

Laudatio

Teuvo Ahti: lichenological luminary

Teuvo Ahti – reflections and recollections by Orvo Vitikainen

Teuvo Tapio Ahti is not only a globally valued and recognized lichenologist but is also distinguished in many other fields of botany and mycology. I have had the great honour and pleasure of knowing Teuvo in his roles as a teacher, employer, superior, colleague and friend over a period of six decades, and I appreciate this opportunity to highlight some events from his career. I (like all Finns) use here his name Teuvo, which derives from Theodosius and Theodor, even if outside Finland he is universally known as Ted. This is apparently because the diphthong *eu* sounds strange, and easily gets twisted and pronounced *oi*, as in German. In spite of the brevity, his surname Ahti has not always been easy to grasp either, and letters addressed to ‘Tuevo Athi’, for example, were sometimes seen in those old days when letters arrived by ordinary snail mail. He is honoured with the specific epithets of *ahtia* and *ahtiana* in 19 genera, and in the generic names *Ahtia* M. J. Lai, *Ahtiana* Goward, *Teuvoa* Sohrabi & S. D. Leav. and *Teuvoahtiana* S. Y. Kondr. & Hur.

Teuvo’s reputation, although anonymously, touched me during a course on plant organology in Autumn 1961. A senior student spoke enthusiastically of an issue concerning the Botany Department and the Faculty of Science having had difficulties finding an opponent for a doctoral thesis on lichens, a subject ‘totally alien to them’. This was much beyond me, a novice and with a wide-ranging lack of knowledge about academic customs and procedures.

Later, the meeting of the Finnish Zoological and Botanical Society Vanamo in January 1962 included a report on *Erysimum cheiranthoides* by a person named Teuvo Ahti (Ahti 1962a), who was introduced as having recently defended his doctoral thesis on reindeer lichens (Ahti 1961a). Now I was able to link the speaker to the previous discussion, and I also realized that these objects of study were totally unrelated. The lecture introduced me to a multitude of new, odd words, the first time I met with concepts such as typification, several kinds of types, code of nomenclature, subspecies etc.; in the dim hall, herbarium sheets were passed around pinned on cardboard, and a couple of them, particularly protected and with appeals to be handled carefully, were called type specimens.

I have since learned that Teuvo, born in Helsinki on 14 June 1934, spent summers as a child in Asikkala, South Häme, and learned to recognize and eat edible mushrooms. In school he found it pleasant to complete the compulsory summer task of collecting and preparing plant specimens for a herbarium, and learned to recognize some lichens through the guidance of a classmate (whose brother was married to Veli Räsänen’s daughter and

had assisted this renowned lichenologist in the field). During their joint bird watching excursions, this friend conveyed his knowledge of lichens to Teuvo.

In 1952, when still a schoolboy, as well as in 1953, Teuvo took work as a forest inventory biologist in the National Forest Survey, a task assuming a good and tested knowledge of plants, lichens and mosses, and his skill as a competitive orienteer was a bonus in this job. He described his experiences from this summer in his first publication in *Molekyyli*, a natural history magazine for young people (Ahti 1952).

Teuvo started his studies in the University of Helsinki in Autumn 1954, after his military service, aiming to become a teacher of biology, but he then skipped zoology and geography for genetics. He also worked in the Forest Research Institute identifying plant materials collected during the forest inventory and was from there picked out for a summer job in 1956 in Newfoundland to investigate reasons for the decrease in numbers of caribou. After four months of fieldwork, when composing an account of the results, he noted its sufficiency for a Master’s thesis and completed his M.Sc. degree in 1957. In 1958 he was back in Canada, now in Ontario to evaluate woodland caribou range. Assessing reindeer husbandry and evaluating forage and pastures of reindeer kept him tied to applied science with publications in Finland, Sweden and Canada over many years (e.g. Ahti 1957, 2014).

The theme of his doctoral thesis was to analyze the vegetation in open boreal forests rich in lichens in Finland, including aspects of reindeer pasturing and logging. His observations in the field in Newfoundland had, however, revealed that many of the identifications of *Cladonia* P. Browne in both literature and herbaria were ‘without rhyme or reason’ and led him down the path of taxonomy, thus leaving the vegetation analysis only ‘as a hobby’, as he expressed it. He did however write a short article on the open boreal woodland subzone and its relation to the reindeer husbandry for the ‘guide booklet’ of the XIII International Phytogeographical Excursion in Finland in summer 1961 (Ahti 1961b). It was one of the five articles in English of the 15 in the book, this mirroring the initial change-over of languages from traditional German to English in scientific writing in Finland. English may not have been Teuvo’s first language in publishing, but his arsenal in this field was wide, including for example Russian, a rare but useful skill in communicating with local colleagues.

In 1961, Teuvo and his new wife, Leena Hämet-Ahti, investigated the vegetation, plants, lichens and habitats of mountain caribou in Wells Gray Provincial Park, British Columbia. On 14 October 1961 he successfully defended his worldwide monograph of reindeer lichens (*Cladonia* subg. *Cladina*), Assistant Professor Jaakko Jalas being his official opponent (Ahti 1961a). The correct rank of *Cladina* Nyl., whether a genus on its own or to be subsumed in *Cladonia*, later led to much speculation, though the latter alternative was arrived at (Ahti 1984), and *Cladonia* remained

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Teuvo's favourite study subject (being a keyword in 136 of his publications) but by no means the only one.

Autumn 1962 saw Teuvo and Dr Bror Pettersson in Wadi Halfa Reach in Sudanese Nubia for some six weeks, rescuing plants from inundation by Lake Nasser. The final touch to identifications of these phanerogams was given by Teuvo's wife, Dr Leena Hämet-Ahti, published in 1973, with lichens being absolutely absent (Ahti *et al.* 1973).

On 1st April 1963 Teuvo was appointed Lecturer (Docent) in Botany, two months later Curator of Cryptogams and then on 3rd November 1969 Head Curator of Cryptogams in the Helsinki Botanical Museum (H). However, in the years 1965–1968 he acted as the Deputy Head Curator of phanerogams of the same herbarium, and he returned to his post as Head Curator of Cryptogams until 30th November 1979.

In spring 1963 I decided to take botany as my main graduate subject and went to see Professor Jalas to explore a suitable M.Sc. thesis topic. Professor Jalas had a surplus of pupils and enquired as to my relationship with lichens. I had to admit that my knowledge here was only elementary, but that I had no dislike of them. I was then told that a new lecturer, Teuvo Ahti, needed pupils and might propose for me a suitable subject; 'he is always in the museum and can be found there'. One day, at noon, I plucked up courage and climbed to the third floor of the Botanical Institute, knocked on the door, was called in, and found half a dozen people sitting in the tiny study with a slanting skylight, apparently enjoying their lunch-and-coffee break. I recognized Professor Jalas, Docent Ahti plus a couple of junior teachers and tried to vanish but was caught in the corridor, and a new appointment was fixed. I later learned that I was accepted as the second (if I am not wrong) of Teuvo's pupils.

In Autumn 1963 Teuvo staged his first lichen course, the first one in this subject area in a long time. It started with an excursion to shoreline rocks in Helsinki, rich in lichens, and we had the opportunity to collect and show our finds for the teacher's identification. When some three of my samples received the same judgement '*Cladonia squamosa*', I concluded that lichens, at least in this genus, were quite tricky and the course would turn out to be rewarding. In the spring term of 1965, Teuvo asked if I was willing to be his research assistant for a four-month period. The task was to prepare his collections into herbarium samples, type labels and similar. I confessed that my skills in typing and recognizing lichens were limited but I would try. So I made what I could of distinguishing and separating different samples, mixed in the collection packets for Teuvo to check and name, and soon learned that the number of specimens I prepared one day had by the next day considerably increased, since Teuvo had by then separated additional small crustose elements which I had overlooked.

My M.Sc. thesis was on epiphytes of *Populus tremula*, and to show my learning I made a reference to an article by A. Hiltzer in French, a language I did not have much command of. I remember that when commenting on my writing, Teuvo felt pity in needing to point out my ignorance that Bohemia is, in Finnish, Böömi. Otherwise, the thesis was mostly acceptable.

Teuvo had by no means forgotten his interest in botanical geography. In 1964 we in Finland learned, for example, that our southern 'oak zone' had been replaced with the term hemiboreal, when naming the sections of horizontal and vertical vegetation zones for regions in North-west Europe, as proposed by Ahti, Hämet-Ahti, and Jalas (Ahti *et al.* 1964, 1968). The system was later applied in North America and Japan (Hämet-Ahti & Ahti 1969; Hämet-Ahti *et al.* 1974).

Teuvo's copious literary output, over a period of 72 years and in all probability continuing, consisted, according to the inclusive listing by Belyaeva & Chamberlain (2014), of 417 publications up to that date. When 40 from the post-2014 listings of Recent Literature on lichens, plus elsewhere, are added, the result (an underestimate) amounts to some 458 publications. This publication record discloses the broad field of Teuvo's interests and study objects: besides the obvious ones concerned with lichen taxonomy, nomenclature, chemistry and molecular phylogeny especially in *Cladonia* and *Parmeliaceae*, key words describing his scientific output include ecology, vegetation, floristics, macro- and microfungi, lichenicolous fungi, bryophytes, phanerogams, phytogeography, and zonality of vegetation, with obvious lacunae being algae and hydrophytes as well as physiology (aside from lichen chemistry). There are examples of connections to applied practices, such as the development of reindeer husbandry, or the inventory of reindeer pastures from aircraft.

The listing of Teuvo's publications also mirrors the breadth of his fieldwork, which extends to all continents excluding Antarctica, either in terms of specified projects (Fig. 1) or from excursions in connection to field meetings or congresses, always with an abundant harvest of specimens for the herbarium of Helsinki (H) and with duplicates sampled for many other herbaria across the world. An important and helpful contribution was to edit the material of William Nylander's lichenological papers into six volumes, the first three, vols IV–VI, coming into print in 1967, and vols I–III, with an appendix containing the first substantial biography in English and a revised list of Nylander's lichenological publications, in 1990 (Ahti 1967a, b, c, 1990a, b, c, d).

Teuvo is sociable, helpful and easy to approach, and no wonder that he has colleagues and friends everywhere, which results in joint projects and publications. A summary count shows some 270 co-authors, at least. Besides help in identification, Teuvo's expertise in solving nomenclatural problems is often needed. Activities as an editor or member of editorial boards (e.g. *The Lichenologist*, *Nordic Lichen Flora*, the Finnish mycological publications *Karstenia*, *Sienilehti* and *Suursieniopas* [Macrofungus guide], Finnish Publishing Board etc.) are an important part of his career. He has memberships (in invited and honorary status) and responsibilities in several scientific societies in Finland and elsewhere, for example President of the International Association for Lichenology 1975–1981 and



Figure 1. Teuvo in the field in Finland (2013) collecting material for the 'Crustose lichens of Finland' book project (Stenroos *et al.* 2015). Image: Soili Stenroos. In colour online.

Honorary President 1996, its Erik Acharius Medal (silver) granted in 2000, and Council Member of the International Association for Plant Taxonomy, to mention only a few.

Teuvo's pupils in Helsinki with a special interest in lichens are, for example, Keijo Huovinen, Filip Högnabba, Kimmo Jääskeläinen, Laura Kivistö, Mikko Kuusinen, Kati Kärkkäinen, Ming-Jou Lai, Katileena Lohtander, Sampsa Lommi, Leena Myllys, Jari Oksanen, Juha Pykälä, Mohammad Sohrabi, Soili Stenroos, Saara Velmala, Orvo Vitikainen and Heino Vänskä (Fig. 2). He also likes to encourage and help his pupils to establish contacts or gain learning in the use of new methods overseas when suitable facilities are not available in Finland. On the other hand, he has welcomed a great number of students and colleagues from nearby and further afield for studies or to conduct research in the Helsinki herbarium, as well as having looked after their well-being and making them familiar with the local environs and colleagues.

Teuvo was appointed a Professor (Extra Ordinem) of Cryptogamic Botany at the University of Helsinki, an office which one cannot apply for, but which is granted according to the person's merits. He had this post from 1st December 1979 to 31st July 1991, when he became Research Professor and Professor of the Academy of Finland for a period of five years, from 1st August 1991 to 31st July 1996, returning to his previous professorship for the period 1st August 1996 to 30th June 1997. Then his status changed to Professor Emeritus and Research Professor in the Department of Ecology and Systematics, continuing to this day and beyond.

During all these phases of study, Teuvo has always remained present within the variable premises of the cryptogamic herbaria of the Botanical Museum. He does not have the behaviour of a boss pushing others around and giving orders, but is rather a

leader who believes in showing an example, an untiring leader from the front and together with his group. Even now, when I at times come from further away to visit the lichen herbarium, it is always a pleasure to meet Teuvo and hear what is going on. When he is not there, people assume that he 'might be visiting the collections in the storerooms', these being located apart from the institute building.

I look forward to continuing our meetings!

Teuvo Ahti – reflections and recollections by Irwin (Ernie) Brodo

Teuvo (Ted) Ahti has been contributing significant and game-changing papers on North American lichens for over 60 years (e.g. Ahti 1964; Goward & Ahti 1992; Ahti & Hammer 2002; Spribille *et al.* 2023). He has been on this continent to study lichens so often that he is widely regarded to be a North American lichenologist, even though his home base is Helsinki, Finland. Anyone who has the good fortune to be in the field with Ted knows that his vast lichenological knowledge extends far beyond the genera *Cladonia* and *Parmelia* s. lat. Indeed, he is an acknowledged expert on lichen ecology, biogeography and nomenclature and has applied that expertise to numerous North American projects from one coast to the other. I personally am very grateful that Ted has spent so much research time in Canada, especially Newfoundland, Ontario and British Columbia, and has contributed so many important papers covering the taxonomy, biogeography and floristics of Canadian lichens. Most importantly, Ted is anxious to share his knowledge with students, colleagues and laypeople. I have learned a great deal from Ted, starting from the first time I met him.



Figure 2. Teuvo Ahti among his colleagues during the Nordic Lichen Society excursion in Pulkkilanharju, Finland (2007). Teuvo is in the front row next to his former students Kimmo Jääskeläinen (first on the right) and Heino Vänskä. Image: Kimmo Jääskeläinen. In colour online.

And when was that? It was in a graduate student office at Cornell University in 1958. Or perhaps early in 1959 (Ted would remember; he doesn't forget much). Being hazy on details, I won't try to elaborate, nor am I sure exactly why Ted was at Cornell (certainly not to visit me). He was the first lichenologist I ever met in person, although at the time I had been corresponding with Mason Hale for guidance. There was no lichenologist at Cornell, so I was the only game in town. Ted was waiting for me in my office when I returned from supper, and he was already checking through my reference card index for literature that he didn't know about. I was much impressed by his questions, and we instantly became friends.

That friendship has been maintained over all these many decades as I gradually met his family: Dr Leena Hämet-Ahti, an internationally renowned botanist in her own right, and his lovely daughter, Riitta. Our families shared many adventures together, including Expo-67, the world's fair in Montreal in 1967. Ted and his family stayed at our brand-new house on Benson Street just a few months after we moved in (we're still there), and he forgave us for passing on our 24-hour stomach flu to him and his whole family, which cut short our visit to the fair by a day.

I will always be indebted to Ted for hosting me so warmly in Helsinki on my sabbatical in 1992–1993, and then collaborating on a treatment of the genus *Cladonia* in Haida Gwaii, a learning experience I will never forget (Brodo & Ahti 1996). A brilliant scientist, and yet humble and caring, he has been for me a role model, a mentor, a colleague, but most of all, a friend. My wife, Fenja, joins me in wishing Teuvo many more years of health, good times and interesting lichens, on this, his 90th birthday.

Teuvo Ahti – lichenology's ambassador, by Trevor Goward

For more than half a century, Finnish lichenologist Teuvo 'Ted' Ahti has been widely acknowledged as a leading luminary of lichenological science. With around 450 published papers in and out of lichenology, more than 100 lichens described new to science, and four genera and 19 species named in his honour, Ted's scientific contributions are remarkable. His receipt of an Acharius award for lifetime achievement already in 2000 further underscores his impact. Yet Ted stands out in lichenology not only for his scientific prowess but also for his generosity of spirit, an attribute that has left an indelible mark on the hearts and minds of friends and colleagues worldwide.

As we celebrate Ted's 90th birthday, it seems fitting to shine a light on the interpersonal side of his legacy. In this tribute, I call attention to just some of the ways in which Ted's hallmark kindness has touched lives and shaped careers, my own life and career in particular. For this I apologize; if I could think of a better way to underscore the importance of kindness in scientific discourse, I'd gladly take it. Still, as I hope to show, Ted's welcoming approach to lichen enthusiasts outside of the field exemplifies the kind of interdisciplinary openness that lichenology increasingly needs in our rapidly evolving scientific landscape.

My first contact with Ted Ahti came unexpectedly in November 1977, in the form of a letter that found its way to me at a small university in eastern Canada. At the time, I was finishing an undergraduate degree in French and Latin; receiving a letter of introduction from an eminent Finnish lichenologist was about the last thing I had any reason to expect.

Of course, there was a connection. Ted had long taken a special interest in the lichens of my home province, British Columbia. Earlier that summer, he had heard about a young fellow who, working as a seasonal naturalist in Wells Gray Provincial Park

(a large, protected area about six hours north-east of Vancouver) had begun to share that interest.

Fortuitously, Wells Gray turned out to be an epicentre of Ted's research on BC lichens. In 1960, a paper had been published (Edwards *et al.* 1960) showing that the park's caribou feed in winter almost exclusively on the hair lichen genera *Bryoria* Brodo & D. Hawksw. and *Alectoria* Ach. Coincidentally, Ted had already conducted successful research on caribou foraging behaviour in Newfoundland (in 1957; see Ahti 1983) and northern Ontario (in 1958; Ahti & Hepburn 1967). Bringing him west to study caribou foraging in south-central BC was the logical next step. In 1961, the BC government did just that, inviting him to conduct a lichen survey in Wells Gray.

By the summer of 1961, Ted and Leena Hämet-Ahti, a vascular plant taxonomist, had recently married. Rather than focus solely on Wells Gray's lichens, the 'honeymooners' decided to study its entire terrestrial flora. For two months, they conducted a first comprehensive survey of the region's plants, mosses, hepatics and lichens (Goward 2011, 2024). Working diligently, they amassed thousands of specimens including around a thousand in lichen numbers alone.

By the time I joined the Wells Gray scene in 1976, Ted and Leena had already begun to give the park some international visibility. Leena had published a vascular flora of the park and a fascinating paper on its vegetation zones (Hämet-Ahti 1965a, b). Meanwhile, Ted had prepared a comprehensive report of his findings (Ahti 1962b) and co-authored a paper on his moss collections (Ahti & Fagerstén 1967). True to form, Ted had also mentored a local lichen enthusiast named George Otto, catalyzing the first checklist of BC lichens (Otto & Ahti 1967). This document, once updated (Noble *et al.* 1987), would lay the groundwork for hundreds of papers on BC's lichens in the decades to follow.

When Ted's letter reached me in November 1977, I was contemplating my next move after graduating the following spring. At the time, I was seriously considering building a future around mushrooms, my first love. Unfortunately, most of the professionals I had reached out to were not very encouraging. Perhaps they mistook me for one of those young people motivated by the hallucinogenic properties of mushrooms, or maybe my arts focus stood in the way. Whatever the reason, their unwelcoming response to my youthful enthusiasm had the effect of damping rather than kindling it.

How different my ensuing correspondence with Ted Ahti proved to be! Already in his second letter, he wondered aloud if we might '... .. publish together a lichen flora of Wells Gray Park'. By his third letter, three months later, he was already opening the door to a possible extended study visit to Helsinki.

Ted's openness to possibility set a fire under me. His welcome to lichenology was life-altering. In the event, I took Ted up on his offer of a study visit at H, not once but twice, in 1979 and again in 1981. When it became clear, on the first visit, that my lack of educational credentials precluded financial support, he and Leena responded by opening their own home to me. In this gesture alone, I learned something of value that has stayed with me ever since, and that I try to integrate into my own life.

Looking back, it is fair to say that Ted took my lichen education seriously. I retain many fond memories of heading out into the field with him, even in midwinter, or absorbing the finer details of laboratory identification late into the night. Under Ted's tutelage, I quickly learned most of what I needed to know about lichen taxonomy, systematics, and distributional ecology;

and together we eventually described my first lichen species, *Parmelia hygrophila* Goward & Ahti (Goward & Ahti 1983). That done, I was on my way!

Reading this over just now, I see this encomium could be construed as suggesting that generosity is rare on the ground in lichenology. Of course, this is simply not true; lichenologists in my experience are the most collegial of colleagues, always willing to pitch in or lend a hand. However, what stands out about my own case is the tremendous effort Ted expended for somebody *outside* science. With no degree, no formal training, and no institutional support, in 1977 I had no real prospects for a meaningful contribution to lichenology. Yet Ted went out of his way, again and again, to encourage me and make me feel welcome.

In short, Ted's approach to mentorship represents something more than personal kindness. It embodies a principle of openness and inclusivity that has become increasingly crucial in modern science. As disciplines evolve and intersect, this welcoming attitude towards diverse perspectives and backgrounds can, I believe, catalyze innovation, and foster cross-pollination of ideas.

Biology has lately been undergoing a major conceptual makeover (Ball 2023a) – a shift in perspective that stems partly from new methodologies such as phylogenomics and computational science, but also marks a transition from the modern synthesis to the extended evolutionary synthesis (Laland *et al.* 2015). Keeping pace with this is recent scholarship by philosophers of science that, taken together, seems poised to revolutionize our understanding of lichens in the coming decades. Here I am thinking of ongoing work on concepts such as the Kantian whole (Kauffman 2013), the holobiont (Gilbert 2023), the organism (Huneman & Wolfe 2010), emergence (Cassell 2015), complex adaptive systems (Filotas *et al.* 2014), organismal subjectivity (Schlicht 2017), organismal agency (Ball 2023b), processual philosophy (Nicholson & Dupré 2018), and relational thinking (Ingold 2004). Such ideas, as must be obvious, come to bear on lichens by reason of their quintessentially relational nature on the one hand, and their remarkably intermediate position between organism and ecosystem on the other hand.

One outcome of this scholarship is that lichens have already begun to attract interest from researchers and theorists in disciplines outside of biology, especially in the humanities and social sciences. Attesting to this trend is a recent wave of lichen-centred publications in fields as diverse as, for example, posthumanism (Zonca 2023), nature poetry (McKay 2020), literary deconstructionism (Milne 2019), environmental theory (Woods 2022) and gender theory (Griffiths 2015). A challenge common to most of these authors is the spectre of inadvertent misreadings and misconceptions. Rather than go into detail on this point, I will simply suggest that lichenology, now more than ever, stands to benefit from proactively opening its doors to lichen enthusiasts often inadvertently kept at arm's length from the lichenological ivory tower. If others are now going to bring lichens expanded attention, and they will, then it behoves us to ensure, insofar as possible, that their work is well grounded.

Viewed in this light, Ted Ahti's legendary attitude of generosity towards enthusiasts from outside the disciplinary fold is not just admirable, it is also timely and potentially transformative for lichenology. As our field continues to evolve and intersect with diverse disciplines, Ted serves as a model for fostering interdisciplinary collaboration and nurturing new perspectives. We could all do well to follow his example in the coming years, embracing curiosity and enthusiasm wherever we find it. In doing so, we not only honour his legacy but also ensure that lichens themselves occupy a

conceptual space commensurate with their remarkable dual nature in an increasingly interconnected scientific landscape.

References

- Ahti T (1952) Kokemuksiani metsänarvointibiologina kesällä 1952. [Working as a forest inventory biologist in the summer 1952]. *Molekyyli* 8, 10–12. [In Finnish]
- Ahti T (1957) Poronjäkäliköistä peurojen asuma-alueina [Reindeer lichen stands as habitats of reindeer and caribou]. *Luonnon Tutkija* 61, 76–79. [In Finnish]
- Ahti T (1961a) Taxonomic studies on reindeer lichens (*Cladonia* subgenus *Cladina*). *Annales Botanici Societatis Zoologicae Botanicae Fennicae Vanamo* 32, 1–160.
- Ahti T (1961b) Open boreal woodland subzone and its relation to reindeer husbandry. *Archivum Societatis Zoologicae Botanicae Fennicae Vanamo* 16 (suppl.), 91–93.
- Ahti T (1962a) On the taxonomy of *Erysimum cheiranthoides* L. (*Cruciferae*). *Archivum Societatis Zoologicae Botanicae Fennicae Vanamo* 16, 22–35.
- Ahti T (1962b) Ecological investigations on lichens in Wells Gray Provincial Park with special reference to their importance to mountain caribou. Unpublished Report, B.C. Parks, Victoria. [WWW resource] URL <https://edgewoodwild.org/valley-miscellany/wells-gray-publications-reports/>.
- Ahti T (1964) Macrolichens and their zonal distribution in boreal and arctic Ontario, Canada. *Annales Botanici Fennici* 1, 1–35.
- Ahti T (ed.) (1967a) *William Nylander's Collected Lichenological Papers. IV*. Lehre: J. Cramer.
- Ahti T (ed.) (1967b) *William Nylander's Collected Lichenological Papers. V*. Lehre: J. Cramer.
- Ahti T (ed.) (1967c) *William Nylander's Collected Lichenological Papers. VI*. Lehre: J. Cramer.
- Ahti T (1983) Lichens. In South GR (ed.), *Biogeography and Ecology of the Island of Newfoundland*. The Hague: Dr W. Junk Publishers, pp. 319–360.
- Ahti T (1984) The status of *Cladina* as a genus segregated from *Cladonia*. *Beihefte zur Nova Hedwigia* 79, 25–61.
- Ahti T (1990a) Introduction to collected lichenological papers of William Nylander (1822–1899). In Ahti T (ed.), *William Nylander's Collected Lichenological Papers, Vol. 1b VIII–XXIV*. Berlin and Stuttgart: J. Cramer, pp. VIII–XXIV.
- Ahti T (ed.) (1990b) *William Nylander's Collected Lichenological Papers. I. Introduction and Lichenological Papers 1852–1862*. Berlin and Stuttgart: J. Cramer.
- Ahti T (ed.) (1990c) *William Nylander's Collected Lichenological Papers. II. Lichenological Papers 1863–1868 with Addenda nova ad lichenographiam europaeam 1865–1887*. Berlin and Stuttgart: J. Cramer.
- Ahti T (ed.) (1990d) *William Nylander's Collected Lichenological Papers. III. Lichenological Papers 1869–1887*. Berlin and Stuttgart: J. Cramer.
- Ahti T (2014) Lichens are staple food for caribou and reindeer. *Fungi* 7, 14–19.
- Ahti T and Fagerstén R (1967) Mosses of British Columbia, especially Wells Gray Provincial Park. *Annales Botanici Fennici* 4, 422–440.
- Ahti T and Hammer S (2002) *Cladoniaceae*. In Nash TH, III, Ryan BD, Gries C and Bungartz F (eds), *Lichen Flora of the Greater Sonoran Desert Region, Vol. I*. Tempe, Arizona: Lichens Unlimited, Arizona State University, pp. 131–158.
- Ahti T and Hepburn RL (1967) Preliminary studies on woodland caribou range, especially on lichen stands, in Ontario. *Ontario Department of Lands and Forests Research Report (Wildlife)* 74, 1–134.
- Ahti T, Hämet-Ahti L and Jalas J (1964) Luoteis-Euroopan kasvillisuusvyöhykkeistä ja kasvillisuusalueista [Vegetation zones and regions in Northwest Europe]. *Luonnon Tutkija* 68, 1–28. [In Finnish]
- Ahti T, Hämet-Ahti L and Jalas J (1968) Vegetation zones and their sections in northwestern Europe. *Annales Botanici Fennici* 5, 169–211.
- Ahti T, Hämet-Ahti L and Petteersson B (1973) Flora of the inundated Wadi Halfa reach of the Nile, Sudanese Nubia, with notes on adjacent areas. *Annales Botanici Fennici* 10, 131–162.
- Ball P (2023a) *How Life Works. A User's Guide to the New Biology*. Chicago: University of Chicago Press.
- Ball P (2023b) *Organisms as Agents of Evolution*. John Templeton Foundation. [WWW resource] URL <https://www.templeton.org/news/organisms-as-agents-of-evolution-new-research-review>.

- Belyaeva I and Chamberlain K** (2014) Teuvo Tapio Ahti, botanist and lichenologist – 80 years young. *Skvortsovia* **1**, 213–238.
- Brodo IM and Ahti T** (1996) Lichens and lichenicolous fungi of the Queen Charlotte Islands, British Columbia, Canada. 2. The *Cladoniaceae*. *Canadian Journal of Botany* **74**, 1147–1180.
- Cassell P** (2015) Incomplete Deacon: why new research programs in the sciences and humanities should emerge from Terrence Deacon's *Incomplete Nature*. *Religion, Brain and Behavior* **5**, 47–54.
- Edwards RY, Soos J and Ritcey RW** (1960) Quantitative observations on epidendric lichens used as food by caribou. *Ecology* **41**, 425–431.
- Filotas E, Parrott L, Burton PJ, Chazdon RL, Coates KD, Coll L, Haessler S, Martin K, Nocentini S, Puettmann KJ, et al.** (2014) Viewing forests through the lens of complex systems science. *Ecosphere* **5**, 1–23.
- Gilbert S** (2023) A sympoietic view of life: Gaia as a holobiont community. *Preprints* **2023**, 2023091072.
- Goward T** (2011) *Wells Gray Profile. Leena Hämet-Ahti and Teuvo Ahti: A Wells Gray Honeymoon*. [WWW resource] URL <https://www.waysofenlichenment.net/wells/ahiti>.
- Goward T** (2024) *Wells Gray Scholars & Friends: Teuvo Ahti and Leena Hämet-Ahti*. [WWW resource] URL <https://edgewoodwild.org/valley-miscellany/wells-gray-scholars-friends/ted-and-leena/>.
- Goward T and Ahti T** (1983) *Parmelia hygrophila*, a new lichen species from the Pacific Northwest of North America. *Annales Botanici Fennici* **20**, 9–13.
- Goward T and Ahti T** (1992) Macrolichens and their zonal distribution in Wells Gray Provincial Park and its vicinity, British Columbia, Canada. *Acta Botanica Fennica* **147**, 1–60.
- Griffiths D** (2015) Queer theory for lichens. *Undercurrents* **19**, 36–45.
- Hämet-Ahti L** (1965a) Vascular plants of Wells Gray Provincial Park and its vicinity, in eastern British Columbia. *Annales Botanici Fennici* **2**, 138–164.
- Hämet-Ahti L** (1965b) Notes on the vegetation zones of western Canada, with special reference to the forests of Wells Gray Park, British Columbia. *Annales Botanici Fennici* **2**, 274–300.
- Hämet-Ahti L and Ahti T** (1969) The homologies of the Fennoscandian mountain and coastal birch forests in Eurasia and North America. *Vegetatio* **19**, 208–219.
- Hämet-Ahti L, Ahti T and Koponen T** (1974) A scheme of vegetation zones for Japan and adjacent regions. *Annales Botanici Fennici* **11**, 59–88.
- Huneman P and Wolfe CT** (eds) (2010) The concept of organism: historical, philosophical, scientific perspectives [special issue]. *History and Philosophy of the Life Sciences* **32**, 145–424.
- Ingold T** (2004) Beyond biology and culture. The meaning of evolution in a relational world. *Social Anthropology* **12**, 209–221.
- Kauffman S** (2013) What is life, and can we create it? *BioScience* **63**, 609–610.
- Laland KN, Uller T, Feldman MW, Sterelny K, Müller GB, Moczek A, Jablonka E and Odling-Smee J** (2015) The extended evolutionary synthesis: its structure, assumptions and predictions. *Proceedings of the Royal Society B* **282**, 20151019.
- McKay D** (2020) *All New Animal Acts: Essays, Stretchers, Poems*. Kentville, Nova Scotia: Gaspereau Press.
- Milne D** (2019) Notes on 'Lichen'. *Textual Practice* **33**, 883–900.
- Nicholson DJ and Dupré J** (eds) (2018) *Everything Flows: Towards a Processual Philosophy of Biology*. Oxford: Oxford University Press.
- Noble WJ, Ahti T, Otto GF and Brodo IM** (1987) A second checklist and bibliography of the lichens and allied fungi of British Columbia. *Syllogeus* **61**, 1–95.
- Otto GF and Ahti T** (1967) *A Preliminary Checklist of the Lichens of British Columbia*. Vancouver.
- Schlicht T** (2017) Experiencing organisms. From mineness to subject of experience. *Philosophical Studies* **175**, 2447–2474.
- Spribile T, Fryday AM, Hampton-Miller CJ, Ahti T, Dillman K, Thor G, Tønsberg T and Schirokauer D** (2023) Compendium of the lichens and associated fungi of Alaska. *Bibliotheca Lichenologica* **112**, 1–522.
- Stenroos S, Velmala S, Pykälä J and Ahti T** (eds) (2015) Suomen rupijäkälät [Crustose lichens of Finland]. *Norrinia* **28**, 1–454. [In Finnish with English summary]
- Woods D** (2022) Prosthetic Symbiosis. *New Centennial Review* **22**, 157–186.
- Zonca V** (2023) *Lichens: Toward a Minimal Resistance*. Cambridge, UK: Polity Press.

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