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**BRITISH
LICHEN
SOCIETY
BULLETIN**



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FORTHCOMING FIELD MEETINGS

The Gower Peninsula - South Wales (Cancelled)

Howgill Fells - Cumbria 21-24 October 1988

Leader: Dr. O.L. Gilbert

URBAN DEMOLITION SITES: A NEGLECTED HABITAT

The clean sweep philosophy of urban renewal has produced large tracts of land in our cities that are covered with brick rubble and lumps of concrete. Due to planning blight or lack of money it is often a number of years before these sites get redeveloped and, during this time, soil forming processes start to work on the rubble to produce embryo soils. These become colonised, first by annual plants, later by tall herbs, and eventually an open grassland with scattered bushes of willow or buddleia comes to occupy the sites. These have variously been called urban commons or urban fields. Lying amongst this young vegetation, often half-hidden, are large quantities of potential lichen habitats, viz. lumps of concrete, mortar, bricks, brick fragments, broken paving stones, kerbstones, chippings, ash, tarmac and balks of timber, often supplemented by dumped material including clothing and cardboard. Until recently this varied though temporary habitat, which is probably now diminishing following a peak in the late 1970's, has been largely neglected by lichenologists.

My interest was aroused on encountering an eight year old site well colonised by Peltigera didactyla (P. spuria). In towns this species has its headquarters in greenhouses, cold frames and on little used garden paths, though its presence on demolition sites is not too surprising since it is the closest we have to a ruderal lichen (a species adapted to conditions of low stress and high disturbance). Other terricolous lichens present on these sites, especially where compaction or nutrient deficiency limits the growth of higher plants, are common Cladonia species such as C. chlorophaea, C. coniocraea, C. fimbriata, C. furcata, C. humilis and, occasionally, C. subulata (on ash); none are red fruited. Where organic matter in the form of dead plant bases or stems has accumulated a search may reveal Placynthiella icmalea, P. oligotropha and P. uliginosa. Compacted mortar-rich soil may support Collema tenax and a stunted proliferating form of C. crispum.

The major habitat is mortar encrusted brick. It is difficult to separate the two micro-habitats involved, but brick needs to be considered separately as it provides a nutritionally unbalanced substrate, being particularly rich in available phosphorous, potassium, calcium and magnesium. This could be partly responsible for the presence of unusual species. The common lichens of damp brick lying

among decaying vegetation are Lecania erysibe including f. sorediata, Scoliciosporum umbrinum, Trapelia coarctata(AB), T. obtegens, T. placodioides and Lecidella scabra. Less commonly recorded, but sometimes locally abundant, are Sarcosarium campestre, Arthopyrenia monensis, Bacidia caligans, B. chlorotricula (all Sheffield), and Bacidia subfuscula (Leeds).

Mortar and concrete provide the expected range of common urban calcicoles, e.g. Candelariella aurella, Caloplaca citrina, Lecanora dispersa (ab), Rinodina gennarii, Verrucaria muralis and V. nigrescens. Other lichens locally present are Sarcogyne regularis on soft mortar and, associated with concrete, Thelidium minutulum, Verrucaria murina and B. chlorotricula. This latter species may have its headquarters in Britain on urban demolition sites as Peter Earland-Bennett has an additional record from a lump of tarmac on Canvey Island, Essex, and Albert Henderson knows it in Leeds. There may be parallels between the flora of this microhabitat and that of intermittently disturbed soft chalk nodules which have been designated a distinct association, the Lecideetum watsoniae.

The baulks of timber common on many sites have usually originated as rafters, joists or door and window frames, though some may have been dumped. These become colonised by lignicolous species such as Lecanora conizaeoides, Trapeliopsis flexuosa, T. granulosa and, if dust impregnated, by Candelariella vitellina, Lecanora muralis, Phaeophyscia orbicularis, Physcia spp. and several others. Brian Fox has recorded Stereocaulon pileatum growing copiously on the lead-painted timber of demolished houses in Cheshire. Old clothing may itself become clothed with Lecanora conizaeoides, showing that it is not restricted to the dress of scarecrows, while fragments of old canvas sheeting supporting Trapeliopsis granulosa have been reported. It is certain that much remains to be discovered about the lichen communities of urban demolition sites. A hint of the possible riches awaiting discovery is provided by observations made by G. Salisbury at Ainsdale sand dunes in the nineteen-fifties. There, on the site of a demolished greenhouse, colonising brick, boot leather, rags and cardboard he recorded Thelocarpon laureri, T. olivaceum, T. magnussonii and T. pallidum, the latter pair new to science (Lichenogist 3: 175-196 (1966)).

The parameters that control the lichen communities of this habitat include the fresh, almost unweathered nature of the substrata due to recent disturbance. For this reason there are similarities with the flora occurring on rock fragments and soil along tracks, particularly recently constructed roads running through forestry plantations. It is likely that pioneer species such as Porpidia tuberculosa, Lecidella crustulata, Rhizocarpon obscuratum and Baeomyces rufus will be reported

once acidic examples have been surveyed. The physio-chemical resemblance of mortar to chalk nodules has already been commented on the disturbance factor being provided by rabbits and sheep in one case, by bulldozers in the other. Current levels of air pollution in British cities do not substantially affect the composition of the communities which occur in areas well sheltered by vegetation against injury.

If any members can add to this provisional account of a neglected habitat please send comments and records for inclusion in the 'New, rare or interesting' section.

OLG.



A four year old urban demolition site
that was formerly a steelworks

Yet another change of venue for the A.G.M. ... and the promise of a further change next year - to the Jodrell Centre, Royal Botanic Gardens, Kew, with a visit to the CAB International Mycological Institute in the afternoon. This year's meeting was held in the Meeting Room of the Royal Entomological Society with its fine wooden panels and comfortable facilities. 53 members attended and the President welcomed members to the start of the 30th year in the Society's history. To mark the occasion, and in recognition of two hard working and active members of the Society, the meeting enthusiastically elected Mr. Frank Brightman and Mr. Jack Laundon as honorary members for their long-standing contributions to lichenology and the British Lichen Society since its inception in 1958.

The officers, as usual, gave their reports; the Secretary promised a membership list with the Summer Bulletin, and the Assistant Treasurer told the meeting that the number of members deleted through non-payment of subscriptions was well down this year - a good sign in these times of financial stringencies. The Treasurer told the meeting that they should be looking for a new Treasurer now that he had entered his 80th year. Although Mr. Tallwin was prepared to stand for another year, there were a number of changes to the Officers of the Society. Dr. Oliver Gilbert was elected back as editor of the Bulletin and thanks were expressed to Frank Brightman for editing the Bulletin while Oliver had a year off. There were also changes to the editorial board of The Lichenologist - Dr. Dennis Brown was elected Co-Senior Editor with a view to taking over from Professor David Hawksworth next year. Dr. Paulette McManus was leaving the editorial team and was thanked for her contribution.

On the Conservation front it was decided that the work of Conservation Officer was too much for one person and two people were nominated as joint Conservation Officers; Mr. Rob Jarman would look after the site records and Dr. Kery Dalby would take care of the secretarial side of the duties. Frank Brightman would remain as Conservation Chairman, and Council decided that the Conservation committee could nominate any one of these three to represent the committee at Council meetings. Thanks were recorded to Miss Joyce Gadsby for acting as minutes secretary to the Conservation committee. Dr. Brian Coppins was elected as President for the next two years and Professor David Richardson as Vice-President. Following a ballot, Dr. Roy Alexander, Mrs. Peggy Cayton and Mr. Jack Laundon were elected to Council.

The Treasurer announced his intention to reapply to the Charity Commissioners

after the budget for subscriptions to be paid by covenant. Dr. Mark Seaward informed members that he had been awarded a personal grant of £5,000 by the Central Electricity Generating Board to support the publication of another volume of the Lichen Atlas, and the President said that "Horizons in Lichenology" had been through the proof stages and should be published later in January. Professor Hawksworth also mentioned that an index to Vols 11-20 inclusive of The Lichenologist would be issued with part 4 this year and thanked Mrs. Benfield and Mr. Sandell for their work in producing this. The meeting agreed that the book sale should be held again next year; the sum raised for the Society this year was £130.

At the Exhibition Sandy O'Dare had the 1988 greetings cards, designed by Claire Dalby, for sale and Frank Dobson brought along, as usual a selection of books for sale from Richmond Publishing. The "Lichens on Rocky Seashores" chart was also available. Dennis Brown displayed an update of the library catalogue; Claire Dalby exhibited mounted paintings of Lecanora chlorotera, Caloplaca spp. and Rinodina luridescens. Joy Fildes showed three photocopied pages of lichens from the 1892 National Encyclopaedia and an attractive card dated 1852 with 'The Yellow Wall Lichen' (Parmelia parietina) printed on it and a specimen of Xanthoria parietina mounted on the card. Tim Moxham exhibited a material collage of Xanthoria parietina designed by Joss Jewell.

Tim Moxham

REPORT ON THE LECTURE MEETING: OUR CHANGING LICHEN FLORA

While Introducing the programme David Hawksworth reminded the 78 people present that significant changes are occurring within the British lichen flora which are not attributable to air pollution. He mentioned in particular the death of elms, tidying up of churchyards, succession of terricolous sites, the growth of ivy on trees, water pollution, and new methods of capping walls in Devon. Few of these phenomena have been studied to the point where quantitative data are available and he suggested that members should start monitoring local sites.

John Henry Looney spoke of his Preliminary studies on the effects of acid rain in upland Britain. The effects of acid rain on the environment are quite complex, for example it lowers the pH of precipitation and also increases total deposited acidity, the former being more pronounced in the east of Britain, the latter in the west; also annual average values are thought to be of less consequence than the occurrence of highly acid episodes particularly

if these follow one another in quick succession. Growth of members of the Lobarion community is being monitored at many sites and the preliminary findings are that while in the New Forest, Wales and Northern Scotland species are growing well, with radial extension up to 2 cm per year, in the east and central Lake District, Argyll and north-west Scotland growth is almost static.

Pat Wolseley had much to say on Past woodland management and its effect on the lichen flora with reference to upland Britain. Her historical researches showed that far from being in a natural state many woods in the West of Scotland had been periodically grazed out, cut over, coppiced or managed as wood pasture by centuries of charcoal burning, iron smelting, ship building, crofters, farmers and other land owners. This intensive management had even extended to such notable sites as the Loch Sunnart woods and Glas Drum. In the west of Scotland these influences did not appear to affect the Lobarion too much as it is growing under near optimum climatic conditions. However, in lower rainfall areas, the survival of old forest communities depends upon very special circumstances often revolving round the continued presence of hazel (easily grazed out) which can act as a refugium.

Mark Watson spoke of the Impact of Dutch elm disease on the lichens of the British Isles. A likely scenario for the future is that elms in the south of England may be reduced to a low understory of sucker regrowth by constant reinfection while in the north there may be considerable survival as spread of the disease is held up by the cooler climate and more dispersed distribution of the trees. Two hundred species of lichen have been recorded from elm which supports a rather specialised epiphytic flora due to the water-retentive, nutrient-rich bark. Species most at risk include Gyalecta ulmi, G. flotowii, Caloplaca luteoalba, Collema fragrans and Cryptolechia carneolutes. Though many of the species can also occur on other trees the latter is very much an elm lichen and with a substantial proportion of its world population in south-west Britain we have a special responsibility to try to ensure, through transplant attempts, that it survives.

Kate Rigby brought us up to date with work on Peppered moth - lichen - air pollution inter-relationships. For a long time it appeared that she was going to conclude that there was no relationship between morphs of Biston betularia and the presence/absence of lichens, but at the very end, to general relief, one was found. Problems with the classic theory are that var. carbonaria is fairly frequent in East Anglia where trees are lichen clad, typical forms are never quite eliminated in towns, and on a transect from North Wales to Manchester there has been an inward shift in the distribution of var. typica over the 1973-1986 period but no significant shift in the abundance of grey

foliose lichen species to form a cryptic background. However the abundance of Lecanora conizaeoides has increased greatly at the urban end of the transect and this doesn't form a protective background for either morph so there the predation pattern on var. carbonaria has changed for the worse. A topic which now needs urgent investigation is the location of resting sites of the moth on trees as it is possible that they prefer sites in the canopy rather than on the trunks which is where the lichen cover is usually assessed.

Brian Fox talking on Improvements in the lichen flora of a midland county explained to those living south of Watford the pleasures of working a polluted county - Cheshire. Over the last decade Cheshire has been gaining lichens, but not everywhere. Brian had tracked them down to a specialised habitat, willow carr containing very old crack willows, the wetter the better. In such sites extensive swards of Parmelia sulcata now occur accompanied by nine or ten other pollution sensitive lichens which he arranged in order of sensitivity, the top ones being Usnea spp., Parmelia glabratula, P. revoluta and Physcia aipolia. Parmelia caperata was soon expected to start spreading through the carrs which it was suggested now merited the designation SISI - sites of increasing scientific importance.

Albert Henderson talking on Lichens - urban denizens spoke of his studies in Leeds where most species are at their synanthropic limit, but others can form a 'guild of successful plants', not under pressure. These are characterised by a low surface area to volume ratio. Some species show a shift in their substrate preference, calcifuges in particular (Parmelia saxatilis, Lecidella scaba) moving into high pH niches. Certain species even move into totally new habitats such as the exposed roots of beech trees. At their inner limit, thallus morphology changes, imbrication of lobes or a cushion form being adaptations shown by foliose species while crustaceous ones tend to be sterile and go in for soredia, isidia or pycnidial production. The top ten urban lichens in Leeds are (in order) Lecanora dispersa, L. conizaeoides, Candelariella aurella, Caloplaca citrina, Lecanora muralis, Lepraria incana, Rinodina gennarii, Scolicosporum umbrinum, Verrucaria muralis and Lecania erysibe. Albert ended by reminding us that 'The idle notion of nature as something separate from man is now untenable!!

TWO NEW HONORARY MEMBERS OF THE BRITISH LICHEN SOCIETY

FRANK H. BRIGHTMAN BSc, FLS

There can be few members who are not familiar with Frank Brightman's work for the British Lichen Society. Since the Society's foundation, he has been one of its most active participants; not only does he attend most of its meetings and field excursions, but he has also held several offices including that of President (1978-80). Over and above this, he has on numerous occasions stepped into the breach to help us out, particularly in respect of conservation matters, and, more recently, as temporary Editor of this Bulletin. In the early days of the Society Frank introduced many of us to the delights of lichenology through his stimulating pioneer paper entitled 'Neglected plants - lichens' in New Biology (1959), and his field meeting reporting, refereeing, herbarium and reading circle activities; more recently, his Oxford Book of Flowerless Plants (1966) continues to stimulate others to take up the subject. Frank is indeed a 'man with many hats': the breadth of his interests and the depth of his knowledge on subjects as far ranging as Surtees, Bogart and Botanical Gardens are exceptional, and he has never been satisfied with anything other than an active role in any pursuit he has set his hand to. Frank has been a staunch and unfailingly reliable friend over many years both to the Society and to me personally, and it therefore gave me particular pleasure to propose him for honorary membership at the recent Annual General Meeting.

Mark Seaward

JACK LAUNDON

Jack has devoted much time to the society and, as a conscientious and eminently reliable secretary and Bulletin editor (1963-1979), he was a valued officer during its major formative years, in 1984-85 he was a very effective president. In addition to these often arduous administrative duties, his scientific work in the problematical areas of lichenology has won him international recognition, particularly his taxonomic research on sterile crusts. He has had a long and patient interest in Lepraria, a project which is now coming to successful fruition. He has even had the audacity to name a small, often sterile, crust found in bogs as Lecanora jamesii after the head of his section at the British Museum without censure.

In recent years J.R.L. has produced fundamental work on the nomenclature of British lichens. This activity reached a peak in 1984 and early that year he announced that the familiar species Caloplaca heppiana should be more correctly known as C. flavescens, a change which even took its proposer a good year to get into the habit of using. A few months later this was followed by 16 new combinations based on a critical study of Withering's Botanical Arrangement of 1776.

Well known and well loved names which trip easily off the tongue, like Anaptychia fusca, Lobaria laetevirens and Peltigera spuria, were destined to be sunk forever. From then on it became customary to refer to species which experienced a change of name and status as having been "jacked" or "hi-Jacked"; it falls to few people to add a new word to the lichenological literature! Jack has never been one to limit his attention to the library and herbarium and is a fairly frequent attendee at society field meetings, often accompanied by his wife Rita and daughter Jennifer. Both the BLS and lichenology owe J.R.L. a great debt of gratitude extending over many years of devoted interest and service to the subject and the society and it was for this reason that he was proposed and elected to honorary membership.

Peter James

LICHENOLOGIA

After the Annual General Meeting this year the final speaker in the lecture programme recounted how lichens were repenetrating into the heart of the city of Leeds, relating this to topography and the amelioration of atmospheric pollution. His last slide showed Cudbear Street in the city centre, where once the lichen was transported for dyeing textiles; it is unlikely however that Ochrolechia tartarea will ever appear there spontaneously. A correspondent has drawn my attention to a note in a nineteenth century book, stating that cudbear is "so-called after Mr. Cuthbert, who first brought it into use as a dye". The author, the Rev. C.A. Johns, who wrote the best-selling account of a botanical excursion, A week at the Lizard, and an even more popular British Flora, is describing how various plant materials were used to adulterate tea and other drinks. A Publicans' Guide, he says, had been published with a recipe for the manufacture of port wine from cider, brandy and sloe-juice, coloured with cudbear. Another recipe of dubious effectiveness appeared recently in an article in a colour magazine about "secret gardens" which included a description of building a "rock grotto". To finish it off, masonry nails were driven into the roof and walls and plastered with cement to form "stalactites"; they were then coated with yoghurt "to attract lichen".

Down in the west country, the Society's professionals, experts and dedicated amateurs assembled for a "workshop" which proved to be a most successful gathering. Groups of lichenologists made forays into a variety of different types of habitat, and much time was spent afterwards in serious study in the laboratory. A key to sterile corticolous species, compiled for the new Flora, was available, and it and other keys for this work were tested by the members present. It is good news that about 70% of the species accounts for the Flora are now in draft form. Another piece of good news is that the Nature Conservancy Council has awarded

a contract to the Conservation Association of Botanical Societies to prepare data sheets for endangered species of cryptogams over a three-year period; the groups to be covered are lichens, bryophytes and charophytes. Ultimately a Red Data Book for cryptogams may be published.

CUDBEAR

LIFE IN THE SQUIDGY BITS

Lichenologists, like cats, tend to avoid the nasty wet squidgy bits on the assumption they are poor for lichens. With a summer like the last and no doubt another in prospect we can hardly ignore this up and coming habitat. Mid Wales has an unfair advantage. Ask any camper - it's famous for its squidgy bits. They are best developed on north facing hillsides, where around the edge of dripping vertical rocks, thick gelatinous cocktails of algae overgrow mosses, liverworts and turf. On these natural agar surfaces a range of fungi fruit and some can fairly be claimed to be lichens.

They are best sought in damp weather when they are more obvious, but collecting can be a problem. Traditional paper packets bear more than a passing resemblance to well used paper handkerchiefs by the time you get them back. Your chances of identifying the lichens, which were probably slim anyway, are now non-existent. Slime moulders faced with this problem use boxes with cork or polystyrene in the base. A varnished fisherman's fly box makes a fashionable accessory to green wellies and a Barbour jacket. The rest of us will, however, find a homely old plastic margarine pot with a bit of polystyrene wedged in the bottom, quite adequate. The moss or turf can be pinned to the bottom. This also has the advantage of allowing any slime moulds to slink off into the corners and reduce the possible sources of confusion - slightly. If you cannot look at the material immediately, the boxes can be opened, the contents dried and conventionally packaged.

So what's there? In mid Wales the sites that dry out occasionally are typically dominated by Micareas. No, don't give up! Order another box of cover slips. M. botryoides, with its black branched conidiophores is easy. The only other common species is M. lignaria with black, or occasionally in these wet sites, blue-green fruits. In wetter areas, sunken orange Gyalecta-like fruits with acicular spores are probably Bryophagus gloeocapsa. Any superficial orange Gyalecta - like fruits with 2-3 septate spores could be Absconditella trivialis. Black perithecia with a depression round the ostiole and 1 septate spores - Epigloea soleiformis. A similar species with fine black spines ornamenting the outside of the fruits, and probably not a lichen, is Epibryon casaresii. Not bad for the squidgy bits.

Ray Woods

PLANNING LICHEN ECOLOGY EXPERIMENTS

or

IF ONLY

October was in mid-flight; the misty mornings were heavy with low cloud sending hydrographs soaring; the grasses were so laden with dew that the taller ones were almost bent double. The University term had just started and it was now time for the hardy-perennial practical on 'nitrogen fixation'. The runner beans had been dug up for their root nodules, the alder trees had been visited and some of their bright orange nodules snipped off, Azolla had been collected from the local pond and it was now time to collect Peltigera from a nearby disused quarry. This was a 'safe' annual practical, I had been collecting these same materials for the past 10 years. The ground I covered was so familiar that it was one of those times in such a hectic term when, while rushing to collect these items, I could allow my mind to wander to topics that were usually squeezed out by pressing tasks.

I left the building and began to trudge up the paved walkway noticing anew the Xanthoria parietina growing in-between the little aggregate gravel bits on the path. A couple of years ago there had not been any lichens growing on the path here - now they were quite well developed; rounding the corner and still looking down at the path, I noticed that the X. parietina which, ten years ago had been prolific here was now practically non-existent - if only I had been far-sighted enough ten years ago to do a thorough survey of all the paths round this four-square building, by now I might have had some interesting results to show for it. Continuing up the familiar path, head down against the driving wind, the paving stones changed from aggregate to smooth surfaced and with them, the lichen flora changed. Masses of non-descript sterile crusts crowded the edge of the pavers where, undisturbed by the trample of many feet, they grew, while in the centre of the path a lichen desert made footwork more secure than on the slippery edges. If only I had listened more attentively at those field meetings, I might now be able to identify some of these lichens and, with the pavers acting as ready-made quadrats, map the path and see what the effect of tramping is on the lichen flora here.

The campus boundary appeared, and gave way immediately onto the local golf course. One hundred metres ahead the stone-built corners of the water reservoir supporting the wire netting around the enclosure, supported also a rich mat of Lecanora campestris, and, where for years vast thalli of orange X. parietina some 20cms in diameter had adorned the stonework, now there were gaping circular holes of bare stone. Remembering how, years ago, I had vowed to bring a camera along with me the next time and photograph these beautiful specimens of apothecia encrusted lichens, I sighed at another opportunity lost

five minutes later I was among the fallen stones of the disused quarry and ducking under the prickly rose, blackberry and hawthorn to get to my final 'quarry' the Peltigera. And there it was, festooning the stones and mingling with the mosses in their damp grassy habitat. I recalled the work of J.W.Thompson Jr. in the 40's when he made cut marks on the Thalli of P.canina, P. horizontalis and P. polydactyla and recorded their regeneration a year later. I had meant to do a similar thing - here was an ideal opportunity, visiting the site each year at the same time - if only there was time...but I must dash back, the class starts in quarter of an hour.

Tim Moxham

RECENT RESEARCH: HOW XANTHORIA MEETS ITS MATCH

Xanthoria parietina is a widely distributed lichen which produces only ascospores for propagation. Its algal partner Pseudotrebouxia is extremely rare in the free-living state so germinating spores can not count on finding suitable algae when germinating. Despite this the lichen is widespread and common. The answer to this apparent contradiction has been the subject of research by Sieglinde Ott (1987 a,b) who has uncovered some strange reproductive strategies, these have been verified in the field and can possibly be observed in your garden.

Normal development of a thallus appears to involve the ejected ascospores germinating and first associating with foreign coccal green algae such as Pleurococcus which never occur in the Xanthoria thallus as we know it. Initially the hyphae invade and grow in a tangled mass within the spreads of Pleurococcus which cover trees and stonework, the final stage being a green areolated crust which, until recently, most people have looked on as normal swards of Pleurococcus though realising they contained the odd hyphae. This areolated crust, which has a low degree of organisation, is the normal precursor of Xanthoria though many other lichens probably form similar crusts. Patches permeated by Xanthoria hyphae seem inhospitable to other lichens. The fungus spreads through the algal crust until it makes contact with a Pseudotrebouxia cell at which physical point jelly is copiously secreted onto the surface. This is an important signal that 'contact has been made' and from here on development to a well organised clump of tissue and a typical yellow thallus lobe ensues.

Xanthoria's chances of an encounter with Pseudotrebouxia cells are improved still further by its capability of robbing them from soredia or even directly stealing them from intact lichens. This has been demonstrated for Physcia tenella, a lichen with which it regularly grows. If one looks at a mixture of these thalli on tree bark it is common to see Physcia being attacked by Xanthoria at points where it spores or more often the green areolated crust make contact with it. The success of the attack depends on the size of the Physcia thallus. If it is small, it is quickly invaded by Xanthoria hyphae, assumes a yellow (K + purple) colour and its further development changes to that of Xanthoria. If Xanthoria

attacks a fully grown fruiting colony of Physcia tenella only part of the thallus is appropriated, including the fruit, the Xanthoria behaving as a pure lichen parasite initially. Curious intergeneric mixtures can arise but the hybridisation does not lead to a stable condition and the origin of Xanthoria from a mixed thallus is not obvious. Hyphae of the Xanthoria can penetrate and take over soredia of the Physcia which turn yellow. These then distribute Xanthoria not Physcia so for a short time Xanthoria parietina can be dispersed by soredia. Observations such as these are supported by the work of other lichenologists, for example Freidl, Jahns and Jørgensen.

- Ott, S. (1987a) Reproductive strategies in lichens. In Progress and Problems in Lichenology in the Eighties Bib. Lichenol. 25: 81-93. J. Cramer, Berlin.
 Ott, S. (1987b) Sexual reproduction and developmental adaptations in Xanthoria parietina. Nordic J.Bot. 7: 219-228.

ETYMOLOGICAL NOTES ON LICHEN NAMES - PART 5

George Barker has pointed out the reliance of poets upon the English dictionary. The etymologist of lichen nomenclature has similar needs. Translation of lichen names leads into regions bordering those of the Japanese 'hokku' and the Anglo-Saxon riddle, and entails the fondest acquaintance with the lexicons and vademecums enlisted. Failure to use them fully will lead the lichen etymologist into such errors as that committed on page 16 of Bulletin 59 (1987). Readers will oblige by deleting the text published there as etymological note 15, and inserting the following corrected version:

15. Thelotrema lepadinum With bored-out, limpet-like pustules.
Derivation: thele (Greek) = nipple, teat.
trema (Greek) = perforation, orifice, borehole.
lepas (Greek) = a limpet.
34. Cystocoleus ebeneus With pouching sheaths, and of ebony hue.
Derivation: kystis (Greek) = a bladder, pouch.
koleos (Greek) = a sheath.
ebeneus (Latin) = ebon.
35. Dermatocarpon miniatum With fruits in the skin, and cinnabar-coloured.
Derivation: derma (Greek) = skin, leather.
karpos (Greek) = a fruit.
miniatus (Latin) = coloured with cinnabar, vermilion.
36. Enterographa crassa Covered in intestine-like scribblings, and thick.
Derivation: enteron (Greek) = bowel.
graphie (Greek) = scratching, writing, drawing.
crassus (Latin) = heavy, thick.

37. Ephebe lanata A woolly, young thing.
Derivation: ephebos (Greek) = a youth
lanatus(Latin) = downy, woolly.
38. Haematomma ventosum With blood-red eyes, and puffed up.
Derivation: haima (Greek) = blood
omma (Greek) = eye, appearance, aspect.
ventosus(Latin) = swift, windy.
39. Mycoblastus fucatus A fungus-like growth, stained with red.
Derivation: mykes (Greek) = a fungus, knobby body.
blastos (Greek) = a germ, bud, shoot.
fucatus (Latin) = painted (red). NB Latin fucus =
rock-lichen yielding a red dye.
40. Orphniospora atrata Dusky-spored, apparelled as for a funeral.
Derivation: orphnos (Greek) = dark, dusky.
spora (Latin) = spore, seed.
atratus(Latin) = dressed in black.
41. Platismatia glauca A broad, blue-grey plate.
platysma (Greek) = anything broad like a plate.
glaukos (Greek) = bluish-green or grey, silvery.
42. Sphinctrina turbinata With tightly bound circular fruits, of
whipping-top shape.
Derivation: sphinkter (Greek) = something tightly binding, a
circular muscle around an opening.
turbinatus(Latin) = cone-shaped. NB. Latin turbo =
anything that whirls around.
43. Squamarina lentigera Scaly, as if bearing lentils.
Derivation: squama (Latin) = a scale.
lens (Greek) = a lentil.
-ger (Latin suffix) = bearing, carrying.

A. Henderson

THE DIARY OF A LATTER-DAY ENGLISH LADY LICHENOLOGIST

In July 1987 Paulette McManus and I participated in the "Lichen Flora of Sardinia," Excursion 49 of the XIV International Botanical Congress. The meeting was jointly organised by Professor Josef Poelt of Graz and Professor Pier-Luigi Nimis of Trieste. There were 22 participants from 12 different countries and the company included such well-respected and august names as Vezda, Brodo, Ahti and Jahns, as well as Poelt and Nimis. With some trepidation we stepped out on this adventure - the sole British representatives of the B.L.S.!

Sunday, 12 July

Arrived in Cagliari. Slightly curious about meeting the rest of the party but as we entered the hotel we were warmly (and loudly) greeted by Professor Nimis - "Ah! The English Lady Lichenologists!" Well, at least everyone now knows who we are. Indeed, the image of the slightly dotty English "Ladies" stuck with us for the rest of the Excursion because we often found it more comfortable to be in the field in cotton skirts and blouses than the more conventional trousers, woolly socks and walking boots.

Monday, 13 July

Slept until 10.00, then shopping for straw sun-hats and post-cards and a cappachino at a pavement cafe. In the afternoon our first field trip: Capo Carbonara on the extreme south-east coast of Sardinia. It was very hot, rocky and barren with a sparkling blue sea and the noise of hammers and chisels on rocks. The Prickly Pear Cactus, an introduced species, is widespread in this coastal area. On some old stems of a coastal shrub, the lichen Chiodecton myrticola is abundant, a rather distinctive species with cushion-like, white-pruinose 'stroma' scattered on an indistinct thallus. The opportunity to swim was taken up by some of the company, including Paulette.

Tuesday, 14 July

Packed and an early breakfast and introduction to the coach and driver. Paulette and I established ourselves on the back seat - very comfortable and well-ventilated - and we set off for Giara di Gesturi, a basaltic plateau above the village of Barumini. The coach radio gave us Rossini operas all the way! En route, Professor Poelt told the company that there are no venomous snakes on Sardinia - sighs of relief from all wearers of open-toed sandals. Also there are no Fagus or Abies species on the island, but there is an endemic species of Alnus as well as a number of endemic plants and lichens. The plateau of Giara di Gesturi is a high, flat place (550 m) with steep sides, dramatic with huge, tumbled boulders of basalt. The centre of the plateau has an open Quercus suber (cork oak) stand. Paulette and I do not venture far on to the plateau,

preferring to become acquainted with Q.suber lichen communities growing on the strange corky bark. This bark proved to be a veritable labyrinth of ant homes; the ants tumbled out with amazing rapidity when the corky layer was attacked by the lichenologist's knife. Collecting from Q. suber was fraught with peril - the ants, with tails erect mimicking scorpions, hang on to clothing and skin with incredibly strong, locked mandibles.

The trunks of the cork oak carry a typical flora of Pertusaria amara, Physcia spp., Lecidella elaeochroma and Parmelia subrudecta with Ramalina spp. on the branches. The basalt rocks were all well covered with lichens forming close mosaics. Lecanora bolcana is common and Xanthoria calcicola formed bright patches of a very deep, dense orange, more reminiscent of the shade of X.elegans. At lunch-time we went down to the village of Barumini to visit the historic nuraghe of Su Nurax. The Nuraghe culture is unique to Sardinia; the most characteristic prehistoric remains are strange circular towers resembling Scottish brochs. The nuraghe at Su Nurax has been recently excavated and partly restored and has revealed a complex of small rooms linked by narrow passages, a labyrinth only completely appreciated by viewing from the top of the nuraghe tower. The lichen dominating the stonework on the sides of the nuraghe is Caloplaca teicholyta, abundantly fertile.

After lunch we drove further inland to the village of Laconi. The countryside is very dry; in some places there is a patchwork of small fields of some cereal crop long harvested, intermingled with small vineyards and groves of olives and almonds. Small flocks of dusty-coloured sheep stand sheltering from the glare of the afternoon sun under isolated olive trees or hedges, almost invisible, blending with the dusty landscape of parched, bare, over-grazed ground. In the valleys sleek, dun-coloured cattle and horses browse on the wetter pastures. The hills are grazed by goats among the garrigue and maquis vegetation.

The village of Laconi has only one hotel, but it is a wonderful old-fashioned establishment that has been in the same family for generations. Clean and cool, although not large enough for all the party so the younger and Italian-speaking members are farmed out at some houses in the village. In the hotel there are three showers among the 14 accommodated, so there was the amusing sight of revered members of the international lichen hierarchy clad only in bath towels, running along the dim corridors. However, it all created a great spirit of bonhomie and comradeship. The "English Ladies" were given a delightful room, cool and airy with a verandah, twin beds plus a babies' cot and a picture of a benign-looking Christ!

That evening Professor Poelt held his first "court" or determination session. Where there were acknowledged experts in certain groups - e.g. Professor Nimis for Ramalina and Peltigera, Christophe Scheidegger for Buellia, Ted Ahti for

Cladonia, and Professor Vezda for anything that looked like nothing, these were duly consulted. Meanwhile, Professor Poelt, with the relaxed manner of an acknowledged grand master, gave his opinion of other specimens, often with the addendum "But it needs investigation".

I am very impressed by Professor Poelt; his energy and indefatigable appetite for discovering new habitats with unusual species, whilst ascending mountains at great speed, are legendary. My most common view of him was from the back, a tall, slightly stooped figure carrying a battered brown shopping bag, rapidly disappearing ahead of me. Impatient at delays, always urging slower members on to the coach, no one dared to be late back after the appointed time of departure! His attitude was always serious, but he was not without humour or humanity and always approachable and patient, even when I heard him say "Lecidella elaeochroma" for the twentieth time.

Professor Vezda was more difficult to get to know - a small figure, slightly bowed, also a devotee of the battered brown shopping bag. He kept a "low profile" and had to be actively sought out to ask about a difficult specimen, but once approached, he was very attentive and helpful, speaking very quietly in a gentle high-pitched, sing-song voice. He kept a little apart, quiet, shy, busy collecting plants as well as lichens.

And Professor Nimis - young, full of well-directed nervous energy and an amazing repertoire of language - and good humour! He organised the Excursion down to the finest detail with typical Italian flair which made it the success it undoubtedly was. He smokes incessantly but never appears to have the means to light his cigarettes.

That evening, after the "determination session", the meal was terrific - lasagne with home-made pasta, washed down with local red wine and ample supplies of cool, fresh water.

Wednesday, 15 July

Up and breakfasted early as the coach was leaving at 8.00, heading for a mountain area with Quercus ilex forest.

The vegetation is mostly garrigue and maquis, with much Cistus and Juniper and Castanea sativa with long flowering spikes, plentiful in the wetter river valleys. We are told by Professor Nimis that in the mountainous area we are to visit, at heights between 900 and 1000m. there are areas where the Lobarion community exists, due to heavy winter rains and low cloud forming humid conditions.

We arrived at Mont. Arcueri with the Q. ilex growing thickly on the slopes. Walking in steeply sloping Q. ilex woods can be a tricky business; the hard, heathery ever-green leaves that have fallen on to the ground form a treacherous,

slippery surface, sending the unwary skidding rapidly downhill. Some of the trees are ancient with huge girths but the lichen flora on the trunks is disappointing as they are so shaded. Arbutus unedo growing as a shrub layer also have a rather limited flora, with Lecidella elaeochroma and Phlyctis agelaea the most common species.

The younger stands of Q. ilex carry a more varied flora with Parmelia tiliacea, P. laciniatula, Physcia biziana, Phlyctis agelaea and Caloplaca ferruginea.

C. herbidella was also frequent on young, well-lit Q. ilex. Those energetic enough, (e.g. Harry Sipman), also collected Lobaria pulmonaria, Usnea articulata and Bryoria subcana from the top of Mont Arcueri. Lunch was had in an idyllic spot under the trees close to a welcome cool spring. Afterwards a tortuous drive among winding mountain ways eastwards towards Lanusei and our next hotel.

A brief stop was made in a rocky valley with a small river flowing among beautiful lush vegetation which made it look like a garden in paradise. Huge dragon-flies of red, blue and green swooped among the bright pink Oleanders. The more self-indulgent of us paddled in the clear, cool water of the rock pools, whilst the young and enthusiastic scaled steep, red-hot cliffs wielding hammers and chisels.

At the hotel, a lovely sprawling establishment set on the hillside overlooking the distant Mediterranean, the English Ladies have a superb room with a balcony looking east so we can see the early morning sun glinting in the distance on the sea.

Thursday, 16 July

A train journey: we all stand on the "platform" of this amazing Sardinian railway. It is single track, narrow gauge and the train is a diesel engine with one carriage. The first train, going the wrong way, was full of schoolgirls who cooed appreciatively at the young American William Sanders with his jaunty straw boater. When our train came, it was quite full of young Italian families with beautifully dressed children happily sprawling over the seats. In climbed twenty-two lichenologists, walking boots, woolly socks and rucksacks to squeeze in among the happy, holidaying Italians. The journey was slow but very picturesque.

Then we climbed out - seemingly in the middle of nowhere - and re-assembled.

A short walk along a track took us up into a young Quercus pubescens plantation.

I got involved in the lichen communities of these young, sun-lit trees -

Physcia grisea, Parmelia tiliacea, P. quercina, P. acetabulum, Ramalina fastigiata, R. canariensis, when Professor Poelt re-appeared ahead on the dusty track exhorting us to "Come along! This is not the forest we have come to see - everyone is waiting!" So we hasten along to where the rest of the party have finished a leisurely picnic under the trees and are driving off scavenging wild pigs.

The wood we have come to see is the Forest of Monte Arbu. Professor Nimis tells us it is a relict forest with Holly (Ilex aquifolium), Yew (Taxus baccata),

and Hornbeam (Carpinus betulus); some trees are very old, but re-generation is allowed by strictly limiting the grazing, so there is a good mixture of uneven-aged tree cover. The lichens here are typical of Central European and Oceanic habitats.

Pertusaria pertusa is abundant on the smooth barks of young Carpinus, and Parmeliella triptophylla is found on Carpinus near the river. Lecidella eleaochroma is again quite widespread, together with Parmelia sulcata, P. subaurifera, Phlyctis agelaea and Evernia prunastri. Parmelia quercina and P. carporrhizans are both recorded and Professor Nimis suggests that P. tiliacea is an isidiate form of P. quercina and P. pastillifera an insidiate form of P. carporrhizans. This is a most interesting and wonderful wood - Francis Rose would love it! Some really huge trees and a fine variety of habitats. The rock outcrops have Leproplaca xantholyta, and growing over mosses on the boulders, Agonimia tristicula was recorded. Parmelia contorta was seen - long, lacinate lobes, convex and slightly curled, with scattered isidia.

Leptogium lichenoides and L. sinuatum are found, and Dendrisocaulon umhausense, a strange dark, Leptogiumesque lichen that is developed from the cephalodia of Lobaria amplissima. Pertusaria leioplaca is rare on smooth bark and Lobaria pulmonaria is recorded on rocks and trees. Dimerella diluta is abundant on one huge Taxus baccata (!) and a small specimen of Pachyphiale cornea is pronounced by Professor Vezda as more likely to be Gyalecta trucegena. Great excitement and enthusiasm was generated by the party in this excellent wood; Usnea spp. are uncommon and only one example of U. filipendula was recorded. Evernia prunastri, Pseudevernia furfuracea and Ramalina spp. are common, and mosses are abundant on the rocks and trunks of older trees. We returned to the picnic site, and then by relays down a long, rough track for miles to the road and the waiting coach. Whilst waiting for all to assemble, Professor Poelt takes us at great pace to a steep exposed outcrop where the rare Leptochidium albociliatum is growing; it has some resemblance to Pseudevernia furfuracea and Roccella.

Friday, 17 July

Whilst walking up to the coach from the hotel, Tom Nash pointed out where Parmelia conspersa and P. tinctoria are growing side by side on a granite wall. On the coach again we passed through villages where the elderly women still wear the traditional long black skirts and plain brown woollen headscarves. These scarves are sometimes worn folded flat on the head - presumably this is cooler than the usual way tied under the chin. Quercus pubescens is abundant; some really large, old trees, but the ground flora is heavily over-grazed by sheep, goats, cattle and horses. Q. coccifera grows as a shrub but is closely cropped into tight topiary shapes. There can be little chance of

any regeneration and so ultimately the whole area will degenerate into garrigue vegetation.

We stop in a dry, open valley, miles from anywhere - Arcu Correboi, 1200 - 1400 m. One side of the road has granite hills with many rock outcrops and a Quercus ilex plantation on the lower slopes; and across the road a bare shoulder of thin-soiled limestone with exposed rocks at the summit. I chose the limestone, together with Eva Barreno. Eva is a most energetic enthusiast for limestone terricolous lichens, having studied them in Spain. This particular site is of especial interest as it is metamorphic limestone - calcareous schists - and this makes it a good site for Fulgensia spp. which were indeed found. F. fulgens is common, also F. fulgida, the thallus more neat and continuous, growing in rock crevices rather than soil pockets, the fruits being very red. I was very pleased to find Chrysopsora testacea, thick, grey lobed squamules with peculiar clustered orange fruits.

Caloplaca erythrocarpa is abundant on the rocks, a chalky-white orbicular thallus with many bright, rusty-red apothecia. Protoblastenia testacea, a squamulose species, was also found as well as various Toninia spp. and a white Squamarina cartilaginea which Eva thought could be S. oleosa. Some problems here to work on when I go through my box of specimens!

Saturday, 18 July

Up early and pack as today we move to another hotel, this time in the north-east on the coast at Alghero. A long drive to Monte Ortobene, a sort of nature reserve and described as one of the best botanical sites in Sardinia. We met the local expert on the area and he gave us a brief introduction, well translated by Professor Nimis. The site is dominated by a nuraghe, approximately 1500 years old, and the area has been long occupied as the soils are very fertile. Now it is reduced in part to garrigue, but a relict mixed forest still exists along the river valley. 750 vascular plants have been recorded in the area with a very high rate of endemism - 8% (approximately 60 species!)

Climatically the region has a good rainfall and so many species normally restricted to the higher altitudes are found growing in this lowland area, e.g. Holly (Ilex aquifolium), Yew (Taxus baccata) and the Wild Service Tree, (Sorbus torminalis). This remnant of old mixed forest is very rare in lowland Mediterranean areas. It is also very rich in lichens. We started among the rocks of a dried river bed where the speciality is Aspicilia hydrocharis, (Poelt et Nimis spec. nov.) This is found on hard periodically inundated siliceous rocks. "Thallus large, lead-grey to bluish-grey, flat but thick, distinctly effigurate at the margins, the lobes longitudinally fissured and divided at the tips". (Nimis and Poelt, P.44, 1987). On boulders lining the river banks some fine examples of Haematomma ochroleuchum var. porphyrium were found, beautifully fertile with

blood-red fruits.

Further upstream, Lobaria pulmonaria was recorded growing on rocks, and on the trunk of a huge holly was found Thelotrema lepadinum, the first record for Sardinia. This wood was most interesting and very reminiscent of British lowland woods.

Back at the coach and a journey down a dusty, un-made road to a country restaurant where we are to have lunch. A large, elevated verandah with a shady, slatted flat roof, and a long table with benches at either side; platters of a sort of "pittah" bread to nibble before delicious plates of antipasta - thin slices of ham and country sausage - followed by a pasta dish and fresh fruit. Ample wine and water contributed to a most jolly two-and-a-half hour meal, followed by coffee for those addicts that craved it - not an Italian custom apparently. Everyone feeling slightly merry and wandering off to the surrounding area to half-heartedly gather a few specimens from the bark of Acer pseudoplanatus. The restaurant was the house of a Scottish railway engineer who built the Sardinian railway. Amongst other things he had introduced horse chestnuts into the area and built another more exotic mansion near-by for his Indian-born wife - a delightful combination of Asiatic temple and Scottish Gothic castle set in the midst of the Sardinian country-side. It was really like something out of Lewis Carroll.

Later there was the long journey to Alghero and our next hotel, which was right down on the sea-front and was very hot and humid.

Sunday, 19 July

We breakfasted late today - 8.30 - before visiting two coastal sites. The first at Torre Argentina, south of Alghero, with coastal lichens on volcanic tuffs. A most interesting area with huge smooth, rounded rock outcrops, occasionally pitted with solution pockets and large, wind-carved underhangs. The large foliose Collema rysssoleum is well developed just below the solution pockets in the water run-off tracks, and Physcia scopulorum, an endemic species of Sardinia and Corsica was recorded here. Much excitement was generated by the discovery of Xanthospora limonae growing on the thallus of Peltula euploca, a rarity first discovered by Professors Nimis and Poelt at an earlier visit. We lunch by the sea and some manage a quick dip before going on to the second site right in the north-west corner of Sardinia at Punta Falcone. This site has been partly taken over by the tourist developers, who have built neat holiday homes, apartments and hotels. In the un-developed area there is a barren rocky wasteland of granite schists forming a very inhospitable habitat and the lichen flora is limited to shady crevices. Caloplaca aractina was recorded, characterised by a dark, crumbly thallus and small, blood-red discs. The rare Ramalina arabum with dichotomously branching lobes was found growing with Roccella phycopsis.

Monday, 20 July

Final excursion day -tomorrow being set aside for packing specimens, last minute shopping and an opportunity to visit a local grotto. Today we are going to a mountainous region with granite outcrops, a large area run by the Forestry authority at Mont Limbara, 1000 - 1200 m. On the road outside Sassari we see ancient, isolated churches built in very distinctive alternating bands of white limestone and black volcanic rock. This is the typical "Pisan" style, after the state of Pisa in Italy whose people invaded Sardinia in the 12th century. As we ascend M. Limbara the woods are fenced securely and regular signs appear stating "Divieto di Caccia" - No Hunting.

We arrive at the Forestry tourist site with picnic tables set out under the pines, and we lunch on huge water melons. On the trunks of the pines, Ted Ahti points out Hypogymnia bitteriana (syn. H. farinacea), where the soredia erupt from the centre of the thallus and not from the apices of the lobes as in H. physodes.

After lunch we set out to look at the granite outcrops and ancient pine trees at the summit of the mountain. Paulette and I quickly realize this means wading through waist-high prickly vegetation. So we linger to look at Acer pseudoplanatus communities and record Parmelia contorta, Caloplaca ferruginea, Candelariella aurella, Ramalina fastigiata, Rinodina corticola, Lecanora chlorotera (in many weird and wonderful forms), Pertusaria pertusa, Phlyctis argena, and of course, Lecidella elaeochroma; this common and widespread species prompts the observation (Nimis and Poelt, 1987) "The Lecidella elaeochroma complex is much in need of a critical revision. In Sardinia for instance we are certain that it contains a number of different taxa, but at present we are unable to give a clear circumscription of the species". Another problem at first sight is Ochrolechia balcanica and O. pallescens, both looking superficially like O. parella; no doubt all will become clear with further investigation.

Pausing beside a field wall of granite blocks, several good specimens of Parmelia mougeotii are found, a new record for Sardinia. Also on the wall were P. conspersa, P. omphalodes, P. pulla, P. saxatilis, P. sulcata, Huillia tuberculosa, Rhizocarpon geographicum and R. richardii. We leave battling through the maquis to those keen enough to do so and follow a forestry road up the mountain-side where, on an open area of rocks and soil Trapeliopsis wallrothii is found. M. Limbara is the most easterly site for Coelocaulon crespoeae and it was again found during this visit.

We all re-assemble in what is probably the coolest spot in Sardinia - a huge granite table with huge granite blocks to sit on, all set under pine trees. Here Professor Poelt gives us a summary of the natural environments of Sardinia

and how it is pertinent to the lichen flora of the island. He emphasised that the distribution of lichen species is not just a simple matter of describing geographic or climatic zones; it is a more complex question linking geological and climatic history with more recent changes in land use, together with local climatic conditions.

Then we are off again, all squeezed into Forestry Land Rovers, and bump some miles down a rough, boulder-strewn track to a village that is the centre of a local wine co-operative. Here a simple but most enjoyable wine-tasting is followed by a jolly meal, held in a sort of warehouse, with simple trestle tables and benches. The food is plain but plentiful and absolutely delicious; there is water and wine and finally a fierce local liqueur - the perfect way to round off a marvellous week. The speeches are few but very good, then all merry and back to the coach; not quite singing on the way home, but everyone relaxed, voluble and happy.

The lichens mentioned are by no means a complete list of all those recorded during the Excursion.

A comprehensive Lichen Flora of Sardinia is published:

Nimis, P-L. and Poelt, J. The Lichens and Lichenicolous Fungi of Sardinia (Italy). Studia Geobotanica - Unversita di Trieste, 1987. (In English). This volume will in due course be up-dated by contributions from the participants of the Excursion.

Alexandra M. O'Dare

DEWDROPS BEING PUT TO THE ACID TESTS

Milton waxed poetic over the "fresh dews of night". Wordsworth celebrated the "lingering dewdrop", shaded from the sun by a single daisy. For centuries, poets and artists have rhapsodized about the freshness of the morning dew, but where the literati see "dew-pearled" hillsides glistening in the morning light, Dr. William L. Chameides sees something very different. To Chameides, an atmospheric chemist at Georga Tech, dewdrops represent one of the hidden - and underrated - faces of acid rain. "Dew may play a very important role in harming trees, especially at high elevations", says Chameides, who has developed a computer model to show how acid dew may damage plants. In the presence of an atmospheric oxidant such as ozone or hydrogen peroxide, sulfur dioxide reacts to form sulfuric acid, which along with nitric acid, increases the acidity of dewdrops. Because dewdrops are relatively large when they first form, they tend to be only mildly acidic. But when the sun rises and the dew begins to evaporate, the acid in the dewdrops becomes more concentrated. As the dewdrops shrink, their acidity level may increase to the point that they become as corrosive as car battery acid - strong enough to burn tiny holes in plants.

A Seven-hour Scenario for acid Dew:

- 1am Nitric acid and sulfur dioxide in air diffuse into incipient dew droplets. In the presence of ozone and hydrogen peroxide, sulfur dioxide forms sulfuric acid.
- 6am Droplets grow in size as more water condenses in cool morning air. They are now weakly acidic.
- 8am Sun begins to dry the dew. As the acid in droplets becomes more concentrated, the solution may "burn" holes in plants.

The Many Faces of Acid Deposition:

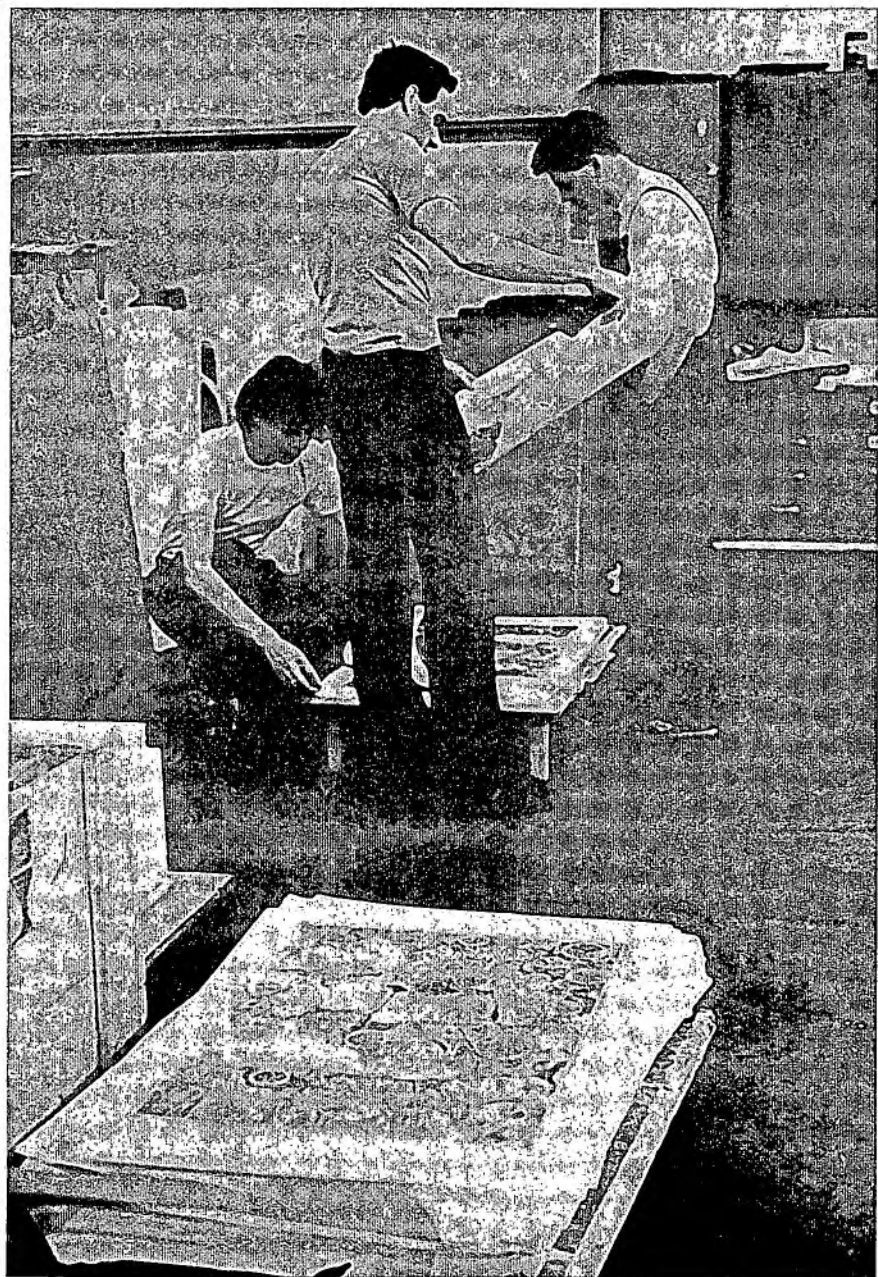
- Acid Rain: Sulfuric and nitric acids formed in clouds and brought to earth by rain. Widespread in United States, Canada, Europe.
- Acid Fog: Acids suspended in fog, which may cause stinging of eyes, nose and throat and other problems.
- Acid Cloud: May be 10 times more acidic than rain reaching the ground. Poses threat to coniferous forests at high elevations.
- Acid Snow: May abruptly increase acidity of lakes and streams when it melts in the spring.
- Acid Dust: Acids attached to dust particles may be inhaled or settle on ground, statues and buildings.
- Acid Dew: Formed when gaseous particles of nitric acid and sulfur dioxide land on dewdrops and make them acidic.

(Extracted from "The Atlantic Constitution" 27th October 1987.)

'HORIZONS IN LICHENOLOGY' PUBLISHED

This is the proceedings of the symposium that we organised jointly with the Linnean Society of London to celebrate their bicentenary last year. The attractively bound volume of exactly a hundred pages contains seven of the contributions delivered at the meeting. Several embody more information than was actually delivered on the day so even if you attended the symposium you should consider purchasing this treatise. As a reminder, it contains Hawksworth on fungal-algal symbioses; Jahns on the growth of lichen thalli; Richardson on pollution sensitivity of lichens; Galloway on plate tectonics and macrolichen distribution; Winchester on lichenometry for dating stone monuments; Rose on Lobarion phytogeography and ecology; and Seaward on progress in the study of the lichen flora of the British Isles.

Copies of 'Horizons in Lichenology' can be obtained from The Richmond Publishing Co.Ltd., Orchard Road, Richmond, Surrey, TW9 4PD. Price £12.00 post free within the U.K. (£9.00 post free to members).



Printers inspecting first batch of Wall Charts (Lichens on Rocky Shores) prior to adjusting colour registration on the Aurelia Press at Jolly & Barber's, Rugby, Warwickshire.

LICHEN FLORA OF GREAT BRITAIN AND IRELAND: PROGRESS REPORT

Good progress is being made on the Flora, two years having now lapsed since the project started. Drafts to almost 1000 of the 1600 or so lichen species occurring in the British Isles have now been completed. In addition, a preliminary key to the sterile corticolous lichens has been prepared. This key includes some 130 species and relies on straight forward spot test reactions and ecological data rather than t.l.c. information as primary characters.

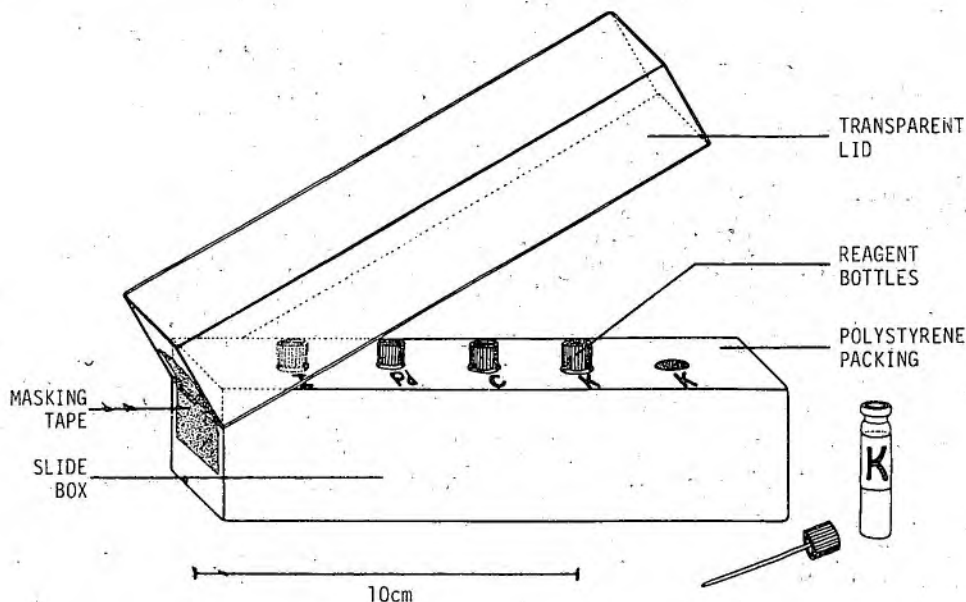
Many useful comments on the Flora were received at the recent BLS/Systematics Association Flora Workshop held in Ilfracombe. The workshop was well attended, with at times about 30 people present. The contributors of Flora drafts were encouraged by the response of the participants and I hope all will be spurred on to producing their remaining drafts by the September deadline!

O.W. Purvis 9/5/88

CARRYING REAGENTS IN THE FIELD

For the last year and a half I have been using small perfume sample bottles to carry lichen chemical reagents in the field. The idea is very simple and cheap to set up - given the availability of perfume sample bottles! The best types of bottles are those with a plastic dropper incorporated into the stopper. This makes it easy to place small drops of reagent accurately onto the lichen specimen. I carry the bottles in an empty colour transparency box, hinged with a strip of masking tape (see diagram). The box is filled with expanded polystyrene packing with holes to take the bottles. The holes are just smaller than the bottles so they are gripped during transit. I have written the standard code letters on the polystyrene next to the bottles as the bottle labels are obscured when in place. So far the reagents have not eroded the plastic stoppers, although the Pd bottle stopper has turned dark brown! These bottles are very small, but contain sufficient solution for several days in the field. This is certainly a much cheaper method than using draughtsman's pens (see John Skinner Bulletin 57: 16) but of course it is not so precise, nor is it so easy to carry 'incognito'. One 'disadvantage' is the persistent fragrance that remains for several months, giving the reagents rather unusual odours - some may like this.

Mark Watson



MISCELLANEOUS

Advance Notice of New Year Meeting 1989

Next year's Annual General Meeting will be held on Saturday 7 January 1989 in the Jodrell Centre, Royal Botanic Gardens, Kew. This will be combined with an "open day" at CAB International Mycological Institute for the first part of the afternoon, followed by the lecture meeting. Three speakers have been invited:-

Dr.C.J.B.Hitch - Changes in the lichen flora of Suffolk churchyards.

Mr.I.P.Day - Changes in the Lobarion communities in the Lake District.

Mr.A.Henderson - Lichens on unusual man-made substrata.

On Friday 6 January 1989 there will be the annual book sale at 18.00 in the Meeting Room of the Royal Entomological Society of London, 41, Queen's Gate, London, SW7 5HU.

Membership List

It is hoped that the membership list, which has been distributed with this issue of the Bulletin, will stimulate lichenological co-operation locally, nationally and internationally. Members are reminded that the membership list

(which is also used for mailing the Bulletin) is held on computer file and is covered by the Data Protection Act 1984. The list is for the use of B.L.S. members only and will not be passed to any other person or institution by the Society.

Library

A photo-copied supplement to the library microfiche covering 1987 acquisitions is available from the librarian in exchange for two 13p stamps.

NEW, RARE AND INTERESTING BRITISH LICHEN RECORDS

(Contributions to this section are always welcome. Please submit entries to Frank Brightman, South London Botanical Institute, 323 Norwood Road, London, SE24 9AQ, in the form species: habitat: locality: vice county (V.C.): grid reference (G.R.): date: comments: recorder. Grid references may be abridged in the interests of conservation; they will be omitted when the record has been published elsewhere).

Acarospora macrospora: On 'black-lime' mortar of millstone grit wall coping, Stainland, Halifax, VC 63, South-west Yorks, GR 44/08-10- (1976).

P.M.Earland-Bennett

Lecidea pernigra: On exposed carboniferous gritstone outcrop. Nick of Pendle near Burnley, VC 59, S.Lancs. GR 34/7738, 1986. Second British record with a similar habitat to Brian Fox's Derbyshire record. M. Gosling

Micarea lutulata: With M. botryoides, Racodium rupestre and a sterile, Pd+o sorediate Porpidia sp. (det. B.J. Coppins). On shaded vertical acid outcrop within a coastal wood. Embelle Wood, west of Porlock. VC 5 Somerset, GR 21/815413 (1987) A.M. O'Dare & P.A. Wolseley

Micarea misella: On standing decorticate birch trunk in valley woodland, Cwm Clydach, VC 41 (Glamorgan), GR 22/68-06-, (1988). First Welsh record. A. Orange

Parmelia laevigata: In alder carr, Mark Ash Wood, Hants. VC 11, South Hants., seen in the New Forest at Wood Crates (1972); no longer there. Mark Ash is the most easterly British station; it seems extinct at Morden Decoy, Dorset due to shading by rhododendron, and the next site west is in the Quantock Hill. F. Rose

Parmelia subaurifera: On a wooden bench with P.sulcata and Hypogymnia physodes, Abney Park cemetery, Stoke Newington, VC 21, Middlesex, GR 51/335868 (1988). Only 7km from Charing Cross.

Parmeliopsis aleurites: On headstone in churchyards at Lamberhurst, Kent, GR 51/682367, and Horsmonden, Kent GR 51/704382, VC 16, West Kent (1988). Unusual to be growing on stone. K. Palmer

Rinodina orchulariopsis: On quartzite cobble in churchyard wall, Tunstall near Kirby Lonsdale, VC 60, W. Lancs. GR 34/3473, 1986. First British record, associated with Diplotomma alboatra, Lecidella scabra and Verrucaria nigrescens. Detected B.J. Coppins, specimen in E. M. Gosling

Staurothele questphalica: On liassic limestone pebble on shingle beach, West Aberthaw, VC 41 (Glamorgan), GR 31/01-66-, (1988). First Welsh record. A. Orange

Thamnozia vermicularis: A few small patches in open turf on the Red Pike - High Crag ridge above Buttermere Lake, VC 70, Cumberland, GR 35/16-15-. Alt. 700m. (1988). Unusual at this comparatively low altitude. Associated species Baeomyces placophyllus, Cetraria islandica. O. Gilbert

Trapeliopsis percrenata: On old Quercus petraea pollard in fairly open, gladed situation within a wood in east-facing valley. Some very old pollards within this wood and many wet flushes. Valley on Ennycombe Water - a tributary of the River Barle, north of Withypool, Somerset. VC 5, GR 21/841365 (1987). Probably first record for southern England. Growing with Placynthiella icmalea, Trapelia corticola and Micarea prasina; (det. B.J. Coppins) A.M. O'Dare

Verrucaria bulgarica: On calcareous pebbles on soil in the rose garden, Dyffryn Gardens, VC 41 (Glamorgan), GR 31/094723, (1988). Det. P.M. McCarthy. First British record for this minute species. A. Orange

Verrucaria dolosa: On limestone stones on woodland path, Porthkerry Park, VC 41 (Glamorgan), GR 31/083663, (1988). Det. P.M. McCarthy. First Welsh record. A. Orange

Interesting records for Canvey Island, Essex

(Records made by P.M. Earland-Bennett on Canvey Island, VC 18, South Essex in 1982-1987)

Arthopyrenia sublitoralis: Growing with A. halodytes on sandstone rocks below H.W.M. (1982).

Bacidia arnoldiana: On flint on ground (1984).

Buellia stellulata: On red asbestos-cement roof tiles, growing with Lecanora stenotropa (1985).

Candelariella aurella f. heidelbergensis: Five records on various calcareous substates (1982-4).

C. vitellina f. flavovirella: On red asbestos-cement roof tiles; known from five sites in S. Essex (1983). (C. medians f. steepholmensis has not been found on the island, although it is present at two localities nearby).

Collema bachmannianum: on soil, growing with C. limosum (also known from one other site on the island) and C. tenax var. ceranoides (1984-5).

Lecanora saligna: Five records on lignum (1984-5).

L. stenotropa: Five records on brick, sandstone, gravestones and red asbestos-cement roof tiles; three records on lignum (1982-5).

Lecidea lichenicola: On chalk pebble (1987).

Lecidella carpathica: Five records on various calcareous substrates; not uncommon in Essex (1982-5).

Sarcopyrenia gibba: On concrete (1984).

Stangospora moriformis: On wooden jetty (1984).

Thelidium incavatum: On oolitic limestone gravestone (1984).

Tonia aromatica: On limestone block on ground above H.W.M.; rare in Essex (1984).

Thelocarpon laureri: Two records on lignum (1984).

GRANTS FOR FIELDWORK

For academics working in recognised institutions there are numerous grant-awarding bodies to which they can apply for finance, but for most amateurs these are quite unsuitable. However, there are a number of organisations who are prepared to give financial assistance for bona fide projects.

If the work you are planning fits in with the sort of thing that these awarding bodies are granting money for, ask for an application form, or send in a neatly presented and succinct application. If you are manifestly not eligible, please don't waste either their time and money or yours. Still, it's surprising just how much money is available for well thought out projects, and you may be one of the fortunate ones who gets a grant, but be prepared also for a refusal - it doesn't necessarily mean that your project wasn't worthwhile, only that they weren't prepared to award you anything this time.

Here is a short list of trusts to which you could apply; a number of them may be for members only, so check that point. The list is by no means exhaustive, and if none are suitable for your particular work, consult the reference book "Directory of Grant-Making Trusts" published by The Charities Aid Foundation, 48 Pembury Road, Tonbridge, Kent, TN9 2JD.

Grants for travel:

Biological Council Awards; c/o Barbara Cavilla, Institute of Biology,
20, Queensbury Place, London SW7 2DZ (Tel: 01-581 8333)

Royal Geographic Society, Kensington Gore, London SW7 2AR (Tel: 01-589 5466)

Executive Secretary, The Royal Society, 6 Carlton House Terrace, London, SW1Y 5AG

Dax Copp Travelling Fellowship, c/o Institute of Biology, 20 Queensberry Place,
London SW7 2DZ (Tel: 01-581 8333)

Winston Churchill Memorial Trust, 15 Queen's Gate Terrace, London, SW7 5PR
(Tel: 01-584 9315)

The British Council, 65 Davies Street, London, W1Y 2AA (Tel: 01-499 8011)

Grants for Botanical and Conservation Projects

Conservation Officer, World Wildlife Fund, 1110 Morges, Switzerland.

Dennis Stanfield Award, The Executive Secretary, The Linnean Society of London,
Burlington House, Picadilly, London, W1V 0LQ (Tel: 01-434 4479)

International Union for Conservation of Nature, 1196 Gland, Switzerland

Botanical Research Fund, c/o Dr. K.L. Alvin, 2 Little Gaynes Lane, Upminster,
Essex RM14 2JP.

SECRETARY'S REPORT FOR 1987

The Society was founded in 1958 and we are commencing the thirtieth year of its history. The year didn't really get started until February as the A.G.M. had been changed from the usual first weekend in January in order to join with the Linnean Society of London to celebrate their bicentenary. The change was further accentuated by holding the meetings in the Linnean Society's rooms in Picadilly instead of at the British Museum (Natural History). The well-attended meetings (75 people) started on the Thursday with a seminar entitled "Horizons in Lichenology" where eight invited speakers covered several of the topical growth areas in recent lichenology. Thanks are due to D.H. Dalby, D.L. Hawksworth and S. Drury for editing the papers which will be produced in book form as a run-on from the Botanical Journal of the Linnean Society. In the evening a dinner was attended by 43 people at Imperial College, and after-dinner speeches were given by Professor W. Chaloner (President, Linnean Society), Professor D.L. Hawksworth (President, B.L.S.), Professor H.M. Jahns and Professor D.C. Smith.

Throughout Friday, a series of lectures was held on the subject "Variation in Lichens" and in the evening a book sale (now, apparently, an established part of the Society's calendar) was attended by 50 people. The accompanying buffet was held in the Library of the Linnean Society and was of the usual superb standard. Thanks to the lively efforts of Frank Brightman and Mark Seaward, the auctioneers at the book sale, a sum of £350 was raised for the Society. Two long runs of The Lichenologist from Alice Burnet and Ted Wallace were sold and the proceeds have been set aside as a Wallace/Burnet fund for assisting members to travel, attend field meetings, carry out surveys, etc.

On Saturday the A.G.M. took place in the morning followed by a slide show, an exhibition and the Richmond Publishing stall, and in the afternoon a "Flora Workshop" was held to test out some of the keys produced by William Purvis for the forthcoming 'Lichen Flora'..

Council met twice in 1987 and once so far in 1988, the Flora committee have met on the same number of occasions, and the Conservation Committee, reacting to the stimulation of Frank Brightman, has now firmly re-established itself with two productive meetings. Society Field trips have been arranged and Chris Hitch has dutifully kept members informed with his duplicated insert to the Bulletin. Four issues of The Lichenologist and two issues of the Bulletin were produced to their usual high standard, and the Library produced a catalogue of its holdings on microfiche.

42 members joined the Society in 1987, the membership now stands at 493, there being about 50:50 U.K. : overseas members. 218 Institutions subscribe to The Lichenologist - an indication of its importance in these days of economic cut-backs in education. The membership list, promised at the last A.G.M. will be distributed to all members with the Summer '88 issue of the Bulletin.

There has been a continuing interest in lichenological projects at all levels of primary, junior, secondary, further and higher education. The Society has made representations to the N.C.C. supporting the appointment of a lower plant specialist; has acknowledged its interest in the founding of a "Centre for Biology" proposed by the Institute of Biology; has taken part in a PREST survey run by the University of Manchester to evaluate the effectiveness of the British Museum (Natural History); has continued to support, through the Floral committee, the production of the new British Lichen Flora, and mounted a small lichenological exhibition at Stockport to mark the European Year of the Environment. The Society is represented on the committees of the Biological Council, the International Mycological Association and C.A.B.S.

The main strength of the Society comes from the collaboration of members from all walks of life up and down the country and throughout the world, sharing together their interest in a common subject - lichens.

NEW MEMBERS

The following members joined the Society between November 1987 and March 1988. All have been included in the new Membership List.

JM = Junior Associate Member:

Miss Marion D.B. ALLEN, 122 Kensington Road, BELFAST, N.Ireland, BT5 6NJ

Mr. Steve BOREHAM, 6A Vicarage Road, Stratford, LONDON, E15 4HD

Dr. David S.H. CANNON, Coldbeck House, Ravenstonedale, KIRKBY STEPHEN, Cumbria CA17 4LT
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Prof. Jousz NOWAK, Assoc. Professor, Institute of Botany, Polish Academy of
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Miss Kate D. RIGBY, Bell Meadow End, Henham, BISHOPS STORTFORD, Herts., CM22 6AR.
Dr. Ornella SALVADORI, Laboratorio Scientifico, Soprintendenza ai Beni
Artistici e Storici, Cannaregio 3553, 30131 Venezia, ITALY.
Mr. Anthony G. SMITH, 30 Timberdene, Stapleton, BRISTOL, Avon, BS16 1TJ.
Mr. Mats WEDIN, Dept. of Systematic Botany, P.O. Box 541, S-75121 Uppsala, SWEDEN.

Literature pertaining to British lichens - 4

Lichenologist 19(4) was published on 29 October 1987, 20(1) on 22 January 1988, and 20(2) on 29 April 1988.

CHISHOLM, J. E., JONES, G. C. & PURVIS, O. W. 1987. Hydrated copper oxalate, moolooite, in lichens. Mineralog. Mag. 51: 715 - 718. [Mineral formation in lichens by reaction between secreted oxalic acid and water containing copper.]

CLARK, M. C. 1987. An inner city heathland site. Proc. Eggham nat. Hist. Soc. 25: 218 - 219. [Lichen records from Burberry Brickworks site.]

CLAUZADE, G. & ROUX, C. 1987. Likenoj de Okcidenta Eŭropo Suplemento 2a. Bull. Soc. bot. centre-ouest II, 18: 177 - 214. [Additions and corrections to the authors' lichen flora. In Esperanto.]

CLERC, P. 1987. Systematics of the Usnea fragilesceus aggregate and its distribution in Scandinavia. Nordic J. Bot. 7: 479 - 495. [Detailed taxonomic account with key. The correct name for Usnea inflata is U. cornuta Körber. The species U. fragilesceus is divided into two varieties: var. fragilesceus (saxicolous) and var. molliis (Vainio) P. Clerc (corticolous).]

COPPINS, B. J. 1987. The genus Ramonia in the British Isles. Lichenologist 19: 409 - 417. [Four species, including Ramonia dictyospora Coppins sp. nov. and R. nigra Coppins sp. nov. Key to all five European species.]

COPPINS, B. J. 1987. Two new lichenicolous species of Opegrapha from western Scotland. Notes R. bot. Gdn Edinb. 44: 601 - 606. [Opegrapha brevis Coppins and O. thelotrematis Coppins on thalli of Thelotrema.]

EGAN, R. S. 1987. A fifth checklist of lichen-forming, lichenicolous and allied fungi of the continental United States and Canada. Bryologist 90: 77 - 173. [List of 3409 accepted taxa plus hundreds of synonyms. The foliose species of Cetraria are placed in Tuckermannopsis Gyelnik by Hale. Arthopyrenia caesia, A. halodytes, and A. strontianensis are placed in Eyrenocollama by Harris.]

GILBERT, O. L. 1988. Studies on the destruction of Lecanora conizaeoides by the lichenicolous fungus Athelia arachnoidea. Lichenologist 20: 183 - 190. [Description of a vegetation cycle.]

GILBERT, O. L. 1988. Colonization by Parmelia saxatilis transplanted onto a suburban wall during declining SO₂ pollution. Lichenologist 20: 197 - 198. [Two periods of production of new colonies originating from transplants.]

GRAHAM, G. G. 1988. The Flora and Vegetation of County Durham. Durham Flora Committee & Durham County Conservation Trust. [Includes detailed lichen flora. Lichens are also included in the vegetation survey.]

HALE, M. E. 1987. A monograph of the lichen genus Parmelia Acharius sensu stricto (Ascomycotina: Parmeliaceae). Smithson. Contr. Bot. 66. [38 species.]

LAUNDON, J. R. 1987. Dougal Swinscow: a birthday tribute. Lichenologist 19: 343 - 344. [Appreciation, with photograph. Comments on the formation of the British Lichen Society are included.]

LOONEY, J. H. H. & JAMES, P. W. 1988. Effects on lichens. In ASHMORE, M., BELL, N. & GARRETTY, C. (Editors) Acid Rain and Britain's Natural Ecosystems: 13 - 25. Imperial College, London. [Review.]

MAYRHOFER, H. 1987. Monographie der Flechtengattung Thelenella. Cramer, Berlin. [Bibliotheca Lichenologica 26] [Monograph of 17 species.]

MAYRHOFER, H. 1987. Ergänzende Studien zur Taxonomie der Gattung Protorthelenella. Herzogia 7: 313 - 342.

MAYRHOFER, M. 1987. Studien über die saxicolen Arten der Flechtengattung Lecania in Europa. 1. Halecania gen. nov. Herzogia 7: 381 - 406. [Account of the new genus Halecania M. Mayrhofer and its six species. Halecania ralfsii (Salwey) M. Mayrhofer and H. spodomela (Nyl.) M. Mayrhofer, formerly in Lecania, occur in Britain.]

MCCARTHY, P. M. 1988. New and interesting species of Verrucaria I. Lichenologist 20: 1 - 10. [Verrucaria aranensis McCarthy and V. knowlesiae McCarthy are described from Ireland. V. dolosa Hepp is recorded from England. V. mutabilis Borrer ex Leighton is discussed. Key.]

REDHEAD, S. A. & KUYPER, T. W. 1987. Lichenized agarics: taxonomic and nomenclatural riddles. Arctic and Alpine Mycology 2: 319 - 348. ["Potrydina is recognized as a separate genus from Omphalina". Potrydina botryvodes (L.) Redhead & Kuyper (Omphalina ericetorum auct.), B. luteovitelina (Pilát & Nannf.) Redhead & Kuyper, B. velutina (Quélet) Redhead & Kuyper, and B. viridis (Ach.) Redhead & Kuyper (Coriscium viride (Ach.) Vainio, Omphalina hudsoniana (Jennings) H. Bigelow) refer to British species.]

ROGERS, R. W. & HAFELLNER, J. 1988. Haematomma and Ophioparma: two superficially similar genera of lichenized fungi. Lichenologist 20: 167 - 174. [The Haematomma ventosum group is shown to belong to Ophioparma Norman, separated chiefly on ascus structure: O. lapponica (Räsänen) Hafellner & R. W. Rogers is a new combination.]

SEAWARD, M. R. D. 1988. Progress in the study of the lichen flora of the British Isles. Bot. J. Linn. Soc. 96: 81 - 95. [Review of 300 years.]

THOR, G. 1988. Caloplaca lucifuga: a new lichen species from Europe. Lichenologist 20: 175 - 178. [Caloplaca lucifuga Thor from England.]

WINCHESTER, V. 1988. An assessment of lichenometry as a method for dating recent stone movements in two stone circles in Cumbria and Oxfordshire. Bot. J. Linn. Soc. 96: 57 - 68. ["Thalli of Aspicillia calcarea dating to around 1366 and of Rhizocarpon geographicum to 1523 are reported ... lichenometry has considerable potential for assessing the detailed treatment over the recent centuries of prehistoric or historic structures. The method merits greater attention by historians than it has hitherto received."]

J. R. LAUNDON

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Literature Guide by Hawksworth (1970) £1.00

Conservation by Gilbert (1975) £1.00

A new guide to microchemical techniques
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by F.J. White and P.W. James (1985)
(Suppl. to Bulletin 57) £1.50

Check-list of British Lichen-forming,
Lichenicolous and Allied Fungi by Hawksworth,
James and Coppins (1980) £4.00
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Members must state that they belong to the Society
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Lichen Atlas by M.R.D. Seaward and C.B.J. Hitch (1982)
from The Institute of Terrestrial Ecology, Merlewood Research
Station, Grange-over-Sands, Cumbria. LA11 6JU.

Cost to members £3.85 (post free).

When ordering please state you are a member of the Society.

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