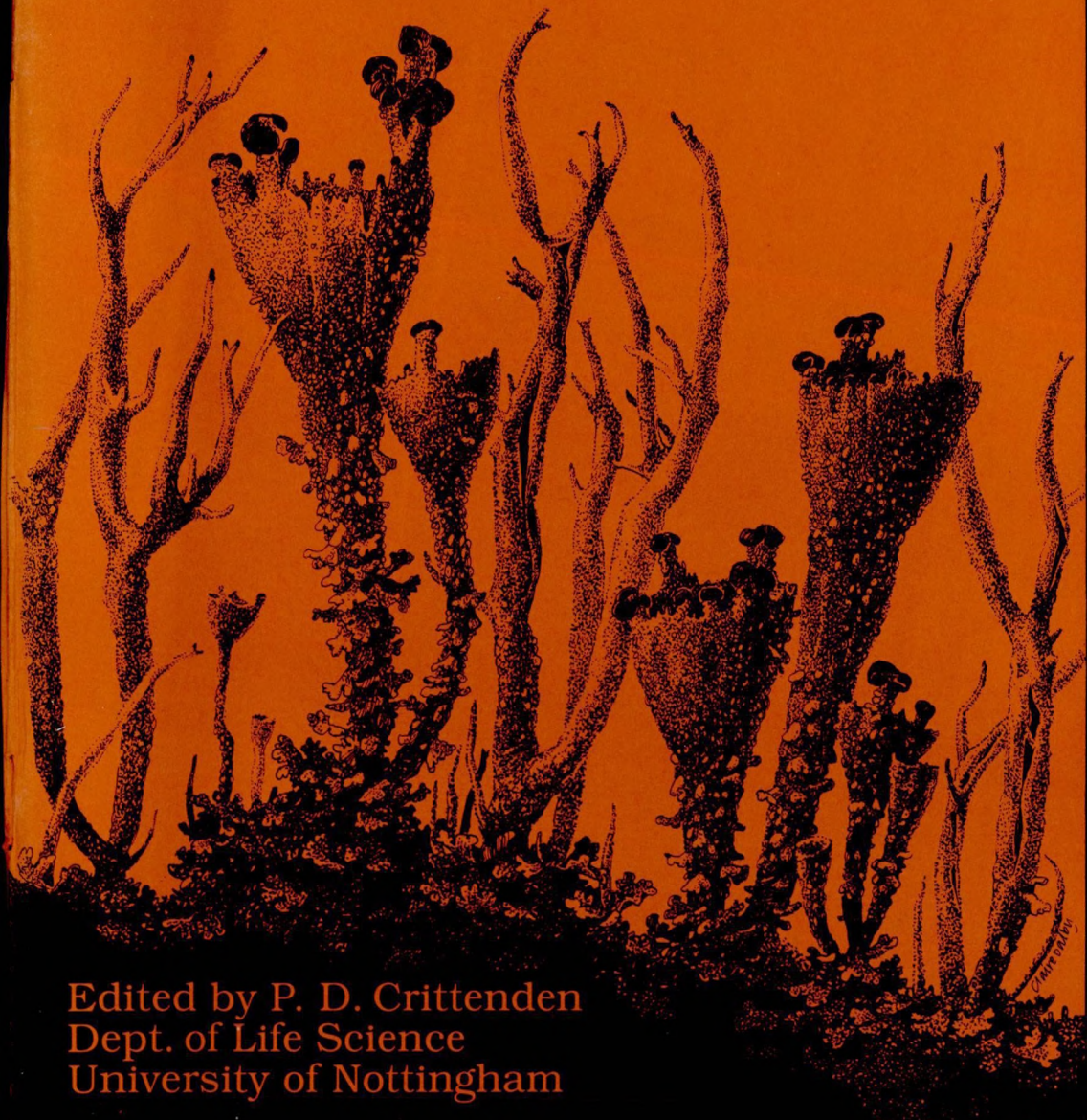
BRITISH LICHEN SOCIETY BULLETIN
No. 78 Summer 1996

+ key to non-yellow species of *Rhizocarpon*



Edited by P. D. Crittenden
Dept. of Life Science
University of Nottingham

FORTHCOMING BLS MEETINGS

DEVON (Slapton Ley) - *Parmelia* and *Ramalina* Workshop
Leader: Peter James — 26 July - 2 August 1996

CUMBRIA (Grange-over-Sands)
Leaders: Oliver Gilbert and Brian Fox — 25 - 28 October 1996

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SUBMISSION DEADLINE - 13 September 1996

Cover artwork by Claire Dalby

TASMANIA: ITS VEGETATION AND LICHENS

Introduction

Tasmania's international reputation is perhaps most closely associated with the infamy of its bleak and at times violent early European colonial history, its unique mammals such as the Tasmanian Devil or the extinct Thylacine, or its ancient conifers. However, the island also has much more to offer the biologist. It is only sparsely populated, and about one quarter of its 68 000 square kilometre land mass lies within National Parks and other formal conservation areas, which have been gazetted primarily for their wilderness, natural or aesthetic values.

Tasmania is situated between latitudes 41° and 43°S, 240 km south of the south-eastern tip of the Australian mainland, and is roughly equivalent in area to Ireland or Sri Lanka. Together with New Zealand and the southern part of South America, it is one of three major southern land masses which lie in the path of the prevailing westerly winds, known as the Roaring Forties. The island is renowned for its ruggedness, with most mountains concentrated in the western half and in the north-east. Nevertheless, the highest peak, Mt Ossa, is a mere 1617 m high. The west of the island comprises intensely folded Precambrian and Cambrian sediments whilst the east and centre consist mainly of faulted Permian and Triassic sediments, capped with Jurassic dolerite. The combination of mountainous terrain in the west, and westerly winds produce a marked east-west variation in climate. Thus western Tasmania receives an annual rainfall of 1200-3600 mm, whilst parts of the east receive as little as 500 mm. This zonation in climate and geology underlies many of the vegetation patterns, especially at the level of communities and species.

Vegetation

At least five major vegetation formations can be discerned in Tasmania:

Sclerophyll forest

This is dominated mainly by *Eucalyptus,* with an understorey dominated either by small trees and tall shrubs, such as *Banksia, Acacia* or members of the Asteraceae (wet sclerophyll forest), or by low, heath-like members of families such as the Epacridaceae or Fabaceae (dry sclerophyll forest). Eucalypts are among the tallest flowering plants in the world, and some individuals in Tasmania exceed 90 metres in height.

Cool temperate rainforest

This is dominated mainly by *Nothofagus,* or by *Eucryphia, Atherosperma,* or the conifers *Lagarostrobos, Athrotaxis, Phyllocladus* or *Diselma.* Rainforest is considered an ancient vegetation, resembling parts of an early

flora which occurred in Gondwana prior to its breakup. Important rainforest flowering plant families include the Epacridaceae (Fig 1), Proteaceae and Cunoniaceae. All the species are evergreen with the exception of *Nothofagus gunnii*, a fire-sensitive shrub or small tree from high altitudes. Today related forests occur in south-eastern Australia, New Zealand and southern South America.

Buttongrass moorland

This comprises vegetation associated with the sedge *Gymnoschoenus sphaerocephalus*. It can be divided into two basic types, the most extensive of which occurs on shallow peat across hilly terrain, and is analogous to the blanket bogs of the Northern Hemisphere (Fig 2). Buttongrass moorland usually consists of a complex mosaic of sedgeland, heathland and scrub, rich in species of Cyperaceae, Epacridaceae, Myrtaceae, Proteaceae and Restionaceae. They are very inflammable and have a long history of accidental and deliberate burning.

Alpine vegetation

This includes mosaics of heathland, sedgeland, bolster moor, herbfield, grassland and coniferous woodland (Figs 3 & 4). These communities are typically very rich in Tasmanian endemics and taxa of Gondwanic origin. Most alpine communities are very fire sensitive and many Tasmanian mountain systems have been extensively damaged, especially in this century. The conifers are particularly susceptible.

Coastal vegetation

This comprises a mosaic of heathland, woodland (often dominated by *Allocasuarina*), halophytic, succulent communities and tussock grasslands. Perhaps more than any other formation, coastal communities have been cleared or modified for farming or settlement.

History of lichenology

The study of Tasmanian lichens began in the late 18th century (Kantvilas, 1983). From the first collections by J J de la Billardière in 1792, specimens were sent to European specialists, first by the early explorers and later by resident naturalists and plant collectors. Thus most of the initial study and description of Tasmanian lichens was undertaken by botanists such as C Babington, J D Hooker, A Jatta, A Krempelhuber, J Müller-Argoviensis, J Stirton and T Taylor, of whom none but Hooker ever visited the region personally. Towards the end of the 19th century, significant contributions on Tasmanian lichens were also published by the resident Australian lichenologists, J Shirley and F R M Wilson.

After a lapse of over half a century, general interest in lichenology, in

Fig. 1 Cool temperate rainforest with the tall rosette shrub, *Richea pandanifolia* (Epacridaceae) very abundant. Other rainforest communities may have a very open and park-like structure.

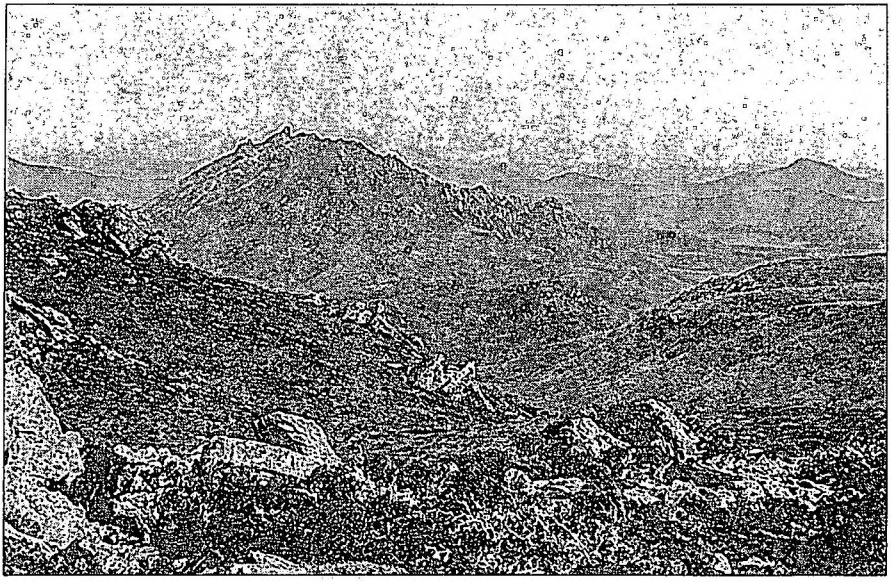


Fig. 2 Rugged, folded Precambrian metamorphic landscape, The Thumbs, south-western Tasmania. The vegetation is buttongrass moorland over a blanket peat.

Australia as elsewhere, was rekindled in the 1960s. This period featured the relearning of the knowledge of the early lichenologists, most of which had fallen into disuse, and its reappraisal in terms of modern taxonomic principles and techniques. Although the greatest emphasis of lichenology has been taxonomic and floristic, considerable progress has also been made in phytosociology and ecology, particularly as regards rainforest lichens.

Composition of the lichen flora

The most recent checklist of Tasmanian lichens (Kantvilas, 1994) lists more than 760 taxa in 210 genera, although significant additions continue to be made as research on the flora progresses. The crustose lichens in particular are poorly known, and their taxonomy at or above generic level is still unstable.

The largest genera in the Tasmanian lichen flora include *Bunodophoron* (11 taxa), *Cladonia* (45), *Collema* (19), *Hypogymnia* (14), *Leptogium* (11), *Menegazzia* (23), *Pertusaria* (17), *Porina* (14), *Pseudocyphellaria* (16), *Psoroma* (c. 20), *Ramalina* (11), *Rinodina* (14), *Usnea* (19) and *Xanthoparmelia* (49). Other genera which are significant in the flora, especially with respect to biomass in particular vegetation types or habitats, are *Cladia, Micarea* and *Siphula.*

Biogeographical affinities

The Tasmanian lichen flora can be considered in terms of several broadly overlapping biogeographical groupings, analogous to those found on other land masses with similar geographical features, climate and geological origin. The major elements present are the austral cool temperate, the Australian or austral warm temperate, the subantarctic, the cosmopolitan, the pantemperate, the bipolar, the tropical and the endemic elements. The closest floristic similarities are with nearby New Zealand and south-eastern Australia (see Galloway, 1979; 1990; Jørgensen, 1983) but affinities are also apparent with southern South America and, to a lesser extent, with southern Africa and India (Rogers & Stevens, 1981). These relationships are today attributed mainly to the common origin of these land masses in the supercontinent of Gondwana, with ancestral distribution patterns having since been modified by climatic changes, evolution and long-distance dispersal.

Austral cool temperate element

The austral cool temperate element is particularly prominent in the Tasmanian lichen flora, especially in cool moist habitats. It predominates in rainforest (Kantvilas *et al,* 1985) where it includes species from genera such as *Austroblastenia, Bunodophoron, Degelia, Fuscoderma, Menegazzia, Metus, Pseudocyphellaria, Psoroma, Psoromidium, Roccellinastrum* and

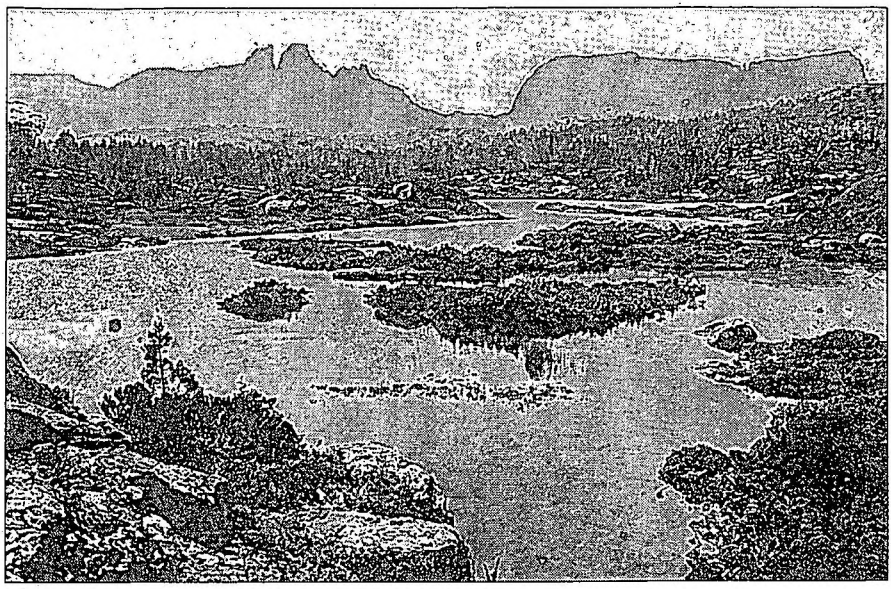


Fig. 3 Alpine heathland and coniferous forest dominated by *Athrotaxis cupressoides*, Lake Ophion, Central Highlands.

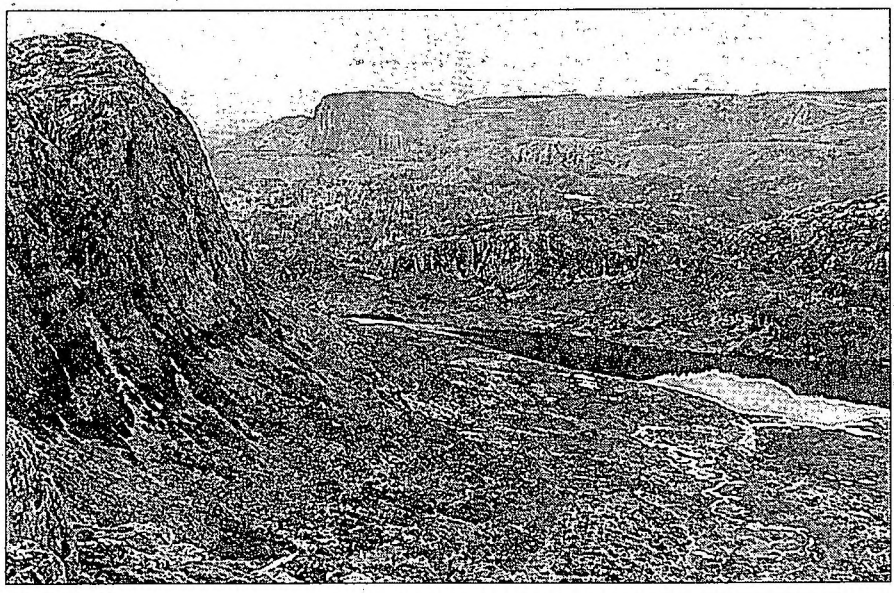


Fig. 4 Extensively faulted dolerite plateaux at the Walls of Jerusalem, typical of much of Tasmania's Central Highlands. The vegetation is a mosaic of mostly heathy and grassy alpine communities.

Sagenidium (Fig 5). This element is also well represented in treeless vegetation such as buttongrass moorland (Kantvilas & Jarman, 1988) and alpine communities (Kantvilas, 1995). Its closest geographical affinities are with New Zealand, southern South America and south-eastern Australia, and it is common to find the same or at least closely related lichens occupying the same ecological niches in these regions (Galloway, 1987;1988). Most Tasmanian endemic lichens have their closest relatives in the austral cool temperate element.

Australian or austral warm temperate element

Species from this element occur mostly in sclerophyll forests, coastal heathlands and, to a lesser extent, buttongrass moorland. Many species occur on rocks and soil whilst others are epiphytic on *Eucalyptus, Acacia* and other trees, or are confined to charred wood. Prominent lichens include those from the genera *Xanthoparmelia, Cladia, Heterodea, Thysanothecium* and *Neophyllis*. This element displays closest relationships with mainland Australia, although some affinities can also be found with southern Africa and India. Compared with its occurrence on mainland Australia, the Australian element is relatively poorly represented in Tasmania where in the main only the most common and widespread species are found.

Subantarctic element

In Tasmania, this element is well-developed in alpine vegetation, where it is characterised by species of *Placopsis, Siphulastrum, Siphula* and *Neuropogon,* and in buttongrass moorland where characteristic lichens include *Knightiella splachnirima, Lithographa subantarctica, Fuscidea absolodes, Micarea austroternaria, M. isabellina* and *Stephanocyclos henssenianus*. The subantarctic element is also represented by the lichens *Turgidosculum complicatulum* and *Caloplaca cribrosa* on maritime rocks along Tasmania's southern coastline. The subantarctic element displays strongest geographical affinities with the cold, treeless high altitude areas of New Zealand, southern South America and subantarctic islands.

Cosmopolitan element

The cosmopolitan element contains species with world-wide distributions and is represented in most Tasmanian vegetation types. Common species include several from the large terricolous genus, *Cladonia,* for example *C. scabriuscula, C. chlorophaea* and *C. ramulosa,* and the forest epiphytes *Thelotrema lepadinum* and *Dimerella lutea.* Typically, cosmopolitan species tend to be associated with disturbance. In native vegetation, they occur on freshly exposed soil, e.g. *Stereocaulon ramulosum* and *Trapeliopsis granulosa,* or at the margins or in the canopy of the closed forest, e.g. *Parmotrema chinense* and *Usnea rubicunda.* They are particularly prominent within habitats created or modified by man. Thus *Physcia*

adscendens and *Punctelia subrudecta* are frequently the dominant epiphytic lichens in parks and gardens, *Neofuscelia pulla* is found on bitumen pathways and *Xanthoria parietina* occurs on roofing tiles and introduced trees.

Pan-temperate element

This element is also represented in most Tasmanian vegetation formations, although it is particularly common in rainforest. Typical species include the small crustose lichens *Arthothelium ilicinum, Chaenotheca brunneola, Cliostomum griffithii, Leproloma membranacea, Lecanactis abietina* and *Lopadium disciforme,* and these are usually best developed on the oldest trees in mature closed forests, mostly on the very dry trunks (Kantvilas, 1988). Examples of pan-temperate macrolichens found in Tasmania include the forest epiphytes *Tuckermannopsis chlorophylla* and *Imshaugia aleurites.* All these species are also found in similar ecological niches in the forests of northern Europe and cool temperate North America (James *et al*, 1977).

Bipolar element

The bipolar element includes species which occur in cold Arctic and Antarctic regions with intervening populations along high mountain chains (Du Rietz, 1940). In Tasmania, the bipolar element is rather depauperate, probably due to the relatively mild climate and low altitude of the mountains (Kantvilas, 1995). Thus bipolar species such as *Alectoria nigricans, Arthroraphis* spp., *Coelocaulon aculeatum, Ochrolechia frigida, Catillaria contristans, Pseudephebe pubescens* and species of *Umbilicaria* are mostly uncommon and restricted to the highest peaks.

Tropical element

Despite its cool climate and southerly location, Tasmania also supports a small number of essentially tropical lichens. For example, *Phaeographis exaltata* and the basidiolichen, *Dictyonema sericeum,* are found in rainforest, whilst *Coenogonium implexum* is abundant in wet sclerophyll forest. In coastal vegetation, *Phaeophyscia endococcinodes* and species of *Relicina* and *Heterodermia* are present and locally abundant.

Endemic element

As indicated above, most Tasmanian lichens have rather wide distributions and occur in other regions of the world. Only about 5 % of the flora is endemic to Tasmania, including such noteworthy species as *Lichina tasmanica,* which occurs semi-submerged in the alpine streams, *Roccellinastrum flavescens* and *R. lagarostrobi,* which are confined to the leaves of some endemic Tasmanian conifers, and *Cladia moniliformis* and *Siphula jamesii,* which characterise the buttongrass moorlands of the

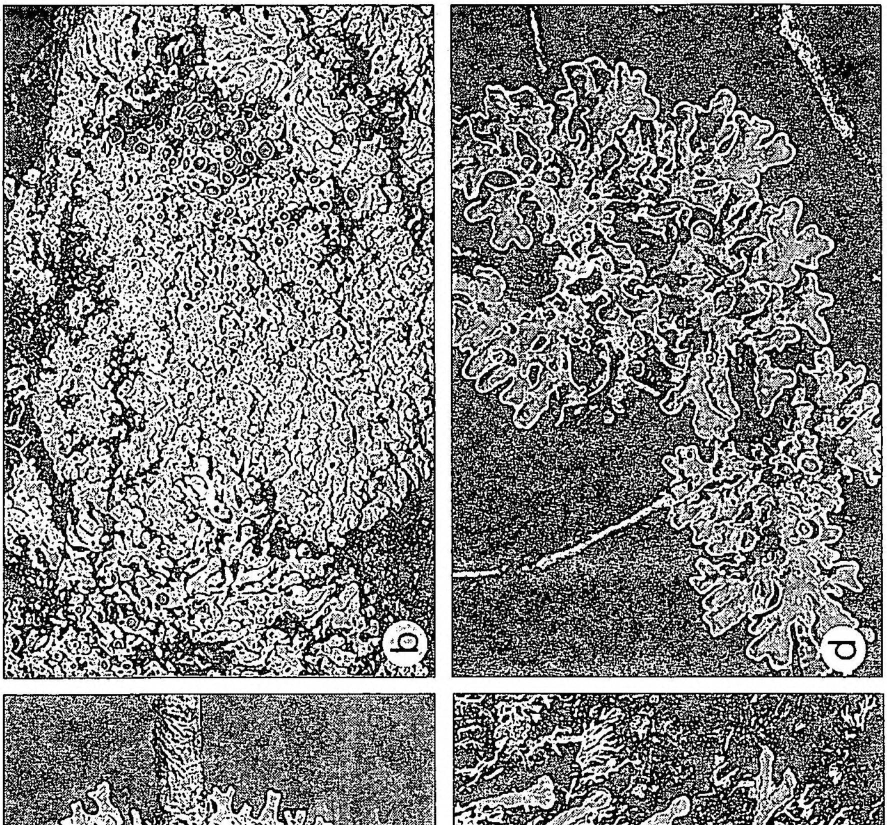


Fig. 5

(a) *Pseudocyphellaria billardieri*, a common lichen in wet forests. (Photo: B Fuhrer)

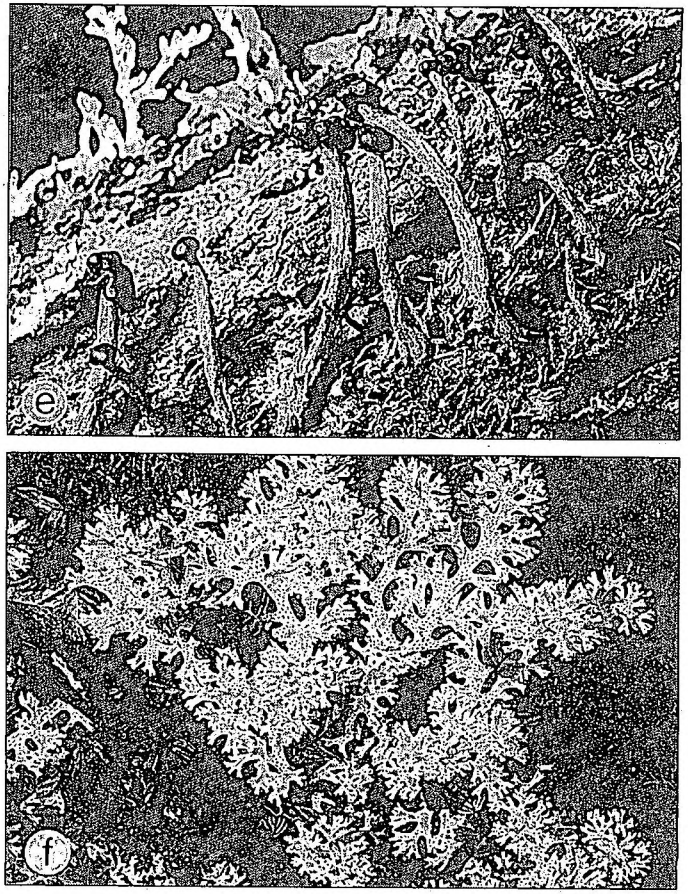
(b) *Menegazzia weindorferi*, a common epiphyte in wet forests, especially in the canopy. (Photo: B Fuhrer)

(c) *Bunodophoron imshaugii*, a rainforest lichen. This genus is characteristic of moist mossy tree trunks in the shady rainforest interior. (Photo: B Fuhrer)

(d) *Psoroma euphyllum*, an uncommon rainforest lichen. Unlike this taxon, most Tasmanian species of *Psoroma* have a squamulose thallus. (Photo: B Fuhrer)

(e) *Metus conglomeratus*, from the deeply shaded rainforest understorey. (Photo: B Fuhrer)

(f) *Cladia retipora*, also known as coral lichen.. A very typical Australasian lichen, common in heathland from coastal to alpine environments. (Photo: B Fuhrer)



South-West. There are also several endemic epiphytic species of the genus *Menegazzia* . There is only one described endemic genus, *Siphulella,* which grows mainly in alpine vegetation in the south-west, although *Conotremopsis* and *Wawea,* two monotypic genera also known in New Zealand, clearly attain their maximum development in Tasmania.

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PRESIDENTIAL ADDRESS 1995

The last year has seen the achievement of many of the projects that were planned earlier and the development of new projects. The Society is financially better off than ever in its history, due much to the splendid efforts of our Treasurer and his assistant, Jeremy Gray.

The three committees dealing with Conservation, Data and Promotion and Education have continued to discuss and to work out the details of several new projects which have been well received and sanctioned by the Council. The result has been that new specialised habitat cards, based on the highly successful churchyards scheme pioneered by Tom Chester, have appeared and others are very close to completion. It is hoped that these will provide the working documents to understand in greater detail the status of lichens in specialised habitats within the British Isles. One disappointment has been the failure to establish a more comprehensive computer data base accessible more freely to members. This delay has been due largely to rapidly changing philosophy as to how to undertake this in the most comprehensive and economic way. No sooner has a system been considered that it is already out of date. This work continues to be one of the most important tasks of he Society and hopefully a system can be developed as soon as possible.

The almost explosive expansion of communication systems, especially of the super highway technology has caused us to radically rethink the best ways of promulgating and communicating information within our subject. This has affected our thinking not only from the point of view of data acquisition and analysis but also of presentation of our data to the wider public. Our publishers, for example, are now implying that journals , in the conventional printed form, may not be an economical proposition by the turn of the millenium. We are not alone in considering this dilemma, most scientific societies are in the same boat. Before long we may be reading our *Lichenologist* only through a password on Internet. We shall, however, be able to communicate with lichenologists all over the world, download pictures that are more detailed than the conventional reproduction in a journal, at the touch of a switch in our home, or even, God forbid, on a boulder in the wild. Already, check-lists, including our own, are or soon will be available to all on these media.

I feel sure that there is an equally exciting future for the hands-on lichen hunters. Are lichens still to be considered as a cosy mixture of reasonably compatible, self supporting species of algae and fungi, or is there much more to this plant than meets the eye? The tlc plate of even our commoner

species suggests that much has yet to be learned, and that soon we will not be able to just dismiss variation as a chemical quirk of one particular combination we chose loosely to call a species. Will our present check-list and flora be the last in this conventional form? Can this new appreciation of a lichen still fire the enthusiasm and eagerness of the bulk of our membership who have contributed so much to the present excellence of our knowledge of this plant group? Even the computer-spurning ecologist may have to look harder at his "familiar" lichen. These are questions of the near future that we are being forced to consider. So many times, we have seen a lichen looking sick (or sometimes more beautiful), only to discover it is a new, recently recognised, as yet unpublished species!

It seems to me that one of the prime tasks of our Society is to ensure that this wonderful diversity of biological adaptation, exhibited by our chosen plant group, is more closely understood and conserved, for future generations to enjoy the thrill of further discovery. To understand where they are threatened and to take steps to minimise such threats has been the job of the contributors to the Red Data Book soon to be published by several of our members through the Joint Nature Conservation Council. To do this, data acquisition and analysis, accurate publicity and sympathetic education must be our action phrases, through which I see our Society going from strength to strength. We are blessed with new enterprising and relatively young leaders who I am sure will rise to this new phase in our development. I am looking forward to many years, exploring these new developments, and I feel that our Society is in good hands and good heart.

Brian Fox

JANUARY MEETINGS 1996

Evening buffet and the inaugural Dougal Swinscow Memorial Lecture

The buffet and lecture were held for the first time in the history of the Society in the elegant and historical rooms of the Linnean Society, Piccadilly on the evening of Friday 6 January. We had afternoon tea in the library where we were served delicious, traditional, hand-baked cakes from recipes originating from various parts of the country. At 18.00 the President of the Linnean Society, Professor B. Gardiner, welcomed the Society and a fellow was duly admitted with great ceremony. Peter James then introduced the concept of the Dougal Swinscow Memorial Lecture and the guest lecturer, Professor Per Magnus Jørgensen, Director of the Botanical Gardens,

University of Bergen. The lecture could not have been more appropriate. Professor Jørgensen reported that both Dougal and Linnaeus were medical doctors and amateurs in lichenology. The major difference being Dougal knew his lichens much better! The Linnean lichens are also housed at the Linnean Society, since Linnaeus's wife sold them to Sir Joseph Banks for $1000 after having offered them to the King of Sweden! Per Magnus presented an engaging and stimulating discussion of Linnaeus, how he did not understand cryptogams and was a bit old-fashioned partly through his reluctance to study them using a microscope. Michaeli had drawn spores 50 years earlier and Linnaeus could have used microscopes had he wished. Several lichenologists had examined individual lichen specimens previously, but Per Magnus explained how, by looking at the original manuscripts, travel records and herbarium, including studying annotations, corrections and correspondence, Linnaeus had come alive to him and Peter and how he had been able to really understand how Linnaeus had come to make decisions. Whilst Per Magnus felt Linnaeus would have loved to have had a personal computer, it was pointed out that it would have been far less easy for future generations to have carried out such detective work owing to the tendency not to keep earlier drafts! Acharius once wrote that because of the misuse of names, many misunderstood, leading to damage, uncertainty and confusion, it seems absolutely necessary to retain the names given by Linnaeus. This stability has now at last been achieved by Professor Jørgensen and Mr P.W. James. For those wishing to learn more details about the Linnean lichens, a full report is published in *Botanical Journal of the Linnean Society* (1994), **115:** 261-405 by P.M. Jørgensen, P.W. James & C.E. Jarvis.

1996 Annual General Meeting

In keeping with previous years the minutes are circulated as a separate sheet. The Secretary's and President's reports are printed in this *Bulletin*; other reports were published in the winter *Bulletin*.

Exhibitions

The following exhibits were on display
Posters:

"An experiment to detect environmental changes using epiphytic lichen communities of twigs of *Quercus petraea* at Tycanol NNR, West Wales" by Pat Wolseley and Kate Pryor.

"Nitrogen distribution in *Cladonia portentosa* as an index of nitrogen deposition on British heathlands" (M. Hyvärinen & P D Crittenden)

"Scottish Cryptogamic Conservation Project - Lichens" by Sandy and Brian Coppins. (A joint project between Scottish Natural Heritage & The Royal Botanical Garden, Edinburgh - Team Leaders: Dr Vin Flemming, Dr Brian Coppins & Dr David Long).

"*Xanthoria fulva* (Hoffm.) Poelt and Petutschnig in the British Isles" by CJB Hitch.

Other exhibits:

Cladonia alpina new to Britain (Alan Orange)

A woodland lichen survey card (Neil Sanderson)

Aspicilia melanaspis (Oliver Gilbert)

Churchyard projects (Tom Chester)

Rhizocarpon obscuratum (Alan Fryday)

Dictionary of the Fungi (new 8th edition) (David Hawksworth)

Lectures

Brian Fox began his talk on the lichens of Derbyshire volcanic outcrops by giving a brief introduction to the geology of the Peak District. Igneous activity occurred during the end of the Carboniferous period, in several episodes about one million years apart. About 150 million years later, hot fluids permeated around these sills depositing zinc, lead and copper minerals. When miners encountered the larva, the "tadstein" or toadstone, they knew that they had come to the end of the rich mineral deposit. Lumps of toadstone in limestone walls are very conspicuous, and stand out by their cover of such species as *Candelariella vitellina, Aspicilia caesiocinerea* and *Lecanora polytropa*. Other species typically occurring on these rocks are *Tephromela atra, Trapelia placodioides, Lecanora intricata, L. soralifera* and *Porpidia soredizodes*. Lichens are slow in colonising newly exposed volcanic rock presumably because weathering of the exposed surface is first required. The characteristic brownish-red colour of the toadstone is due to oxidation and hydration. Studies in South Africa suggest that in that climate it takes about 12 years to produce an oxidation layer 1 mm deep; in Derbyshire this may take about 50 years. Most lava rocks support a typical acid-favouring lichen flora, but occasionally contain small quantities of marmorised limestone, and support such species as *Verrucaria hochstetteri*

and the rare *Caloplaca arenaria*. There is a correlation between the type of lichens on lava and the degree of weathering. It appears that 0.8 to 0.9 mm of weathering needs to occur before lichens can start to grow. *Trapelia placodioides* is frequently a pioneer coloniser. Brian showed a sample of toadstone with a representative number of these lichens. In particular, the dominant *Candelariella vitellina* was parasitised by *Carbonea vitellinaria* evident by its conspicuous black discs.

Next, Alan Fryday gave an account of lichens of disused Welsh mines. Alan initially performed a six week preliminary survey of mines inland from Aberystwyth and this revealed that they are of international importance for lichens. The Countryside Council for Wales then contracted Steve Chambers to make a more detailed inventory. Within mine sites a number of sub-habitats can be recognized. Block-spoil does not have a high metal content and therefore does not support a large number of metal-tolerant species, but it is good for such species as *Stereocaulon nanodes*, *Rhizocarpon obscuratum*, *R. oederi*, and *Porpidia tuberculosa*. The spoil heaps themselves are composed of much finer debris which is often highly mineralized. These are characterized by such species as *Lecanora subaurea*, *Acarospora sinopica* and *Lecidea endomelaena*. The mine buildings were constructed using lime mortar so that calcareous conditions and a calcareous flora typically develop on the ground around the foot of the walls of the now derelict buildings, supporting such species as *Vezdea cobria*, *V. leprosa* and *Gyalidea subscutillaris*. *Stereocaulon condensatum* and *S. glareosum* occur on more acidic soils, while *Lecanora handelii*, *L. epanora* and *Placopsis lambii* occur on the walls themselves. The old wheel pits provided yet another habitat, very damp inside and often again becoming calcareous towards the bottom due to leaching of calcium from the mortar; *Bacidia* spp and *Psilolechia leprosa* occur here. Tunnels, which essentially are just holes in the hillside, are good habitats for *Micarea* spp. (eg *M. coppinsii* and *M. botryoides)* and *Ephebe hispidula*. Mine shafts are more hazardous but their edges are rich in terricolous lichens, especially where fenced when lichen heaths often develop with such species as *Cetraria islandica* and *Cladonia* spp (similarly within the fences around forestry plantations). The bad news is that these sites are under threat from such activities as dumping in the pits and sheep grazing. A further threat is the maintenance and restoration of old mine buildings (eg repairing and pointing of walls).

The third lecture of the afternoon ("Lichens and Metals") was given by William Purvis in which he considered both the range of lichens occurring at metalliferous sites and how rock mineralogy is an important factor influencing the composition of these assemblages.

Lichens that grow on metal-rich rocks usually look perfectly healthy (e.g. *Acarospora rugulosa* on copper carbonate) and so presumably have tolerance to the toxic effects of the element. Saxicolous lichen communities are very closely associated with rock type and some species can be used as biogeochemical indicators in prospecting for metal reserves. For example, *Lecanora cascadensis* was used by Steve Czehura in Montana to locate copper geochemical anomalies. The type of metal in a rock and its mobility are very important in determining species present in the lichen association. However, the presence of sulphides may be the most significant factor determining lichen communities; these become oxidized to sulphates as a result of weathering and bacterial activity producing very acid environments for lichens. Parys Mountain on Anglesey is an example of an environment where such metal-rich acidic habitats have developed and *Acarospora sinopica* is an example of a species which grows well in these conditions. However, at Black Scar workings at Coniston the converse situation can be found. Here the copper rich rocks are more basic because of the presence of malachite (a hydroxy copper carbonate) and these provide the habitat for *Lecidea inops*, a species restricted to such high pH and copper-rich environments (*Lecidea inops* is included on Schedule 8 of the Wildlife and Countryside Act). Although chemical analyses of rocks can be made by ICP-atomic emission spectrophotometry (ICP-AES), a petrological examination of the mineralogy in thin section may provide additional important information on the stability (and potential availability) of particular metals.

Some metallophyte lichens spread into man-made metalliferous environments. An example is *Psilolechia leprosa*, now known to be a lichen especially associated with copper leaching (eg in churchyards). Interestingly, in the Azores *P. leprosa* occurs on rocks that probably contain little or no copper. *Acarospora smaragdula* has been shown to chelate or "fix" copper with lichen acids (eg norstictic acid). Many lichens in Scandinavia have now been found to have this property but only two so far are known in Britain (*A. smaragdula* and *Buellia aethalea*): William now wonders whether there are others to be discovered! Many crustose species (of such genera as *Lecidea* s. lat. and *Acarospora*) growing on metal-rich rocks look atypical and therefore present taxonomic problems and opportunities. At the same time there may be new species to be found in these habitats (eg a new species of *Gyalidea* has been found growing on galena crystals). Because metal-rich sites support distinct lichen assemblages they are an important resource in that they contribute to the biodiversity in an area. They also provide an opportunity to study fundamental aspects of tolerance and, potentially, speciation.

Peter Crittenden and William Purvis

OFFICERS' REPORTS

Secretary's report for 1995

The British Lichen Society, with the aid of its various subcommittees on Conservation, Data and Promotions and Education, is now actively seeking to promote lichenology to a wider audience. We have published a new colour prospectus, and through the tremendous enthusiasm of our churchyards co-ordinator, Tom Chester, a trial pack of educational project materials on "Exploring Churchyard Lichens"' From the very many items of correspondence, phone calls, and now also e-mail, I and other council members receive on almost a daily basis, there can be no doubt that there is a real need for such educational tools. A series of colour photographs are also being produced of the genus *Parmelia* to show a range of diagnostic features to complement the atlas fascicle. I would particularly like to mention here the sterling efforts that Mr Jeremy Gray has made as the principal photographer. His photographs are truly excellent. The Society, recognising the importance of publicising lichens is preparing a poster to publicise both lichens and the BLS at the forthcoming Exhibition Fungus 2000, for the Centenary of the British Mycological Society to be held in the RHS rooms at Vincent Square in September.

On Friday 6 January 1995, 30 people attended a buffet, slide show and book sale held at the Royal Entomological Society of London, and on Saturday 7 January the Annual General Meeting was held in the NHM. In the afternoon there was a lecture session on the theme "Lichen Microenvironments". Council met on three occasions in January, April and September. Major field meetings were held in Anglesey and Clwyd, ably led by Trevor Duke and Brian Fox. A successful summer field meeting / *Cladonia* workshop led by Peter James was held in Pembrokeshire. I would like to thank all the leaders and organisers for their tremendous effort.

1995 was the first year when members received six issues of the *Lichenologist* amounting to around 480 pages per volume produced under the Senior Editorship of Dr Brown, and two issues of the *Bulletin* totalling 120 pages by Dr Crittenden. Special thanks are due also to Mr Frank Dobson, Dr John-Henry Looney and other willing helpers who assisted during Dr Crittenden's sabbatical in the Antarctic and Australia earlier this year. BLS members are getting excellent value currently from the *Lichenologist* and we owe a special debt of gratitude to Dr Dennis Brown and his editorial team whose editorial job is set to increase as we can now look forward to receiving 100 pages of text per issue.

I would like to thank the retiring Officers, Dr Oliver Gilbert, Dr Elizabeth John, Dr Brian Coppins and Dr John-Henry Looney for their hard work. There are many others to whom thanks are due, but I especially wish to mention Professor Brian Fox on behalf of Council. He has put a tremendous effort into the running of the Society during his term as President. He took early retirement from a demanding job as Deputy Directory of an important medical laboratory, but I believe he has worked even harder in his capacity as President of BLS! He established the various subcommittees and has taken an active part in all. His great ability as a diplomat has ensured that even where there are differences of opinion there has always been a successful outcome. Thank you Brian!

The Society has currently 575 members, including 59 new members who joined during 1995.

BLS sub-committees

BLS Council established three sub-committees during 1995 to which it has now devolved detailed planning regarding three key areas of concern to the Society viz Promotion and Publicity Sub-committee (chaired by Mr P W James), Data Sub-committee (chaired by Professor B W Fox) and the already well established committee, now renamed Conservation Subcommittee (chaired by Dr A Fletcher). The composition of these committees has been chosen to involve more of the expertise of the membership of the Society as a whole. Any member either wishing to contribute or else wishing to bring any items to the attention of any subcommittee should please contact the relevant chairman.

William Purvis

Conservation Officer's Report - 1995

Much of the effort has been on "committee-type" affairs so 1995 was relatively low key. The EC Habitats Directive was commented upon as it failed to mention several important lichen habitats, most notably parkland. Fifteen lichens were proposed for addition to Schedule 8 in the 3rd Quinquennial Review of the Wildlife and Countryside Act. The Plant Conservation Strategy of PLANTLIFE was worked on, together with comments on Biodiversity Challenge. I also attended meetings of JNCC's Plant Conservation Strategy Working Group. The British Lichens Red Data Book, initiated by the committee several years ago, has now been edited by JNCC and will appear in the New Year.

Several activities traditionally associated with the Conservation Committee have now grown big enough for subcommittees in their own right. Leaflets and publicity are now dealt with by the "Publications and Promotion" Sub-Committee, Churchyards are very capably handled by Tom Chester's group. Mrs Ishpi Blatchley now answers questions on Churchyard Conservation on behalf of the BLS. Databases and computers are now in the hands of the Data Sub-committee. My proposal for a "distributed computer database" system was agreed and the first stage will be the formation of a documentation standards group, to be convened by me to maintain common standards. I hope that this will get under way in the New Year. Further proposed targets will include the completion of maritime and woodland survey reports, maintaining the network of conservation representatives (**volunteer required!**) and the commission of further lichen conservation leaflets (**ideas needed!**). I would also like to continue our popular *Conservation News Bulletin* if an **editor** would step forward.

It has been difficult for the Conservation Officer to maintain many initiatives this year and my personal workload increased dramatically after taking on the post of Leicestershire County Ecologist on January 1st. It means however, that lichen matters are being given maximum attention at local authority level wherever contacts can be established. This is important since with decreased funding to English Nature, etc., local authorities are becoming increasingly important in effecting nature conservation. I have also given advice on lichen conservation in Wales, speaking to the Welsh Islands Conference in November.

Owing to diary conflicts only one meeting was held this year. But we expect to continue the normal practice in 1996 of January, April and September meetings.

I would like to thank all members of the Conservation Committee for their hard work during 1995. Also, warmest thanks are expressed to those who gave information or took action on behalf of lichen conservation interests. Please accept my apologies that this report was not prepared in time for inclusion in the Winter 1995 *Bulletin*.

Anthony Fletcher

FROM THE ASSISTANT TREASURER

Subscriptions

It is a great help to me that over half the membership of the Society has now paid a three or five year subscription, or has made arrangements to pay annually by Standing Order. Thank you!

Giro payments

Each year the Society receives a number of Giro credits with no indication on the Giro slip, or on the statement, as to whom they are from. Though Girobank is sometimes able to help in identifying the originator of the payment, in some cases it is totally unable to give us any information about the sender. It is obviously essential that those members who use this convenient method of payment ensure that the name of the sender is the first item in the "message".

Car Stickers

Council has approved the production and distribution of car stickers, free of charge, to members. We hope that you like them and that they will have value as publicity for the Society as well as enabling members to recognise each other in car parks at field meetings! Should you want any more, they can be ordered from me at a cost of £1-40 including postage.

Overseas Members 1997 Subscriptions

As explained in a previous *Bulletin*, the Society does not refund subscription overpayments to overseas members because of the costs involved. I will write to all such members in credit in November so that appropriately reduced payments may be made for 1997.

Second-hand copies of *The Lichenologist*, the *BLS Bulletin* and *The Bryologist*.

Following the offer in the previous *Bulletin* the members whose addresses I give below may still have for sale complete or nearly complete sets of volumes, some bound, of the above publications. Please contact them directly if you are interested.

Dr H Ullrich, Zelterstrasse 12, D-38642 Goslar, GERMANY
Mr F Ambrose, 1 Rookery Meadow, Holmer Green, High Wycombe, Buckinghamshire HP15 6XFU
Dr M G Davies, Summerleas, Crapstone Road, YELVERTON, Devon PL20 6BZ
Rev G G Graham, 3 The Willows, BISHOP AUCKLAND, Co Durham DL14 7HH
Mr P L T Willan, 30 Coniston Road, CHEADLE, Cheshire SK8 4AP.

Jeremy Gray

AUTUMN FIELD MEETING IN CLWYD (26-31 OCTOBER, 1995)

Bryn Morfydd Hotel, Llanraedr was the headquarters for this year's autumn meeting in the Vale of Clwyd and after a start disrupted by a television filming session at the hotel, the planned itinerary was followed with superb weather conditions throughout. Fourteen members joined us for various periods during the weekend.

The main object of the meeting was to visit sites of varied geological and topographical interest and to provide the mapping scheme with new records for this very underworked area of North Wales. In the event we were able to add 430 new records in over four 10km squares.

Geologically, the Vale of the Clwyd consists of Bunter Triassic sandstone surrounded on each side by Silurian grits and areas of limestone and coal measure series of the Carboniferous. The limestone is dark coloured and sandy in most places and represents the most recent of the limestone deposition before the onset of the Devonian period. The Ludlow series are very gritty greywackes with mudstones and siltstones with much disturbed bedding planes.

Merchion Woodlands, Henllan, near Denbigh, 33/022693 (VC 50), 114-122m.

We were accompanied on this meeting by Dr John Osley, the district officer of Clwyd who introduced us to the owner of the woodlands, Mr S C Lloyd, to whom we are grateful for permission to visit the site.

This is mixed woodland bordering a valley, the eastern edge being limestone and the western edge of the Silurian grits. This private woodland was one of the richest sites we visited and a small area of the western edge, with large oak and ash trees over limestone outcrops, yielded 135 records. This did not include any of the eastern edge. Interesting species included *Biatora sphaeroides, Calicium glaucellum, Caloplaca cirrochroa*(unusually common on limestone outcrops and walls in the whole district), *C. flavovirescens, Clauzadea immersa, Hyperphyscia adglutinata, Lecanactis subabietina, Lecania cyrtellina, Lecanora confusa, Lobaria pulmonaria, Micarea adnata, Normandina pulchella, Ochrolechia subviridis,* eight *Opegrapha* species including *O. calcarea,* seven *Pertusaria* spp, *Thelotrema lepadinum, Tomasella gelatinosa,* and the very rare *Rinodina immersa.*

Coed Nant Mawr 33/077619, and Coed Mawr Wood, 33/045674,(VC 50)

These were two adjacent small mixed woodland sites near the hotel itself

and owned by Major Arthur Williams who kindly gave us permission to visit. The first piece of woodland (Coed Mawr Wood) consisted of fairly recently planted conifers and did not yield much of interest, although some limestone outcrops nearby had some nice *Dermatocarpon miniatum* and *Diploicia canescens*. The Parkland trees had good stands of both *Ramalina farinacea* and *R. fraxinea*.

Coed Nant Mawr, was a shaded woodland in a river valley and contained more interesting species, but declining light and a cloud of protesting pheasants curtailed a detailed study. However, a very fine ash tree was encountered with contrasting patches of *Pertusaria flavida* and *Ochrolechia subviridis* in fruit: this was well worth seeing. *Graphis scripta, Bacidia chloroticula* (on nearby fence posts) and *Hyperphyscia adglutinata* suggested that more could be discovered in this wood.

Halkyn Mountains, old lead spoil mine heap, 33/193715, (VC 51)
This turned out to be an extensive, old mine working area, which regrettably did not yield any metalliferous lichens, except possibly *Sarcosagium campestre*. However, the limestone outcrops, together with the nearby churches, yielded an extra 100 species for this very under-recorded 10 sq km area.

Rhyd-y-Foel limestone, Llandulas, Abergele, 33/90-77-, (VC 50)
The first of these sites which we visited in the morning was an east-facing slope with more or less dense juvenile woodlands and a few outcrops of limestone. The most striking feature of these outcrops were the extensive colonies of *Squamarina cartilaginea* var *pseudocrassa* (Pd-), the inland form. In addition, *Acrocordia salweyi, Caloplaca cirrochroa* (plentiful), *Catapyrenium lachneum, C. pilosellum, Clauzadea immersa, Diplotomma alboatrum, Gyalecta truncigena, Leproplaca chrysodeta, L. xantholyta, Petractis clausa, Placynthium subradiatum, Protoblastenia calva, P. cyclospora, Psora lurida, Sarcosagium campestre, Toninia sedifolia, Verrucaria aspiciliicola,* and *Leptogium diffractum*. One of the finest stands of *Rhizocarpon concentricum* was extensively photographed. Amongst the epiphytic species recorded were *Anisomeridium biforme* and *A. nyssaegenum* on an elm.

After a figure-of-eight car journey to try to see the sea, we had lunch. We then visited the lower slopes of the limestone, just below an iron age fort on Pen-y-Corddyn Mawr (33/91-76-). This rich, east-facing limestone outcrop yielded several new species, including *Acrocordia gemmata, Caloplaca dalmatica, Protoblastenia incrustans* and *Thelidium decipiens.*

Mynydd Hiraethog, near the Alwyn Reservoir, at the beginning of the Forest Walk, 23/952537 (VC 50).
Following a spate of equipment purchasing at a nearby field station, some large ash, sorbus and conifers were investigated as well as an old calcareous sandstone building alongside the Reservoir. This yielded a number of interesting species, including *Bacidia viridifarinosa, Catillaria chalybea, C. lenticularis, Clauzadea monticola, Fuscidea cyathoides, Lecania turicensis, Lecanora rupicola, Lecidea lithophila, L.pycnocarpa, Lecidella anomaloides, Micarea bauschiana, Miriquidica leucophaea, Ochrolechia turneri* (saxicolous form), *Porina chlorotica; Psilolechia clavulifera, Lecanora jamesii* (saxicolous form), *Rhizocarpon lecanorinum*, and *Sarcogyne regularis*. Perhaps the most striking lichens, however, were the large colonies of heavily fruiting *Lecidella scabra* looking quite resplendently different from its more usual sterile self. Epiphytes at this site included *Arthopyrenia lapponina, Bacidia delicata, Gyalideopsis anastomosans, Parmelia exasperata, Peltigera horizontalis* (at the base of a tree), *Usnea filipendula, U.flammea, and U. wasmuthii*. The whole assemblage reflected the moist, shaded lakeside woodland ecology.

Craig Bron-Banog, near Cerigydrudion, 33/01-51- (VC 50), alt 500 m.
This was an exposed crag in the centre of a large area of Forestry Commission land, whose location was kindly suggested to us by Mr Iolo Lloyd, a forester. The area consisted of a heather moorland with outcrops and a few young *Sorbus*. The epiphytic flora included *Bryoria fuscescens, Buellia disciformis, B. griseovirens*, and *Lecanora aitema*. The rocks yielded *Buellia disciformis, Fuscidea lygaea, Lecidea lithophila, Miriquidica leucophaea, Mycoblastus sanginarius, Ophioparma ventosum* (both colour forms), *Parmelia omphalodes, Pertusaria aspergilla, Porpidia flavocaerulescens, Protoparmelia badia, Rhizocarpon distinctum; Stereocaulon pileatum, S. vesuvianum, Umbilicaria polyphylla* and *Verrucaria aethiobola* (normally found on semi-inundated rocks!)

One of the highlights of the meeting occurred here: the rediscovery of *Rhizocarpon grande* (det P W James) which had been considered previously incorrectly recorded from the British Isles and is now confirmed as a British species.

Any BLS visit would not be complete without a visit to local churchyards, and the most interesting of the six visited was the beautiful medieval church of St Dyfnog, a short walk from the hotel. Most of the other churches visited had been considerably "improved" by refacing and cleaning, and had lost much of the lichen interest they would have developed.

St Dyfnog Church,Llanraedr-Yng-Nghinmeirch, 33/082634 (VC 50) 107 species were recorded on the walls and tombs of this church,some parts of which dated to the 14th century. One of the most frequent and interesting was *Lecanora conferta* (both the A and B variants recognised by some field workers) where it could be compared with *Lecanora crenulata* and *L. dispersa*, with which it was growing. Other species of interest included *Bacidia delicata, Caloplaca dalmatica, C. holocarpa* (the B variant), *Enterographa zonata, Lecania rabenhorstii, Lecanora fugiens, Parmelia verruculifera, Rinodina teichophila, Verrucaria dolosa*, and *V. macrostoma*. Of particular interest was the discovery of three *Vezdea* species under a painted iron railing, with zinc netting, in the extension of the cemetery, namely *V. leprosa, V. aestivalis* and V. *acicularis*.

The other five churches included St Stephen, Bodfari (33/03246)(VC 51)(40 species), St Michael, Caerwys (33/127728)(VC 51)(53 species), Cerrigydrudion (23/953486)(VC 50)(32 species), St Mary, Nannerch (33/167698)(VC 51) (65 species)and St Teymog , Llandyrnog (33/108651)(VC 50)(30 species).

The local Kings Arms provided a fitting venue for après lichenological recovery, and an excellent dinner to celebrate a very successful meeting.

Brian Fox

PEGGY CAYTON

It is with deep regret that we inform the Society that Peggy Cayton died in March from leukaemia, after battling for over a year with the illness. She was well known to members as a regular attender of field meetings, at which she always wore wellingtons, a woolly hat, carried a Sherlock Holmes type of magnifying glass, and had a fear of getting lost. Peggy was intrepid, defying the gales of Arran on one occasion and could often be seen bent double observing patches of earth for terricolous lichens which were her main speciality.

She was a true amateur, enjoying lichens for their own sake. Her house had shelves covered with the more spectacular species, some collected by friends when abroad, and she cultivated a *Vezdaea* garden in seed-trays, under the toxic drip from wire-netting, watching the successive crops of fruits appear and trying to relate this to the seasons, though she had no ambitions to publish her results.

Once when asked how she saw her role in the BLS, she replied that she enjoyed the teamwork. She was a quiet but gregarious person, always ready to welcome newcomers and particularly good company in a one-to-one situation. Probably what gave her most pleasure were the weekly outings of the East Anglian Group, which comprised Chris Hitch, Peter Earland-Bennett, Peggy and sometimes Peter Lambley. She was a legendary letter writer; an archive of several hundred letters that detail the activities of the Group, over the period 1985-1995, have been deposited with the Society's archivist. Peggy never learnt to drive, so on Tuesdays she would take a taxi to her local rural railway station (becoming an authority on its lichens and writing to BR when they removed a seat supporting a rare lichen) and catch a train to wherever the Group was meeting. They would work a churchyard, a wood or a quarry, taking time off for a pub lunch and a chat. She often stumped barmen by ordering Angostura bitters which she had acquired a taste for during time spent in Brazil, as she had for coffee, preferring it in tiny cups and very hot, a difficult proposition in most British catering establishments.

Like many people who, through force of circumstances live alone, her husband dying in 1985, without issue, she enjoyed the camaraderie of the BLS and the joint endeavour of shared fieldwork. Being very active and enthusiastic, and unconventional, she would search for lichens in unlikely niches, finding several species new to Suffolk. After a long time as a potter, Peggy came into lichenology in 1984, having discovered lichen fruits (her "jam tarts") in a churchyard and with her inquisitiveness she was then "hooked" to the exclusion of all else.

Peggy liked Marguerite Yourcenar's novel about the emperor Hadrian, who addressed the soul as "Animula, vagula, blandula", to which we would like to add the adjective "delicatula", which translates as "Dear pilgrim soul, so pale, so fastidious". This seems to be the Peggy that we knew. A lovely lady and a dear friend to many of us.

Oliver Gilbert, Chris Hitch, Albert Henderson, Brian Coppins

FIELD MEETING AT ASHTEAD COMMON

The weather forecast was bad with high winds and heavy rain expected. Fortunately a group of about twelve BLS members ignored this forecast and met on a perfect January day to survey as much of Ashtead Common as was possible in a single morning.

Ashtead Common covers about 500 acres and due to its infertility and waterlogged nature (it is sand over London clay) it was never enclosed. It has a wide variety of habitats but possibly the most notable of them is the ancient pasture-woodland which includes several thousand pollarded oak trees. It was made an SSSI in 1995 and is now managed by the Corporation of London. Vikki Forbes, the Keeper of the Common, was able to join us and provided invaluable local knowledge. At one point she left us to chase a motorcyclist riding over the common. She returned later with a triumphant look as she had, after several years, succeeded in getting the necessary evidence to take action against him.

The common showed the recovery from pollution that is normal in Surrey and had some of the best developed *Parmelia perlata* seen on any of these January field meetings. *Usnea subfloridana* was also present on a group of *Salix* near the stream and abundant on one oak pollard. *Lecanora conizaeoides* is still common on these pollards together with *Chaenotheca ferruginea* and *Hypocenomyce scalaris*, but rarer "old forest" species were not found. Possibly the best find was *Physcia aipolia* on twigs. This is a rare species for this part of Surrey. Another surprise was *Parmelia acetabulum* but, unfortunately, the only specimen seen was on a felled *Salix* and therefore, presumably, it will die in the near future.

An old brick bridge had been examined on an earlier visit to the Common. Unfortunately this bridge had become unsafe and had to be replaced by a new structure. This has caused the loss of a number of species (marked with an asterisk on the list below) but as none of them are rare they probably exist elsewhere on the Common.

The group then moved on to the local pub and, after lunch, they felt ready to tackle the church of St. Giles. This is a much restored medieval church set in a large churchyard. The flint walls of the church have recently been repointed and therefore were lacking in much lichenological interest. On the tiles of the porch roof was a large specimen of *Caloplaca flavovirescens*, and *C. decipiens* occurred on the south wall of the church. *Physcia aipolia* was found once more growing on *Sambucus* at the wooded boundary to the church.

As is usual at this time of year, we were forced to stop due to the failing light. We did produce a list of 79 species from the church and churchyard and even if it cannot match nearby Mickleham it is good for East Surrey. The members then dispersed for home and shortly afterwards the weather became more seasonal with the rain starting to fall.

Frank Dobson

Lichens recorded at Ashtead Common

Buellia punctata
Caloplaca citrina
holocarpa
Candelariella aurella
reflexa
Chaenotheca ferruginea
Cladonia chlorophaea
coniocraea
fimbriata
squamosa
Cliostomum griffithii
*Dipliocia canescens**
Evernia prunastri
Hypogymnia physodes
Lecanora albescens
chlarotera
conizaeoides
dispersa
expallens
Lecidella elaeochroma
elaechroma f.
soralifera
*scabra**
stigmatea
Lepraria incana
lobificans
Parmelia acetabulum
caperata
glabratula
perlata
revoluta
saxatilis
subaurifera
subrudecta
sulcata
Pertusaria albescens
Phaeophyscia orbicularis
Physcia adscendens
aipolia
caesia
tenella
Physconia grisea
Platismatia glauca
Ramalina farinacea
Rinodina gennarii
Sarcogyne regularis
Scoliciosporum chlorococcum
*Toninia aromatica**
Trapeliopsis flexuosa
granulosa
*Usnea subfloridana**
*Verrucaria nigrescens**
Xanthoria candelaria
elegans
parietina
polycarpa

* species once present on an old brick bridge which has since been demolished.

St Matthew's Church and churchyard (from lists by K Palmer and T Chester)

Acarospora rufescens
Agonimia tristicula
Aspicilia calcarea
contorta
Bacidia arnoldiana
sabuletorum
Belonia nidarosiensis
Buellia aethalea
ocellata
punctata
Caloplaca citrina
decipiens
flavescens
flavovirescens
holocarpa
saxicola
teicholyta
Candelariella aurella
medians
reflexa
vitellina
Cladonia chlorophaea
coniocraea
fimbriata
humilis
Collema crispum
Diploicia canescens
Haematomma ochroleucum
var. *porphyrium*
Hypogymnia physodes
Lecania erysibe
Lecanora albescens
campestris
conizaeoides
dispersa
muralis
polytropa
Lecidea fuscoatra
Lecidella scabra
stigmatea
Lepraria incana
Leproloma vouauxii
Micarea denigrata
Parmelia mougeotii
saxatilis
sulcata
verruculifera
Petractis clausa
Phaeophyscia orbicularis
Physcia adscendens
aipolia
caesia
dubia
tenella
Physconia grisea
Placynthium nigrum
Polysporina simplex
Porpidia macrocarpa
soredizodes
tuberculosa
Protoblastenia rupestris
Psilolechia lucida
Rhizocarpon obscuratum
Sarcogyne regularis
Sarcopyrenia gibba
Scoliciosporum umbrinum
Tephromela atra
Toninia aromatica
Trapelia coarctata
Trapeliopsis flexuosa
granulosa
Verrucaria baldensis
glaucina
hochstetteri
macrostoma
f. *furfuracea*
muralis
nigrescens
Xanthoria candelaria
parietina
polycarpa

A PROVISIONAL RE-ASSESSMENT OF THE NON-YELLOW SPECIES OF *RHIZOCARPON* OCCURING IN THE BRITISH ISLES

Introduction

The account of *Rhizocarpon* in Purvis *et al.* (1992) mentions a number of species where there are apparent problems *eg R. hochstetteri* and *R. obscuratum*. In the process of carrying out ecological research for my PhD thesis on British montane lichen vegetation it became necessary to study the non-yellow *Rhizocarpon* species in some detail as they constitute an important part of the montane vegetation. Many of my collections failed to fit in with current taxonomic concepts; in particular Feuerer's 1991 revision, which used a rather broad species concept, failed to do justice to the variation I was encountering. It soon became clear that most upland/ montane specimens called *R. obscuratum* were in fact *R. lavatum* and that there were also at least two very distinct entities included within *R. hochstetteri*. I have, consequently, paid special attention to these groups, collecting them extensively and subjecting all my collections to a detailed microscopic analysis. I have followed this up with herbarium work in the Natural History Museum and the Royal Botanic Garden, Edinburgh, and I have also seen a small number of collections from Scandinavia (principally in the *R. copelandii* group).

The keys presented here must be considered provisional for three main reasons:-

i) The genus is relatively poorly represented in the British Isles compared with, for instance, Scandinavia. Many species are rare and it will be necessary to examine foreign material to gain a clearer concept of these.
ii) More work is needed on a number of problem areas *eg* the *R. copelandii* group.
iii) Although the main taxonomic entities are established the correct names for them are not. In particular, there are numerous previously published names included in the synonymy of *R. hochstetteri* and it will be necessary to examine the type material of many of these.

In cases of doubt, I have tended to retain species as separate entities rather than "lump" them together as it is easier to combine separately recorded species than it is to separate ones recorded together. Consequently, *R. cinereonigrum* and *R. jemtlandicum* are retained as distinct from *R. badiotrum* and *R. cyclodes*, respectively, although I strongly suspect that they are, at most, only worthy of 'variety' status.

Not included in the key are the lichenicolous *R. advenulum* (on *Pertusaria* spp) and *R. ochrolechiae* (on *Ochrolechia parella*).

Key to the species

1 Ascospores 1-septate (occasionally 3-septate or submuriform) ... 2
Ascospores 3-septate to eumuriform ... 18

2(1) Ascospores remaining colourless (over-mature spores sometimes becoming brown, but then usually distorted) ... 3
Ascospores soon becoming dark blue-black (occasionally brown) ... 13

3(2) Medulla I+ blue; ascospores occasionally becoming 3-septate or submuriform ... 4
Medulla I-; ascospores usually remaining 1-septate ... 5

4(3) Thallus usually C+ red (gyrophoric acid). Epithecium K-, maritime species ... ***R. richardii***
Thallus usually C-. Epithecium K+ purple, montane species ... ***R. polycarpum***

5(3) On basic rock ... 6
On siliceous rock ... 9

6(5) On slightly calcareous rocks (epidiorite, basalt, andesite) in oceanic areas. Rarely on semi-inundated siliceous rocks further east (Scotland). Thallus grey, K-, Pd-. Apothecia flat to slightly convex, to 1.5mm diameter, ± inmarginate. Spores 16-18 (-19) x 7-8µm. Epithecium aeruginose, especially in K. ... ***R. caesium*** Fryday in ed.
Usually on more strongly basic rock, especially limestone. Thallus white; apothecia smaller. Epithecium olivaceous to brown ... 7

7(6) Epithecium K+ purple ... ***R. chioneum***
Epithecium K- ... 8

8(7) Exciple K-. Apothecial disc usually pruinose. Thallus K+ yellow, Pd+ orange (stictic acid) ... ***R. caeruleoalbum***
Exciple K+ purple. Apothecial disc not pruinose. Thallus K-, Pd- ... ***R. expallescens***

9(5) Ascospores >24 µm long, usually becoming brown when old. Paraphysoids with only slightly swollen pigmented cap; remaining ± conglutinate in K ... 10

Ascospores usually <22 µm long, rarely becoming brown when old. Paraphysoids with ± distinct, abruptly swollen pigmented caps; ± separating in K 11

10(9) Thallus grey-brown; Usually K-, Pd- (stictic acid absent). On exposed upland/montane siliceous boulders. .....
..... ***R. colludens*** (Nyl.) Fryday in ed.
Thallus red-brown; Usually K+ yellow, Pd+ orange (stictic acid). Restricted to high altitude .....
..... ***R. colludens*** v. ***rufoatrum*** Fryday in ed.

11(9) Thallus thin, olivaceous-brown, ±continuous; K-, Pd-. Apothecia with thin, persistent exciple. Ascopores 19-21 x 9-11µm. Epithecium brown. Frequent oceanic species, becoming scarce in Scotland although extending as far north as Knoydart. Usually on boulders in woodlands but becoming upland/montane in SW England (Dartmoor) and SW Ireland (Brandon Mountain). .....
..... ***R. oceanicum*** Fryday in ed.
Thallus white, grey or brown, areolate to slightly warted. Apothecia with thicker exciple or occasionally ±immarginate. Ascospores 14-16(-18) x 7-8µm. Epithecium brown or blue-black. Upland or montane species 12

12(11) Thallus pale grey to brown, areolate; either K+ red, Pd+ yellow (norstictic acid), K+ yellow, Pd+ orange (stictic acid) or K-, Pd- (no substances). Epithecium blue-black (occasionally olivaceous-brown); paraphysoids with distinct, pigmented cap and separating in K ..... ***R hochstetteri***
Thallus white or pale grey, warted-areolate, K+ red, Pd+ yellow (norstictic acid). Epithecium bright blue-black; paraphysoids less distinctly capitate and only slightly separating in K. On disused metal-mine spoil, montane rocks and coastal shingle.
..... ***R.* aff. *cinereovirens***

13(2) Medulla I+ blue; ascospores 12-16 x 6-8µm; exciple K+ purple .....
..... ***R. simillimum***
Medulla I-; ascospores larger, exciple K+ purple or K- 14

14(13) Epithecium K+ purple 15
Epithecium K- 16

15(14) Thallus K-, Pd- (no substances). Sub-montane; usually on semi-inundated boulders in streams or the margins of lakes
..... ***R. badioatrum***

Thallus K+ yellow, Pd+ orange (stictic acid). Apparently restricted to high altitude, usually associated with areas of prolonged snow-lie ..... ***R. cinereonigrum***

16(14) Thallus of plane to convex white areoles; K+ red, Pd+ yellow (norstictic acid). Exciple K+ purple. Usually on shaded rocks or sides of boulders at intermediate altitudes. ..... ***R. copelandii***
Thallus grey to brown; K+ yellow, Pd+ orange (stictic acid). Exciple K-. Usually on exposed mountain tops. 17

17(16) Thallus usually grey, areoles up to 1mm diameter. Epithecial pigment diffuse. Apothecia ±innate, flat to slightly convex, exciple indistinct. Usually on tops of exposed montane boulders. ..... ***R. ?cyclodes*** Hellb. ex. Th. Fr.
Thallus usually brown, areoles up to 1.5mm diameter. Epithecial pigment less diffuse. Apothecia sessile remaining flat with a persistent, thick, raised exciple. Usually associated with areas of prolonged snow-lie. ..... ***R. jemtlandicum.***

18(1) Ascospores predominantly 3-septate (if medulla I+ blue see 2a) .. 19
Ascospores usually with some longitudinal septa 20

19(18) Thallus orange to rust-red. Apothecia umbonate to gyrose. Usually on metal-rich rocks. ..... ***R. oederii***
Thallus grey. Apothecia smooth. On montane rocks ..... ***R. submodestum*** (Vainio) Vainio

20(18) Ascospores dark brown, asci 2-spored ..... ***R. geminatum***
Ascospores colourless 21

21(20) On calcareous rocks 22
On siliceous rocks 23

22(21) Thallus grey to white. Exciple at most slightly pruinose, disc not pruinose. Ascospores strongly muriform (3-9 transverse, 1-2 longitudinal septa), 20-50 x 10-24µm ..... ***R. petraeum***
Thallus chalk-white. Exciple thickly pruinose, disc usually pruinose. Ascspores less strongly muriform (3-4 transverse, 1(-2) longitudinal septa), 15-30 x 9-16µm ..... ***R. umbilicatum***

23(21) Thallus continuously, finely isidiate-sorediate (blastidia). On metal-rich rocks. Apothecia rare ..... ***R. furfurosum***
Thallus otherwise. Apothecia usually present 24

24(23) Asci 2-spored ..... ***R. subgeminatum***
Asci 8-spored 25

25(24) Medulla I+ blue. Epithecium usually K+ purple; exciple K+ purple ..... ***R. distinctum***
Medulla I-. 26

26(25) Epithecium K+ purple. Apothecia innate. On semi-inundated rocks ..... ***R. amphibium***
Epithecium K- 27

27(26) Ascospores submuriform, usually <25µm long 28
Ascospores eumuriform, usually >25µm long 29

28(27) Ascospores (16-)18-22 x (10-)11-13µm. Length/breadth ratio 1.5-2.0. Thallus indistinct, K-, Pd- (stictic acid absent). Rare upland/montane species ..... ***R. postumum***
Ascospores 19-28 x 10-12. Length/breadth ratio 1.75-2.75. Thallus well-developed, K+ yellow, Pd+ orange or K+ red, Pd+ yellow (stictic or norstictic acids), common species of rocks and pebbles . ..... ***R. reductum*** Th. Fr.

29(27) Ascospores 33-50 x 12-17µm. Length/breadth ratio 2.0-3.0 ..... ***R. lavatum***
Ascospores usually <30µm long. Length/breadth ratio 1.5-2.0 30

30(29) Thallus brown, granular-areolate. Ascospores 22-33 x 11-19µm. Only brown pigments present internally; epithecium K+ grey (at least in places) ..... ***R. ?anaperum*** (Vainio) Vainio
Thallus grey, cracked-areolate. Ascospores 17-36 x 11-15µm. Brown and blue pigments present internally; epithecium K+ aeruginose (at least in places), exciple edge K+ aeruginose ..... ***R. sublavatum*** Fryday in ed.

Notes.

R. amphibium - new to the British Isles. The specimen from Caenlochan provisionally placed here by Purvis *et al* (1992:539) belongs in *R. lavatum*. However *R. amphibium* has subsequently been recorded from NE Scotland (Glen Quoich) and NE England (Upper Teesdale).

R. ?anaperum - new to the British Isles. A number of collections from damp north-facing corries and near areas of late snow-lie in Scotland are provisionally placed here. This entity has also been recorded from Snowdonia and four disused metal-mines in mid-Wales. Feuerer (1991) referred this

Summary of Important Distinguishing Characters

a - spore septation
b - spore colour
c - medulla I+ b
d - epithecium K+ p
e - exciple K+ p
f - gyrophoric acid
g - norstictic acid
h - stictic acid
i - calcareous rock

Species	a*	b†	c	d	e	f	g	h	i
R. badioatrum	1	d	-	+	+	-	-	-	-
R. cinereonigrum	1	d	-	+	+	-	-	+	-
R. copelandii	1	d	-	-	+	-	+	-	-
R. ?cyclodes	1	d	-	-	-	-	-	+	-
R. jemtlandicum	1	d	-	-	-	-	-	+	-
R. simillimum	1	d	+	-	+	-	±	±	-
R. caeruleoalbum	1	c	-	-	-	-	-	±	+
R. "caesium"	1	c	-	-	-	-	-	-	±
R. chioneum	1	c	-	+	+	-	-	+	+
R. cinereovirens	1	c	-	-	-	-	+	-	-
R. "colludens"	1	c	-	-	-	-	-	-	-
v. *"rufoatrum"*	1	c	-	-	-	-	-	+	-
R. expallescens	1	c	-	-	+	-	-	-	+
R. hochstetteri	1	c	-	-	-	-	±	±	-
R. "oceanicum"	1	c	-	-	-	-	-	-	-
R. polycarpum	1	c	+	+	+	±	-	±	-
R. richardii	1	c	+	-	-	±	-	±	-
R. oederi	3	c	-	-	-	-	-	+	-
R. submodestum	3	c	-	-	-	-	-	+	-
R. amphidium	sm	c	-	+	+	-	-	-	-
R. distinctum	sm	c	+	+	+	±	-	±	-
R. postumum	sm	c	-	-	-	-	±	-	-
R. reductum	sm	c	-	-	-	-	±	+	-
R. geminatum	m	d	-	+	+	-	-	±	-
R. ?anaperum	m	c	-	-	-	-	-	-	-
R. petraeum	m	c	-	-	-	-	-	+	+
R. furfurosum	m	c	-	-	-	-	-	+	-
R. lavatum	m	c	-	-	-	-	-	-	-
R. subgeminatum	m	c	-	-	+	-	-	±	-
R. "sublavatum"	m	c	-	-	-	-	-	-	-
R. umbilicatum	m	c	-	-	-	-	-	+	+

* sm = submuriform, m = eumuriform
† d = dark, c = colourless

species to *R. obscuratum* but even allowing for the previous concept of that species it is clearly morphologically and anatomically distinct.

R. badioatrum. As suggested in Purvis *et al* (1992) records of *R. badioatrum* from the Cairngorms (in particular from the late-lying snow bed in Ciste Mhearad (Gilbert and Fox, 1985) belong in *R. jemtlandicum*. This accounts for the reports of stictic acid in British specimens of *R. badioatrum* (also mentioned by Purvis *et al*) although it is possible that some records are of *R. cinereonigrum*.
R. badioatrum is most frequently a species of siliceous rocks in or on the edge of upland-montane lakes and streams. Two distinct entities are recognised within *R. badioatrum* although only one has been recorded from the British Isles.

R. caeruleoalbum - not studied.

R. "caesium" - new to science. The record of *R. expallescens* from Ben Hope (Gilbert and Fox, 1986; Purvis *et al*, 1992) refers to this species. It most frequently occurs on slightly basic rocks in hyper-oceanic areas where it can be locally common.

R. chioneum - not studied.

R. cinereonigrum - new to the British Isles. Separated from *R. badioatrum* primarily by the presence of stictic acid and its ecology - *R. cinereonigrum* occurs only at very high altitudes, most often in the vicinity of areas of prolonged snow-lie. It probably only deserves recognition as a variety of *R. badioatrum*.

R.* aff. *cinereovirens. The type of *R. cinereovirens* (in BM) is a norstictic acid containing strain of *R. hochstetteri*. The description in the key refers to specimens from disused metal-mine spoil in Wales and Scotland which differ from *R. hochstetteri* in morphology and anatomy and for which it will probably be necessary to find a new name.

R. "colludens" - new combination, resurrected from synonymy. This is a common upland/montane species of siliceous rocks usually called *R. hochstetteri* by British and Scandinavian lichenologists. However, it differs from that species by its much larger spores and less distinctly capitate paraphysoids that remain ±conglutinate in K. It has a grey-brown thallus and lacks stictic acid. The v. "*rufoatrum*" (new to science) differs in the

presence of stictic acid as well as the thicker red-brown thallus and its habitat of high altitudes only.

R. concentricum - see *R. petraeum*.

R. copelandii. The holotype of this species (in L) has a thallus composed of dispersed, grey, convex areoles and a K+ purple exciple. Timdal & Holten-Hartwig (1988) have a much broader concept of this species, including collections closer to *R. jemtlandicum*. These are here provisionally referred to *R. cyclodes* (see below).

R. ?cyclodes - resurrected from synonymy (see *R. copelandii*). This appears to be the earliest available name for those specimens included in *R. copelandii* by Timdal & Holten-Hartwig (1988) but which have a ±continuous, areolate thallus and lack a K+ purple exciple. However, its separation from *R. jemtlandicum* is in need of further investigation. It is not rare at high altitudes in the Scottish Highlands although it has in the past been confused with *R. jemtlandicum*. British specimens are all morphologically similar and contain stictic acid. However, even after the removal of *R. copelandii s. str.*, Scandinavian specimens are morphologically more varied and some also contain norstictic acid in place of stictic acid. The complex warrants further study.

R. distinctum - not studied. *R. distinctum* has a red-brown, K+ purple epihymenium. However, I have a collection (from East Lothian) which has a blue-black, K+ blue epithecium - although the exciple is red-brown, K+ purple. As all other characters coincide with those of *R. distinctum* I have no hesitation in placing it in this species.

R. expallescens. This is an extremely rare species recorded in the British Isles only from Coire Cheap (Ben Alder) and Caenlochan. The record from Ben Hope (Gilbert & Fox, 1986; Purvis *et al*, 1992) is referable to *R. "caesium"*, whereas all other records, including those from disused Welsh metal-mines, belong in *R. hochstetteri* s. str.

R. furfurosum - not studied.

R. geminatum - not studied.

R. hochstetteri. The description in Purvis *et al* (1992) reflects the confusion surrounding this species in the British Isles, it being a composite description of *R. colludens* and *R. "oceanicum"*. The description of this species in Timdal & Holten-Hartwig (1988) refers to *R. "colludens"*. I have been

unable to locate the type specimen of *R. hochstetteri* but from the original description (Körber, 1861) and its location, along with the descriptions and opinions of subsequent German/Austrian authors (Poelt and Vezda, 1981; Wirth, 1987; 1995; Feuerer, 1987) I am confident that my concept of the species coincides with that of Körber. Specimens from disused mine spoil in mid-Wales with a pale grey thallus, appear to have a shallower thecium and be more intensely pigmented internally. These may represent a distinct taxon.

R. jemtlandicum. In the British Isles this species is confined to rocks in the vicinity of areas of prolonged snow-lie. Most previous records from the British Isles refer to the closely related *R. ?cyclodes*. *Rhizocarpon jemtlandicum* is morphologically and ecologically distinct from *R. ?cyclodes* although anatomically it differs in only minor respects. They are here retained as separate species pending a more detailed investigation of this complex.

R. lavatum. This species is very variable morphologically but is anatomically well defined by its large muriform spores and thick, tumid exciple. It is not restricted to lake and stream sides as stated by Purvis *et al*, but is far more widely distributed, being frequent on damp rocks throughout the Scottish Highlands and elsewhere. The ochraceous tinge to the thallus also mentioned by Purvis *et al* is only rarely encountered. The earliest available name for this species is *R. obscuratum* (see note under that species). However as this would cause considerable confusion it will be necessary to preserve the name *R. lavatum* by a formal rejection of *R. obscuratum* (see below).

R. oederi - not studied.

R. obscuratum. The type material of *Lecidea petraea* var. *obscurata* Ach., upon which this name is based, is a small form of the species currently known as *R. lavatum*. As *R. obscuratum* has been used for *R. reductum* (see below) as well as small forms of *R. lavatum*, it seems wisest to reject the name altogether.

R. "oceanicum" - new to science. This species is closely related to *R. hochstetteri* and many British records of that species belong here.

R. petraeum - not studied. Feuerer (1991) showed this to be the correct name for the species previously known as *R. concentricum*.

R. plicatile. The syntype of *R. plicatile* (in BM) collected by Leighton from

Cader Idris (N. Wales) is small and in poor condition with only two immature apothecia. However, detailed anatomical notes were made by P W James in 1960 and the specimen was subjected to tlc in 1983 and found to contain stictic acid and atranorin. It is also sorediate. There is an annotation in pencil on the herbarium sheet (?Lamb) querying its placement in *Rhizocarpon* and an undated determination of *R. obscuratum* by Feuerer; who does not treat *R. plicatile* in his most recent work (Feuerer, 1991). The specimen is referable to a crustose *Stereocaulon* species very close to *S. tornense* (but with muriform rather than 3- septate spores) known from a number of localities in Scotland and one in North Wales. It was previously believed to be undescribed. Most other British collections named *R. plicatile* are referable to *R. reductum*. The position of the non-British *R. rubescens*, usually considered a synonym of *R. plicatile*, is less clear. I have not seen the type of this species but A Schade, in a letter to A L Smith housed with the type of *R. plicatile*, considers *R. coniopsoideum* to belong in *R. rubescens*. As *R. coniopsoideum* is a synonym of *R. reductum* it is probable that the name *R. rubescens* refers to the norstictic acid containing strain of *R. reductum*.

R. polycarpum - not studied. The chemistry of *R. polycarpum* and *R. richardii* is reported as *R. richardii* - stictic acid, gyrophoric acid or both; *R. polycarpum* - stictic acid or none. However, Mackenzie Lamb (1940) cites a collection from Somerset with a C+ red thallus and K+ purple epithecium (ie *R. polycarpum* with gyrophoric acid) and I have also collected similar specimens from Glen Coe. Two further collections from maritime rocks (Islay and Harris) have dark ascospores, a K+ purple epithecium and contain stictic and gyrophoric acid (ie *R. richardii* with a K+ purple epithecium). Laundon (1986) has shown that spore colour is very variable in *R. richardii* and these apparant intermediates reduce the distinction between the two species considerably. However, they are here retained as distinct entities pending a more critical investigation of this group.

R. postumum. The single British gathering of this species mentioned in Purvis *et al* (1992) is referable elsewhere; possibly to an apparently undescribed species known from two other collections, also from Ben Lawers (*cf* Gilbert *et al*, 1988 - as *R.* sp 'A'). However there are two specimens of *R. postumum* in BM, from Ben Lawers (Holl 1886) and Caithness (Willey 1905) and I have also collected this species more recently in West Sutherland. The type collection (in H-NYL) is also from Scotland.

R. reductum - resurrected from synonymy. This entity has usually been called *R. obscuratum*. (see note under that name). The only recent work

to recognise *R. reductum* as a distinct species is Foucard (1990).

R. richardii - not studied. See note under *R. polycarpum*.

R. simillimum - not studied.

R. subgeminatum - not studied. This species appears to be fairly frequent at low altitudes in the Scottish Highlands where it usually occurs on the sloping upper sides of siliceous boulders. British specimens are reported as containing no lichen substances (Purvis *et al* 1992). However, Timdal & Holten-Hartwig (1988) report four chemotypes among Scandinavian specimens, which are also morphologically and anatomically rather varied. The complex clearly warrants further study, particularly with reference to the K+ purple exciple which does not appear to have been mentioned in previous studies.

R. "sublavatum" - new to science. Often occurs with *R. lavatum* on damp, montane rocks. In this situation *R. lavatum* is often the host to lichenicolous fungi but *R. sublavatum* always remains uninfected. It most closely resembles *R. anaperum* and its separation from that species and *R. lavatum* relies upon a number of small details. However all three species often occur together when they remain morphologically distinct.

R. submodestum - new to the British Isles. Not studied. The species with 3-septate spores are poorly understood. Both British collections (Glas Moal and Aonach Mor) contain stictic acid. Feuerer (1991) included this species in *R. obscuratum*.

R. umbilicatum - not studied.

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Alan Fryday

Note added in proof

R. grande (Flotow) Arnold. This species has recently been collected from the British Isles (Field Meeting in Clwyd - this volume). I have not seen this specimen and cannot comment on it. In the key *R. grande* will appear as *R. geminatum* but it is readily separated from that species by its 8-spored asci, smaller ascospores, I+ blue medulla, C+ red thallus and K- epithecium (K+ purple in *R. geminatum*).

A NEGLECTED HABITAT: RESERVOIR DRAWDOWN ZONES

Reservoir drawdown zones are well known for supporting rare, ephemeral mosses and liverworts. As I was unaware of any lichen survey work in this habitat I spent a morning in January examining the drawdown zone of Ladybower Reservoir in the Peak District National Park. It is sited on Millstone Grit so the reservoir bed is covered with fragments and small flagstones of sandstone lying on sand or silt. In places a twenty percent cover of annual plants such as corn spurry, marsh cudweed and willow-herb had grown up.

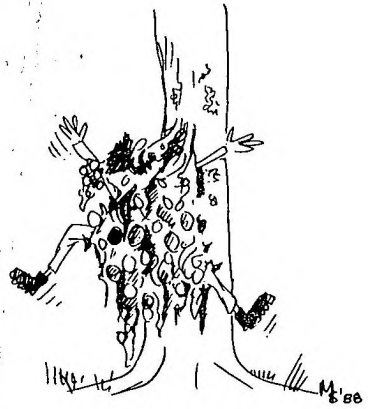
One lichen was present in great abundance, this was *Trapelia coarctata*, which extended to 5 m (vertical) below top water mark. It became less frequent with increasing distance from the shore-line and at the very lowest level was represented by scattered sterile areoles. Growing with it was a small pyrenocarp with a dark thallus. This was later identified as *Verrucaria hydrella*. The drawdown zone must be a severely stressed habitat for lichens because these were the only two species that were at all common. At one point, 2 metres (vertical) below the shore-line, there was a group of about twenty stones well covered with a different pyrenocarp, it had a light coloured thallus and turned out to be *Thelidium minutulum*. The only other species encountered were *Lecidea crustulata* (rare) and an *Acarospora* (seen once) with all reactions negative. A haul of five lichens was disappointing and may be partly related to the acidity of the habitat. Most ruderal lichens such as *Peltigera didactyla* and *Steinia geophana* prefer nutrient-rich conditions.

A lowland reservoir at Ogsdon was visited next. Being on coal measures this also had a bed littered with pieces of sandstone. The main feature here was a 1 m wide band of abundantly fruiting *Lecania erysibe* just below top water mark. *Verrucaria funkii* was present further out and *Trapelia coarctata* was occasional. Other reservoir margins now need to be surveyed to help fill in the national picture. Some might be major sites for *Thelocarpon*. Who knows?

Oliver Gilbert

ICONES LICHENUM UNIVERSALIS: SPECIERUM NOVARUM FIGURAE.

By Jolanta Miądlikowska & Michał Skakuj



Ramalina cannibalii
ASIA: New Guinea

Fakiria spinosa
ASIA: Iran

Peltigera sindbadii
ASIA: Saudia Arabia

LICHEN RECORDS FOR ORKNEY

When I first set up my Shetland lichen databases, I did the same for Orkney using the full BLS data set available at that time - kindly supplied by Mark Seaward. The only changes needed were to add fields to the Paradox database to take account of the square and tetrad data used by the Orkney Field Club/Biological Records Centre (OFC/BRC). The dearth of fully localised records prevented me doing much more in the short term. I have now however been able to extract data from the national herbaria in Edinburgh and London - these include the much-quoted collections from Sanday and Eday made by William Jackson Hooker and his good friend William Borrer in 1808, and records made by Ursula Duncan, Pauline Topham and Mrs Neville Smith, and currently Brian Coppins sends me further records culled from mycological accessions at Edinburgh. All in all it has now become more realistic to proceed with Orkney recording. So at this stage I ask for anyone with Orkney material, or Orkney records, to let me know so that I can add them to my databases.

But there is more. The OFC/BRC has recently taken a significant step forwards by setting up house for its computer and other materials and data, close to the Scottish Natural Heritage office in Junction Road, Kirkwall. Consequently this seems to be the time for me (as OFC Recorder for lichens) to link my own databases with those of the OFC, and make a positive step forward in collecting Orkney lichen records in the interests of both conservation and biogeography.

Orkney is at present credited with 258 'species' (that is, taxa recognised in the BLS mapping scheme) in contrast to a total of 436 for Shetland (this figure takes in 74 for Foula and 109 for Fair Isle). I am at present examining the lists from Orkney and Shetland to see if any clues emerge for this inequality in the lichen lists. Habitat diversity must be significant - possibly low for Orkney in comparison with Shetland as its land area is only about two thirds that of the latter and its bedrock geology is so much less varied (being mostly Old Red Sandstone). However the scattered basic outcrops and extensive calcareous sandy grounds (especially on Sanday) must go a long way to balance the very hard metamorphic limestones of Shetland. It is true that the major serpentines of Unst are not matched in Orkney, but then I think that there are not so many species wholly restricted to these rocks in Shetland. The range of vascular plant communities is probably not significantly different because although, as Elaine Bullard writes (*Wildflowers in Orkney*, 1995) "the only marked British vegetation types missing from Orkney are conifer and broadleaf forests,

and rivers", the same is equally true for Shetland. Hoy has relict scrub woodland communities on birches and rowans especially - which Shetland lacks. Yet both island groups are intersected by lines of softwood fence posts (the older the better for lichens), and sycamores are frequently encountered near habitations. It is on these substrata that we find the corticolous and lignicolous lichens in both archipelagos - as well as on stranded sea timbers around high water mark.

I suspect that however important the solid geology and fences and trees may prove to be as substrata for lichens, the real difference in recorded species richness may prove to be due to the history and intensity of lichenological field work. As far as I can determine, Orkney has had little by way of 'high-powered' systematic studies comparable to those carried out in Shetland in the years after Ursula Duncan's visit in 1959. Very many new 10 km square records remain to be made in both groups of islands as difficulties of access to the more remote islands and coastlines remain serious constraints to fieldwork. Even as we approach the Millennium armed with notebook computers and satellite positioning systems, these aids assist but little in crossing slippery *Porphyra*-draped rocky shores or traversing turbulent tide races. It is not so very difficult to come upon lichen species new to Orkney. My wife and I were able to find *Thelotrema lepadinum* on Hoy during a very brief visit in rather repellent weather, and Barbara Benfield picked up a piece of cliff-top stone at Yesnaby on Mainland which proved to have *Lecidella meiococca* on it (another new record for Orkney). I think it unlikely that almost-by-chance observations in Shetland would reveal such distinctive species new to those islands. More on this subject anon.

Further records could help to narrow the gap between Orkney and Shetland, lichenologically speaking at least. The essential minimum data needed are species name and 6-figure grid reference, but if at all possible we would also like to have locality (including island name), habitat details, date of collection and "whodunnit". The OFC/BRC records are based on a combination of islands and tetrads, so any new records for Orkney that are accompanied by 6-figure references can speedily be converted to the appropriate BRC format using a BASIC program which I have written for this purpose. In the absence of grid references, though, the island name alone is very welcome.

If you have any crusts, powders or spots from Orkney whose identity is uncertain, remember that Trevor Duke is BLS referee for Orkney, and he will verify them before I send the confirmed record on to Kirkwall. If the

record is new to Orkney, then I will first let Mark Seaward know, and in any event I will see that the data is incorporated into all the relevant databases. The OFC/BRC ask for all records to be sent in through their recorders, and to have been properly verified (admirable quality control) - as unconfirmed records will not be 'recognised' in Orkney.

So here we see the start perhaps of an *Annotated List of Orkney Lichens* to balance the equivalent Shetland enterprise (now well under way) - part perhaps of a 20th Century postscript to the 13th century "Orkneyinga Saga"?

Kery Dalby

PARMELIA CAPERATA REACHES CENTRAL LONDON

The expansion of *Parmelia caperata* into the Greater London area has been dramatic, but the nearest site from which it was reported by Hawksworth & McManus (*Bot. J. Linn. Soc.* **100**: 99-109, 1989) was on *Salix* in Gunnersbury Park (TQ(51)/187785), 11 km west of Charing Cross. On 6 December 1995 I was privileged to be able to examine lichens within Buckingham Palace Gardens (TQ(51)/288796) in the City of Westminster and just 1.7 km south-west of Charing Cross, through the courtesy of Mark Lane (Head Gardener). I discovered a single 0.6 cm thallus of this sulphur dioxide sensitive species on an inclined *Salix* trunk (tree no. 1818) by the Lake. The ability of this species to withstand the current ambient sulphur dioxide levels in Central London would have been predicted from its known tolerance levels, and its colonization here may be a prelude to its establishment in other Central London gardens and parks. Fifteen lichenized species were found on this preliminary visit, and details of these and future discoveries will be published in the report of a fuller survey of the natural history of the Gardens currently being undertaken by the London Natural History Society.

David L Hawksworth

LETTER FROM AN OVERSEAS CORRESPONDENT

Czech Lichenology in 1995

Last year brought jubilees of two respected Czech lichenologists: Prof Zdeněk Černohorský (85), a botanist with a considerable breadth of knowledge, mainly of higher plant morphology, editor and co-author of *The Macrolichens of Czechoslovakia* published in 1956 and a *Rhizocarpon* specialist, devoted much of his activity to the Czechoslovak Botanical Society; and Dr Ing Antonín Vežda (75), a well-known taxonomist who specialized in several groups (*Gyalectaceae, Gomphilaceae, Bacidia* sens. lat. etc), particularly foliicolous lichens, editor of exsiccata collections, author of more than 200 papers in which he described over 300 new species. *SCRIPTA LICHENOLOGICA (Bibliotheca Lichenologica* No 58 edited by E Farkas, R Lücking and V Wirth), a Festchrift dedicated to A Vežda, was published and presented during the Symposium on Foliicolous Cryptogams in Eger.

The activity of the Bryological and Lichenological Section followed an established scheme with two field meetings (in eastern Moravia in spring and in northern Bohemia in autumn) and several excursions for students. Two issues of the newsletter *Bryonora* were published. Number 15 contained short articles on *Caloplaca cerinelloides,* a new species in the Czech lichen flora, by R Dětinský and on *Spilonema paradoxum* and *Thermutis velutina*, species that emerged during revision of herbaria by B Wagner. Issue number 16 contained an article by B Coppins, Z Palice and Z Soldán on *Micarea polycarpella* (Erichs.) comb. nov., a new species to the Czech flora, and an article on lichens of the Biosphere Reserve Východné Karpaty (Eastern Slovakia) by I Písút and A Lackovičová. It also contained a list of distribution maps of lichens in papers by Czech and Slovak authors prepared by J Liška, an obituary of J Poelt, portraits of the Association Francaise de Lichenoliogie and the Bordisk Lichenologisk Forening and a bibliography of a new Czech and Slovak lichenological literature.

The total number of members of the Section increased to 70 (both students and teachers are among new members). In 1995 two students of lichenology graduated at Charles University, Prague: J Halda (thesis on lichen flora of the Orlické hory Mts) and G Jelínková (thesis on lichens in Czech textbooks during last 150 years).

Jiří Liška and Zdeněk Černohorský

CHURCHYARD PROJECT NEWS

Howard Fox has drawn the attention of the Churchyards Committee to a most attractive Irish booklet, *The Care and Conservation of Graveyards* (ISBN 07076 1614X). Although lichens receive rather scant attention, it contains some lovely drawings of stonework and ironwork and some evocative colour prints. It costs £1 and can be purchased through a bookseller or directly from The Government Publication Sales Office, Sun Alliance House, Molesworth St, Dublin 2.

I have also just received a copy of *Northamptonshire's Red Data Book* (ISBN 0 9520788 1 3). It has been written by Adrian Colston, Chris Gerrard *et al* and is only the third county volume of its kind, the others being Lincolnshire and South Humberside, and Dorset. It is published by The Wildlife Trust of Beds, Cambs and Northants Ltd and is available for £5 from Lings House, Billing Lings, Northampton NN3 8BE. The final section, on lichens, cites two vulnerable (RDB2) species: *Bacidia incompta* and *Caloplaca virescens*, ten nationally scarce species and 69 species scarce in the vice-county (i.e. found at three or fewer sites). This is from a total of 342 taxa. Two-thirds of the nationally rare or scarce species and almost half of the locally scarce species occur in churchyards. The book has a number of failings which will hopefully be rectified in future editions, but at least it forms a basis for future survey work.

The publication of a third useful little book, *Wildlife in Church and Churchyard* (ISBN 0 7151 7574 2), coincided with a conference at Stoneleigh organised by the Council for the Care of Churches. The author is Rev Nigel Cooper and it is available from the CCC at Fielden House, Little College Street, London SW1P 3SH for £6.95 +50p postage and is full of excellent advice. Even though it isn't specifically mentioned, our churchyard leaflet has clearly been read and inwardly digested.

I continue to receive requests for the pack *Exploring Churchyard Lichens* even from as far away as Massachusetts, USA and Rhodes University in South Africa. A list is being kept of the names, addresses and telephone numbers of everyone who has asked for a pack, whether or not they have received one. They have all been sent a churchyard leaflet and a BLS prospectus. **If you have passed on copies to others, please would you send me their details. It would help if packs not being used are returned as soon as possible for redistribution. Could you also remind recipients of the importance of some feedback before 20 July.**

We are delighted that Ivan Pedley has now joined our committee. He has agreed also to take over from John Walton as co-ordinator for his Upland England (Phase 2) Area. This covers five vice-counties - Cheshire, Derbyshire, Herefordshire, Shropshire and Staffordshire. Please send mapping cards for this area initially to Ivan rather than to me. His address is 48 Woodlands Drive, Groby, Leicester LE6 0BQ. When his busy schedule permits, John will continue his surveys in Warwickshire and we are grateful for all his help in the past.

Thanks to the expertise and hard work of David Newman, I am now able to enter survey details onto an Access 2 database with relative ease and print species distribution maps for the Lowland (Phase 1) Area. However, only when at least 2000 such lists have been added will it be possible to produce maps of any significance. If you have a computer with Windows 3.1 or subsequent version and have the time to enter some of these records for us, we would be more than grateful to hear from you. Initially, it would help if you could write to David at 39 Pear Tree Lane, Loose, Maidstone, Kent ME15 9QX.

Tom Chester

LICHENOLOGY AND INFORMATION TECHNOLOGY

I should like to offer the following to stimulate discussion on what I think should be a major area of concern to lichenologists as we approach the new millenium.

Back in the mid-1970's a few people at school studied computer science at A level. They sat at terminals connected to the county council computer and might have to wait half an hour before the computer was ready to serve their needs when they would write programs that subtracted numbers from each other or added them together. I wasn't very impressed. At university in the late 70's and early 80's engineers adorned their walls with silhouettes of various objects printed out as a grid of noughts or crosses on a long strip of computer paper. I wasn't impressed. Christmas 1983 was taken by storm by Amstrad and the BBC computer that one plugged into one's T.V. - 'the domestic computer has come of age!' I was even less impressed. Yet the vision of the BSBI's *'Atlas of the British Flora'* (Perring & Walters, 1962) and the fact that a computer was the only feasible means of converting hundreds of thousands of records into a meaningful document continued to

haunt me. As time went by and my time became scarcer and scarcer I gave up ruling lines on my index cards, I gave up putting my records on cards at all; they remained closeted in appalling handwriting in my field notebooks. On those rare occasions that I ventured out in the field my poor memory was bewildered; had I seen that species before? Did I know that species under a different name? What species have I found in lowland churchyards? Could I expect to find it here? I needed something that would enable me to enter all my records rapidly, in any random order, then arrange them for me in any way I wanted and print out a list neatly in seconds. I needed a computer.

And in those intervening years technology had wrought the miracle I wanted. The ordinary humble domestic computer can now do what the BSBI's megatherium of the 1960s did with a fraction of the effort. Printers produce text, line drawings and half-tone images of outstanding quality to match that of professionally printed books. It took me approximately twenty hours to enter all my lichen records from a period of ten years. I can pick out the obvious mis-identifications at a glance. It amazes me how many records of interesting species I had forgotten and looking at my lists brings back the memories of that particular tree or rock, and thus some of the subtler habitat requirements of that species. And I can plot my records on a map - at national level, at county level, at any level I like with symbols I can choose to represent whatever qualifier I wish to give that record!

Hurrah! But it wasn't quite so easy getting there. The problem is that a commercial lichen recording programme of exactly my specification doesn't exist. I first purchased a programme recommended (then) as being the best for natural history recording, but it didn't do what I wanted and the list of lichens was horribly out of date. I had to modify a commercial database programme myself. To do so I had to learn how to programme it and that took hours and hours of frustration as what I wanted to do didn't seem to have been considered in the world of commerce. Then I had to enter the list of lichen names - my typing was rusty and never my forte. Having spoken to other lichenologists who seem to have met similar problems, I am therefore delighted that the BLS has set up a computer users group to help others thinking of embarking.

What I have so far achieved is negligible compared to what computerisation and information technology could potentially bring to lichenology, not just in the future but today. The buzz-words now are "net-working", "the internet" and "the information super-highway." The media may present these as futuristic but people with computers have been communicating elec-

tronically for years. Technology has now improved so it is easy to send coloured images down telephone lines and across the world at minimal cost, and commercial groups have organised things such that it is relatively easy for the technologically illiterate to do this. Many academic groups have "bulletin boards" where workers across the world can "pin" ideas, images, even computer programs, for others to read or use. Many groups feel this greatly contributes to research as it is much faster and cheaper than publishing in print (Stix, 1994). Users with passwords can access computer databases remotely, which enables different workers with different perspectives to analyse results or even combine one person's research with their own.

One can see how this might benefit the BLS:

1) Members could download their records directly into the BLS database.

2) Local conservation groups learning of a site in danger could immediately consult the database to see if it were of interest for lichens. If the site were unknown, local members could be informed immediately and the site surveyed.
3) Colour photographs of new species could be posted up for all to see for the fraction of the cost of printing.
4) Workers in areas remote from other lichenologists would feel very much less isolated.
5) Very soon we should be able to have a document translated from one language to another electronically on-line at a fraction of the cost of doing so by current means.
6) The commercial world is promising to deliver video images down-line or even video-conferencing very soon. This would enable BLS members to attend conferences whilst physically remaining at home thus saving time and money, and on Saturday evening those of us who had been unable to make it could dial up a video-recording of last year's field meeting to Terra Exotica.

The past decade has been very exciting for British lichenology; I look forward to the next.

References

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Stix, G (1994). The speed of write. *Scientific American, December, 1994*: 72-77.

David Newman

LICHENS ON THE INTERNET

We have all been using electronic mail (e-mail) in its broadest sense, i.e. we all use the telephone, send fax messages, etc. But in the last few years several lichenologists have been actively using the Internet, that sprawling computer network around the world connecting universities, government, military, commercial and individuals to a variety of computer services. Gopher services (a program for viewing on-line directories and obtaining text information e.g. checklists, lists of type specimens) have been available from several museums. Last year, however, saw the establishment of the bulletin board (lichens-l), a means whereby anyone with an e-mail address could make requests, enquiries or comments to a registered group. Several lichenoligists also set up home pages on the World Wide Web (WWW) in 1995 where various documents, databases and even pictures can be accessed. A number of museums also have web pages where information on some lichen collections can be accessed. In some instances, this information is still available only through gopher files but many are being converted to WWW format.

Many (at least 150) lichenologists now have e-mail addresses and some preferentially use this method to communicate. For most government, organisation, museum and university employees the service is free. Individuals not associated with these organisations normally access the system through a variety of commercial on-line sources, e.g. Compuserve.

Bulletin boards or listservers are group mailing lists. In this case, you address the message to the bulletin board name from where it is broadcast to all members. People wishing to participate "subscribe" to the list. Though one often thinks of subscription costing one money, this service is completely free. In the case of the lichen bulletin board you subscribe making the request via your e-mail system as follows:

To:	listproc@hawaii.edu
Subject:	(leave blank)
Message:	subscribe lichens-l <your name>
	(note that your name is typed in without the brackets)

You should receive a message in acknowledgement within about an hour. Your subscription will be accepted and some further information provided. This message should be saved for later reference. From then on, if you wish to make a general enquiry you address your request to "lichens-l@hawaii.edu" The message goes to the "post office", in this case, in Hawaii and is then distributed. Note that the name of the addressee is case sensitive so when addressing the lichens-l bulletin board always use lowercase letters. If you

wish to respond to a message you have three options:
1. You may use the respond function which will automatically address the response and include the original message. You simply enter your response and send it. You can even intersperse your responses within the original message answering questions wherever they were asked. In some systems, you are able to omit the original message;
2. You can send a new message addressed to the bulletin board. In this case you would have to address the new message to lichens-l@hawaii.edu; or
3. You may want to address your response directly to the enquirer. Normally, it is best to share your response with everyone on the board. However, there are times, particularly when you want to include a personal note, that it is more appropriate to respond to the individual address only.

If you generate a message to the bulletin board you may get one or two error messages telling you that certain people did not receive the message for some reason or other. Occasionally, their system does not respond or there is some problem with their address. You do not need to do anything further. We will try to resolve the problem at this end.

Once you have subscribed you can obtain a list of all of the other people on the bulletin board by sending the message "review lichens-l" to listproc@hawaii.edu. There are currently 125 people subscribed to lichens-l. We send out a list of subscribers about once a month. If you know somebody who is not subscribed you may want to let them know of the existence of the bulletin board and how to subscribe. Please note that if you want to send a message to the bulletin board you send it to "lichens-l@hawaii.edu" but if you want information about the bulletin board you send the message to listproc@hawaii.edu.

Another way to get a lichenologist's address is to go to the World Wide Web (WWW). The Web is a collection of home pages set up in individual Internet user accounts that contain a wide variety of information that can be accessed at any time. You access WWW using a Web Browser, such as Netscape. There are several others all of which do the same thing. Much of the entry level software is free from Microsoft, Netscape, etc., directly or via one of the commercial on-line e-mail providers. There is a somewhat rudimentary home page for the International Association of Lichenologists (IAL) on my account at "http://www2.hawaii.edu/~cliff/". This formula is referred to as the URL (Uniform Resource Locator). When you access this home page you have a number of options. For lichenologist's addresses click on "Lichens" and then on the following screen on "International Association of Lichenologists". After that you click on "List of Lichenoligists" at which

time you will be presented with a listing of the alphabet. You click on the first letter of the surname of the person you wish to find. You are then presented with a listing of all people that I have on file. If I have that person's e-mail address you will see it in blue or red lettering. This coloured lettering means that it is linked to a file that will automatically enable you to send a message to that person. If you click on their e-mail address the message screen will appear. You then type in your message and send it. Using the "Back" button you can return to the alphabetical letters to find someone else or to a previous screen to look at the IAL Constitution, IAL Acharius Medallists, some lichen photographs or whatever may be available as the system grows. You will also find hotkeys - URLS that are formulated in such a way that you are automatically transferred to that Web site. Just click on one of them and you can view that home page. You do not leave the initial Web site to which you can return by clicking on the "Back" button to return to look at other URLs. You can also exit the Web, of course.

A word of caution regarding all communication on the Internet. **All information on the Internet is available to anyone**. There is no privacy. What is more, all communications are archived for later retrieval whether you would want it or not.

Clifford Smith

ACTION PLAN FOR LOWER PLANTS IN SCOTLAND

The Scottish Cryptogamic Conservation Project (see *Bulletin* **74**: 38, 1994) was completed in Spring 1995, with the production of dossiers on 32 species of cryptogams (13 lichens) listed under Schedule 8 of the Wildlife and Countryside Act. The dossiers have promoted considerable interest and feed-back from regional staff of Scottish Natural Heritage (SNH), other conservation bodies and land managers. Following the success of this project, SNH and the Royal Botanic Garden Edinburgh have continued this work to include a further selection of cryptogams that are nationally or internationally rare, or apparently endemic to the British Isles. The project team comprises Brian and Sandy Coppins and Alan Fryday (lichens), David Long and Gordon Rothero (bryophytes), Nick Stewart (charophytes), Roy Watling (fungi), and Vin Fleming (co-ordinator for SNH). With regard to lichens, additional contributions are being made by Oliver Gilbert and Pat Wolseley, and Mark Seaward is gratefully acknowledged for making available information from the BLS Mapping Scheme's files.

The lichens included are *Alectoria ochroleuca, Aspicilia melanaspis, Caloplaca flavorubescens, Catolechia wahlenbergeri, Cladonia botrytes, C. maxima, Graphis alboscripta, Gyalideopsis scotica, Halecania rhypodiza, Hypogymnia intestiniformis, Lecanora achariana, Leptogium saturninum, Parmelia subargentifera, Peltigera malacea, Pseudocyphellaria norvegica, Pyrenula dermatodes, Ramalina polymorpha, Thelenella modesta,* and *Toninia cumulata.* If anyone has personal observations on the occurrences of any of these species (especially in Scotland), knowledge of unpublished information or herbarium material other than in the national herbaria in London (BM), Cardiff (NMW) or Scotland (E), they are requested to contact us at the Royal Botanic Garden Edinburgh, EH3 5LR (Tel 0131 552 7171; Fax 0131 552 0382; E-mail: B.Coppins@rbge.org.uk). Contact us also if you require a list of the other cryptogams included in the project.

The inclusion of some of the above-listed species may need some explanation. *Graphis alboscripta, Gyalideopsis scotica* and *Halecania rhypodiza* are included as they are currently unknown outside the British Isles. *Lecanora achariana* is a Schedule 8 species, but as it was not discovered in Scotland until 1995 it was not included in the previous project. From its post-1960 dot-map distribution, *Leptogium saturninum* would seem to be well established in Scotland, but there have been reports of marked declines in its populations. *Pseudocyphellaria norvegica* is not particularly rare or threatened (at least in Scotland), but is, however, considered to be an internationally rare species. *Ramalina polymorpha* is certainly not threatened in several of its Welsh and northern Scottish sites, but is under serious threat from quarrying applications and agricultural pollution in its localities in the Scottish Borders. There are several records from the 1960s and early 1970s of *Cladonia botrytes* in NE Scotland, but the species has not been seen in Britain for over 20 years. The reasons for this dramatic decline are currently an enigma. It has mostly been recorded from the cut stumps of pine, so some changes in forestry practice may be responsible.

Lichen hunters who would like an alternative challenge could look out for *Tulostoma niveum,* a tiny, white, stalked puffball recently discovered in Britain from near Inchnadamph in Scotland. Its habitat amongst mosses on limestone boulders, is more likely to come under the scrutiny of bryologists and lichenologists than it is by "non-lichenized" mycologists!

Brian and Sandy Coppins

WHY HAVE SPECIES OF *LOBARIA* DECLINED IN THE PAST CENTURY?

David Hawksworth's note (1995) on the decline of *Lobaria* spp in Cumbria between 1969 and 1994 has made me reflect on the causes of this decline. He considers acid rain and the complete loss of elms in the 1960s and 1970s to be major factors. Seaward and Hitch (1982) have pointed out that *Lobaria* species all require moderately basic bark (pH 5 to 5.5), and that they have disappeared in historic times from central England and east Britain where winter SO_2 concentrations exceed 25 to 35 $\mu g/m^3$ air. Some, but not all, British species of *Lobaria, Pseudocyphellaria* and *Sticta* have a cyanobacterial photobiont. In theory, these species should be able to grow without an external nitrogen supply, and may well excrete nitrogen. Excessive amounts of externally applied nitrogen as ammonia or nitrogen oxides are almost certainly toxic.

In Dorset atmospheric SO_2 concentrations are low and four species of *Lobaria* still survive despite losses from some sites. The best remaining sites are large parks and woods, including one on an army range, where agricultural operations are minimal, and grazing is chiefly carried out by deer or by cattle at a low density. It is possible that ammonia from the urine of animals kept at high density, or from manure plastered onto trees in fields by muck-spreaders, has assisted the decline of the *Lobarion*.

This hypothesis has yet to be tested. Air pollution monitors rarely give more than imprecise estimates of SO_2, and sometimes the pH of rain, but ammonia concentrations are neglected. One needs a series of measurements over many years to detect trends, which are expected to vary greatly with location. The toxicity of ammonia towards *Lobaria* spp. could be tested using fairly inexpensive laboratory methods, but I am not aware that this has been done. In remote environments SO_2 produced naturally is neutralised by the natural production of NH_3. The quantities of both gases produced have been greatly perturbed by man's activities, and where either is in excess the imbalance might have potentially lethal effects on lichens.

References

Hawksworth, D L (1995). Great Wood and environs twenty-five years on. *British Lichen Society Bulletin* **77**: 25-27.

Seaward, M R D & Hitch, C J B (1982). *Atlas of the Lichens of the British Isles*. Cambridge: Institute of Terrestrial Ecology.

Humphry Bowen

NEW, RARE AND INTERESTING BRITISH LICHEN AND LICHENICOLOUS FUNGUS RECORDS

(Contributions to this section are always welcome. Please submit entries to Chris Hitch, The Whin, Wadd Lane, Snape, Saxmundham, Suffolk IP17 1QY, in the form of species, habitat, locality, VC no, VC name, Grid Reference (GR), altitude, where applicable, in metres (m), date, comments and recorder. An authority with date after species in only included when the record is new to the British Isles. *In the interests of accuracy, typescript is much appreciated. Please use only one side of the paper.)*

Acarospora veronensis: several thalli on top of sandstone chest tomb, Winterbourne churchyard near Bristol, VC 34, West Gloucester, GR 31/64-81-, June 1995. Very few records outside of NW Wales. Determined O W Purvis.

M J Simms

Arctomia delicatula: on mossy trunk of *Fraxinus* on NW-facing slope, near Kilblaan, Glen Shira, Inverary, VC 98, Main Argyll, GR 27/12-13-, 1996. Fourth British record.

B J & A M Coppins

Arthothelium ruanum: on *Corylus* twigs, Cwm Llyfnant, VC 46, Cardigan, GR 22/73-97-, alt 90m, 1994. Confirmed B J Coppins & F Rose. New to Cardigan.

S P Chambers

Bryoria capillaris: on bole of mature *Quercus* near River Derwent, VC 66, Durham, GR 35/94-49-, alt 300m, February 1992. Confirmed D L Hawksworth who suspects that the bark may be acidified. New to north-east England.

D E McCutcheon

Caloplaca granulosa: on east face of marble cross close to seaward boundary of Llanbadrig churchyard, GR 23/37-94-, VC 52, Anglesey, June 1995 (BLS Summer Field Meeting). Possibly first churchyard record.

T W Chester *et al*

Caloplaca ruderum: on mortar on south wall of Llaneilian church, GR 23/46-92-, VC 52, Anglesey, June 1995 (BLS Summer Field Meeting). An unusual westerly location. Confirmed J R Laundon.

T W Chester *et al*

Candelariella reflexa: growing with *Bacidia caligans, Catillaria chalybeia* and *Lecania erysibe* on wooden palings affected by dust from nearby cement works, Claydon, VC 25, East Suffolk, GR 62/13-49-, November 1995. Also found fertile on *Salix* in adjacent carr.

P M Earland-Bennett & C J B Hitch

Carbonea assimilis: on steeply sloping, SW-facing basaltic rocks, Traprain Law, VC 82, East Lothian, GR 36/57-74-, alt 125 m , 1996. Second British record, new to southern Scotland.

B J Coppins & A M Fryday

Catapyrenium squamulosum: on thallus of *Collema fuscovirens* on low, marble coped tomb dated 1911, Southwick churchyard, VC 32, Northampton, GR 52/02-92-, October 1995. New to vice-county. Confirmed P W James.

T W Chester

Cetraria chlorophylla: on crags of Old Red Sandstone conglomerate near summit of Seefin, Galty Mountains, VC H7, South Tipperary, GR 11/89-19-, July 1994. New to Munster but greatly under-recorded in Ireland.

M J Simms

Chaenotheca brachypoda: on underside of inclined *Fraxinus* at edge of wood, Cockfield Hall, Yoxford, VC 25, East Suffolk, GR 62/39-69-, March 1996. This species is by far the commonest member of the *Caliciales* in East Suffolk, and although most commonly found on *Sambucus*, it is also known from *Salix* and *Ulmus*.

P M Earland-Bennett & C J B Hitch

Chrysothrix flavovirens: abundant on *Pinus* by the sea, Pleinmont, Torteval, Guernsey, UTM Grid Ref WV/2—7—, 2 September 1994. Rhizocarpic acid and chrysophthalma unknown present (TLC No 3263). Distinguished by its vivid yellow-green sorediate thallus. Sterile. New to the Channel Islands.

J R Laundon

Cladonia arbuscula subsp. *arbuscula* (Wallr.) Flot. (1839): on old dunes and heathland, Barry Links, Carnoustie, VC 90, Angus, GR 37/5—3—, 1995. New to the British Isles. This taxon contains psoromic acid (PD+ deep yellow) rather than fumarprotocetraric acid (PD+ yellow to red), which is characteristic of the common (in western Europe) subsp. *squarrosa*. It was found at three places at Barry Links, together with the subsp. *squarrosa* and *C. mitis*.

B J & A M Coppins

Cladonia cyathomorpha: in shelter of rock on talus slope, Bench Vird, 2 km ENE of Vidlin, Lunnasting, Mainland, VC 112, Shetland, GR N41/49-66-, August 1992. Determined D H Dalby, confirmed B J Coppins. New to Shetland.

D H Dalby

Cladonia polydactyla var. *umbricola*: on litter of deep *Calluna* on wet moor, Mickle Fell, VC 65, North-West York, GR 35/82-26-, alt 580m, August 1993. Determined B J Coppins. New to Yorkshire.

D E McCutcheon.

Cladonia symphycarpa: on unstable earth on eroding soil terraces on sea banks, South Sound, Nibon, Northmavine, Mainland, VC 112, Shetland, GR N41/30-72-, August 1995. Determined D H Dalby, confirmed O W Purvis. New to Shetland.

D H Dalby

Collema limosum: on damp clay soil below sea-defence gabions, Llanina Point, VC 46, Cardigan, GR 22/40-59-, 1992. Confirmed A Orange. New to Cardigan.

S P Chambers

Collema limosum: growing with *Thelidium zwackhii* on disturbed soil at site of old Butlins Holiday Camp, Clacton-on-Sea, VC 19, North Essex, GR 62/16-13-, April 1995.

P M Earland-Bennett

Gyalecta truncigena: growing with *Leproloma vouauxii* on mortar of church wall, Cold Overton, VC 55, Rutland, GR 43/81-10-, June 1995. An unusual second saxicolous record for this normally corticolous species. Determined B J Coppins.

P M Earland-Bennett & C J B Hitch

Gyalidea subscutellaris: around broken wheel-pit, Welsh Foxdale mine, Gwydyr Forest, VC 49, Caernarvon, GR 23/76-59-, alt 220m, 1994.

S P Chambers

Lecanactis latebrarum: on a damp shaded underhang of the West Water, VC 90, Forfar, GR 37/51-70-, February 1996.

R C Munro

Lecania atrynoides: on west wall of Llaneilian church, GR 23/46-92-, VC 52,

Anglesey, June 1995 (BLS Summer Field Meeting). Possibly first churchyard record. Determined B J Coppins

T W Chester *et al*

Lecanora achariana: an extensive population on tops of low rocks in small lochan and pools, and also on side of boulder in fast flowing stream, Gleann na Sguaib, Beinn Dearg, Ullapool, VC 105, West Ross, GR 18/24-5-82- alt 575-725 m, August 1995. New to Scotland.

A M Fryday

Lecanora agardhiana: locally frequent on SW-facing limestone, Little Ormes Head. VC 50, Denbigh, GR 23/81-82-, alt 50m, 1994. Determined A M Fryday.

S P Chambers

Lecanora pruinosa: abundant on plinth of war memorial, with thalli present on several other gravestones and on south wall of the church, Stanton, VC 33, East Gloucester, GR 42/06-34-, September 1995. This species appears very substratum- specific, being confined to surfaces on the local Middle Jurassic oolite and absent from gravestones of Portland oolite or Lower Lias limestone which otherwise are of similar age and aspect.

M J Simms

Lecanora pruinosa. (i) On limestone string course and chamfered plinth on south wall of Aldwincle church, VC 32, Northampton, GR 52/00-81-. (ii) On limestone and mortar on north, south and east walls of Woodnewton church, VC 32, Northampton, GR 52/03-94-. The most North-easterly station in the British Isles so far. (iii) On limestone on north and west walls of Pewsey church; also, surprisingly, on what appears to be a sarsen stone set in the south wall of the church, VC 8, South Wilts, GR 41/16-59-. All records October 1995.

T W Chester

Lecidea ahlesii: on lip of small waterfall in ravine woodland, Cwm Wyre. VC 46 Cardigan, GR 22/58-70-, alt 100m, 1995. Confirmed A M Fryday.

S P Chambers

Lecidea hypopta: with *Hypocenomyce caradocensis* and *Micarea melaena* on flaking bark of old *Larix*, Caer Meirch, VC 46, Cardigan, GR 22/75-73-, alt 250 m, 1995. Confirmed A M Fryday. New to Cardigan.

S P Chambers

Lecidea silacea: on south-facing spoil, Parys Mountain, VC 52, Anglesey, GR 23/43-90-, alt 120 m, 1995. New to Wales.

S P Chambers

Lecidella asema: on wooden palings approximately 10 km from the sea, Glaisdale, VC 62, North-east York, GR 45/78-05-, March 1976. Determined B J Coppins. First modern record for Yorkshire.

P M Earland-Bennett

Lecidella asema: on wooden wall just above HWM, Walberswick, VC 25, East Suffolk, GR 62/50-74-, June 1992. New to Suffolk.

P M Earland-Bennett, C J B Hitch & P N Cayton

Lepraria crassissima: on sheltered, vertical, slightly calcareous rocks in gorge, just above Glencairn Bridge, Dollar Glen, VC 87, Clackmannan, GR 26/96-99-, 1995. New to Scotland.

B J & A M Coppins

Lepraria lobificans: on mosses on damp rock, Crossgerd, near Fladdabister, Mainland, VC 112, Shetland, GR N41/42-26-?, June 1959. Specimen in E (collected UK Duncan), determined R C Holland and B J Coppins, 1989. New to Shetland. (There is no "Crossgerd" near Fladdabister: local opinion favours a hill slope of this name 6 km south - GR given above). A further 20 specimens (from sites in Mainland and three other islands), collected and determined D H Dalby using TLC, are also this species which is by far the commonest *Lepraria* in Shetland.

D H Dalby

Lepraria lobificans: scarce on shaded north side of brick chest-tomb, Catel churchyard (Fr Castel), Guernsey, UTM Grid Ref WV/3—7—, May 1995. Atranorin, constictic and stictic acids, and zeorin present (TLC, No 3269). Specimens of *Lepraria* are scarce on Guernsey. New to the Channel Islands.

J R Laundon

Lichenodiplis lichenicola Dyko & D. Hawksw. (1979): in apothecia of *Rinodina sophodes*, Abhainn Alligin, Torridon, VC 105, West Ross, GR 18/83-57-, 1994. New to the British Isles. Differs from *L. lecanorae* in the larger conidia (8.5-) 9.5-10.5(-13) x 4-4.5 µm vs 4-7 x 2-3 µm, which have a relatively narrower scar, and longer conidiogenous cells, 8.5-17 vs 5.5- 12 µm.

B J & A M Coppins

Micarea lithinella: on flint on ground in Norsey Wood, Billericay, VC 18, South Essex, GR 51/68-95-, May 1994. Determined B J Coppins.

P M Earland-Bennett

Micarea misella: on rotten log (probably *Pinus*) in heathland, SW of Isle of Thorns, Ashdown Forest, VC 14, East Sussex, GR 51/43-30-, 1994. New to Sussex; specimen in E.

J F Skinner

Microcalicium ahlneri: on hard lignum on side of stump of old *Quercus*, Humbie Woods, VC 82, East Lothian, GR 36/4—6—, 1995. New to southern Scotland.

B J & A M Coppins

Parmelia discordans: with *Umbilicaria polyrrhiza*, Cairn Owen, VC 46, Cardigan, GR 22/73-88-, alt 470m, 1995. Both new to Cardigan.

S P Chambers

Parmelia disjuncta: locally abundant on steeply sloping, SW- to S-facing basaltic rocks, Traprain Law, VC 82, East Lothian, GR 36/57-74-, alt 125-150 m, 1996. New to the Lothians.

B J Coppins & A M Fryday

Parmelia soredians: abundant on an *Acer pseudoplatanus* by drive, Smeaton House, East Linton, VC 82, East Lothian, GR 36/59-78-, 1995. Second record for SE Scotland.

B J & A M Coppins

Peltigera degenii: on several fallen mossy boles and mossy acidic rocks in river gorge wood, Derwent Gorge NNR, VC 66, Durham, GR 45/04-49-, alt 182m, November 1991. Confirmed B J Coppins. New to England and still in good heart October 1995.

D E McCutcheon

Peltigera elisabethae: on ± vertical surfaces of small overhangs at base of hill slope, Alva Glen, Ochil Hills, VC 87, Clackmannan, GR 26/88-98-, alt *c* 200 m, 1985. Previous British records are from altitudes of over 700 m Confirmed O Vitikainen.

B J Coppins

Peltigera rufescens: as an extensive sward amongst grass, Purley Rise,

Purley, VC 17, Surrey, GR 51/30-61-, April 1995. In view of air pollution, an amazing sight so close to London.

J W Millbank and C J B Hitch

Phaeographis smithii: on young *Fraxmus* trunk, Cwn Einion, VC 46, Cardigan, GR 22/69-94, alt 100m, 1994. Confirmed B J Coppins. New to Cardigan. Also on smooth *Fraxinus* twigs, Nant Paith, Nanteos, near Aberystwyth, VC 46, Cardigan, GR 22/63-78-, 1995; and on *Corylus*, Llayfnant Valley, VC 46, Cardigan, GR 22/71-97-, 1995.

S P Chambers

Phoma physciicola Keissler (1911): in apothecia of *Physcia aipolia* on *Fraxinus*, Glen Shira, Inverary, VC 98, Main Argyll, GR 27/12-12-, 1996. New to the British Isles. For description see Hawksworth's "The Lichenicolous Coelomycetes" (*Bulletin of the British Museum (Natural History), Botany* **9**: 1-98, [1981]).

B J & A M Coppins

Physcia dubia: fertile on brick wall in a garden, Clacton-on-Sea, VC 19, North Essex, GR 62/16-13-, August 1994.

P M Earland-Bennett

Polycoccum microsticticum: on thallus of *Acarospora fuscata* on retaining wall of old railway line, Forfar, VC 90, Forfar, GR 37/48-52-, January 1996.

R C Munro

Porina mammillosa: overgrowing mosses on vertical rock face, a few yards from the river, Dunkistry Burn, VC 90, Forfar, GR 37/43-73-, alt 400m. August 1995. A rather low altitude for this rare upland species.

R C Munro

Porpidia zeoroides (Anzi) Knoph & Hertel (1984): on calcareous mica-schist boulders, Creag Loisgte, Ben Lawers, VC 88, Mid Perth, GR 27/63-41-, alt 1000m, June 1995. New to the British Isles. Similar to *P. superba* but apothecia with a black (not brown) disc and with the outer edge of the exciple distinctly white pruinose. Also recorded from limestone outcrop, Beinn Sgulaird, Loch Creren, VC 98, Main Argyll, GR 27/02-45-, alt 525m, July 1995.

A M Fryday

Protoparmelia atriseda: associated with a yellow *Rhizocarpon* sp. on rim of blocky spoil around old mine shaft, Glynllifion mine, Gwydyr Forest, N

Wales, VC 49, Caernarvon, GR 23/78-59-, alt 270m, 1994. Very locally frequent.

S P Chambers

Psilolechia leprosa: on wooden peg at base of copper lightning conducter of church, Winchcombe, VC 33, East Gloucester, GR 42/02-28-, September 1995. Another lignicolous record of this mainly saxicolous species.

M J Simms

Psilolechia lucida: on oolitic limestone on north wall of the church, Stanway, VC 33, East Gloucester, GR 42/06-32-, September 1995. An unusual record for the oolite-built churches of the Cotswolds, it is associated with *Leproloma vouauxii* and abundant *Psilolechia leprosa* on a copper-stained patch of the wall (no trace of the copper source itself remains). A copper lightning conductor elsewhere on the same wall is associated only with sparse *P. leprosa*.

M J Simms

Pyrenula chlorospila: growing with *Arthonia spadicea, Lepraria lobificans* and *Porina aenea* on a shaded trunk of *Fraxinus* in Putney Wood, Clacton-on-Sea, VC 19, North Essex, GR 62/15-16-, June 1994. Confirmed B J Coppins.

P M Earland-Bennett

Ramonia interjecta: on horizontal branches of decumbent *Salix* in marl pit. Butley VC 25, East Suffolk, GR 62/37-51-, January 1996. Also growing with *Licea parasitica* on *Sambucus* in woodland, Cockfield Hall, Yoxford, VC 25, East Suffolk, GR 62/39-69-, March 1996.

P M Earland-Bennett & C J B Hitch

Rhizocarpon cinereovirens: on well-lit mine spoil with *R. "expallescens"* Coed Mawr Pool mine, Gwydyr Forest, N Wales, VC 49, Caernarvon, GR 23/77-58-, alt 190m, 1994.

S P Chambers

Rhizocarpon ochrolechiae: on thallus of *Ochrolechia parella* on sea-shore rocks, a small point to N of Ard Baeg, Trumpan, Waternish, Skye, VC 104, North Ebudes, GR 18/21-61-, 1979. This species develops small thalli within that of its host. It is further characterised by its immarginate apothecia, thick K+ purple epithecium and dark grey, muriform spores. However, this collection from Skye and that from Ardnamurchan (see *Bulletin* **72**: 51 [1993]) have larger ascospores [c 24-35 (-40) x 12-17

(-19) µm] than are reported from the type [18-27 x 10-12.5 µm: see Nimis & Poelt, in *Studia Geobotanica* **7** (Suppl 1): 205 (1987)].

B J Coppins

Rinodina isidioides: on *Fraxinus* by boundary wall, near Allt Buidhe, Glen Shira, Inverary, VC 98, Main Argyll, GR 27/12-13-, 1995. Fertile.

B J & A M Coppins

Sagediopsis aquatica: on fertile *Koeberiella wimmeriana*, Llyn Glas, Snowdonia VC 49, Caernarvon, GR 23/61-55-, alt 650 m, 1994. Determined B J Coppins. New to Wales.

S P Chambers

Scutula solorinaria (Nyl.) P. Karst. (1885): on thallus of *Solorina bispora* on damp, calcareous, mica-schist crags, northern side of Meall nan Tarmachan, VC 88, Mid-Perth, GR 27/58-39-, alt 800 m, 1995. Determined B J Coppins. New to the British Isles.

A M Fryday

Skytella mulleri: on cortex of decaying *Peltigera praetextata* on mossy log, Cwm Llyfnant, VC 46, Cardigan, GR 22/71-97-, alt 45m, 1995. Determined B J Coppins. New to Wales.

S P Chambers

Strangospora moriformis: on sea-cliff top fence post, with *Lecanora saligna,* Llangranog, VC 46, Cardigan, GR 22/31-54-, 1994. Determined B J Coppins. New to Cardigan.

S P Chambers

Strigula lateralis Aptroot & v.d. Boom (1995): on *Corylus*, Correl Glen NNR, VC H33, Fermanagh, GR 23(H)/0—5—, 1995. New to the British Isles. (see Literature Pertaining in this issue).

B J & A M Coppins, & H Fox

Trapeliopsis glaucolepidea: on consolidated peat between low rocks on peat hags, Mickle Fell, VC 65, North-West York, GR 35/82-24-, alt 730 m, August 1993.

D E McCutcheon

Trimmatothele perquisita: on outcrop of mica-schist and metamorphosed limestone, east ridge of Ben Sgulaird, Loch Creran, VC 98, Main Argyll, GR 27/02-45-, alt 525 m, 1994. Second British record, previously recorded in

the British Isles from a single limestone outcrop in the Ben Alder range. The two Scottish collections apparently have larger spores than the type from Norway (see *Flora* p. 615).

A M Fryday

Usnea wasmuthii: on mature *Quercus* in wooded river valley, Upper Derwent Valley, VC 66, Durham, GR 35/94-49-, alt 280 m, June 1995. Confirmed B J Coppins. Formerly sunk in *U. subfloridana,* but very much rarer and apparently much less tolerant of air pollution, New to north-east England.

D E McCutcheon

LITERATURE PERTAINING TO BRITISH LICHENS - 19

Lichenologist 27(5) was published on 11 October 1995, 27(6) on 3 January 1996, 28(1) on 30 January 1996, and 28(2) on 12 April 1996.

Taxa prefixed by *are additions to the checklist for Britain and Ireland. Aside comments in square brackets are mine.

APTROOT, A & BOOM, P P G van den 1995. *Strigula lateralis* spec. nov. with notes on the genus *Julella* (Ascomycetes). *Mycotaxon* **56:** 1–8. **Strigula lateralis* Aptroot & v d Boom, described from Portugal and Ireland, has perithecia with lateral ostioles, muriform spores, 25–35 x 6.5–8.5 µm, and pycnidia with large, bacilliform, 7–9(–10)-septate macroconidia, 28–40 x 3–4 µm, which have a long gelatinous appendage at either end. [In the field, the Irish collection closely resembled *Pyrenula laevigata*. See New Rare and Interesting in this issue.]. Also included are notes and a key to corticolous species of *Julella*, and *J. fallaciosa* is confirmed as a synonym of *J. sericea* [cf. *Flora* p. 280].

ARMSTRONG, R A & SMITH, S N 1996. Experimental studies of hypothallus growth in the lichen *Rhizocarpon geographicum*. *New Phytologist* **132:** 123–126.

COPPINS, B J 1995. Two new, diminutive *Micarea* species from western Europe. *Bibliotheca Lichenologica* **58:** 57–62. **M. deminuta* Coppins is described from England (Devon, Kent), Scotland (Kirkcudbright, Perthshire, Stirling), Wales (Cardigan) and Belgium, where it grows mostly on the lignum of logs or wood fragments lying on the ground. **M. parva* Coppins

grows on shaded sandstone rocks or crumbling walls in woodland, and is reported from England (Durham), Scotland (Midlothian) and Belgium.

COPPINS, B J, PALICE, Z & SOLDÁN, Z 1995. *Micarea polycarpella* (Erichs.) comb. nov., a new lichen species for the Czech Republic. *Bryonora* **16:** 22–25. The supposed exciple of *Lecidea polycarpella* was found to be merely the remnants of the hyphal layer that previously surrounded the apothecium in its initial stages. The species was therefore transferred to *Micarea* as *M. polycarpella* (Erichs.) Coppins & Palice.

DAVID, J C & HAWKSWORTH, D L 1995. *Zevadia*: a new lichenicolous hyphomycete from western Ireland. *Bibliotheca Lichenologica* **58:** 63–71. **Zevadia peroccidentalis* J.C. David & D. Hawksw. forms black, stromatic conidiomata, *c.* 2–3 mm diam., on the thallus of *Usnea flammea*. Its conidia are dark brown, with roughly warted walls, 0(–1)-septate, 5–7.5 µm diam. This new species is reported only from the type locality, Clare Island in Co. Mayo. A key is provided to the genera of dematiaceous fungi with aggregated conidiophores.

DICKHÄUSER, A, LUMBSCH, H T & FEIGE, G B 1995. A synopsis of the *Lecanora subcarnea* group. *Mycotaxon* **56:** 303–323. Five species are accepted within the group, of which *L. subcarnea* itself is the only British representative.

FARKAS, E É, LÜCKING, R & WIRTH, V (eds) 1995. Scripta Lichenologica: Lichenological papers dedicated to Antonin Vezda. *Bibliotheca Lichenologica* **58:** i–xv, 1–501. Thirty papers contributed by many of Dr Vezda's friends and colleagues, world wide, to celebrate his 75th birthday. Many of the papers are relevant to the British lichen flora - the most pertinent being included in this listing.

GIRALT, M & BARBERO, M 1995. The saxicolous species of the genus *Rinodina* in the Iberian peninsula containing atranorin, pannarin or gyrophoric acid. *Mycotaxon* **56:** 45–80. Seven of the twelve species treated occur in the British Isles. New chemical data includes the finding of additional ovoic, umbilicaric and 5-*O*-methylhiasic acids in both *R. aspersa* and *R. atrocinerea*.

HAFELLNER, J & TÜRK, R 1995. Über Funde lichenicoler Pilze und Flechten im Nationalpark Hohe Tauern (Kärntner Antei, Österreich). *Carinthia II* **185/105:** 599–635. *Lecidea insidiosa* is transferred to the recently described genus, *Ramboldia* Kantvilas & Elix (*Bryologist* **97:** 296–

304, 1994), as *R. insidiosa* (Th.Fr.) Hafellner.

HARRIS, R C 1995. *More Florida Lichens, including a 10 c tour of the Pyrenolichens.* New York: published by the author. [The part of this book of most relevance to the British lichen flora is that dealing with the pyrenolichens. This contains many innovations and changes, providing much "food for thought" - certainly more than 10 cents worth! Only some of the more important, proposed nomenclatural changes are included here.]. The genus *Arthopyrenia* is accepted with *A. analepta* (Ach.) Massal. (1852) as type. A lectotype for *A. analepta* is chosen, and this name is taken up for *A. lapponina*. The *A. punctiformis* group is treated in the genus *Naetrocymbe* Körb. (1865) with the following new combinations (British taxa only): *N. fraxini* (Massal.) R. C. Harris (syn *A. fraxini*). *N. punctiformis* (Pers.) R. C. Harris (syn *A. punctiformis*), *N. saxicola* (Massal.) R C Harris (syn *A. saxicola* Massal., *Pyrenocollema saxicola* [but with a comment that it may require removal to a new genus]. *Mycoporum* is redefined, and to it are transferred: *M. antecellans* (Nyl.) R. C. Harris (syn. *Arthopyrenia antecellans*) and *M. lacteum* (Ach.) R. C. Harris (syn. *Tomasellia lactea*). *Mycoporum hippocastani* and *M. quercus* are placed in *Cyrtidula* Minks (1876) as *C. hippocastani* (DC) R. C. Harris and *C. quercus* (Massal.) Minks (1891), respectively. In an appendix, a provisional world key to *Anisomeridium* is presented; in this, *Arthopyrenia viridescens* is transferred to *Anisomeridium* as *A. viridescens* (Coppins) R C Harris [if this placement is correct, then *A. ranunculospora* should also be moved to *Anisomeridium*]. In discussions on *Porina*, the author considers *P. guaranitica* to be different from *P. heterospora* [if this be so then the latter is the correct name for the species occurring in SW Ireland and Devon].

HENDERSON, A 1995. Stones, cups-and-rings and lichens: a study of lichen distribution on the carved rocks of Rombalds Moor. *Bull. Yorks. Nat. Un.* **24:** 20–21. A contribution to a symposium on the ecology of Ilkley Moor. Includes a diagram of the lichen zonation in a moorland gritstone community.

HENSSEN, A 1995. *Sagiolechia atlantica*, eine neue Flechte von den Atlantischen Inseln (Ascomycotina, Ostropales). *Bibliotheca Lichenologica* **58:** 123–136. *S. rhexoblephara* is shown to deviate from the type of the genus, *S. protuberans*, in the structure and development of its apothecia. The genus *Rhexophiale* Th.Fr. (1860) is therefore reinstated with *R. rhexoblephara* (Nyl.) Hellb. (1875) [NB: not "(Nyl.) Zahlbr." as cited].

HERTEL, H 1995. Schlüssel für die Arten der Flechtenfamilie Lecideaceae in Europa. *Bibliotheca Lichenologica* **58:** 137–180. An annotated key to

species of *Cecidonia*, *Lecidea* s.str. and *Melanolecia*. Among the new taxa described is **Lecidea subspeirea* Coppins, P. James & Hertel, which was collected on the mortar and calcareous sandstone of a church wall in Sussex. It differs from *L. fuscoatra* in its white cretaceous thallus that forms a 'pseudothalline margin' around each apothecium. Also new to Britain is *L. ecrustacea* (Anzi ex Arnold) Arnold (1876), which differs from *L. lapicida* var. *pantherina* [=*L. lactea*] in having an inapparent, endolithic thallus. Several names proved to be synonyms, and the following changes are to be made to the British list. *L. matildae* becomes *L. confluentula* Müll. Arg. (1872); *L. nigrogrisea* becomes *L. siderolithica* Müll. Arg. (1872); *L. pernigra* becomes *L. promixta* Nyl. (1898). [From the key and notes it would appear that some British specimens answer to *L. swartzioidea* Nyl. (1859), which is said to differ from *L. lactea* in having a very dark brown (rather than hyaline to pale brown) hypothecium.]

JAHNS, H M, KLÖCKNER, P, JØRGENSEN, P-M & OTT, S 1995. Development of thallus and ascocarps in *Stereocaulon tornense*. *Bibliotheca Lichenologica* **58:** 181–190.

KÄRNEFELT, E I & THELL, A 1995. Genotypical variation and reproduction in natural populations of *Thamnolia*. *Bibliotheca Lichenologica* **58:** 213–234.

KÜMMERLING, H, LEUCKERT, C & WIRTH, V 1995. Chemische Flechtenanalysen XI. *Lepraria jackii* Tønsberg. *Nova Hedwigia* **60:** 457–465. *L. jackii* is shown to contain as major compounds atranorin and the fatty acids jackinic and/or roccellic acid, and sometimes variable amounts of zeorin. The species is shown to be of wide occurrence in Europe and present also in USA, Mexico and Australia.

LEUCKERT, C, KÜMMERLING, H & WIRTH, V 1995. Chemotaxonomy of *Lepraria* Ach. and *Leproloma* Nyl. ex Crombie, with particular reference to Central Europe. *Bibliotheca Lichenologica* **58:** 245–259. *Leproloma cacuminum* is considered to belong to *Lepraria* as a member of the *L. neglecta* group, but the new combination proposed is probably predated by that of Lohtander [1995; see *Bulletin* **77:** 46]. *L. elobata* is considered to be synonymous with *L. lobificans*, but no evidence is presented [and the decision seems quite remarkable, given the clear-cut morphological differences between the two]. Useful chemical data is provided for the chemically variable taxa, especially *L . nivalis* and *L. caesioalba*.

LUMBSCH, H T, FEIGE, G B & ELIX, J A 1995. A revision of the usnic acid-

containing taxa belonging to *Lecanora sensu stricto* (Lecanorales: lichenized Ascomycotina). *Bryologist* **98:** 561–577. Eighteen species are treated, of which only *L. jamesii* occurs in Europe. It is concluded that the usnic acid containing species of *Lecanora* do not form a natural group and cannot be separated from *Lecanora* s. str.

LUTZONI, F M 1995. A generic redelimitation of the *Ionaspis-Hymenelia* complex (Lichenized Ascomycotina). *Systematic Botany* **20:** 224–258. The traditional means of separating these two genera by their respective photobionts is rejected, and the genera are redefined using a wide range of characters. British species are rearranged thus: *Hymenelia cyanocarpa* (Anzi) Lutzoni (syn. *I. cyanocarpa*), *H. epulotica* (Ach.) Lutzoni (syn. *I. epulotica*, *H. prevostii*), *H. heteromorpha* (Kremp.) Lutzoni (*I. heteromorpha*), *H. melanocarpa* (Kremp.) Arnold (1869), *H. rhodopsis* (Sommerf.) Lutzoni (*I. rhodopsis*) [if British material is correctly identified], *Ionaspis lacustris* (With.) Lutzoni (*H. lacustris*), *I. odora*, *I. suaveolens* (Fr.) Th.Fr. ex Stein. [The author citation for the last species is subject to final ratification of a nomenclatural proposal.]. [The differences between the two genera are difficult to summarize in a few words, but note that all the *Hymenelia* species, except *H. epulotica*, have dark discs and an N+ reddish epihymenial pigment. Although *H. prevostii* is considered to be a synonym of *H. epulotica*, the taxonomic status of the 'large-spored' morph of *H. prevostii* from England and Wales (see *Flora* p. 273) remains to be resolved.]

POELT, J & LEUCKERT, C 1995. Die Arten der *Lecanora dispersa*-Gruppe (Lichenes, Lecanoraceae) auf kalkreichen Gesteinen im Bereich der Ostalpen - Eine Vorstudie. *Bibliotheca Lichenologica* **58:** 289–333. This will prove to be a valuable contribution to a better understanding of this difficult group. Lichen chemistry, especially with regard to xanthones, is providing a valuable aid.

PRINTZEN, C 1995. Die Flechtengattung *Biatora* in Europa. *Bibliotheca Lichenologica* **60:** 1–275. This detailed revision is in German, but with a summary and key to species in English. The accepted British species are: *B. chrysantha* (Zahlbr.) Printzen (1994) (syn. *B. gyrophorica* Tønsb., *B. epixanthoidiza* auct.), *B. cuprea*, *B. efflorescens* (Hedl.) Räsänen (1935) (syn. *B. epixanthoidiza* (Nyl.) Räsänen), *B. subduplex* (Nyl.) Printzen (1995), and *B. vernalis*. European distribution maps are provided for all the accepted species. On account of their apothecial ontogeny, *B carneoalbida*, *B. epixanthoides*, *B. sphaeroides* and *B. tetramera* are excluded from the genus and referred to *Mycobilimbia*. In addition, an annotated checklist is provided for holarctic, *Biatora*-like species; i.e. non-saxicolous species

formerly treated as *Lecidea* sect. *Biatora*, *Catillaria* sect. *Biatorina* and *Bacidia* sect. *Weitenwebera*. This checklist includes many comments on possible affinities that will be valuable for further studies of these little-studied species.

PURVIS, O W, JØRGENSEN, P-M & JAMES, P W 1995. The lichen genus *Thelotrema* in Europe. *Bibliotheca Lichenologica* **58:** 335–360. *T. monosporum* auct. europ. is newly described as *T. macrosporum* P.M. Jørg. & P. James, and likewise *T. subtile* auct. europ. as *T. petractoides* P.M. Jørg. & Brodo. The previously considered Irish endemic, *T. isidioides*, is shown to occur widely on the Azores, where it is mostly corticolous.

ROPIN, K & MAYRHOFER, H 1995. Über corticole Arten der Gattung *Rinodina* (Physciaceae) mit grauem Epihymenium. *Bibliotheca Lichenologica* **58:** 361–382. The species of *Rinodina* with a grey, K+ violet epihymenium are revised. *R. colobina* is shown to be incorrectly reported from Britain, the British material being referred to the newly described **R. pityrea* Ropin & H. Mayrhofer. The former has spores of the *Pachysporaria*-type (rarely *Physcia*- or *Mischoblastia* types), whereas those of *R. pityrea* have the distinctly thickened wall of the *Tunicata*-type.

SCHOLZ, P & KNOPH, J-G 1995. *Buellia vezdana*, a new lichenicolous species from coastal rocks in Great Britain. *Bibliotheca Lichenologica* **58:** 405–410. **Buellia vezdana* P. Scholz & Knoph is a new lichenicolous lichen described from Cornwall and Pembroke, where it grows on the thalli of *Caloplaca verruculifera*. [It probably belongs in *Diplotomma* if and when this genus is considered distinct from *Buellia* s. str.]

SEAWARD, M R D 1995. Recorders' reports from 1994. Bryology and lichenology. *Trans. Lincs. Nat. Un.* **23:** 210–211. Records of many species, including four new to Lincolnshire.

STAIGER, B & KALB, K 1995. *Haematomma*-Studien I. Die Flechtengattung *Haematomma*. *Bibliotheca Lichenologica* **59:** 1–198. A world revision, with 35 accepted species. In German, but with a summary and key to species in English. The correct name for *H. leprarioides* auct. europ. is shown to be *H. sorediatum* Rogers (1982) (syn. *H. neglectum* Lumbsch & Feige), a species originally described from Australia. A colour plate of this and other selected species is also included.

THELL, A 1995. A new position of the *Cetraria commixta* group in *Melanelia* (Ascomycotina, Parmeliaceae). *Nova Hedwigia* **60:** 407–422. A

detailed analysis of a wide range of characters has resulted in the *Cetraria commixta* group being referred to *Melanelia* Essl.; the group includes *M. commixta* (Nyl.) Thell and *M. hepatizon* (Ach.) Thell. [British species of *Parmelia* s.lat. that are also included in this genus are *P. disjuncta*, *P. elegantula*, *P. exasperata*, *P. exasperatula*, *P. glabratula*, *P. laciniatula*, *P. septentrionalis*, *P. stygia* (type species), *P. subargentifera*, and *P. subaurifera*.]

TSCHERMAK-WOESS, E 1995. The taxonomic position of the green phycobiont of *Sticta canariensis* (Ach.) Bory ex Delise and extraordinary modification in the lichenized state. *Bibliotheca Lichenologica* **58:** 433–438. In culture, the green photobiont of *S. canariensis* proved to be *Dictyochloropsis reticulata*.

WEDIN, M 1995. *Bunodophoron melanocarpum*, comb. nov. (Sphaerophoraceae, Caliciales s.lat.) *Mycotaxon* **55:** 383–384. The new combination *Bunodophoron melanocarpum* (Sw.) Wedin, is made to accommodate the *Sphaerophorus melanocarpus* complex, which probably represents several species on a world-wide basis. [The mainly Southern Hemisphere genus *Bunodophoron* A. Massal. (1876) is distinguished from *Sphaerophorus* mainly on characters relating to ascospore ontogeny.]

[Erratum to Literature Pertaining - 18: For "KNOPH, J-H" read "KNOPH, J-G"]

Brian Coppins

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