

Tribute

Alan Orange – an appreciation, 19th June 1955–5th February 2023

Alan Orange, who died on the 5th February aged only 67, will be missed more than he would ever have guessed by members of the British Lichen Society and lichenologists across the globe. He was an outstanding naturalist and taxonomist who made detailed studies of difficult groups of organisms, from lichens and bryophytes to mites. His knowledge of sterile crusts and aquatic lichens was unrivalled. He investigated every aspect of his chosen organisms, from their morphology to their chemistry and genetics, in order to describe them taxonomically and to assess their relationships to other lichens.

Alan was born in Leeds but soon afterwards the family moved to Longhope in the Forest of Dean, where his surroundings provided plenty of opportunities for botanical and other exploration, often with his cousins Heather, Margaret and Stephen, and the family's dogs. Early on he developed his botanical skills and his taste for sorting out difficult groups of organisms, and his parents complained that his collection of brambles had taken over his bedroom! He also showed exceptional talent as an artist, producing detailed botanical drawings and sketches which he continued for the rest of his life.

He was accepted for his first degree in Science at Bristol University and then for a master's degree in Pure and Applied Plant Taxonomy at Reading University, which he completed with distinction. After graduating in the early 1980s, he worked as a field botanist based at the University of Wales Institute of Science and Technology field centre at Newbridge-on-Wye, Powys. Tasked with undertaking botanical survey work on the upper reaches of the Rivers Wye, Usk, Severn and Teifi, this tall, immensely quiet but undoubtedly talented character with hair below his waist rejected the proffered car to drive. Instead, a motorbike was acquired. As part of a very successful team, he helped lay the foundation for the science behind the statutory conservation of rivers and so began his own fascination with the hugely variable community of aquatic lichens.

In 1977, while still an undergraduate, Alan was employed by the Nature Conservancy to survey the trees and flora in the permanent transects within Lady Park Wood in the Lower Wye Valley. The resulting records were so neat, thorough and accurate that they have been used as a basis for all subsequent recording. This, now possibly the largest and most enduring long-term study in Europe of how natural woodlands behave, would have been abandoned in its youth without Alan's contribution. When he returned in 2014 to check the lichens for the Lady Park book (Peterken & Mountford 2017), he appeared to have no idea his work had been so significant.

In 1986 he was appointed Curator of Lichens at the National Museum of Wales (NMW), now Amgueddfa Cymru-Museum Wales. His talent for illustration was quickly put to good use, producing a useful beginner's guide to lichens on trees (Orange 1994). He held the post of curator until 2013 when he became an Honorary Research Fellow at the Museum and a self-employed biological consultant. He carried out surveys of lichens and bryophytes for many organizations including Natural Resources Wales, the Royal Society for the Protection of Birds, Plantlife, the National Trust and ecological consultancies. His lichen collections on the database at NMW consist of more than 7000 specimens from his work in Wales and the UK, and from visits to Nordic countries and others such as Nepal. His collections and records from the numerous surveys he had completed in Wales provided information for the first checklist of Wales (Woods & Orange 1999) and later for the *Conservation Evaluation of British Lichens and Lichenicolous Fungi* (Woods & Coppins 2012), which is an invaluable source of information on species in need of protection. However, his personal collection of c. 15 000 specimens represents a considerable amount of his work since 2013 and is gifted to NMW. This material, consisting of lichens, fungi, bryophytes and *Rubus* spp., will be incorporated in the NMW database and available for further study. He was married to his long-term partner Dr Ingrid Jüttner, a diatomist, and much of Alan's later work was carried out together with Ingrid. Although he was not easy to find, he was a good communicator with a quirky sense of humour, always ready to help amateurs and professionals with difficult taxonomic problems.

If you ever worked with Alan, you learnt to observe lichen communities that often went unnoticed by other lichenologists. His wide species identification skills enabled him in 2008 to produce a monumental report for the Joint Nature Conservation Committee describing the range of bryophyte and lichen-dominated communities from the British uplands (Orange 2008). These communities had been omitted from the volumes of the National Vegetation Classification. This internal report deserves to be fully published. His knowledge and appreciation of sterile crusts led to 11 papers on leprarioid lichens, where he showed that these apparently simple organisms without a cortex and without sexual reproduction developed a range of metabolites that allowed them to function in a wide range of habitats across the globe. Although this required technical expertise in the laboratory, his eye for detail in the field was acute and he used a combination of morphology, simple chemical tests and UV response to make this work available to other members of the lichen community (Orange 1995), as well as at a more detailed level in editions of *The Lichens of Great Britain and Ireland* (Smith *et al.* 2009). He contributed many of the illustrations of features of lichens in *The Lichens of Great Britain and Ireland*. In 2006 he prepared a handbook for a British Lichen Society

Cite this article: Wolseley P, Woods R, Douglass J, Coppins BJ and Peterken G (2023) Alan Orange – an appreciation, 19th June 1955–5th February 2023. *Lichenologist* 55, 103–106. <https://doi.org/10.1017/S0024282923000245>





Figure 1. Alan Orange. © Amgueddfa Cymru-Museum Wales. In colour online



Figure 2. Alan investigating the effect of liming on freshwater lichen communities in the Wye catchment. © Amgueddfa Cymru-Museum Wales. In colour online

workshop on British pyrenocarps at Blencathra Field Centre, with clear illustrations of the characters of component genera and species. We still have this version on our bookshelves, but he later improved this, adding more species, photographs and illustrations, now available online as a second edition (Orange 2013a).

Meanwhile, the development of methods of establishing genetic variation in both nuclear DNA and mitochondrial units became central to his research and he began to collaborate with colleagues abroad working on a wider geographical scale. As a result, the differentiation between species across Europe in the *Lepraria jackii* group became clearly defined (Fehrer *et al.* 2008). This paper showed the correlation between molecular structure and secondary metabolites in this group of sterile lichens and included a discussion about the possibilities for evolutionary development in sterile species that were distributed across Europe. Alan's publication on Microchemical Methods (Orange *et al.* 2010) is used throughout the lichenological world. Widely known as the 'Orange' book, this is another landmark publication now available as a pdf.

Alan's contribution to freshwater lichen taxonomy and ecology is extensive (Orange 1998, 2013a, b, 2014, 2015), and many of his publications describe new species. His work was always very thorough and easily accessible, with excellent photographs and detailed illustrations, especially where difficult genera such as *Porpidia* were concerned (Orange 2014). He undertook a number of freshwater lichen surveys, in particular *The Importance of Watercourses for Lichens in Eryri SSSI* (Orange 2017), which

describes the ecology, communities and threats (including hydro-electric schemes) at 20 sites on 15 streams and is an excellent introduction to the study of freshwater lichens. Alan was always realistic about the difficulties of studying freshwater lichens and the limitations of these studies which, despite major advances (many of these pioneered by Alan himself), are still at a relatively early stage. He also studied lichenicolous parasites on freshwater species, with two very accessible accounts on *Placopyrenium* (Orange 2009) and lichenicolous fungi on *Ionaspis lacustris* (Orange 2002).

His adoption of molecular techniques allowed further development in the taxonomy of aquatic lichens, especially in unravelling the relationships of species included in the widespread family *Verrucariaceae*, another group of lichens where morphological characters are very variable and difficult to define. This culminated in a large collaboration of authors whose combined data provided some solutions to generic groups and also highlighted groups where further work using specimens from a wider geographical area would contribute to a better understanding (Gueidan *et al.* 2009). Meanwhile, a visit to Nepal in 2009, together with his partner Ingrid Jüttner to collect specimens of *Verrucariaceae* from streams and other rock habitats in the Annapurna Conservation Area, resulted in records of 28 species of *Verrucariaceae* including one new genus and nine new species (Orange 2022). A major aim was to improve global sampling in order to improve knowledge of the distribution and taxonomy of this huge family, which contains c. 950 species of lichens and lichenicolous taxa.

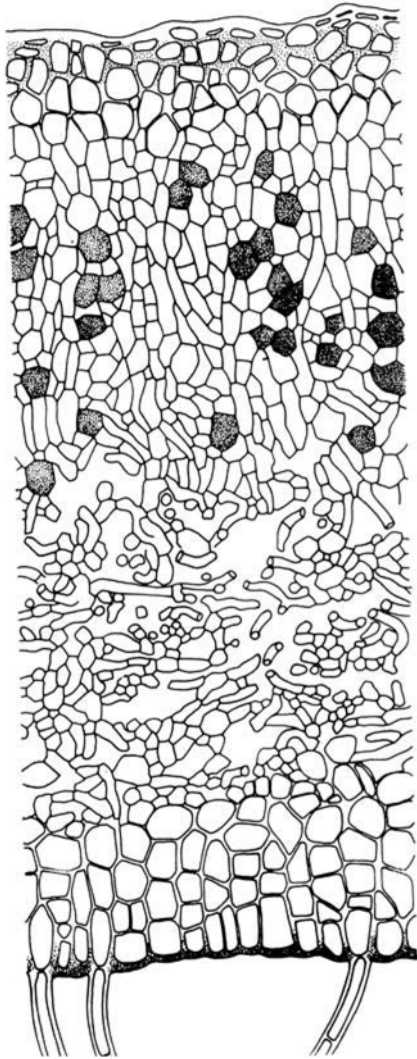


Figure 3. Illustration by Alan of a section of the thallus of *Placidium lachneum* showing the distinctive vertical rows of cells in the lower cortex. © Alan Orange from *British and Other Pyrenocarpous Lichens* (2013a).

The recent publication of his account of *Verrucariales* in *The Lichen Flora of Great Britain and Ireland* [published as the series *Revisions of British and Irish Lichens*] (Orange *et al.* 2023) is a tribute to his knowledge of this difficult group. His account covers 43 genera found in the British Isles. Many of these genera form distinct molecular clades but do not have sufficient morphological characters to distinguish them. In order to make it easier for people to identify species in genera that were defined only by molecular analysis, he created a key to all the species in the British Isles using habit and spore septation as the primary divisions.

In 2011 he visited the Falklands and in 2014–2015 he became a key participant in a Darwin Initiative in the Falklands, together with Alan Fryday at Michigan State University (MSU) and others at Amgueddfa Cymru (NMW herbarium), aiming to survey the lichens and bryophytes of the Falkland Islands. This involved assessing collections from other lichenologists including Henry Imshaug, whose *c.* 2738 lichens and 1170 bryophytes were mainly unidentified and not databased in the MSU herbarium. Other collectors included Charles Darwin (BM) and R. Lewis-Smith (BAS)

in Cambridge (<http://apex.nerc-bas.ac.uk/f?p=252:1>). In 2000, D. H. (Kerry) Dalby made a collection of 296 lichens on the Falkland Islands (BM) that Alan has identified and returned to the BM. Alan's own collection of 820 specimens from this project is in NMW. The collections at MSU are now identified and well curated, and are available at <http://www.herbarium.msu.edu/>, including 33 species new to science and more needing a formal description. The checklist of lichens on the Falkland Islands (Fryday *et al.* 2019) summed up the work that had been taking place there since Darwin visited on the Beagle in 1833/4. This work represents a great leap forward in our understanding of the lichen component of islands in the Southern Ocean. In 2016 Alan produced an illustrated guidebook to 94 of the common species of lichen in the Falkland Islands which is widely available and useful in other areas of the Southern Hemisphere (Orange 2016). This project also led him to revisit the taxonomic status of species of *Trapelia* in Britain and the Falklands (Orange 2018).

Alan has been a long-standing member of the British Lichen Society and was on the board of editors of *The Lichenologist*. He was an active member of the editorial team, overseeing the development of a new account of *The Lichens of Great Britain and Ireland*, an update of the second edition (Smith *et al.* 2009), to which he had also made a major contribution. Alan was first author for the family accounts of *Porinaceae*, *Trapeliaceae* and *Verrucariaceae*, and had important inputs into many others, including the *Catillariaceae* and *Pilocarpaceae* (in which he introduced new taxa and combinations). His contributions were always thoughtful, and the remainder of the project will be the poorer without him.

Alan's last publication on crustose species of *Normandina* (Orange 2023) arrived in the post the day after his funeral. It seems as though he was reminding us that there is still work to be done in areas where lichens can contribute to solving larger problems concerning their origin and distribution, in the effects of climate change in upland regions and in the Southern Hemisphere, and closer to home where he has shown the effects of deteriorating water quality on aquatic communities. His death is a wake-up call for further research in these areas that contribute to maintaining biodiversity on our planet.

Acknowledgements. We thank Dr Ingrid Jüttner and Katherine Slade from NMW for help on the location of AO herbarium specimens and illustrations, Dr Alan Fryday at MSU for information on the Falklands and Dr Paul Cannon for up-to-date information on Alan's contributions to the 3rd edition of the *Lichen Flora of Great Britain and Ireland*.

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Figure 4. Alan measuring trees as part of ecological survey at Lady Park Wood. © George Peterken. In colour online

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