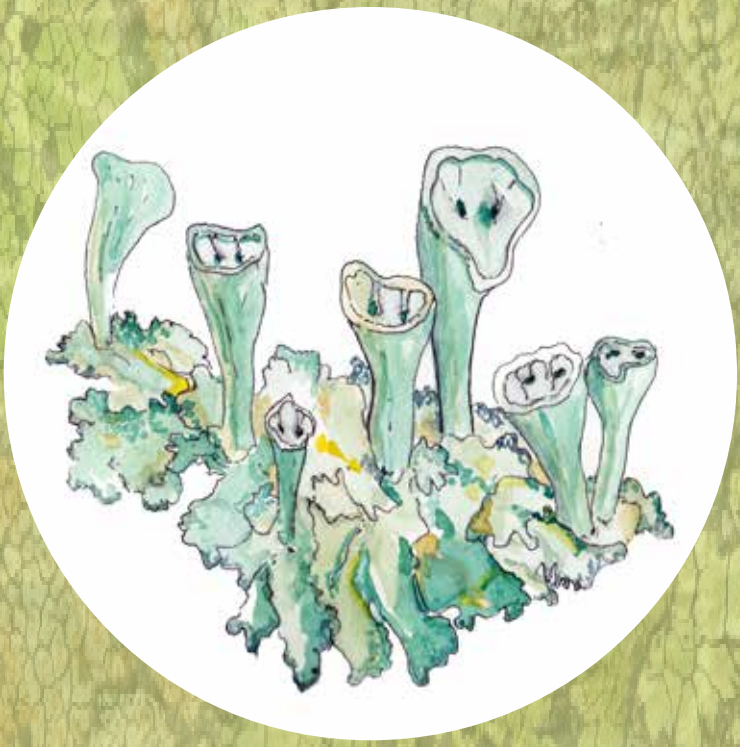
Their mycorrhizal hyphae can penetrate between the rock's crystalline structure which seems impervious to moisture up to 16mm deep (1/2") This is an extreme survivor well adapted to survive in adverse situations. It has been sent into outer space and remained viable despite the extreme radiation conditions encountered.

Lichens are a symbiosis of a fungus which provides a framework enfolding a living algae or cyanobacteria. The fungus envelopes the photosynthetic cells of algae or cyanobacteria with its tentacle-like network of hyphae, the tips of which pierce the cell walls of the partner and feed upon the sugars produced by the captive cells.

In return the fungus offers protection for its algal partner, preventing it from desiccating and protecting it from excessive solar radiation.

Map Lichen

Rhizocarpum geographicum



On open rocks there's so much space,
Yet lichens vie to claim a place.
Such mapping out and plans for conquest.
Put spatial skills to telling test

Busily they spread their charts
Intent to plunder foreign parts.
They will persist, blueprints unfurled
There's truth in claim they cover world.

Xanthoria lichens **-** Xanthoria are distinctive orange coloured lichens which grow near the waters edge and in particularly nutrient rich situations.

On the *Limestone Islands* there are large areas of the limestone shelf covered in this bright orange lichen. On Fairwood's West end it is found in small patches interwoven with other lichens along the shore's edge.

The example above shows how Xanthoria tend to radiate outwards in interlocking circles with the active growing parts on the outer perimeters. The inner areas of the expanding circle die off, gradually decompose and are blown away.

Note the little orange 'wine glass' fruiting bodies of this lichen.

Orange Lichen
Xanthoria

With golden cups that toast success
Xanthoria seeks to impress.
It thrives in only purest air
Obsessed with health, self-focussed care.

It chooses sites along the shore
With freshest breeze and views galore
Holistic life it is apprisin'
While keeping eyes on new horizon.

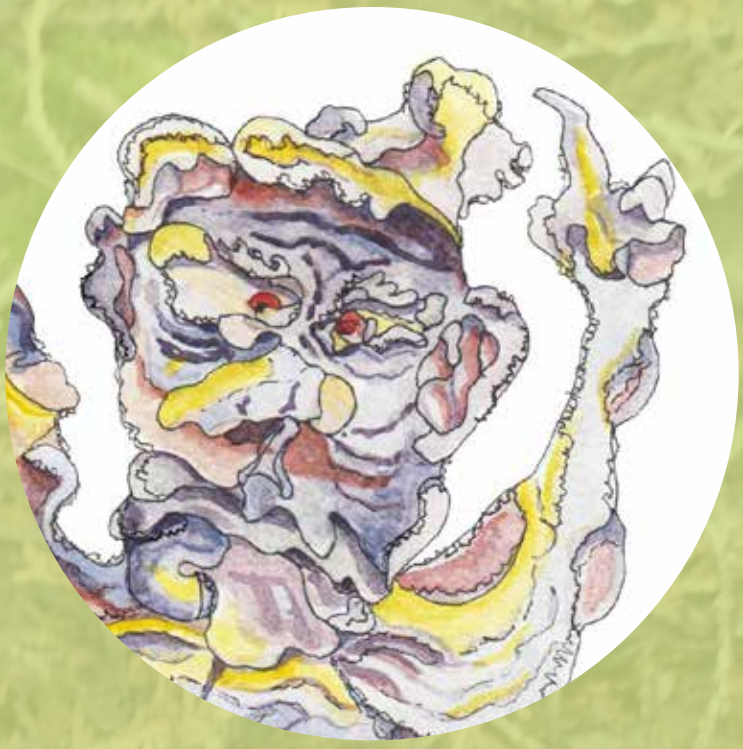
Dog Lichen – Peltigera **-** Named due to its similarity to dog's teeth. This is a 'foliose lichen' or leaf-like. Its larger leaves absorb and fix nitrogen from the atmosphere. This lichen provides shading and protection for many small creatures like tardigrades (water bears)

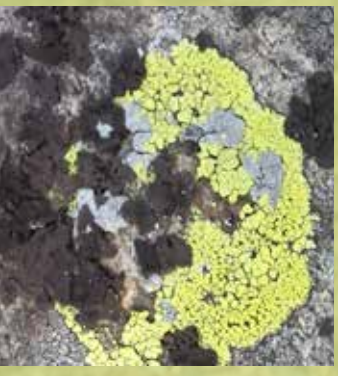
Quartz lichens **-** These are crustose lichens which can have hyphae that extend deep in between the fractures of quartz crystals. These are grey green lichens which have a distinctive halo around the perimeter where the new growth and fruiting bodies are establishing themselves.

Chewing Gum Lichen - Lecanora muralis
This is very common on granite rocks. It too has little cup-like fruiting bodies. It often appears as random separated dots that look like discarded chewing gum trodden into the pavement.

Dog Lichen and Other Lichens

Peltigera





Of gold and silver lodes some talk
But lichens revel in plain rock.
With humility serene and blissful
They send their tendrils inter-crystal.

Their acids, clever alchemy
Dissolve this ancient history
Converting it into nutrition
Which helps bring algae to fruition.

Note textural/structural differences from Reindeer lichens, (Cladonia) found growing in similar locations

Lichens Growing on Trees:

Old Mans Beard – Usnea
This is a pale green assemblage of tendrils usually found rooted to branches of white pines, larch and scotch pine. Usnea acid is regarded as a natural antibiotic.

Green Shield Lichen
This is the most common lichen found on tree bark. It tends to be found on the shaded north sides of trees (which are less likely to dry out in the sun) or on sheltered undersides of trees

Dust Lichen – Lepraria
This very common lichen appears everywhere as a light grey dust on the bark of trees, on all exposures. It is feeding on the lignum in the wood.

Old Man's Beard

Usnea

When hair at last embracing fate
Recedes relentless from the pate,
It imparts to some appearance sage
That grim-jowled prerogative of age.

Festooned from branches, unkempt, weird,
Are tangled tufts of Old Man's Beard.
No youthful rashness here foments,
For old age has brought 'enlichenments'.

Reindeer Lichen – Cladonia rangiferina

Reindeer Lichen (*Cladonia)* is often erroneously regarded as a moss and it is usually found interspersed among green mosses. Cladonia is however a lichen, a fusion of fungal and algal partners.

This lichen forms 90% of the nutritional diet of the northern caribou.

In dry seasons it will desiccate into a brittle cluster, but this will instantly revive into a supple, viable organism in the first rain. This ability to go into dormant mode and then quickly revive when weather favours is characteristic of many lichens.

This lichen is edible by other mammals, including squirrels and chipmunks and it contains less of the dissolved rock derived acids than other lichens.

The nitrogen stabilises the soil and Cladonia is regarded as a vital first step in establishing a 'tree succession'.

Reindeer Lichen

Cladonia rangiferina

A partnership both algal / fungal
Is Reindeer moss. The true North's jungle.
If not to taste of me and you
This snack delights a caribou.

Supple, tender after rain
Medicinal, it eases pain.
And offers up a balanced diet.
Why are so many loath to try it?

Indian Pipe to west of Caravanseral

Indian Pipe (*Monotropa uniflora*) is a parasitic herbaceous perennial which derives its nutrients from the mycelia of Russulas and Lactarius that tend to be mycorrhizal with white pine and hemlock. It is a regarded as rare plant, appearing from June to October. There are many locations on Fairwood where it appears annually. At the base of the fragile hollow stalks hard, woody perennial terminating roots retain a clumps position from year to year.

Indian Pipe is often mistaken for a fungus but is actually a blueberry relative that derives its nutrients without chlorophyll. Being non-reliant on photosynthesis, it can grow at night or in shaded locations. Pollens produced within its flowers are a favoured food source for bees and files.

The Indian Pipe's role is called myco-heterotrophy. Many plants, from orchids to ferns, enjoy the benefits of this evolutionary trickery. Usually found in moist areas it emerges in the same places every year and attracts insects which help in its pollination.

Native medicines used its juices for various treatments including eradication of warts, as an antibacterial for dressing wounds or internally as a sedative for colds and flues. (though sparingly since it contains glycosides)

Indian Pipe

Monotropa uniflora (not a fungus)

A pallid soul, few airs and graces
No sunny world this plant embraces
Aligned with fungal parasites.
It high-jacks others' hard sought rights

Still, favorite of wasps and bees,
Who quaff its pollens to the lees
It offers treats to those who poke it
Now put *that* in your pipe and smoke it!

Lady Slippers fringing protected glades mid island.

It is estimated that 90% of plants thrive through fungal associations.

Like Indian Pipe on the preceding page, Lady Slippers (*Cypripedium acaule*) are parasitic plants that tap into mycelium networks to draw nutrients.

These plants appear singly or in small clumps at the end of June into July.

Lady slippers on Fairwood appear to be fungal dependent. They recur in the same locations every year usually around the fringes of glades where they have access to the sun but where soil is shallow and not particularly fertile.

It would appear that they, like so many other plants, rely on fungal mycelia to deliver the nutrients that they require to thrive.

In a symbiotic mycorrhizal relationship the mycelia receive carbon nutrients produced by the plants photosynthesis in exchange for the minerals that they are able to convey to the lady slippers' rhizomes.

Lady Slipper
Cypripedium acaule

This self-effacing springtime blossom
Offers pedal fashion awesome,
Augmenting stylish footloose mood,
Enhancing female pulchritude.

Princes claim that naught is hipper
Than damsel shod in lady slipper
But those aspiring to enthrall
Alas! may find *NO* size fits all!

For many grande dames fume and spit
On finding them constrictive fit.
Though aspiring to a princely throne,
They strain to even force a toe in.

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Wasp fungus on swamp willow next to Giants Causeway

Cordyceps Fungus can infiltrate certain insects and alter their behaviour turning them into zombies that participate in the life cycle of the fungus. *Ophiocordyceps* is known to afflict carpenter ants in more tropical climates, and caterpillars in Tibet.

There are hundreds of varieties of *Cordyceps* all specialising on different types of insects. It is an ancient affliction and examples of the phenomenon have been found fossilised on a leaf dating back 48 million years. Most modern instances tend to occur in tropical climates, but some can be detected on Fairwood.

This 'Wasp fungus' appears to be parasitic *cordyceps* and feeding on a small wasp-like creature that has been immobilised, alive but dormant in the centre of a jumble of hyphae. It has been found affixed to branches of living bog willow and birch, in the swamp alongside the Giant's Causeway. The fungus disappeared by mid September.

Further study is required! This phenomenon appears to be quite different from oak gall wasps which create a gall nest by injecting the oak leaves with an enzyme which genetically reprograms it and makes the tree react by growing a protective gall within which the wasp lays its eggs.

Wasp Fungus

Cordyceps

This self-less wasp devotes its days
And caters to guest's greedy ways.
To captivate a living host
Is talent several fungi boast.

These nightmare lodgers rule the roost
To have their way they are unloosed.
Encrusted with myceliae
Curtailing their hosts joie de vie.

Fairwood Fungus Observation at 280 magnification

Below - Example of Tropical Cordyceps

Massospora cicadina is a fungus that affects the periodical cicadas which emerge from the ground in 13 and 17 year life cycles. There are approximately 10 recognised broods of cicada which during the long nymph cycle feed on tree xylum underground tapping into amino acids and minerals. The cicadas in the Pointe au Baril area are thought to be in 'Brood 10' on the 17 year cycle and expected to emerge in 2021.

As the nymphs tunnel upwards towards the surface they become infected with *Massospora* which will remain concealed in the abdomen of the emergent flying insect. The cicada life span above ground, its mating phase, is approximately 6 weeks. The fungal growth renders the cicada infertile but also alters its character to spread the infection. The infected males become hyperactive, and mimic female behaviour to attract other males and increase the likelihood of fungal spread.

Eventually the end segments of the infected abdomen drop off to expose the fungus fruiting body and allow the wider dissemination of spores like a salt sellar. The infected swarms of periodic cicadas will also infect the less numerous annual cicadas with *massospora* that contains hallucinogenic psilocybin and psilocin. This has been harvested for its mind altering characteristics by some cultures.

At this stage he later spores released are thick celled and they fall to the ground and remain dormant for the ensuing 17 years until the next mass emergence of the periodical cicadas.

Massospora has one of the longest life cycles of any fungus.

Zombie Cicada Fungus

Massospora cicadina

With baleful eye and vacant stare
And fungus dripping everywhere,
This lethal zombie of the woods.
Seduces with infectious goods.

Voracious, questing many prizes
Its hapless mates it hypnotizes
For year it hovered in the gloom
Emerging now to seal their doom.

Afterword

In recent years, our understanding of the role that fungi play in the Earth's fertility has developed extensively. The fungi that we observe on Fairwood are only the tip of a vast underground network that covers the island, criss-crossing the forest floor and covering the rocks which are being mined and dissolved by lichens to produce the minerals necessary to enrich the soils.

Shifting our perception to understand fungi better, our understanding of what life *is* has altered astonishingly. Like the symbiosis within the human body where alien benign bacteria help to digest food, attack malign invaders and rid us of poisons, so too the plant world is utterly dependent on fungal mycelial networks to deliver nutrients across large distances in exchange for the sugars and carbons that the fungi are not able to produce on their own.

How this extraordinary symbiosis has come about and which of the participants gains the greatest advantage from the interaction is impossible to ascertain. It appears that fungi, one of the earliest life forms, was effective in transforming early plant life, extending the primitive and very localised rooting systems into vast networks which could retrieve necessary nutrients from afar.

This compendium has noted three areas where fungi play a critical part in the ecology of Fairwood.

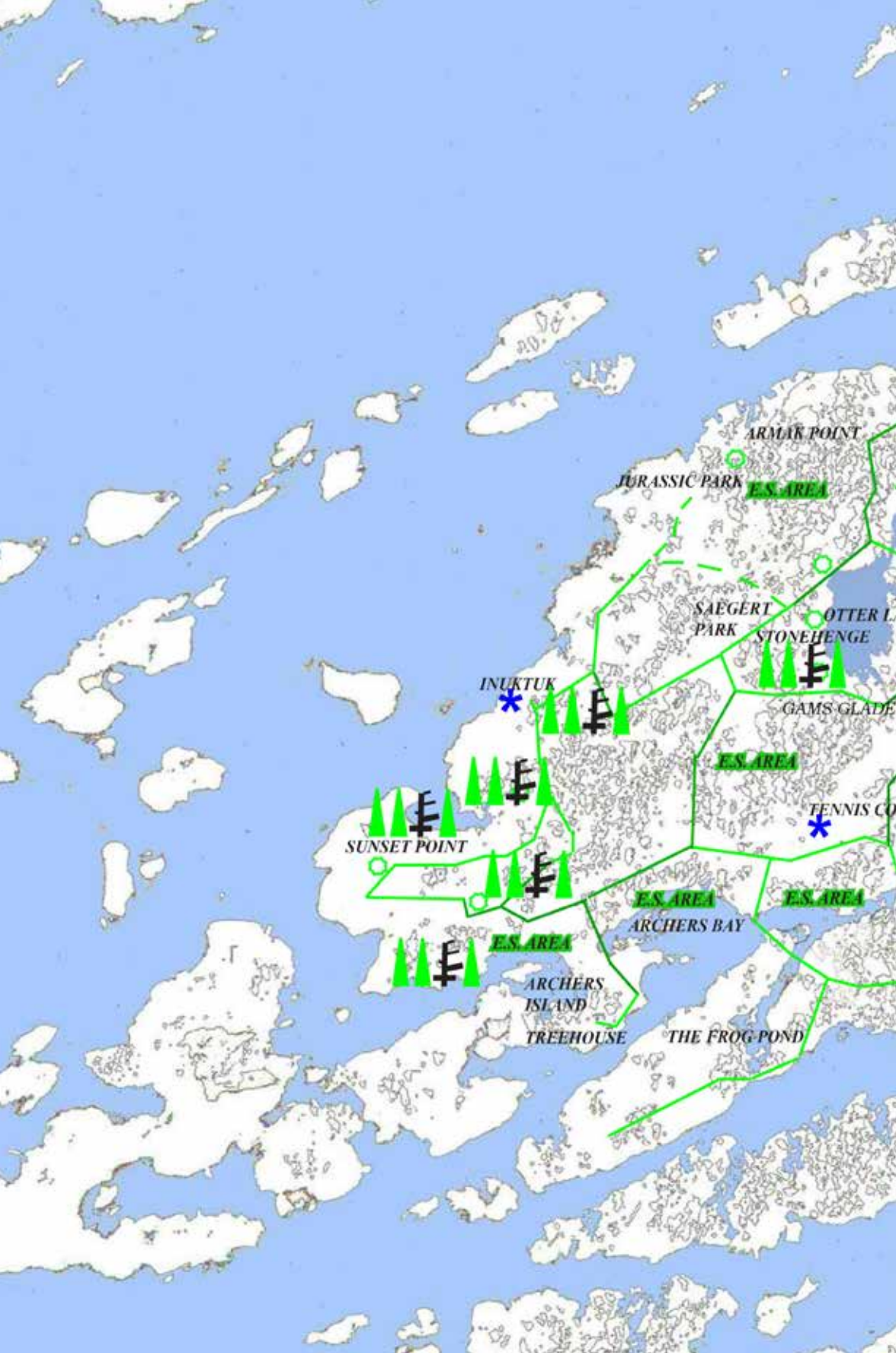
1) The vast mycorrhizal underground networks that develop around different tree and plant species and which help them thrive in adverse conditions. The networks are often somewhat species specific, assisting select species, like white pine, scotch pine, cedar, or wild cherry, rowan or birch to thrive. This also may explain why it is sometimes difficult to introduce some plant species into new areas. For example, it has taken many years for the reforestation of white pine in the West End 'Gulch' to get established. But once they were 'accommodated' and a mycorrhizal network built up, they suddenly began to flourish. Underground mycelial networks seem to be the key to this mystery.

2) The many plants like Indian Pipe or the Ladyslippers and other orchids which appear annually in roughly the same positions, on very thin soil around edges of clearings where they have access to sunlight. The minerals that they require to thrive are being delivered to them by the underlying wood-wide-web.

3) Fungi also affect insect life cycles, infecting cicadas, ants, and wasps deriving nutrition from living animals and using them as vehicles to broadcast their spores.
Blastomycosis is endemic in the soils throughout the Great Lakes region. It typically occurs when an animal inhales the airborne fungal spores of the genus *Blastomyces dermatitidis* after the contaminated soil has been disturbed. This can be from an activity as benign as digging in the dirt or following a scent trail. The spores can also enter through the skin. Pets, like Duffie, can be exposed to *Blastomyces dermatitis* spores when snuffling in the soil and develop *Blastomycosis* in the lungs or brain. Human beings can contract Fungal pneumonia, an infectious affliction of the lungs caused by opportunistic fungi. Fungal infection occurs after the inhalation of spores or conidia.

Lichens are increasingly identified as playing a key role in creating the Earth's nutritious soils. This Fungal/Algal symbiosis has proven to withstand extraterrestrial conditions and high levels of radiation. Lichens are constantly dissolving the rock that seems so permanent and impervious to life and transforming it into a mineral rich topsoil that all living things depend on.

Perhaps they have been both the past and will be the future of Mars!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GAMS GLADE
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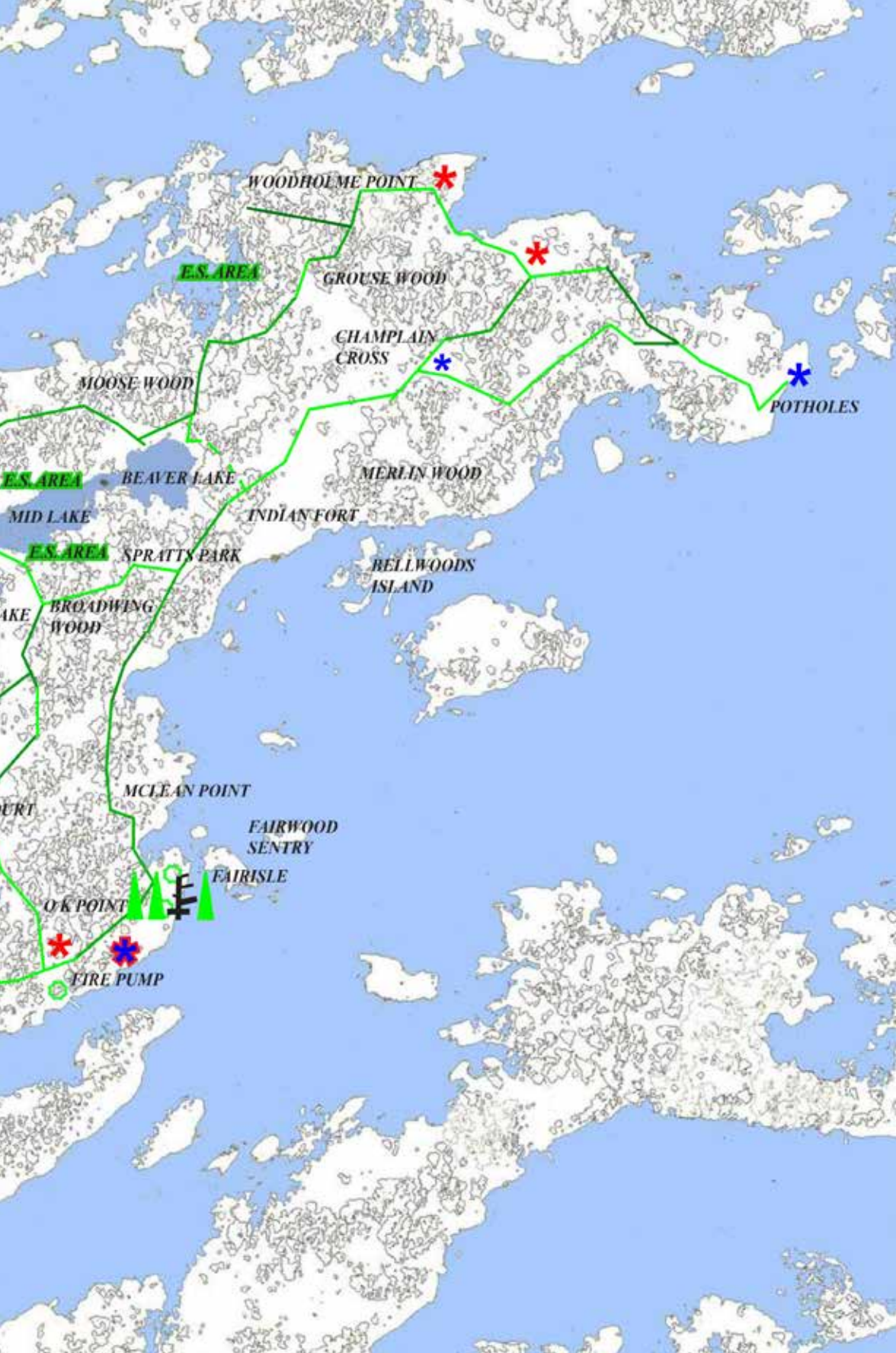
ARCHERS BAY
E.S. AREA
ARCHERS ISLAND
TREEHOUSE
THE FROG POND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CHAMPLAIN CROSS
MOOSE WOOD
POTHOLES
E.S. AREA
BEAVER LAKE
MERLIN WOOD
MID LAKE
INDIAN FORT
E.S. AREA
SPRATTS PARK
BELLWOODS ISLAND
BROADWING WOOD
MCLEAN POINT
FAIRWOOD SENTRY
FAIRISLE
O K POINT
FIRE PUMP

Specific Observations of a mycologist on Fairwood

1) Mycelia are everywhere interlinked in layered networks, but the fruiting bodies, the mushrooms and polypores only appear in certain situations.

2) Mycelia fruits in cool wet weather. Though they do not photosynthesize, they often appear in sunny and open, transition spaces.

3) Mushroom fruiting bodies arrive in definite cycles related to wet periods over the summer. A wide variety of amanitas appear early in the season, followed by the first painted boletes. A wide range of Russulas & Tricholomas appear during a wet August spell. There is an abundance of all mushrooms during September and October, when many of the early species make a reappearance in smaller numbers.

4) Mushroom fruitings may also be slightly sensitive to lunar cycles.

5) Most mushrooms encountered seem to develop on the verges of woods. Though many are 'mycorrhizal' and have a symbiotic relation with specific tree species, they often appear at some distance, very often nestled deep in mossy verges.

6) The mycorrhizal relationships seem to be often three-way collaborations, involving the mycelium, the tree it interacts with and a moss bedding that retains the moisture to sustain the mycelia and provides a propping structure for the fruiting body.

7) Even within a species, significant variations can occur which can make mushrooms very difficult to identify from guide books. The mushroom fruitings change colour and shape considerably as they age. There are many different moulds which afflict older fruiting bodies, and which completely transform the appearance of the mushroom.

8) Added to this challenge, mycologists are continually renaming and reassigning species as they become more familiar with spore types and details at a microscopic scale.

9) The fruiting of mycelia in the form of mushrooms seems often to occur in areas of disturbance, near fallen trees, near paths, near freshly dropped soil or woodchips.

10) Mushrooms do not always appear in the same places. Some years present apparently ideal cool damp conditions and yet mushrooms do not appear at all where they were previously abundant.

11) Many mushrooms on Fairwood are tiny and can be easily overlooked.

12) Mycology is a very young branch of science. Until the 1970's fungi were considered a type of plant with plant-like behaviour. They were one of the few life forms that survived the Permian extinction 252 million years ago. They made

possible the migration of the first photosynthetic organisms to land. We have subsequently learned that fungi comprise a distinct and much older kingdom which had integrated itself into all living things.

13) Very little mycorrhizal activity seems to occur in the vicinity of cedars. Apparently the cedars exude a natural pathogen which discourages fungi. The nutrients in deciduous woods, oak, birch willow and cherry are associated with greater varieties of mushrooms.

14) Some years, like 2021, have seen a flourishing of Indian Pipe and other plants that are entirely dependent on mycelial networks. The networks are there but the fruiting bodies, the mushrooms, may not appear at all through the season.

15) Lichens are much the most successful fungal/algal collaboration on Fairwood. Some fungi are excellent indicators of air quality. Fungi have established themselves on tree branches of various pines, where the moist microclimate favours such efflorescence.

16) Some animals can eat mushrooms such as russulas and amanitas that are deemed somewhat poisonous by humans. The bears seem to eat some russulas but leave the amanita bisporgiera alone.

Yours Truly,

Fl@ubert