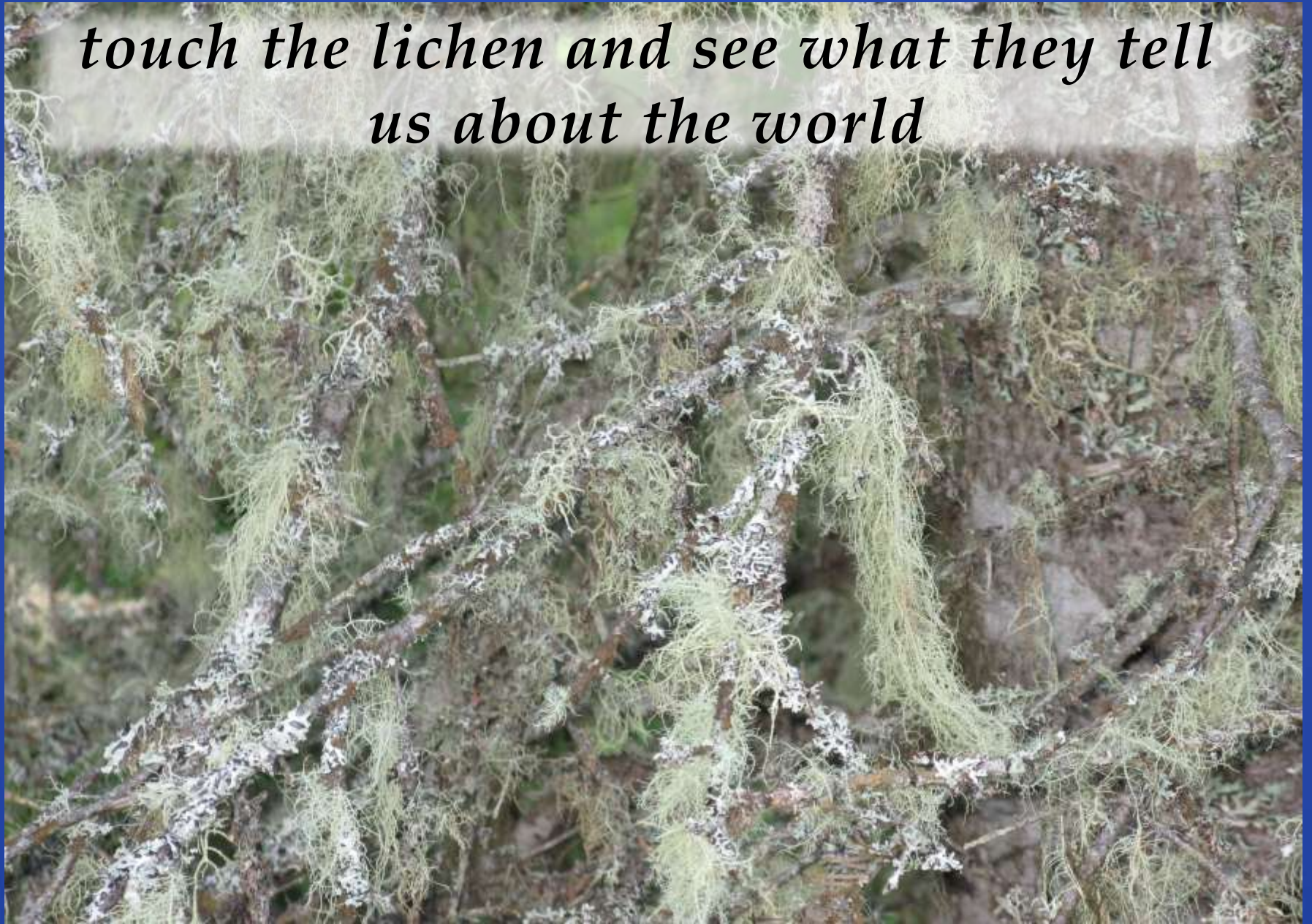


lichens



*touch the lichen and see what they tell
us about the world*



Are those mosses killing those trees?



Biological Interactions

Symbiosis: the living together of unlike organisms

- **Mutualism** is a biological interaction between individuals of two different species, where both individuals derive a fitness benefit.
- **Commensalism** is a kind of relationship between two organisms where one benefits and the other is not significantly harmed or helped (like a bird living in a tree). The term derives from the Latin *com mensa*, meaning "sharing a table".
- **Parasitism** a relationship in which one member of the association benefits while the other is harmed.
- **Amensalism** is a biological interaction between two species in which one impedes or restricts the success of the other without being affected positively or negatively by its presence. Usually this occurs when one organism exudes a chemical compound as part of its normal metabolism that is detrimental to another organism.

Hologenome theory

explains the rapid adaptive changes that are difficult to explain within the traditional Darwinian framework

Organisms in symbiotic relationships evolve to accommodate each other, and the symbiotic relationship increases the overall fitness of the participant species.

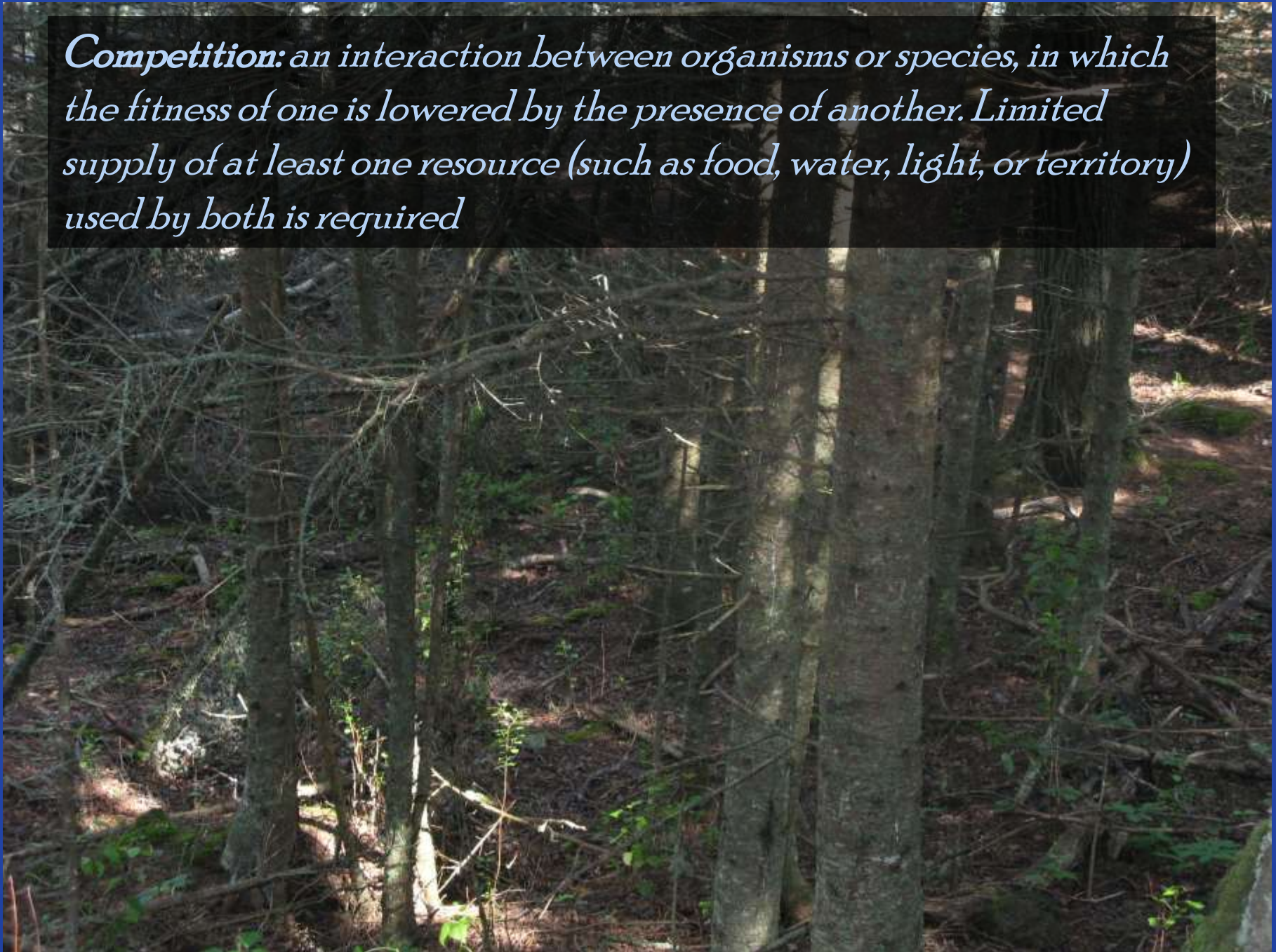
The evolution of a concept

In ancient Greece a parasite was one who received a meal in exchange for a witty conversation.





Competition: an interaction between organisms or species, in which the fitness of one is lowered by the presence of another. Limited supply of at least one resource (such as food, water, light, or territory) used by both is required



View lichen as parts or as a whole

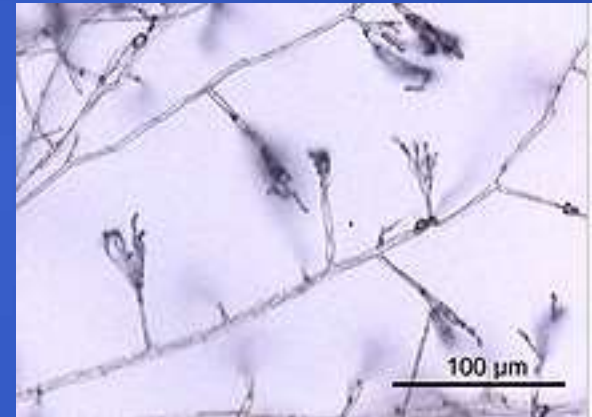
Mycobiont

- Fungus – primarily Ascomycetes



Photobiont

- 90% algal
 - Treboxia (40%)
 - Trentepohlia
 - Myrmecia



- 10% cyanobacteria

- Nostoc
- Scytonema





Duck-rabbit image



Lichen Life Forms

- Crust
- Scale
- Leaf
- Club
- Shrub
- Hair



crustose



foliose



fruiticose







Lecanora



Caloplaca

This image shows a close-up of a lichen colony on a rock surface. The colony is composed of two main species: *Caloplaca* and *Aspicilia*. *Caloplaca* is represented by bright yellow-green, lobed, and somewhat irregular patches. *Aspicilia* is represented by a more extensive, greyish-white, and highly textured area with a distinct, regular, hexagonal or polygonal cellular pattern. The two species are intermingled, with *Caloplaca* patches often appearing as islands within the *Aspicilia* matrix.

Aspicilia

Aspicilia cinerea





Candelariella

Xanthoparmelia



Rhizocarpon disporum

Rhizocarpon geographicum



Porpidia



Buellia







Xanthoria

Sensitivity to pollutants



Sulfur levels ranged from 180 to 2190 ppm
on Isle Royale in 1985



In the Arctic sulfur levels measure at 200-300 ppm

In some urban area levels may be 4300 – 5200 ppm



Lobaria







Stereocaulon



Rhizoplaca



5 mm

Parmeliopsis

A close-up photograph of a tree branch covered in a dense growth of Hypogymnia lichen. The lichen is a pale, greenish-grey color with a highly branched, leaf-like structure. The background is a soft, out-of-focus green, suggesting a forest setting. The lichen covers most of the branch, with some darker, possibly moss-covered areas visible in the upper part of the frame.

Hypogymnia



Hypogymnia



Peltigera







Icmadophila



Cetraria sepincola

Vulpicida pinastri



Cladina



Cladina rangiferina

5 cm



Cladina

Cladonia cristatella





Cladonia gracilis



Cladonia vertilcilata







Umbilicaria



Umbilicaria deusta



Evernia





Aleatoria



Bryoria



Usnea

Usnea cavernosa



Cetraria





Trapeliopsis granulosa

Trapeliopsis glaucopholis



*touch the lichen and see what they tell
us about the world*

*Relationships
Not it, but ki*

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TWELVE READINGS ON THE LICHEN THALLUS is a series of personal essays written by Trevor Goward and currently running in *Evansia*, the journal of the American Bryological and Lichenological Society. Through the vehicle of these essays, Trevor encourages the lichenological community to step outside itself and look back in at lichens and at our own perspectives on them.

ENLICHENMENT

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The Flames (16 genera)

Here belong all lichens having a bright yellow or orange thallus, regardless of growth form. (Note: For species consisting exclusively of yellow- or orange-rimmed apothecia, see the Button Lichens.)

