

New edition of Dahl's keys

The second edition of Dr E. Dahl's Analytical Keys to British Macrolichens is now cyclostyled and on sale, price 6/- post free for members and 8/- post free for non-members, replacing the first edition which is out of print. The keys have been completely revised by Dr Dahl, with assistance from F. H. Brightman, D. L. Hawksworth, P. W. James, Hildur Krog and J. R. Laundon, and are now completely up-to-date. Not only have all recent additions to the British macrolichen flora been included, but keys to Lichina, Pannaria, Parmeliella, Parmeliopsis, Roccella and Usnea have been incorporated which were absent from the first edition. Other new features are the inclusion of a glossary, and the addition of authors' names after the species. As in the first edition the keys are indented, and thus give a visual presentation of a genus, defining the characters of species at a glance. The keys should be obtained from the Treasurer and an order form is enclosed.

Maps scheme: new record card

A new record card for general recording in the British Isles is now available, listing 728 lichen taxa, a copy of which is enclosed. The names of species are in roman, whilst taxa of rank below that of species are in italics; only important subspecies and varieties are included on the card. The new card replaces the old one which lists only 154 easily identified lichens. Future orders for the mapping card will be assumed to be for the 1968 edition, unless the 1964 card is specifically requested. The abbreviations on the new card follow the names in P. W. James's "A new check-list of British lichens" plus additions and corrections, and the list corresponds closely with the taxa included in the manuscript of the proposed new book on British lichens by Miss U. K. Duncan, which is expected to be published in 1969. It is regretted that the cards have suffered slight postal damage.

A new card must be used for each 10 km grid square; where a grid square falls over more than one vice-county it is recommended that a separate card be used for each part. The top panels of the card should be filled in as fully as possible, using figures, not letters, for the designation of the major 100 km grid squares. Presence in the locality concerned is indicated by crossing the name of the taxon through with a single line. All taxa should be correctly determined, and an 'H' should be placed in front of those where a specimen has been preserved. In Ireland an extension of the National Grid (not the Irish Grid) is used, and localities and Irish Grid references should be sent to the Mapping Recorder, who will supply the extended Grid references to be put on the record cards. Separate cards must be used for each island in the Channel Islands, and for the eastern and western halves of Jersey.

The new card will be supplied at the price of 1/9 post free for 10 cards to members, and 3/- post free for 10 cards to non-members. Orders should be sent to the Mapping Recorder on the enclosed form. Completed cards will be replaced free with an equivalent number of new cards on request, provided return postage is enclosed.

The following addition to the list of individual mappers should be noted:

Cladonia furcata var. subrangiformis

P. A. Stott, Department of
Geography, King's College, Strand,
London W.C.2, and
F. H. Brightman, 2 Red Oak Close,
Orpington, Kent.

New check-list reprint and price increase

Copies of "A new check-list of British lichens: additions and corrections - 1" by P. W. James, reprinted from The Lichenologist 3: 242 - 247 (1966), are now available price 1/- post free from the Treasurer, Dr D. H. Brown, Department of Botany, The University, Bristol BSS 1UG. The reprint is a valuable source of reference to use in conjunction with the check-list itself.

From 1 January 1969 interleaved copies of "A new check-list of British lichens" by P. W. James, reprinted from The Lichenologist 3: 95 - 153 (1965), will be sold only together with the additions and corrections reprint. The price of the two will then be increased to 10/- post free to members and 15/- post free to non-members. Therefore anyone contemplating the purchase of a check-list is advised to order it before the end of the year in order to obtain it at the old price of 7/6 post free, or 8/6 with the additions reprint.

The check-list and additions are especially useful to use in conjunction with the new record card for mapping distribution.

Nominations for Officers and Council

Nominations for Officers for 1969 and Council Members for 1969 - 1970 should be sent to the Secretary before 21 December 1968 on the enclosed form. No person may be nominated without their consent. B. W. Ferry, K. A. Kershaw and D. S. Ranwell retire from the Council and are not eligible for re-election.

Annual General, Lecture and Exhibition Meeting, 4 January 1969

The Annual General Meeting will be held at 10.30 hrs. on Saturday 4 January 1969 in the Department of Botany, Imperial College, Beit Hall, Prince Consort Road (north side), South Kensington, London S.W.7. The nearest Underground Station is South Kensington, and Exhibition Road connects this station with Prince Consort Road. The Department is immediately to the south of the Albert Hall. It is hoped that all members will endeavour to attend.

Agenda

1. Apologies for absence.
2. Minutes of the last Annual General Meeting.
3. Matters arising.
4. Reports of the Secretary, Treasurer, and other officers.
5. Place and dates of autumn meeting, 1969.
6. Place and dates of annual general, spring and summer meetings, 1970.
7. Election of auditor.
8. Election of three members of Council.
9. Election of officers.
10. Any other business.

J. R. Laundon
Honorary Secretary.

After the Annual General Meeting from 11.30 until 12.30 there will be an hour for short communications on any aspect of lichenology. Members wishing to speak are kindly requested to complete the enclosed form and return it to the Secretary before 21 December 1968 stating the time they require; an additional five minutes will be available to each speaker for answering questions. The Secretary will inform prospective speakers if they can be accommodated, in view of the limited time available. Members wishing to show transparencies should also complete the form.

The Lecture and Exhibition Meeting will continue in the afternoon in the same building. Members are asked to make a special effort to contribute exhibits of specimens or other material relevant to lichenology, and an hour has been set aside for their study and discussion; during this time the exhibitors may address the meeting should they wish to do so. The afternoon programme is as follows:

14. 00. P. W. JAMES, B.Sc., F.L.S. Modern methods of lichen taxonomy.
14. 30. D. L. HAWKSWORTH, B.Sc. Lichen acids: their identification and use in taxonomy.
14. 50. Study of exhibits and afternoon tea.
16. 00. B. W. FERRY, B.Sc., A.R.C.S. Lichen zonation on rocky shores.
16. 30. M. R. D. SEAWARD, M.Sc. The Society's distribution maps scheme.

Spring Field Meeting and Dyeing Course at Totnes, 1969

The Spring Field Meeting will be held at Totnes, Devonshire, from Wednesday evening 2 April until Wednesday morning 9 April 1969. This will be immediately followed by a dyeing course at Dartington College of Arts from Wednesday 9 April until Monday 14 April 1969. Members will then have a choice of attending either or both the field meeting and the dyeing course.

For the field meeting the Seymour hotel is the headquarters accommodation, and members should meet outside at 9.30 on Thursday 3 April. Accommodation is as follows:

- Dart Vale Manor Private Hotel (Telephone Totnes 3164). 9 double, 1 single, rooms. Half-pension (dinner, bed & breakfast) £11. 0. 6. per week.
- Mount Plym Hotel (Tel. 3442). 8 double, 2 single rooms. Half-pension £11. 11. 0. per week.
- Royal Severn Stars Hotel (Tel. 2125). 17 double, 3 single rooms. Bed & breakfast £3. 12. 0. per double, £1. 19. 6. per single room; dinner 16/6, and grill room also available. No weekly terms.
- Seymour Hotel (Tel. 2114) (headquarters). 23 double, 6 single rooms. Bed & breakfast £1. 15. 0.; dinner 15/6 - 17/-. No weekly terms.
- Seymour Lodge Guest House (Tel. 2206). 10 double rooms. Half-pension £11. 11. 0. per week.

Mrs A. Kok, Dartington College of Arts, Totnes, South Devon, is local Secretary and persons attending must return the enclosed form to Mrs Kok and book their own accommodation, with packed lunches (available at all the above addresses) each day if required. Dr D. H. S. Richardson is leader of the Field Meeting.

The course on dyeing with lichens will form the early part of the Textile Study Course at the Devon Centre for Further Education, Dartington Hall, Devonshire, 9 - 18 April 1969, the dyeing part running until the 14th. This section will consist of practical and experimental work and members attending are advised to make a collection of dye-lichens this autumn if possible, because the results obtained from these should be more satisfactory than that from specimens collected on the Course. The dye-lichens should be dried out and stored in a dry and airy place. Members will be non-residents and will be charged about £9 for attending the course, which included all meals except breakfast. Therefore bed and breakfast should be obtained from college landladies through Mrs Kok, who is the Society's representative for the course. The enclosed form should be returned to Mrs Kok (address above), from whom full particulars are available, and early booking to the Warden, the Devon Centre, Dartington Hall, Totnes, South Devon, stating the dyeing part only is to be attended, is advised.

Summer Field Meeting at Bangor, 1969

The Summer Field Meeting will be held at Bangor, Caernarvonshire, from Wednesday evening 6 August until Wednesday morning 13 August 1969. The Waverley Hotel is the headquarters accommodation and members should meet outside at 9.30 on Thursday 7 August. Accommodation is as follows, the tariff applicable to 1968:

- Albion Hotel, High Street (Telephone Bangor 2854).
- Belle Vue Hotel, Upper Bangor (Tel. 3182).
- British Hotel, High Street (Tel. 3178). 32 rooms. £18. 18. 0. full board per week.
- Castle Hotel, High Street (Tel. 3441). 45 rooms. £2. 2. 0. per night per person, bed and breakfast; other meals extra. No weekly tariff.
- Garth Hotel, Garth Road (Tel. 2913).
- Glanrafon Hotel (Tel. 2251).
- Greystones Hotel, Holyhead Road (Tel. 2768).
- Nantlys Hotel, High Street (Tel. 2663).
- Nelson Arms, Beach Road (Tel. 3262).
- Railway Hotel, High Street (Tel. 2158).
- King's Arms, High Street (Tel. 2912).
- Waverley Hotel, Holyhead Road (Tel. 2017) (headquarters). 15 rooms. Half-pension £18 per week; bed and breakfast £1. 16. 0.

A. Fletcher, Marine Science Laboratories, Menai Bridge, Anglesey, is the leader and persons attending must return the enclosed form to Mr Fletcher and book their own

accommodation for full board with packed lunches each day, or half-pension according to preference. A list of hotels, boarding establishments and restaurants is available from the City Librarian, City Library Ffrod Gwynedd, Bangor, but the Bangor Guide price 1/6, also from this address, gives better detail. Mr. Fletcher will be pleased to answer any special enquiries regarding the summer meeting.

Lichen Site Committee

The Council of the Society have set up a Lichen Site Committee to draw up a list of sites of lichenological importance for the purpose of conservation. The Committee consists of F. N. Haynes (Conservation Officer), J. R. Laundon (Secretary of the Committee), F. H. Brightman, O. L. Gilbert, D. Jackson Hill, P. W. James, D. S. Ranwell, F. Rose, M. R. D. Seaward and T. D. V. Swinscow. The Committee would be grateful to receive from members details of proposed sites considered worthy of conservation for their lichen flora on copies of the enclosed form. Further copies of this form may be obtained free from the Secretary, and orders should state the quantity required.

Dr V. J. Grummam

We regret to report the death of Vitus Johannes Grummam, who was born on 3 March 1899 in Jacobsdorf, Silesia, and died on 12 December 1967 in Berlin. Dr Grummam is renowned for his Catalogus Lichenum Germaniae (1963), which is one of the most useful reference books on lichens to have appeared in recent years, and for his editing of the lichen volume of the Kryptogamenflora der Mark Brandenburg (1957). It is understood that the manuscript of his important book Biographisches und bibliographisches Handbuch der Lichenologie was completed before his death and is to be published shortly. An obituary and list of his publications, compiled by O. Klement, appears in Ber. Deutsch. Bot. Ges. 81: 81 - 84 (1968).

Lichenologist

Part 1 of volume 4 of The Lichenologist was published on 27 June 1968. Any member who did not receive a copy should inform the Secretary. Members who have not yet paid their subscription for 1968 and who have been sent a copy of the journal are kindly requested to send their subscription to the Treasurer, Dr D. H. Brown, Department of Botany, The University, Bristol BS8 1UG, without delay. Anyone not renewing their subscription should have the courtesy to return the issue to Dr Brown, together with a letter of resignation as a member.

Juniper Hall herbarium

A collection of lichens from south-east England is now available at Juniper Hall Field Centre, Dorking, Surrey. The herbarium should be of special interest to beginners, as it includes stunted material. Specimens cannot be posted to students, but anyone is welcome to examine the collection provided they make a written appointment with the warden, J. H. P. Sankey. Although the collection is quite comprehensive, it is by no means complete and any contributions would be gratefully received.

J. P. SHOWELL

County lichen floras

M. R. D. Seaward, Department of Biology, Trinity & All Saints' Colleges, Troy, Horsforth, Leeds, is compiling for publication a catalogue of county lichen floras. Data on floras, additions to floras, MS. floras, and those in preparation, would be much appreciated by Mr Seaward.

West Yorkshire conurbation lichens

M. R. D. Seaward, Department of Biology, Trinity & All Saints' Colleges, Troy, Horsforth, Leeds, is studying the urban lichen ecology of the West Yorkshire conurbation, and would be grateful to receive data/records for lichens found within 40 km (25 miles) of the centres of Bradford, Halifax, Huddersfield, Leeds and Wakefield.

1. Introduction

It has been suggested that many amateur lichenologists would find it useful to have the details of methods and stains used in the examination of ascocarps of lichens. The following account is based on my own experience and there may be other techniques and stains as good or better than those here described. If readers know of any especially useful techniques, J. R. Laundon would welcome details so that they might be included in a later Bulletin.

2. Sectioning the ascocarp

Sections rather than squashes enable one to see the arrangements of the various parts of the ascocarp more clearly. They take very little more time to prepare once the 'knack' of cutting the sections is acquired.

The best instrument for carrying out this operation is half a blade used for safety razors. A vertical cut is made about one third the way across the ascocarp to be sectioned, and this third then removed by flicking the blade away from the larger portion. A second vertical cut is then made parallel to the first and a thin slice of ascocarp falls on to the area of thallus from which the original piece of ascocarp was removed. If the edge of the razor blade or a fine needle is moistened with a little water or saliva, the section can easily be picked up and transferred to a slide on which a drop of water or stain has been placed.

The thinnest sections are obtained if this whole procedure is carried out under a binocular microscope x10 or x20 magnification. Using this technique ascocarps can be quickly and accurately sectioned but a good supply of new razor blades is necessary, especially when the lichen examined is crustose and growing on rock.

3. Examining the ascocarp

Initially it is most helpful to place a coverslip on the section and observe the whole ascocarp under the microscope (about X100 magnification). If spores or asci are required free of the other parts of the ascocarp, one edge of the coverslip is held in place with the index finger of the left hand and then the centre of the coverslip tapped gently but firmly with the index finger of the right hand. This spreads out the ascocarp which may then be re-observed and tapping repeated if the various structures have not been sufficiently separated. The medium in which a section is mounted depends on which structures are being studied.

(a) Water

This is most useful for determining the colour of the spores, epithecium and hypothecium. It is also probably the best medium in which to make measurements of the spores as it causes no appreciable swelling or shrinkage. If it is then desired to make the slides of ascocarp sections semi-permanent, they may be mounted in or irrigated with lactophenol (see below).

(b) Potassium hydroxide

After the section has been observed in water, it can be irrigated with 10% potassium hydroxide. This clears the ascospores of oil droplets which often makes the spores of a number of pyrenocarpous lichens appear muriform when they are in fact simple or only septate in one direction (e.g. Thelelidium spp.).

(c) Meltzer's Iodine (ref. 1)

The importance of this medium is that it both clears the ascocarps and reacts with amyloid and dextrinoid compounds in the asci giving a blue or red colouration. The reagent is made up as follows:

Distilled water	20 ml
Potassium iodide	1 g
Iodine	0.5 g
Chloral hydrate	20 g

The potassium iodide is dissolved in 1 - 2 cc of water and the iodine then added and stirred until it has dissolved. The mixture is diluted with the remainder of the water and finally the chloral hydrate is added. Meltzer's Iodine should be made up fresh each season.

(d) Congo red (ref. 2)

This stains both the thin outer wall and thicker gelatinous inner wall of bitunicate asci. The latter is very difficult to see in water mounts. In order to show the proliferation of the inner wall, the ascocarp is soaked for a few minutes, then surface dried and a section made. The section is placed in a drop of congo red and gently squashed as described above. The inner ascus will be seen to have proliferated in a number of the asci and may be differentiated from the outer ascus as it stains a paler colour and the edge of the wall is not well defined. Often the ruptured edge of the outer ascus can be seen. The proliferation of the inner ascus occurs most readily in fresh material and can be very easily seen in species of the genus Arthonia.

The inner ascus may be demonstrated using only congo red stain and bright field microscopy, but phase contrast in conjunction with the congo red plus glycerine stain gives the finest results. Using this technique the outer ascus appears deep grey and the inner ascus pale pink.

The formula for congo red stain is:

Congo red	1 g
Distilled water	100 ml
880 Ammonia solution	2 - 3 drops

The reagent gives better results if 10% ethanol is substituted for water and up to 30% glycerine may be added to the stain if semi-permanent preparations are required. The reagent deteriorates after a few months.

(e) Cotton blue (Aniline blue) and lactic acid (ref. 1)

If interascal tissue is to be examined then this reagent is very useful. It is similar to the lactophenol and cotton blue reagent described below but often gives better results. The ascocarp sections are placed in a drop of the stain and a coverslip placed on top to prevent evaporation. The slide is then heated in the flame of a spirit lamp until the stain just boils. It is allowed to cool and the section is then transferred with a needle to another slide on which is a drop of pure lactic acid. A coverslip is then added and the section squashed and observed as previously described. The stain consists of 0.66% cotton blue dissolved in lactic acid.

It should be noted that chloral hydrate is poisonous and that both cotton blue and congo red will stain clothing and wood if spilled.

4. Semi-permanent preparations

Semi-permanent slides are valuable for record purposes, for facilitating quick examination of specimens on a subsequent occasion and for comparative use in identification. Either lactophenol alone, for whole ascocarps, or lactophenol cotton blue are suitable media for such slides.

Lactophenol (ref. 3) is made by mixing lactic acid 16 ml, phenol (pure crystals) 20 g, glycerine 31 ml and distilled water 20 ml. A few grains of cotton blue are then added to convert to lactophenol cotton blue, care being taken to add only a very small quantity because the tissues take up this stain very gradually and will eventually become obscured by a very deep stain if excess cotton blue is used. The sectioned ascocarp is placed in this medium and a coverslip placed over it. The edge of the coverslip is then sealed with Hadfields' Ringing Compound, obtained from Hadfields (Merton) Ltd., Phipps Bridge Road, Mitcham, London S.W.19. When this has dried a further film of the ringing compound is added on top of the first. The slide should then last for several years. The British Museum (Natural History) has good slides prepared in this manner dating from 1950. In the absence of Ringing Compound, three films of nail varnish can be used but the seal does not usually last as long.

1. DENNIS, R. W. G. 1960. British Cup Fungi and Their Allies. Ray Society, London. p. xxi.
2. GWYNNE-VAUGHAN, H. C. I. & BARNES, B. 1935. The Structure and Development of the Fungi. 2nd edit. Cambridge. pp. 373 - 377.
3. DADE, H. A. 1960. Laboratory methods in use in the culture collection, C.M.I. Herb. I.M.I. Handbook: 40 - 69. Commonwealth Mycological Institute, Kew, Surrey. p. 59.

D. H. S. RICHARDSON

1. Introduction

The system of lichen photography described below is sufficiently versatile to cover most situations, and allows for a considerable personal preference in the choice of equipment. Lichen photographs may be required for illustrating papers, recording habitats and successions, for teaching and demonstration purposes, or for a simple record of the appearance of the living plant.

2. Materials and methods

The intended use of the photograph determines the choice of film. For many requirements, especially teaching or lecturing, 35 mm colour transparencies are ideal. For illustrating a taxonomic paper from herbarium specimens, or for producing enlargements for exhibitions and demonstrations, a slow fine-grain black-and-white film is most suitable, whilst if there is a possibility that colour prints may be required as well, colour negative film should be used. This is reasonably cheap; it can be developed at home, and black-and-white prints can be made from it in the usual way. Both black-and-white and colour prints can be made from transparencies via an intermediate negative, but the quality is rarely satisfactory for scientific work.

Because of the small size of lichens, close-up photographs are usually preferred. The type of camera most suited to taking such photographs is the 35 mm single lens reflex. This has a shutter in the plane of the lens so that for close-up work a set of extension tubes can be fitted without exposing the film. These are metal or plastic tubes, about 4 cm in diameter, and are usually sold in sets of three or four sections which screw together, and can be fitted between the lens and the body of the camera. In a set of four there would typically be tubes 5 mm, 10 mm, 15 mm, and 20 mm long giving a choice of ten degrees of magnification up to a maximum of 50 mm. With this extension, the lens is within 10 cm (4 ins) of the lichen giving a 1:1 magnification (i.e. a specimen 35 x 24 mm will completely fill the picture; this is adequate for all foliose and fruticose species). Since the photographer sees the same image as the film does, it is easy to frame and focus the picture precisely. The few disadvantages of this type of camera are dealt with below.

A difficulty with the use of extension tubes is that the film requires a considerable increase in exposure (see table) and, as it is desirable to work at as small an aperture as possible (i.e. high f. number) to get the greatest depth of field, some extra illumination is needed. In the laboratory photofloods can be used, but for field work a small portable flash gun is desirable. This can be either a bulb or electronic flash. The bulb flash guns are cheap to buy, but each shot costs 9d. The electronic flashes are initially much dearer, but cost little to run. There is a wide range of choice of these, in price and design. One type, the ring flash, has a circular tube mounted round the lens and is specially designed for close work since it gives very even lighting. However, it is not extensively used outside of medical work since it is expensive, clumsy to set up, and tends to give rather flat featureless photographs. The type most commonly used is a small, low-power gun with an integral power supply, which fits conveniently on a camera flash bar. With these there is a choice of rechargeable ones which usually give about 50 flashes on one charge, and battery ones, which do 90 to 100 on one set of batteries, and are essential if you are camping or remote from a mains electricity supply for recharging. In some makes of rechargeable gun, batteries can be used as well.

In addition to the basic lens on the camera, there are two alternatives which can be bought. The first is the "Macro-lens", which, in effect contains its own built in extension tubes and allows continuously variable magnification up to a maximum of 1:1. They are rather expensive (£50) but are very convenient. The other type of lens is that with the automatic diaphragm. When the camera is being set up and focused, it is at its maximum aperture so that the image is brightest and the focusing most critical. It is then necessary to stop down to the aperture for exposure, and in doing so the focus or framing may be lost if the camera is hand-held. With the automatic lens, the diaphragm automatically stops down to the preset aperture momentarily before the shutter operates.

With this facility, in conjunction with an electronic flash, hand-held close-ups with one or even two sets of extension tubes are quick and easy.

If you prefer to take photographs by natural light, or cannot hold the camera steady enough for close-ups, a tripod must be used, and since lichens do not often grow in the most accessible of places it will have to be very versatile. A suitable tripod, in addition to the normal extending legs and pan-and-tilt head, has a rising centre column which is hinged at the base so it can be set up with the pan-and-tilt head below the point at which the legs are joined. When buying such a tripod it is a good idea to test it for strength and stability by setting it up with the camera and flash aimed at an imaginary, slightly overhanging rock about 20 cm (8 ins) above ground level.

For correct exposure in natural light it is essential to use a good exposure meter. The most consistent results are probably obtained by pointing the meter directly at the lichen from 20 - 25 cm (8 - 10 ins) away, but under most conditions the incident light method is equally good. Do not forget to allow for the exposure correction for extension tubes (see table).

Instead of using extension tubes for close-ups, supplementary lenses can be added in front of the camera lens. Although these give only a limited amount of magnification they have the advantage that no exposure increase is necessary; however, there is often a slight deterioration in picture quality with these lenses unless very good ones are used. In using the focusing table at the end of this article, it is important to remember that the distances are measured from the supplementary lenses.

For flash photographs the exposure problem is much simpler than might be expected since with a normal low-power electronic flash, a 25 ASA film (e.g. Kodachrome II) and extension tubes, the correct exposure at about f. 16 is maintained over the range 8 to 60 cm (3 - 24 ins), provided the flash is kept the same distance from the subject as the lens is. This is an empirical observation which is extremely convenient since the need to calculate the exposure is avoided. The effect of daylight can be ignored in close-ups because the flash is so bright. However, it may need altering by a constant half, or one stop, for a given set of equipment, but this should be found from a trial film. If the subject is very dark, e.g. Verrucaria maura, the lens should be set at f. 11, and for a very light subject, e.g. Buellia canescens, at f. 22. Glare from shiny parts of the object, or water droplets, can be reduced by holding one thickness of handkerchief in front of the flash, but the lens must be opened up by one stop.

If a magnification of greater than 1:1 is needed, such as for photographs of perithecia and isidia, two, three or even four sets of extension tubes can be used, but for this a tripod is absolutely essential. Alternatively a set of extension bellows could be used but these are rather susceptible to rain and other hazards of field work. Coupling of an automatic diaphragm is also more difficult, but can be overcome with a double cable release.

Two types of viewfinder are available for single lens reflex cameras. They are the reflex viewfinder which gives waist-level viewing from the top of the camera, and the pentaprism which gives eye-level viewing. For most purposes the pentaprism is preferable as the image is the right way round and vertical format pictures are far easier to take. But for certain photographs, especially at ground-level, the reflex finder can be more convenient despite its laterally inverted image. Focusing is more easily performed by moving the camera backwards and forwards until the image on the ground glass screen is sharpest, rather than by adjusting the focus ring on the lens.

The single lens reflex is an ideal camera for photomicrography, and special converters can be bought for attaching them to microscopes. Although the subject is too specialised to go into here, moderate results can be obtained by mounting the camera on a tripod vertically over the eyepiece and focusing, but the exposure is difficult to estimate and it is not recommended for more than occasional use.

There are two disadvantages with single lens reflex cameras. Firstly they are rather expensive, often £25 or more, and secondly they are rather heavy.

A cheaper, but less satisfactory, method of photography is to use supplementary lenses on an ordinary 35 mm camera. Because the viewfinder does not see the same image as the camera (it is displaced to the top and side) it is helpful to make a wire frame the same size as the field of view which clips on the lens mount. By making the frame so it is at the plane of focus of the supplementary lens, it is possible to frame and focus a picture by resting the frame against the subject, thus overcoming the parallax problem.

The system with single lens reflex, flash and extension tubes is equally suitable for photographing bryophytes, flowering-plants and fungi. It is used extensively by many people with great success.

3. Apertures

The amount of light passing through a lens is indicated by the f. scale. These numbers are the ratio:

$$\frac{\text{Focal length of lens}}{\text{Diameter of Iris diaphragm}}$$

Since the amount of light which passes through the lens depends on the area of the aperture, it is proportional to the diameter squared. So if the f. number is divided by 2, the exposure is increased 4 times (e.g. in going from f/8 to f/4). So that exposures can be easily calculated, lens f. scales are marked so that going from one f. number to the next doubles the amount of light reaching the film, giving the series: f/1, 1.4, 2, 2.8, 4, 5.6, 8, 11, 16, and 22. To change the aperture by one stop is to go from one number to the next, and the term "to open up one stop" means going from adjacent numbers downwards (e.g. from f/8 to f/5.6).

For close-up work with extension tubes it is found that the ratio should be:

$$\frac{\text{Distance of the lens from the film}}{\text{Diameter of the Iris diaphragm}}$$

where the distance of the lens from the film is the focal length plus the length of the extension tube. Where the extension is 50 mm and the focal length is also 50 mm, the f. number is effectively doubled, and to compensate for this, the lens must be opened up 2 stops.

4. Equipment

Films. The make is largely a matter of personal preference. The 25 ASA films are preferable for flash, whilst the faster ones are more convenient for photography in natural light.

Cameras. There are numerous makes of single lens reflex on the market. The cheapest is the Exa la which costs about £17. This is made by the makers of Exakta and the accessories are interchangeable. It is simple and robust, and mine has given me good service, but with full extension tubes it cuts off the top 3 mm of the picture. The pentaprism is an extra £15 or more. Next in price range, from £24 to £45, are the Russian cameras. I have no experience of these, but they are reported to be satisfactory. At £44 there is the Praktica lb which is an excellent popular camera, with reasonably cheap accessories. The Pentax, at about £80, is probably the most favoured of the more expensive cameras, but it is difficult to choose between them. For natural-light close-up work, through-the-lens exposure meters are very useful.

Extension tubes and bellows. Those sold by the camera manufacturers are usually no better and are more expensive than their equivalents made by independent manufacturers.

Macro-lenses. There are several available. The Nikon 'Macro Nikkor' at £110 is the easiest to use because it includes an automatic diaphragm. Without the automatic diaphragm there is the Pentax 'Macro Takuma' at £61 and the Kilar. This is a 40 mm lens, available in two versions, focusing down to 10 cm (£62) or 5 cm (£79). Adaptor rings are available to convert these to most lens fittings.

Electronic flash guns. The small Metz is a popular rechargeable gun and has proved to stand heavy field use well. I have no knowledge of battery flashes, apart from my own Agfatronic B, which gives good exposures but is not the most convenient shape, and has given trouble with the battery contacts.

Exposure meters. Many makes are available and most are sufficiently accurate. The Sangamo Weston is very robust, and is probably the "best buy", especially if you can get an earlier model at a reduced price.

Tripods. The Velbon is a good make of the hinged centre pillar type, but others are as good. Choose one which is sturdy but not too heavy to carry.

5. Tables

Supplementary lenses

Lens	Focal length	Distance focused on		Object area	
		Lens setting	90cm	90 cm	90 cm
1 dioptré	100 cm	100 cm	47.6 cm	72x48 cm	32x22 cm
2 dioptré	50 cm	50 cm	32.4 cm	36x24 cm	22x15 cm
3 dioptré	33.3 cm	33.3 cm	24.3 cm	24x16 cm	16.5x11.0 cm
4 dioptré	25 cm	25 cm	19.6 cm	18x12 cm	13.6x8.9 cm
5 dioptré	20 cm	20 cm	16.4 cm	14x10 cm	11.1x7.4 cm

The field of view of a 50 mm standard lens focused at 90 cm (3 ft) is 65 x 43 cm. The dioptré values of supplementary lenses are additive, so if a 2 dioptré and a 3 dioptré lens is combined the resulting combination has a power of 5 dioptrés. The distances are measured from the supplementary lenses.

Extension tubes

Extension	Focused on	Subject area	Magnification	Exposure (factor)	Increase (stops)
5 mm	55 cm	36 x 24 cm	0.1	1.2	$\frac{1}{4}$
10 mm	30 cm	18 x 12 cm	0.2	1.4	$\frac{1}{2}$
15 mm	21.6 cm	12 x 8 cm	0.3	1.7	$\frac{3}{4}$
20 mm	17.5 cm	9 x 6 cm	0.4	2.0	1
25 mm	15.0 cm	7.2 x 4.8 cm	0.5	2.3	-
30 mm	13.3 cm	6 x 4 cm	0.6	2.6	$1\frac{1}{3}$
35 mm	12.1 cm	5.1 x 3.4 cm	0.7	2.9	$1\frac{1}{2}$
40 mm	11.2 cm	4.5 x 3.0 cm	0.8	3.2	$1\frac{2}{3}$
45 mm	10.5 cm	4.0 x 2.7 cm	0.9	3.6	-
50 mm	10.0 cm	3.6 x 2.4 cm	1.0	4.0	2

The correct exposure is found by multiplying the shutter speed by the appropriate factor, or by increasing the aperture by the given number of stops.

I. S. C. CAMPBELL

Which ?

With reference to I. S. C. Campbell's article above on lichen photography, the Consumers' Association have commissioned comparative tests on photographic equipment and published the results in their journal "Which ?" This journal appears monthly, and cameras were included in the issues appearing in November 1959 (35 mm), July 1965 (automatic), June 1966 (Polaroid Swinger), June 1967 (cheap), December 1967 (cheap), and May 1968 (automatic). Unfortunately a report on comparative tests of single lens reflex cameras, the most suitable type for lichen photography, is at present unavailable, but is to be published in 1969. Only the single lens reflex Kowa H (Japan) and Ricoh 35 Flex (Japan) were included in the July 1965 report. Other photographic equipment reported on includes cheap films (August 1967), cine (May 1966), colour films (May 1962; July 1962), exposure meters (August 1960), screens (May 1966), slide projectors (December 1966), and slide viewers (August 1968). "Which ?" costs £1. 10. 0. for a twelve month subscription from Which ?, Dept. W., Caxton Hill, Hertford, and back numbers are available from this address price 3/- each, or can be consulted free in public reference libraries.

Non-photographic reports in "Which?" of possible interest to lichenologists include adhesives (October 1964), adjustable shelving (April 1968), aspirin (February 1965), first-aid kits (May 1962), insect repellents (July 1959), life insurance (special supplement), maps (July 1963), matches (January 1960), picnic stoves (July 1960), razor blades (August 1966), slide rules (May 1961), stain removers (February 1964), tin openers (October 1963), typewriters (December 1962) and washing machines (October 1967).

Current research / study projects

The following members are engaged on the projects listed below. The editor of the Bulletin thanks all who completed the questionnaire. Additions to the list are welcome for inclusion in future Bulletins.

AHTI, DR. T., Botanical Museum, University of Helsinki; Unioninkatu, 44, Helsinki 17, Finland.

Lichen flora of Finland, Newfoundland and British Columbia, especially Cladonia gracilis group, C. boryi group, Parmelia sect. Melaenoparmelia.

BAILEY, R. H., Gloucestershire College of Art and Design, Pittville, Cheltenham, Gloucestershire.

Lichen flora of Herefordshire.

Experimental ecology of Lepraria incana.

Dispersal of lichen propagules.

COKER, DR. P. D., 54 Beaumont Avenue, St Albans, Hertfordshire.

An assessment of Parmelia caperata and other species as indicators of air pollution due to sulphur dioxide and hydrogen fluoride.

Lichen phytosociology (Braun-Blanquet), with particular reference to epiphytes.

DIBBEN, M. J., Department of Botany, Duke University, Durham, North Carolina 27706, U.S.A.

Chemical taxonomy of lichens.

FARRAR, J. F., Keble College, Oxford.

Preparation of a lichen flora of Oxfordshire.

Collecting records for a preliminary lichen flora of Colombia, Ecuador and Peru in conjunction with R.M. Garrett; both are going on an expedition to Ecuador in 1969 to collect lichens.

FLETCHER, A., Botany Department, Marine Science Laboratories, Menai Bridge, Anglesey. Ecology of marine lichens on Anglesey.

FLETCHER, M.V., 70 South Street, Reading, Berkshire.

Cultivation of lichens on original or suitably collected substrata under cover.

Would welcome the opportunity of making cultures under varying conditions of material of faster-growing genera (e.g. Cladonia) for taxonomic studies.

FOLLMANN, PROF. DR. G., Kryptogamenabteilung, Botanisches Museum, Königin-Luise-Str. 6 - 8, D-1 Berlin 33, Germany.

Monograph of Roccellaceae (including Dirinaceae), with special reference to chemotaxonomy.

Chemotaxonomy of Ramalinaceae.

Lichen flora and vegetation of Chile.

GAARE, E., Botany Department, Det Kgl. Norske Videnskabers Selskab Museet, Trondheim, Norway.

Growth study of species used as food by wild reindeer: Cetraria nivalis, Cladonia alpestris, C. mitis.

GARRETT, R. M., Colegio Colombo-Britanico, Apartado Aereo: 5774, Cali, Colombia, South America.

Problems of spore dispersal.

Lichen collecting in Colombia.

Ecological work with a view to answering some of the problems that have already come to light from spore dispersal work.

Member of Cambridge University Expedition to virgin jungles in Ecuador, responsible for work on lichens together with J. Farrer.

GILBERT, O. L. Department of Botany, The University, Newcastle upon Tyne 1.

Investigation of the use of lichens as biological indicators for various types of air pollution.

The use of lichen communities as a model for predicting the chain of events which occur when there are deleterious changes in the species structure, organic structure and energy flow of communities.

Preparation of a lichen flora of Northumberland.

Taxonomy of Solorina.

- HAWKSWORTH, D. L., Botanical Laboratories, Adrian Building, The University, Leicester LE1 7RH.
Alectoria, including chemistry of all type specimens and detailed study of British species.
 Lichen flora of Shetland, Leicestershire and Derbyshire.
 Distribution of Dendriscoaulon umhauense and Parmelia furfuracea.
- HERTEL, DR. H., Institut für Systematische Botanik der Freien Universität Berlin, Grunewaldstr. 35, 1000 Berlin 41, Germany.
 Saxicolous species of Lecidea in Europe.
- HUNECK, DR. S., Institut für Pflanzenchemie, DDR-8223 Tharandt/Dresden, Germany.
 Chemistry of lichen substances.
- JACOBS, J. B., Department of Botany, University of Massachusetts, Amherst, Massachusetts 01002, U.S.A.
 Ultrastructure of the composite lichen plants and their isolated component symbionts.
- JAMES, P. W., Department of Botany, British Museum (Natural History), Cromwell Road, London S.W.7.
 General work on British flora.
 Detailed studies of Menegazzia, Psoroma, and Sticta.
 General interest in southern temperate lichen flora.
- JORGENSEN, P. M., Botanical Museum, Postbox 2637, The University, Bergen, Norway.
 Oceanic lichens, their systematics, ecology and distribution pattern.
- KALB, K., Kreuzerstrasse 80, 85 Nürnberg, Germany.
 Alpine lichen communities.
 Muscicolous species of Lecidea.
- KOFLER, PROF. MME. L., Laboratoire de Physiologie végétale, Domaine Universitaire, 38 St Martin d'Herès, France.
 Influence of air pollutants (namely dust particles) on lichen spores and hyphae.
- LAUNDON, J. R., Department of Botany, British Museum (Natural History), Cromwell Road, London S.W.7.
 Taxonomic studies of the Lecanora dispersa and L. varia groups.
 Taxonomy of sorediate crustaceous lichens in the British Isles, including monograph of Lepraria.
 Distribution of Lecanora conizaeoides in relation to air pollution.
 Urban lichen ecology, with special reference to London.
 Chemotypes of Cladonia rangiformis.
- LINDSAY, D. C., Department of Botany, Research Gardens Winterbourne, The University, Birmingham 15.
 Taxonomy and ecology of Antarctic lichens, including the Falkland Islands and their Dependencies.
- MANNING, S. A., Stoke House, Stoke by Clare, Sudbury, Suffolk.
 Collection and study of Cladonia and Parmelia.
 Lichens (especially Cladonia & Parmelia) of East Anglia, Sutherland and Outer Hebrides.
 Reprints and correspondence welcomed on these subjects.
- MARGOT, J., Laboratoire d'Ecologie végétale, Université de Louvain, 92 Avenue Cardinal Mercier, Haverlee, Belgium.
 Ecology of lichens in general.
 Water relations.
 Effects of pollutants.
 Culture of soredia.
 Ecological factors influencing distribution.
- MITCHELL, DR. M. E., Department of Botany, University College, Galway, Republic of Ireland.
 Revision of the sect. Mallotium of the genus Leptogium.
 Study of the lichen flora of the Burren, Co. Clare.

- OSORIO, H. S., Sección Botánica-Museo de Historia Natural, Casilla de Correo 339, Montevideo, Uruguay, South America.
 Preliminary check-list of the Uruguayan lichen flora.
 Study of the distribution of the tropical elements in the lichen flora of south Uruguay.
- PYATT, F. B., Department of Botany, University College, Cathays Park, Cardiff.
 Air pollution in south Wales in relation to the growth and distribution of lichens.
 Biology of lichen propagules.
 Aspects of lichen physiology with special reference to inhibitory phenomena.
 Lichen parasitism.
- SCHOFIELD, E. A., Department of Botany, Ohio State University, Columbus, Ohio 43210, U.S.A.
 Study of the environmental factors responsible for the distribution of lichens and other terrestrial cryptogams on Ross Island and in Victoria Land, Antarctica. These field studies are being complemented by laboratory experiments. The nitrogen nutrition of the plants is being investigated.
- SEAWARD, M. R. D., Department of Biology, Trinity & All Saints' Colleges, Troy, Horsforth, Leeds.
 Distribution studies of British lichens (British Lichen Society's mapping scheme).
 Urban lichen ecology in the Leeds/Bradford conurbation.
 Lichen flora of Lincolnshire.
- THOMSON, DR. J. W., Department of Botany, University of Wisconsin, Madison, Wis. 53706, U.S.A.
 Lichens of the north slope of Alaska.
 American arctic lichens: book and papers on various areas in preparation.
 North American lichens: studies of various genera.

South American lichens

J. F. Farrar and R. M. Garrett are going on an expedition to the Llanganati mountains of Ecuador (a region to the east of Ambato in the Andes) for three months in the summer of 1969. They will be working on lichens with a view to compiling a preliminary lichen flora of Colombia, Ecuador and Peru, from their own and previous collections. They would be interested to hear of any species lists and collections made in these countries, or of anyone engaged in research on lichens from the area. This information should be sent to J. F. Farrar, Keble College, Oxford.

Oxfordshire lichens

J. F. Farrar, Keble College, Oxford, is compiling records of Oxfordshire lichens for inclusion in a projected Flora of Oxfordshire. Mr Farrar will be pleased to receive any Oxfordshire records, including locality, grid reference, date, recorder and location of specimen, where available.

New members

It is intended to issue lists of new members from time to time as well as complete lists of members at intervals of a few years. The following joined the Society after the complete list of members was issued in Bulletin 20 (May 1967) and June 1968: (F.M. = Family member)

- Ahmadjian, Professor V., Department of Biology, Clark University, WORCESTER, Mass. 01610, U.S.A.
- Balding, J. W., M.A., M.Sc., Biology Department, St Luke's College, EXETER, Devonshire.
- Bowen, Dr H. J. M., 20 Winchester Road, Oxford.
- Campbell, Miss E. O., Department of Botany, Massey University, PALMERSTON NORTH, New Zealand.
- Champion, C. L., B.Sc., Cleland House, Page Street, LONDON S.W.1.
- Chapman, D. S., 12 South Lane, NEW MALDEN, Surrey.
- Clokie, J. J. P., Ballaquane, Oakleigh Road, HATCH END, Middlesex.
- Cockitt, Miss M. A., 18 West Avenue, Handsworth Wood, BIRMINGHAM 20.
- Dahl, Dr E., Botanical Institute, Agricultural College of Norway, VOLLEBEKK, Norway.

Dibben, M. J., B.Sc., 15 Northbrook Road, ILFORD, Essex.
 Dudley-Smith, Mrs. D. S., The Follies, Winchcombe, CHELTENHAM, Gloucestershire.
 Dunn, Miss M., Brighton College of Education, Falmer, BRIGHTON, Sussex.
 Dykes, Sergeant J. M., Royal Air Force, 280 S.U., R.A.F. AKROTIRI, B.F.P.O. 53.
 Egan, R.S., Biology Department, University of Colorado, BOULDER, Colo 80302, U.S.A.
 Einarsson, Dr E., Department of Botany, Museum of Natural History, P.O. Box 532,
 REYKJAVIK, Iceland.
 Enson, Mrs. J. E., 218 Longsdale Drive, Rainham Park, GILLINGHAM, Kent.
 Fletcher, A., B.Sc., Botany Department, Marine Science Laboratories, MENAI BRIDGE,
 Anglesey.
 Fletcher, M. V., 70 South Street, READING, Berkshire.
 Fletcher, P. W., 4 Alder Close, ROMSEY, Hampshire.
 Fletcher, R. L., Northern Polytechnic, Holloway Road, LONDON N.7.
 Forbes, R. S., Livorno, Troy Park, LONDONDERRY.
 Gourbière, F., 42 Les Plagues, ST CHAMOND, Loire, France.
 Grassi, Dr M. M., Institute Miguel Lillo, Calle M. Lillo 205, TUGUMAN, Argentina.
 Hatley, Mrs. Z. A., 118 Mill Road, HAILSHAM, Sussex.
 Hickmott, Mrs. M., Oakdene, Greyfield, Clutton, BRISTOL.
 Hobson, Miss E. M., 6 Rothsay Gardens, BEDFORD.
 Hoffman, Professor G. R., Department of Biology, University of South Dakota,
 VERMILLION, South Dakota 57069, U.S.A.
 Howard, Dr G. E., Botany Department, University of Washington, SEATTLE,
 Washington 98105, U.S.A.
 Hutchinson, Professor W. A., 52 Jeffrey Lane, AMHERST, Mass. 01002, U.S.A.
 Ireland, Miss H., 36 Warrington Road, IPSWICH, Suffolk.
 Jenner, E. J., 27 George Street, TUNBRIDGE WELLS, Kent.
 Johnson, Miss M. G., Ford Castle, BERWICK UPON TWEED, Northumberland.
 Jørgensen, Botanical Museum, Postbox 2637, University of Bergen, BERGEN, Norway.
 Kantrud, Mrs. B., R.R.1, JAMESTOWN, North Dakota 58401, U.S.A.
 Kaye, R., Waithman's House, Silverdale, CARNFORTH, Lancashire.
 Kofler, Professor L., Biologie, D.U., University of Grenoble, 38 St Martin d'
 Hères, GRENOBLE, France.
 Kristinsson, Dr H., Department of Botany, Duke University, DURHAM, North Carolina,
 27706, U.S.A.
 Margot, J., 6 Chaussée de Namur, HAMME-MILLE (Bt.), Belgium.
 Milne, Mrs. A. R., 56 Brooklands Park, LONDON S.E.3. (F.M.)
 Nowak, Dr J., Botanical Institute, Polish Academy of Sciences, KRAKOW UL. LUBICZ
 46, Poland.
 Payne, Dr J. M., Quickley, Compton, NEWBURY, Berkshire.
 Peet, D. K., Bar Hill Farm, Madeley, CREWE, Cheshire.
 Pereira, Dr J. Torres, C.P. 521 - Da da Bandeira, LUANDA, Angola.
 Pettersson, Professor B., Section of Ecological Botany, The University, UMEA 6,
 Sweden.
 Pilcher, Mrs. B. E., B.Sc., 121 University Avenue, BELFAST 7.
 Rowlands, P. C., Kesteven College of Education, Stoke Rochford, GRANTHAM, Lincs.
 Sarma, Dr K. G., Sir Robert Robinson's Laboratory, Shell Research Ltd., EGHAM,
 Surrey.
 Sheard, Mrs. J. W., c/o Department of Biology, University of Saskatchewan,
 SASKATOON, Saskatchewan, Canada. (F.M.)
 Sloover, Professeur J. R. de, Laboratoire d'Ecologie Végétale, Université
 Catholique de Louvain, 92 Avenue Cardinal Mercier, HEVERLEE, Belgium.
 Steven, G. J., 205 Canterbury Road, Kennington, ASHFORD, Kent.
 Sturges, Miss A. M., 181 Ramsden Road, LONDON S.W.12.
 Sutherland, T. A., 17 Vaughan Road, Aylestone Park, LEICESTER LE2 8RF.
 Thorp, T. K., B.A., Department of Botany, The University, GLASGOW W.2.
 Tomaselli, Professor R., Via S. Epifanio 14, PAVIA, Italy.
 Tucker, Dr Shirley, 1022 Baird Drive, BATON ROUGE, Louisiana 70808, U.S.A.
 Vickery, A. R., Department of Botany, British Museum (Natural History), Cromwell
 Road, London S.W.7.
 Webb, Captain C. L. F., Elusendy, Penmachno, BETWS-Y-COED, Caernarvonshire.
 Webb, Mrs. C. L. F., Elusendy, Penmachno, BETWS-Y-COED, Caernarvonshire. (F.M.)
 Whiddett, Miss J. M., 18 Pytchley Crescent, Upper Norwood, LONDON S.E.19.
 Williams, Miss R. V., 38 Woodsome Drive, Whitby, Ellesmere Part, WIRRAL, Cheshire.
 Willmot, A., 19 Chalsey Road, Brockley, LONDON S.E.4.
 Wilson, Miss H. E., Killowen, MACDUFF, Banffshire.

Clean Air Bill, 1968

The Clean Air Bill, 1968, is welcomed by British lichenologists as a further step towards the abatement of air pollution, which continues to afflict the country's lichen flora. The Bill was introduced as a Private Member's measure by Mr R. Maxwell (Buckingham, Labour) and was given a second reading and sent to Committee on 16 February 1968. This stage was dealt with by a committee of the whole House and was agreed to, with Government support, on a division on 11 April. It received its third reading in the Commons on 10 May, and its third reading in the House of Lords on 25 July, thus being returned to the Commons. It is expected that the final stage will be dealt with after the House re-assembles on 14 October to continue the present Session, and become law soon afterwards.

The Bill gives the Minister power to prescribe standards of permissible emissions of grit and dust from furnaces, local authorities power to ensure that new chimneys (and old chimneys put to new uses) will be sufficiently high for the effective dispersal of flue gases; makes residences, shops and offices subject to chimney height control, enables the Minister to require a local authority to carry out a programme for smoke control (to be used for local authorities who at present refuse to implement their duty in cleaning their air), and makes it an offence to deliver and buy bituminous coal for consumption in a smoke controlled area. Although there have been criticisms of the Bill for being insufficiently radical, it is useful in providing a number of improvements to the Clean Air Act, 1956.

Air pollution

There is general international agreement that the word "air pollution" should be used in preference to "atmospheric pollution". The use of the latter name should be avoided.

Royal occasion

"Factory owners at Widnes, Lancs., are being asked to restrict smoke on 17 May, so that the Queen can have a clear view from a rooftop garden when she visits the town to see 'Operation Springclean'." - Daily Express.

Facsimile literature

J. Cramer, the German scientific publishers, are producing books of facsimile copies of collected lichenological papers of important authors. These are very useful for those who do not have access to large libraries where they can examine the original publications, and are also valuable in bringing together scattered papers into single volumes, so that an author's work becomes more easily accessible. To date The Collected Lichenological Papers of Edward Tuckerman, edited and prefaced by W. L. Culberson, in two volumes (1964), Jean Müller (Argoviensis). Gesammelte lichenologische Schriften, in two volumes (1967), and William Nylander's Collected Lichenological Papers, edited and prefaced by T. Ahti, vols. 4 - 6 (1967), have been published. Further details are available from Verlag von J. Cramer, 3301 Lehre, Germany.

Books and reprints for sale

WATSON, W. 1953. Census Catalogue of British Lichens. London. New copies obtainable from M. R. D. Seaward, Department of Biology, Trinity & All Saints' Colleges, Troy, Horsforth, Leeds, price 10/- post free.

Literature on lichens

BOWEN, H. J. M. 1968. The Flora of Berkshire. Oxford. (Includes a chapter of lichen records and a map showing the frequency of corticolous lichens in the grid squares within the county.)

CULBERSON, W. L. & CULBERSON, C. F. 1968. The lichen genera Cetrelia and Platismatia (Parmeliaceae). Contr. U.S. Nation. Herb. 34: 1 - IV, 449 - 558. (Monograph of two groups of species formerly placed in Cetraria and Parmelia. The genus Cetrelia Culb. & Culb. comprises the Parmelia cetrarioides group, of which C. cetrarioides (Duby) Culb. & Culb. and C. olivetorum (Nyl.) Culb. & Culb. occur in Britain. The genus Platismatia Culb. & Culb. comprises the Cetraria glauca group, of which P. glauca (L.) Culb. & Culb. and P. norvegica (Lyngé) Culb. & Culb. occur in Britain.)

- HALE, M. E. 1968. Biochemical systematics in lichens: another viewpoint. International Lichenological Newsletter 2 (1): 1 - 4.
- HALE, M. E. 1968. A synopsis of the lichen genus *Pseudevernia*. Bryologist 71: 1 - 11. (Six species. *Pseudevernia furfuracea* (L.) Zopf (physodic acid) and *P. olivetorina* (Zopf) Zopf (olivetoric acid) occur in Britain, and are morphologically indistinguishable.)
- HANSEN, K. 1968. Lichens in the Faeroes. Bot. Tidsskr. 63: 305 - 318. (47 macrolichens with localities and altitudes, and discussion of the poverty of the lichen flora.)
- JANEX-FAVRE, M.-C. 1968. L'ontogénie et l'organisation des ascocarpes des Lichina, et la position systématique de ces lichens. Bull. Soc. Bot. Fr. 114: 145 - 162.
- KROG, H. 1968. The macrolichens of Alaska. Norsk Polarinstitutts Skrifter 144. (Detailed account, with geographical discussion.)
- MOBERG, R. 1968. Luftförörensingars inverkan på epifytiska lavar i Köpmanholmen. Svensk Bot. Tidsskr. 62: 169 - 196. (The influence of air pollution on epiphytic lichens around a sulphate pulp factory at Köpmanholmen, Angermanland, Sweden, with distribution maps.)
- RICHARDSON, D. H. S., HILL, D. JACKSON, & SMITH, D. C. 1968. Lichen physiology. XI. The role of the alga in determining the pattern of carbohydrate movement between lichen symbionts. New Phytol. 67: 469 - 486. (Examination of 27 lichens, involving 8 genera of algae. "The identity of the carbohydrate moving between the symbionts of a lichen depends on the genus of alga present".)
- SANTESSON, J. 1967. Chemical studies on lichens. 4. Thin layer chromatography of lichen substances. Acta Chem. Scand. 21: 1162 - 1172. ("The thin layer chromatography on precoated plates of more than eighty lichen substances is described".)
- SANTESSON, R. 1967. On taxonomical and biological relations between lichens and non-lichenized fungi. Bot. Notiser 120: 497 - 498. (Review of the delimitation between lichens and non-lichenized fungi, with intermediate examples.)
- SANTESSON, R. 1968. Lavar. Some aspects on lichen taxonomy. Svensk Naturv. 1968: 176 - 184. (In Swedish with summary in English. Review article, proposing the term chemotype for a chemically characterised part of a population of morphologically indistinguishable individuals, and morphotype for a morphologically characterised population. "A careful investigation of the lichen substances is very important for lichen taxonomy. However, this valuable tool may not be misused by the application of names of every chemotype".)
- SHEARD, J. W. 1968. The zonation of lichens on three rocky shores of Inishowen, Co. Donegal. Proc. R. Ir. Acad., Sect. B, 66: 101 - 112. (Detailed account and discussion, with figures.)
- SKYE, E. 1968. Lichens and air pollution. A study of cryptogamic epiphytes and environment in the Stockholm region. Acta Phytogeogr. Suec. 52. (Detailed study of the epiphytic vegetation.)
- THOMSON, J. W. 1968. Notes on Rhizocarpon in the Arctic. Nova Hedwigia 14: 421 - 481. (Detailed study with key and conspectus.)
- THOMSON, J. W. 1968. The Lichen Genus Cladonia in North America. Toronto. (To be reviewed in The Lichenologist. *Cladonia phyllophora* Hoffm. is shown to be the correct name for *C. degenerans* (Flörke) Spreng. This work is issued in the United Kingdom by the Oxford University Press, London, for £6. 1s. 6d.)

THOMSON, J. W. & ILLIS, H. H. 1968. A fog-induced lichen community in the coastal desert of southern Peru. Bryologist 71: 31 - 34. (Unique lichen community in nearly absolute desert, dominated by Teloschistes peruensis (Ach.) Thoms., comb. nov.)

VITIKAINEN, O. 1968. On the sorediate species of the lichen genus Physconia Poelt in eastern Fennoscandia. Annal. Bot. Fennici 5: 1 - 9. (Revision of Physcia grisea group in eastern Fennoscandia, with data on the ecology and distribution of the four species.)

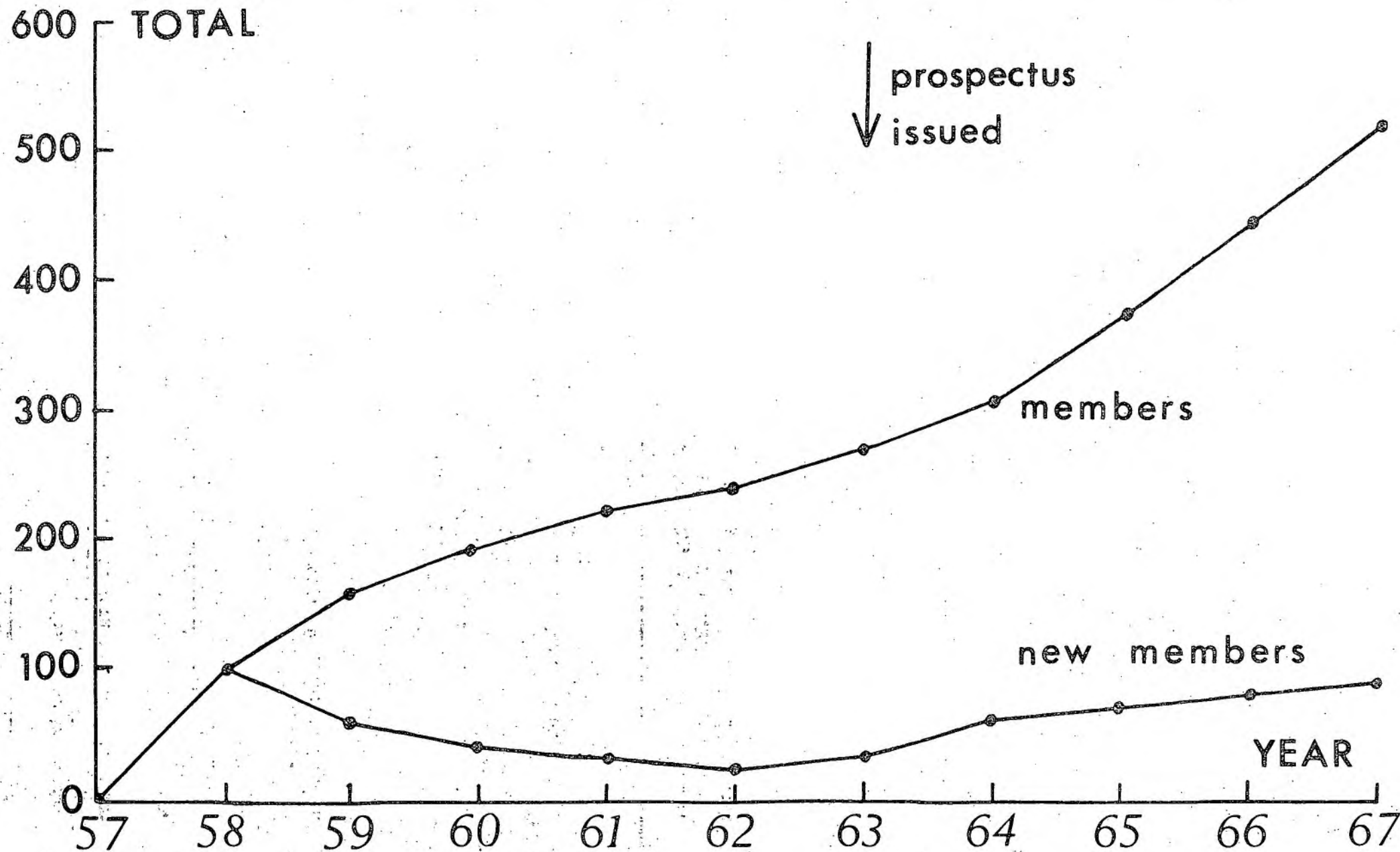
WETMORE, C. M. 1968. Lichens of the Black Hills of South Dakota and Wyoming. Michigan State University Museum publication, Biological series 3 (4): 209 - 464. (Detailed treatment, complete with keys and an account of distribution patterns.)

WIRTH, V. 1968. Soziologie, Standortsökologie und Areal des Lobarion pulmonariae im Südschwarzwald. Bot. Jahrb. 88: 315 - 365. (Detailed account of the Lobarion in the southern Black Forest. Lobarion-Antitrichion fed. nov. English summary.)

Ten years' growth

The graph in this Bulletin (overleaf) illustrates the growth in the membership of the Society since its formation. The upper graph shows the total numbers of members and subscribers, and the lower graph the numbers of new members and subscribers joining each year. The rise in the membership resulting from the distribution of the Prospectus is striking. The fall in the numbers of new members each year until 1962, followed by a steady rise, is remarkable. Now that subscribers are no longer included in the membership, and are administered by Blackwell Scientific Publications, future comparisons with this graph will not be readily available.

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MEMBERSHIP OF THE BRITISH LICHEN SOCIETY