

Boston Mycological Club 117th Annual Business Meeting and Lecture
April 30, 2012. Harvard Herbaria Seminar Room
26 members in attendance

In the footsteps of Roland Thaxter in Patagonia. Presented by Prof. Donald Pfister, Asa Gray Professor of Systematic Botany, Harvard University.

Professor Pfister is the scientific advisor for the Boston Mycological Club and for many years has helped daunted club members to identify some of our most puzzling fungal finds. His focus is on the ascomycetes and in particular cup-fungi. He teaches mycology at Harvard and offers a fantastic Extension School course on New England trees and forests.

Professor Roland Thaxter (1858-1932) was a Harvard educated botanist who studied under William Gilson Farlow and was Prof. Pfister's antecedent as Assistant then Professor of Cryptogamic Botany (cryptogam means "unseen seed" and is an archaic term for fungi, lichens, mosses, alga and even ferns – all "plants" with propagules too tiny to be seen with the naked eye) at Harvard. He is chiefly remembered for his life-long study of the Laboulbeniales; a group of microscopic fungi inhabiting the exoskeletons of insects.

Prof. Thaxter's diary of his Chilean travels of 1906 was donated to the Harvard Herbaria by his daughter. Prof. Pfister transcribed the tiny and dense though tidy and regular script resulting in 135 pages of typescript. The prose of a wry, observant and imaginative author came to life in our age.

Thaxter had traveled to Chile in the hopes of fertile collecting in a fairly novel ecosystem that and to meet with Carlos Luis Spegazzini (1858 – 1926) an Italian-Argentinian mycologist studying South American fungi. With the Panama Canal not completed for nearly another decade, his journey just to get to Punta Arenas from Cambridge seems Odyssean to the modern traveler; taking a steamer to Liverpool, England, stopping off in Portugal and then back across the Atlantic to Montevideo in Uruguay where a river boat would take him to Buenos Aires. After a time there he went on to the Western coast of South America through the Straits of Magellan. Ultimately, he settled for a three month stay in the "corrugated town" Punta Arenas.

Finally free to explore on land having set up a temporary laboratory in a well-appointed rooming house, Thaxter explored and documented the countryside and its mycology. Compared to our North American forests with our pines, beeches, larches and complex relationships with mycorrhizal, parasitic and saprotrophic fungi, the South Chilean forests exist in a cool, temperate climate near Antarctica and are dominated by three species of trees, all of the "southern beech" genus *Nothofagus*, in a "simpler" ecosystem without "complicated interactions" as Pfister describes. *Nothofagus* is endemic to Chile, New Zealand and Australia and is the only ectomycorrhizal species in these forests.

Among Thaxter's fungal collections was the parasitic ascomycete *Cyttaria* which is only to be found on *Nothofagus*. It causes the trunk to form large woody galls from which gregariously sprout numbers of yellowish golf-ball shaped fruiting bodies. Thaxter sought these out as there were only a few collections available for study in North America. As the fruiting bodies were often high up in the tree he managed to rig poles or looped strings to gather his quarry. *Cyttaria*'s range of distribution tracks that of its host and today we can think about this distribution of host/parasite through the theoretical lens of a formerly unified super-continent and continental drift to see that over the millennia

they evolved in tandem as the continents drifted apart and spores and trees drifted across space. Incidentally, seventy years before Thaxter, Charles Darwin collected the same fungus while sailing aboard the HMS Beagle (1831 – 1836) and his collection would later be named *Cyttaria darwinii* by the English mycologist Miles Joseph Berkeley in 1842.

In addition to collecting fungi, Thaxter photographed a geologically dynamic landscape of “rotten stone” and waterfalls that had been strikingly altered by human endeavors. His black and white glass plate negatives reveal forests cleared for grazing sheep and fuel with the resulting erosion and landslides, a railway leading to coal mines through muddy clearings - a burned hillside. Still, the mist muffled mountains overgrown with wind-swept trees whose branches dripped with hoary layers of lichens and moss were utterly unlike the comparatively genteel lanes of Cambridge where little more than one hundred years later Professor Pfister would draw his plans together to see for himself what changes time had brought to the landscape and fungi of Southern Chile.

In 2008 and March of 2012, Pfister and a colleague; Dr. Matthew E. Smith, a former graduate student and now Assistant Professor of Mycology at University of Florida, navigated byzantine airline schedules and helicopter rides to arrive in Chile where in 2012 they were being hosted by the for-profit conservation group Patagonia Sur http://www.fundacionpatagoniasur.cl/about_us_fundacion.htm. The landscape they encountered had changed in some ways from Thaxter’s time. Some forests were recovering and had been placed in conservation while other stretches were clear cut for grazing and firewood, the only visual punctuation in a stretch of pasture being the dead stumps and boulders.

Smith’s work is primarily in hypogeous fungi – that is fungi that fruit below ground and spread their spores by insect or animal mycophagy. Don and Matt made collections of several hypogeous fungi such as *Gymnomyces*, *Hallingea*, *Gymnopaxillus morchelliformis*, and *Thaxterogaster* spp. (named by Rolf Singer to honor our intrepid mycologist) which retains a vestigial stalk and has brown spores developing in its convoluted and crumpled gills. Molecular phylogenies show *Thaxterogaster* to be nested within the genus *Cortinarius* and some species even have that recognizable *Cortinarius* “lilac” purple hue that is so recognizable in our common terrestrial Northeastern species. Looking at *Thaxterogaster* is like looking at a snapshot of evolution in action with its mushroom-like appearance of a vestigial stipe and globular “cap.” It is a reminder of what the genetic revolution in mycology has revealed, that the hypogeous and terrestrial sporocarp have evolved many times over in geological ages and that evolution does not progress toward some final goal of morphological perfection – the same life habits can be “re-evolved” as genetic and environmental pressures push and pull on the lives of individual fungi over millions of years.

Another hypogeous fungus was alluded to in Thaxter’s journal and which he referred to as Geodon, the “earth-tooth.” This near-mythic fungus was intriguing to Pfister and he and Smith set about digging for it and were rewarded by many collections. It is ivory white, nearly the length of one’s pinky finger and shows the slight curve and pointed tip of a tiger’s tooth. Apparently it is common, possibly mycorrhizal, and it may be related to *Underwoodia columnaris* - a rarely seen ascomycete of our Northeastern woods.

Thaxter’s travels continued and he returned to Buenos Aires where his journey came to an abrupt end when he received a letter informing him that his son was critically ill. He immediately left South America and embarked on the seemingly eternal journey back to Liverpool and on to Cambridge. He discovered when the ship arrived in Lisbon that he was too late to see his boy. In the dire anxieties

he must have endured on his passage, he lamented in his journal that almost no one had befriended him during his travels.

For further reading see *Fungi of the Andean-Patagonian Forests: field guide to the identification of the most common and attractive fungi* by Irma Gamundi de Amos and Egon Horak.