

Reports

CONFERENCE REPORT

RECORDING CRITICAL GROUPS IN THE FLORA OF THE BRITISH ISLES, LIVERPOOL, 13th-14th SEPTEMBER 1985

INTRODUCTION

A total of 98 members of the B.S.B.I. and the Biology Curators' Group attended this meeting based at the Merseyside County Museums and the University of Liverpool. A feature of the conference was the workshop sessions where small groups were guided through the difficulties of identification in critical groups by session leaders, each of whom was particularly knowledgeable in his or her field. To help these sessions, the Museum's herbarium was available and a block of four rooms enabled simultaneous sessions to be held, yet with the flexibility for members to change from one session to another as they wished. Most of the sessions were held at the County Museums but other venues included the Department of Botany at the University of Liverpool (Computer Workshop) and the Halls of Residence of the University of Liverpool (Recorders' Forum), whilst a Reception by the Merseyside County Council and an evening talk on 'Operation Groundwork' were held at the Merseyside Maritime Museum.

The Society is greatly indebted to all those who helped to make the conference a success, and is especially grateful to the generosity of the speakers and workshop leaders who helped to keep the costs of the conference to affordable levels.

E. F. GREENWOOD & J. R. EDMONDSON

ABSTRACTS OF PAPERS

LOCAL FLORAS: THE CRITICAL ELEMENT

THE CRITICAL ELEMENT - WITH SPECIAL REFERENCE TO THE ISLE OF MAN

The coverage of critical groups is disappointingly meagre in many modern local Floras. Three reasons can be identified: printing costs, the trend towards shorter-term projects, and lack of taxonomic self-sufficiency. That the sheer size of certain groups compels a certain economy of treatment has to be accepted: sacrificing the coverage of critical taxa in the interest of producing a Flora speedily is more open to challenge. Short-term projects have become the norm in those parts of Britain where field botanists are sufficiently numerous to give rise to substantial teams and where habitat alteration is sufficiently rapid and severe to cause Floras to date quickly. The increasingly heavy emphasis in local Flora work since 1948 on dot-distribution mapping has tended to militate against adequate recording of critical taxa, despite the special value of these in indicating regional and sub-regional affinities and the greater need for their existence to be notified for conservation purposes. By undertaking the study of these taxa themselves, instead of delegating the task to a series of specialists, some or all of whom may be unfamiliar with the local environment and with the local flora more generally, Flora writers can provide a more integrated treatment and use their resulting breadth of view to make illuminating comparisons. The size of this task, however, must vary from area to area. The author's experience in the Isle of Man, discussed by way of example, may have been by no means typical in this respect.

D. E. ALLEN

Ten years ago *Wild Flowers of Guernsey* (1975) put the recorded wild and naturalized plants there at 1340. Since then the total has risen to some 1400. Over half of these are aliens. They come from the four corners of the globe, some are transient, but many have settled down and are a welcome enrichment of the island's tally, only very few endangering native vegetation. Naming new ones calls for familiarity with foreign Floras, consultation of herbaria and a generous amount of help from professional botanists, plantsmen and other specialists. One or two in Guernsey are not yet satisfactorily named through the absence of type specimens or other reliable material. But these newcomers add extra fascination to a fascinating island, not least in pondering when some will become similarly established in England.

D. McCLINTOCK

RECORDING IN IRELAND: PROBLEMS AND PRIORITIES

The organization of recording in Ireland was described and discussed, together with remarks on problems encountered in the field. These include the distances recorders must travel from home to their area of study, and problems of species identification. New vice-county recorders' plans were outlined, and reference was made to contributions by visiting botanists.

D. DOOGUE

B.S.B.I. HANDBOOKS: PROGRESS REPORTS

CRUCIFERAE

The Cruciferae are well represented in Britain and Ireland, with about 300 species recorded to date. They can be considered a critical group because there are a large number of superficially similar species (especially in the 'Yellow Crucifer' aggregate) that cause problems of identification at both the generic and specific level. The genera, despite forming natural groups, are especially hard to define clearly. Within a genus, the species are usually easier to distinguish though there are a few critical genera. Many of the characters require careful examination and a combination often has to be used. It is usually necessary to have both mature flowers and ripe fruit. Some characters are more easily observed on fresh rather than herbarium material, and vice versa. The aim of the Cruciferae Handbook is, therefore, to provide an aid to identification of species likely to be found in the British Isles and Ireland. It will follow the general style and format of the other B.S.B.I. Handbooks. Taxonomy and nomenclature will follow *Flora Europaea* but incorporate recent updates. Descriptions are being prepared from live and herbarium material. Distribution maps will be provided for many species by the Biological Records Centre. Ecological, cytological and other general information will be included where relevant. It is hoped the Handbook will be illustrated by amateur artists. It is planned for publication in 1989.

T. C. G. RICH

LEGUMES

A publication on legumes is being prepared for the B.S.B.I. Handbook Series, and information and help is sought from members. The Handbook will differ from its predecessors in a number of ways. For each species the description, which will be comparatively brief, will be accompanied by illustrations and notes on habitat and use. Distribution maps may also be included. Approximately 100 native and well established alien species will be treated in full but thumbnail sketches will be included for many other aliens. The Handbook is anticipated to be of interest to foreign

botanists, particularly those from areas in which the weed legume flora includes many of our species.

A variety of identification aids, including multi-access keys are being considered as alternatives to dichotomous keys. Separate chapters will deal with dispersal, legume/insect interactions, pollination biology and pollen and honey sources. An innovative aspect of Handbook production is that, for the tribe Viciae (approximately one third of the species), morphological and other information will come initially from the Viciae Database in Southampton.

R. ALLKIN

WEEDS

Weeds constitute a familiar group of plants that affects the lives of all of us. Many definitions have been proposed for the word 'weed', but most agree that a weed is an opportunist plant that causes problems of one sort or another to agriculture, horticulture and other human industries. Weeds have evolved alongside man and have become adapted to the various niches provided by his activities. In order to be able to control weeds with any degree of efficiency, it is important to be able to identify them correctly and to know at least a little of their biology, notably aspects of their life-history, dispersal and ability to withstand destruction by man. Thus, a handbook that brings together information on this group of plants is now in preparation, as there are surprisingly few authoritative texts on the subject. It should be noted that weeds are intrinsically interesting, and they are perfect material for the study of evolutionary processes – easily grown plants, adapted to a variety of catastrophic habitats! The proposed Handbook is being designed for use principally in arable and garden habitats, and other disturbed communities created and maintained by human activities. Aquatic ecosystems are not to be included (although some species typical of wetter soils will be treated), as this would introduce an unwieldy, extra element into the text. Grasslands, with the exception of lawns, will not be given a full treatment. The systematic section of the book will contain accounts of individual species and, in certain cases, groups of species within a genus. There will be detailed descriptions, notes and ecology, distribution and history of particular species, and any appropriate comments on pharmacology, folklore and more anecdotal material. It is thus hoped to introduce weeds to a wider public.

J. R. AKEROYD

TAXONOMIC WORKSHOPS

A LOCALIZED APPROACH TO THE HAWKWEED PROBLEM

The emphasis of the workshop was to show how aspiring field botanists can gain practical knowledge of the genus. It sought to cover the collection of specimens, the main sources of written information, the major relevant herbaria, and the subdivisions of the genus in Britain.

Examples of the main series/sections were available for study. These were recently determined specimens mostly from southern Scotland and northern England.

D. J. MCCOSH

VARIATION AND HYBRIDITY IN SOME BRITISH SPECIES OF *ASPLENIUM* AND *POLYSTICHUM*

Characters were given for the separation of (a) *Asplenium adiantum-nigrum*, *A. billotii* and the hybrid *A. × sarniense*, and (b) the serpentine and non-serpentine forms of *A. adiantum-nigrum*. A range of material was available for comparison, together with specimens of the European *A. cuneifolium*. Help was also available with other difficult species in both *Asplenium* and *Polystichum*, and in the latter genus particular attention was paid to the identification of hybrids by spore examination.

A. SLEEP

The genus *Euphrasia* in Europe consists of a successful group of hemiparasites of a diverse range of grassy, herb-rich habitats, including marshes, saltmarshes, heather moorland, base-poor to base-rich grassland, sea-cliffs and mountain ledges. Numerous morphologically distinct ecotypes exist, some of which have a wide European range. It is convenient to recognize at least the major taxa as separate species, though breeding barriers are often weak or non-existent and the distinctness of the taxa is maintained largely by habitat separation. The British Isles have 21 of the currently accepted 48 European species and with ever-changing patterns of land-use and disruption of habitat-boundaries, the genus shows a complex pattern of hybridization and evolution of local taxa. A flexible approach to the genus was encouraged and the workshop took an ecological view of the major taxa and attempt to define the morphological characters and habitat requirements of the recognized species. The problems of the local recorder, who may be faced with numerous populations that do not readily fit any single species, were discussed, as was the treatment of *Euphrasia* in recording schemes.

A. J. SILVERSIDE

INTERPRETING THE CHARACTERS OF THE CHARACEAE

Students of the Characeae have long indulged in discussion as to the validity of many of the supposed species. Since the publication of the standard work for the British Isles (J. Groves & G. R. Bullock-Webster, *The British Charophyta* (1920 & 1924)), the group has been the subject of a major, world-wide revision (R. D. Wood, *Monograph of the Characeae*, (1965)) which has reduced the number of species reported from these islands by half. Wood questioned the taxonomic significance of many of the characters previously considered important in separating species, but his views have not been accepted by the majority of the European workers, who remain traditionalists. A further dimension has been added to the debate by experimental workers (notably V. W. Proctor) whose success with laboratory cultures and breeding experiments has both clarified and confused the situation. In preparing a Handbook to the Characeae of the British Isles, the author has re-evaluated the 40 or so taxa recorded, adopting a mainly traditional approach in interpreting the characters examined but tempering this with a regard to the work of Wood and the experimentalists.

J. A. MOORE

INFORMAL EVENING SESSION

OPERATION GROUNDWORK: WILDLIFE IN THE URBAN FRINGE

A detailed botanical survey has been carried out in the boroughs of St Helens and Knowsley, Merseyside. A brief description of the methods used was given, especially of a new system tested on the urban areas. The rural area is dominated by intensive barley production, while in the urban areas much open space is 'ryegrass desert' or species-poor rough grassland. There are some remnants of semi-natural vegetation including acidic grassland, brook communities and a fragment of 'heath'. Secondary habitats include some rich meadows, a number of 19th century plantation woods and many marl pits, which together hold much aquatic life. However, many of the most interesting plants are found on derelict industrial land. St Helens has a large and varied collection of such sites, e.g. maritime species on drainage from waste heaps, calcareous grassland on Leblanc process waste, orchids on sand waste, acidic flora on colliery shale, marshes, abandoned dams, railways and the canal. A number of the species found on such sites are locally uncommon or rare – or would be if there wasn't so much derelict land in north-western England.

H. J. ASH

THE STATUS OF *EPIPACTIS LEPTOCHILA* AND *E. DUNENSIS*

Epipactis leptochila and *E. dunensis* are two very closely related, largely autogamous helleborines. They were formerly thought to be ecologically, distributionally and morphologically distinct; *E. leptochila* is a woodland plant of southern England and from northern France to Denmark, with a narrow, acute, patent epichile. *E. dunensis* is endemic to sand-dunes in England and Wales, and has a broad, short, subobtusely, recurved epichile. The only other morphological feature by which they differ statistically is sepal length, which usually exceeds 10 mm in *E. leptochila*, but is shorter in *E. dunensis*. *E. muelleri*, from central Europe is a woodland plant which is virtually indistinguishable from *E. dunensis*. *E. leptochila* var. *cordata* is probably the same plant.

Since 1974, about 15 inland populations of *Epipactis* have been discovered, chiefly on lead and zinc polluted sites under birch in Lincs., Yorkshire and Northumberland. These vary within and between populations in epichile posture and dimensions and sepal length, and contain individuals which are indistinguishable from southern *E. leptochila*, and those which cannot be separated from *E. dunensis/muelleri*. It is concluded that *E. dunensis* cannot be maintained as a species, and it is suggested that *E. dunensis* is returned to varietal rank as *E. leptochila* (Godf.) Godf. var. *dunensis* T. and T. A. Stephenson (*J. Bot.* 59: 205, 1921).

A. J. RICHARDS

DEFINING AND DELIMITING DACTYLORCHID TAXA

Classical taxonomic methods have proved inadequate for dealing with the extensive morphological variation exhibited by dactylorchids (genus *Dactylorhiza*) within the British Isles. The resulting controversies surrounding the classification and nomenclature of these plants have been compounded by: 1) major differences of opinion over the meaning of taxonomic ranks, 2) erroneous descriptions based on unrepresentative data, and 3) a failure to place British populations within a European perspective. Multivariate analyses based on c. 50 morphological characters sampled from 87 dactylorchid populations have enabled the variation within this genus to be quantitatively expressed, and have led to a more objective delimitation of taxa based on morphometric, distributional and ecological criteria.

R. M. BATEMAN & I. DENHOLM

IDENTIFYING BRITISH BROME-GRASSES

Although only a fragment of the genus, 22 species of *Bromus* are likely, in varying degrees, to be encountered in Britain. Many of them present puzzling variation or are downright awkward. The lecture gave delegates the opportunity to consider some of these taxa, including some of the most 'difficult' species pairs and groups, side by side. Some of the differential characters are hard to communicate by mere words and delegates were asked to test out a new, draft key to British material. New characters from spikelet morphology were illustrated. There was a brief analysis of the reasons for the critical nature of some of these species. They include the breeding system, developmental variation, environmentally induced plasticity, hybridization and the sheer smallness of some of the differences. Inevitably, what can be done by way of circumscription has to take into account the variation seen as well as the reasons so far established (by experiment for instance) for at least some of it.

P. M. SMITH

The large number of local variants, named and unnamed, that exists in this group calls for a chain of people versed in the *Rubi* of limited areas. Many of these variants will be unknown to the national referees, and some means needs to be devised of enabling local specialists to examine each other's unnamed material. The matching of the recently-described *R. norvicensis* of the Norwich and Ipswich districts with a bramble long known round Romsey in Hampshire suggests that even floristically very different areas may prove to have species in common. More locally-based work might be forthcoming if the genus were not seen as prohibitively difficult. The difficulties, however, tend to be exaggerated. It is mainly in south-eastern England that the number of species becomes bewildering: over much of the British Isles reasonably widespread ones are comparatively few and their distribution patterns are more clear-cut. Given a good visual memory and a necessary period of intensive field study, the principal local forms can normally be mastered inside a season in these latter areas. Complications are caused by the frequency with which a number of species hybridize and by the variability of many under different environmental conditions. Unfortunately the only recent monograph, W. C. R. Watson's *Handbook of the Rubi of Great Britain and Ireland* (1958), confuses almost as much as it helps.

D. E. ALLEN

HYBRIDIZATION: CRITICAL GROUPS

IDENTIFYING HYBRIDS

Problems encountered in identifying hybrids are mostly the result of the nature of the hybrids themselves, or of the would-be identifier's poor understanding of it. The rule-of-thumb that hybrids are intermediate and sterile works some of the time, but not all of it. With regard to sterility, most hybrids are quite highly sterile, but most are fertile to some extent, and many are quite highly and a few fully fertile. Equally, sterility exists commonly in nature from a wide range of causes other than hybridity, e.g. adverse weather, lack of pollinators, lack of compatible pollen. With regard to intermediacy, most hybrids are intermediate to varying degrees, but many are much closer to one of the parents, and some are identical to one or other and some look unlike either. The results of crosses between two individual plants often show a wide range of variation, only some of which might conform with what we recognize as a hybrid. As a result, our determination of hybrids will sometimes be accurate, sometimes an underestimate and sometimes an overestimate. The only certainty is that we can never be 100% sure, because we can never re-create a particular hybridization event.

C. A. STACE*

IDENTIFICATION IN *RANUNCULUS* SUBGENUS *BATRACHIUM* AND CURRENT WORK ON *RANUNCULUS* *PENICILLATUS*

A new tabular key to species in *Ranunculus* subgenus *Batrachium* was distributed, with a request for help with testing the key in the field. A tabular key is particularly useful in this group because it enables identification to be based on all available features and incomplete material can be identified as accurately as possible. Characters used in the key were discussed and illustrated. Hybridization within the group not only presents difficulties for identification, but also plays an important evolutionary role. The *Ranunculus penicillatus* group is thought to have arisen as amphidiploid hybrids between *R. fluitans* and *R. peltatus*, *R. aquatilis* or *R. trichophyllus*. Within *R. penicillatus*, three varieties – var. *penicillatus*, var. *calcareus* and var. *vertumnus* – are currently recognized. Var. *penicillatus* differs from the other two varieties in having the capacity to form

* Unfortunately Dr Stace was unable to present his paper at the Conference and, at very short notice, Mr D. E. Allen volunteered to contribute his paper on *Rubus*.

laminar leaves, whilst vars *calcareus* and *vertumnus*, which produce only capillary leaves, intergrade morphologically. In addition, var. *penicillatus* is ecologically distinct, occupying base-poor rivers in Ireland and western Britain, whereas both var. *calcareus* and var. *vertumnus* generally occupy base-rich rivers and occasionally share a habitat. Var. *penicillatus* also appears to have a different, if overlapping geographical distribution from the other two varieties, although this difference may be determined largely by ecological preferences. These results suggest that var. *penicillatus* merits separation from the other two varieties at subspecific rank, whilst both var. *calcareus* and var. *vertumnus* should be retained within a second subspecies.

S. D. WEBSTER

RECENT ADVANCES IN THE STUDY OF *TARAXACUM*

Since the publication of *The Taraxacum Flora of the British Isles* (Richards 1972), considerable inroads have been made into our understanding of the British status of this problematic genus. The sectional taxonomy has recently been revised and this has been of considerable value to the student. In addition, our knowledge of the *Taraxacum* flora has doubled the number of species since that of Richards' publication.

The workshop concentrated on the following aspects, supported by the use of appropriate material:

- Hints on the collection, preservation, presentation and identification of dandelions.
- An outline of the 'problem' nature of the genus.
- Description and demonstration of the diagnostic features of the nine sections found in the British Isles and some discussion of their inter-relationships.
- A review of our current understanding of the composition and distribution of the species known in Britain.

C. C. HAWORTH & A. J. RICHARDS

MENTHA SPECIES AND HYBRIDS IN BRITAIN

In common with other perennial cultivated groups, the mints are difficult to treat taxonomically and difficult to identify. Of the six species occurring in Britain, four are native in part of their range. These are *M. aquatica*, *M. arvensis*, *M. suaveolens* and *M. pulegium*. The last, and also the introduced Corsican *M. requienii*, do not normally cause identification problems. Most problems are caused by *M. spicata*, the Garden Spearmint, belonging to sect. *Mentha* as do the first three species mentioned above and among which hybrids occur frequently. The relationships of these species were discussed and the importance of careful observations in the field and, if possible, in cultivation, was underlined. The value of traditional characters for identification was considered, together with others such as scent, epidermal hairs, sex and fertility. It was pointed out that a range of characters should be assessed together when dealing with possible hybrids between genetically very variable species, as often no hard-and-fast rules can be drawn up for their identification. As with many critical, polymorphic groups, local variants are worth recognizing at least informally, as they can provide evidence of means of vegetative spread and dispersal, and their history and origin may sometimes be possible to unravel. In many cases these variants are impossible to treat in formal taxonomic terms, when considered against the total variation encountered in the species or hybrid as a whole.

R. M. HARLEY

DACTYLOID SAXIFRAGES

The Dactyloid Saxifrages of the British Isles are currently classified into four species, *Saxifraga cespitosa*, *S. rosacea*, *S. hartii* and *S. hypnoides*. Recent research has both questioned and

confirmed certain aspects of this classification. An example of this is that cytological work has shown the group to have a chromosome base number of $x = 13$. *S. cespitosa* is hexaploid ($2n = 78$) and *S. rosacea* and *S. hartii* are tetraploid ($2n = 52$). *S. hypnoides* has been found to consist, throughout its range (Iceland, Faeroes, British Isles, north-eastern France), of two geographically separate chromosome races, a tetraploid ($2n = 52$) and a diploid ($2n = 26$). This total separation of chromosome races suggests that they are biologically separate species. In proposing this taxonomic change, a problem arises because the morphological differences between the two cytotypes are slight. The only possible definitive characters are based on cell size (and chromosome number) and thus a microscope needs to be used for identification. The most effective character was found to be stomatal guard cell diameter. The demonstration illustrated the situation with *S. hypnoides* and presented information on geographical distribution which is currently the best method of separating the two cytotypes. *S. rosacea* and *S. hartii*, although having a consistent chromosome number in the populations that have been studied, show characters that particularly question the specific rank currently afforded *S. hartii*. This species was described from material collected on Arranmore Island, Co. Donegal. Recent collections of plant material from this island proved to be a further variant of *S. rosacea*, with some affinity to the variant found on Clare Island to the south. It was concluded that *S. hartii* should be included within the variable *S. rosacea* but that fieldwork was necessary on Arranmore Island in order to confirm this. The demonstration showed the variability of *S. rosacea*, including the population from the Burren and Aran Islands, Co. Clare, which has the most claim to be treated as a separate subspecies or species.

D. M. PARKER

ROSA

As a critical group of plants, roses are more akin to willows than say to brambles or hawkweeds. The taxonomic solution to their diversity appears to lie in recognizing hybrids between a few species rather than in characterizing many microspecies. This is often difficult and complicated by the unique genetic performance of at least the British members of this genus during sexual reproduction, a process which leaves the genetic factor of the female parent predominant. Unfortunately, in the past, varietal and even species names have been allocated to many taxa which we should now recognize as hybrids. *Flora Europaea* adds to the confusion, and the treatment of roses in this work was compared with that of Wolley-Dod (A revision of the British roses, in *J. Bot., Lond.*, 1930-31, supplement, 1931), Clapham, Tutin & Warburg (*Flora of the British Isles*, 2nd ed., 1962), and Melville (in Stace, C. A. (ed.), *Hybridization and the flora of the British Isles* 1975). The main British species as well as some common hybrids were discussed and characters of use in recognizing hybrids were pointed out. Recording from herbarium specimens is often dubious. Field observation is paramount in the study of this genus, and fresh fruiting material was used to illustrate the session.

G. G. GRAHAM

COMPUTER WORKSHOP

CARMARTHENSHIRE FLORA PROJECT, DOT-MAP PLOTTING PROGRAM

The use of a Sinclair Spectrum linked to a suitable dot-matrix printer to produce good quality species distribution maps was demonstrated. The operator manually input each record to be plotted and selected the appropriate map symbol to signify the particular status (e.g. post-1970, native). Maps so constructed were saved to tape for subsequent recall and update and were of sufficient quality to be ready for publication. The major disadvantage with the method was that records needed to be abstracted manually from the master card-index before plotting, a very time consuming business.

Future advances were demonstrated at informal evening sessions. Using a B.B.C. Model B computer an innovative database has been developed which allows rapid and easy input by displaying on the screen species lists derived from the Nature Conservancy Council's Wales field card. Plants recorded are selected by the cursor, a method which also allows status and habitat information to be appended to each species. The economic use of the machine's memory enables the complete vice-county database of nearly 700 tetrads to be stored within the 1.3 megabytes available on two double-sided floppy discs.

Interrogation of the database is very flexible. The present hardware takes about ten minutes to search the whole and plot a distribution map for the selected species or combination of species. Other enquiries can, for example, produce a list of species for a given tetrad or group of tetrads, sum the number of species recorded in a tetrad, plot recorded habitats, list species by status, etc. The use of hard disc or sideways RAM would significantly increase the speed of interrogation.

The system is adaptable to any county or area and to any floral or faunal group. A database to store higher-plant data for the whole of Wales by 10-km-squares is already under development.

R. D. PRYCE

FLORA OF CUMBRIA DATABASE

A series of interactive computer programs (in FORTRAN 77) has been written to maintain and utilize a database which contains species records catalogued by the tetrads in which the species occurs. Program FILESPP is responsible for the input of new records into the database and has facilities for checking, as far as possible, the accuracy of the data entered.

Program SELECTSPP interrogates the database to extract the following information:

- i) Compile a list of tetrads in which a given species occurs and produce a distribution map.
- ii) Compile a list of tetrads in which a given combination of species occurs, and produce a distribution map for that combination.
- iii) Compile a list of tetrads which have a total number of species lying between given limits, e.g. tetrads with 150–200 species, and produce a distribution map.
- iv) Compile a list of species in a given tetrad.
- v) Compile a list of species in a given group of tetrads.
- vi) Compile a list of species found in a given number of tetrads, e.g. a list of species in 10–15 tetrads.
- vii) Compile a list of species-totals in each tetrad in the database. The maps produced are of sufficient quality to be ready for publication.

A. J. C. MALLOCH

W. LANCASTER FLORA: USE OF A B.B.C. COMPUTER

A survey of the flora of West Lancaster (v.c.60) was started in 1964. At that time and for many years afterwards the use of computers was not contemplated. As publication of a new Flora approaches, the B.B.C. microcomputer has been utilized for capturing dot-map distributional data for onward transmission and map production using the Flora of Cumbria Database at Lancaster University. The B.B.C. microcomputer is also used as a word-processor for the production of text.

E. F. GREENWOOD, P. W. PHILLIPS & J. RAVEST

IDENTIFICATION BY COMPUTER

Computer programs for interactive identification on the BBC-B and TORCH microcomputers were demonstrated. Examples were shown of sets of data relating to the critical genera *Rubus*, *Taraxacum* and *Euphrasia*, as well as a set for grasses with vegetative characters only.

R. J. PANKHURST

THE NORTH WEST BIOLOGICAL FIELD DATA BANK'S CATALOGUING SYSTEM

The North West Biological Field Data Bank holds information on nearly 2,000 sites in north-western England. The workshop demonstrated the use of the commercial programme dBase II to construct the catalogue of these sites. On-line retrieval of the data was demonstrated and the use of command files which allow the database to be used by the computerphobic person was explained. Further expansion possibilities were described and some other commercially available database programmes for micro-computers were also mentioned.

A. S. GUNN

THE USES OF CRITICAL RECORDS

FLORA RECORDING AND THE NATIONAL VEGETATION CLASSIFICATION

The National Vegetation Classification is providing a systematic and comprehensive description of all the vegetation in natural, semi-natural and major artificial habitats in Great Britain. From its results it will be possible to produce a phytosociological profile for a large proportion of the British vascular flora as well as for many bryophytes and lichens. It is hoped that the National Vegetation Classification will encourage flora-recorders to set their observations in an ecological context and serve as a framework for research on the conservation of individual taxa.

J. RODWELL

THE ROLE OF CRITICAL SPECIES RECORDING IN EVALUATING SITES OF SPECIAL SCIENTIFIC INTEREST

Biological Sites of Special Scientific Interest are usually notified on grounds of habitat or plant communities for which the Nature Conservancy Council uses guidelines based on the concepts of the *Nature Conservation Review* (1977): naturalness, diversity, size, rarity and fragility. This picks up most good botanical sites, but there is also provision for S.S.S.I.s to be notified on grounds of individual species or assemblages of species alone, both for animals and plants. For plants on Schedule 8 of the *Wildlife and Countryside Act 1981*, that is 'Red Data Book' (*British Red Data Book 1. Vascular Plants*, 2nd ed. (1983)) species which require special protection, the policy is to notify all localities. For all other vascular plants, an assemblage score of 200 or more is used as a guideline, which includes use of critical species. The remaining 'Red Data Book' species score 100, species occurring in 16–30 10-km-squares in *Atlas of the British Flora* (1962) and *Critical Supplement to the Atlas of the British Flora* (1968) score 50, 31–100 squares score 40. The Council is not bound by the score and single species localities (including critical species) of particular note: British endemics, species rapidly declining, those with fewer than six locations in Britain, and species at the edge of their range receive special attention and may merit notification. The Council's capacity to use critical groups in evaluating S.S.S.I.s is limited by the information available about their distribution. It would like to have better information to facilitate this process.

N. A. ROBINSON

CRITICAL SPECIES AND NATURE CONSERVATION

The objective of plant conservation in Britain must be the protection of our native taxa in their original habitats. This is of particular importance for critical species groups or infraspecific taxa where endemic variants have evolved since the separation of these islands from the Continent.

These taxa present several difficulties because they are recognized by a very small number of specialists:

1. What are the taxa? Which specialists do we follow?

2. Where are the taxa? Who can collect distribution information over a short enough period for an assessment of their status to be made?
3. What are the management requirements? Can site managers recognize the taxa and have adequate knowledge to ensure their survival?
4. How can the Law be enforced? Should critical taxa be scheduled under the *Wildlife and Countryside Act 1981*? Would ignorance of identity be a defence for picking a critical taxon?
5. In the light of these difficulties and the scientific importance of these taxa, decisions have to be made on the number of sites for each we should be seeking to protect; we may find out, with the help of experts, how many sites for each are already protected; and consider the role of botanic gardens/universities in gathering and monitoring living collections of taxa within nominated groups.

The relevance of collecting data for further editions of the *Atlas of the British Flora* (1962) and the *Critical Supplement to the Atlas of the British Flora* (1968) and the monitoring of change in the distribution of critical taxa must also be considered.

F. H. PERRING

FIELD EXCURSIONS TO NESS GARDENS AND RED ROCKS, 14TH SEPTEMBER 1985

The field excursion on Saturday, 14th September visited two quite different areas. In the morning, Dr H. McAllister, Deputy Director of the University of Liverpool's Botanic Gardens at Ness, South Wirral, Cheshire welcomed delegates and took them on a guided tour of the Gardens. There was far too much for delegates to see on one trip and certain features were selected for special comment. These included the national collection of willows recently transferred from Long Ashton Research Station, Bristol, taxonomic studies on *Orobanch*e, and the native plant garden where a number of endangered British species are grown.

In the afternoon, delegates drove a few miles north-westwards to the coast of the Wirral peninsula at West Kirby. Here the Red Rocks S.S.S.I., managed as a nature reserve by the Cheshire Conservation Trust, was visited. It is a small area of sand dunes with a brackish slack and reedbed, and developing saltmarshes adjoining the site. In continuing the critical groups theme of the conference, *Atriplex littoralis*, *A. prostrata*, *A. glabriuscula* and *A. laciniata* were distinguished. In a new developing slack *Juncus ranarius* was noted and distinguished from *J. bufonius* sensu stricto growing further inland. A feature of Red Rocks is the presence of *Equisetum* \times *trachyodon*, and considerable discussion took place when distinguishing this hybrid from *E. variegatum*, which it was thought was growing as a robust upright variant in a nearby dune slack. The other parent, *E. hyemale*, formerly occurred here but has not been seen for many years. The meeting finally ended after a developing *Salicornia* marsh was examined, where *S. ramosissima*, *S. fragilis* and *S. dolichostachya* were identified.

E. F. GREENWOOD & H. McALLISTER

EXHIBITION MEETING, 1985

The Annual Exhibition Meeting was held in the Department of Botany, British Museum (Natural History), London, on Saturday, 30th November 1985, from 12.00 to 17.30 hours. The following exhibits were shown.

SOME ADDITIONS TO THE FLORA OF EUROPE

The exhibit illustrated some of the new information that is being assembled for the revised edition of *Flora Europaea* Volume 1, currently being prepared at Reading University. Herbarium material and maps were displayed of taxa that have been reported as native to Europe, or

naturalized aliens, since the publication of *Flora Europaea* Volume 1 in 1964. The examples shown were:

- Arenaria pomeli* Munby, an annual species formerly thought to be endemic to Morocco, but now known from southern Spain;
- Chenopodium pumilio* R.Br., an alien from Australia that is naturalized in western and central Europe;
- Crassula alata* (Viv.) Berger, similar to *C. tillaea*, recently found on Crete and in the Cyclades, which has its main distribution in N. Africa and the Middle East;
- Polygonum lanigerum* R. Br., a species of the Old World Tropics that extends to the Middle East, reported in southern Crete;
- Rumex vesicarius* L., an annual species that has been refound at its only European station at Nafplion in southern Greece;
- Tellima grandiflora* (Pursh) Douglas ex Lindley and *Tolmeia menziesii* (Pursh) Torrey & A. Gray, saxifragaceous species from Pacific N. America, which are becoming established in shady places in the British Isles.

J. R. AKEROYD

SOME RECENT *RUBUS* DISCOVERIES IN HAMPSHIRE

By 1983, 115 *Rubus* species were reliably on record from v.c. 11 and/or v.c. 12. In the following year, five more species were added, their Hampshire occurrences representing in each case startling extensions of their known British ranges.

- R. hastiformis* W. C. R. Wats., locally abundant in Cornwall and Devon, with rare outliers in Glamorgan, Cardiganshire and Sussex;
- R. leptothyrus* G. Br. (*R. danicus* (Focke) Focke), a common Scottish species, not previously known south of Suffolk and Herefordshire;
- R. norvicensis* A. L. Bull & Edees, known since 1972 in abundance in woods and hedges around Romsey, extending to Winchester and Southampton, and in copses on Hayling Island. In 1984, a chance look at the BM holotype of this recently described species of the Norwich and Ipswich districts suggested the two might be identical, a hypothesis confirmed by A. L. Bull;
- R. tumulorum* Rilst. (not exhibited), formerly believed to be confined to the Looe district of south-eastern Cornwall and one or two places in Devon;
- R. winteri* P. J. Muell. ex Focke, believed to be restricted to the central and east Midlands of England. In 1984–85 it was found in copses on chalk in three widely separated parts of Hampshire, one of them by the border with S. Wilts., v.c. 8, into which it probably continues.

Also exhibited was the holotype (BM) of *R. hantonensis* D. E. Allen, described in *Watsonia*, 15: 387 (1985), so far known only in Hampshire and the Isle of Wight.

D. E. ALLEN

DISTINGUISHING BETWEEN *BETULA PENDULA*, *B. PUBESCENS* AND THEIR HYBRIDS

Betula pendula Roth (2n=28) and *B. pubescens* Ehrh. (2n=56) can be separated reliably using three leaf characters: leaf tip width, 'leaf tooth factor', and distance to the first tooth on the leaf base. This identification is carried out by using a discriminant function. Hybrids are identified as *B. pubescens* by this method. Artificial hybrids can also be distinguished from both parent species by using a pair of discriminant functions involving nine leaf characters. Stomatal length varies between *B. pendula*, *B. pubescens* and the hybrids, those of *B. pendula* being the smallest and those of the hybrids being intermediate.

M. D. ATKINSON & A. N. CODLING

SEED-SET IN BRITISH *REYNOUTRIA* POPULATIONS

Members of the rhizomatous, perennial genus *Reynoutria*, giant knotweeds, are now established members of the flora of the British Isles. As part of a study carrying on from A. P. Connolly's work on the genus, an examination of the reproductive biology of these plants has been undertaken. *Reynoutria japonica* was found to have 88 chromosomes, and *R. japonica* var. *compactum* and *R. sachalinensis* 44 chromosomes. Two groups of hybrids were found to have 44 and 66 chromosomes. In order to examine the role played by seed set, seeds and parental rhizomes were collected from a number of localities in the British Isles, and chromosome counts performed on the plants that were raised. A most surprising result is that the majority of seedlings from parents with 88 chromosomes had 54 chromosomes. These plants are thought to be hybrids with *Fallopia aubertii*, Russian Vine ($2n=20$), as the male parent.

J. P. BAILEY

× *ORCHIACERAS BERGONII* (NANTEUIL) CAMUS: A BIGENERIC HYBRID NEW TO BRITAIN

Bigeneric hybrids between *Aceras anthropophorum* (L.) R. Brown and species of the genus *Orchis* subgenus *Militares* are often recorded on the Continent, especially × *Orchiaceras bergonii* (Nanteuil) Camus (*A. anthropophorum* × *Orchis simia* Lamarck). The first British specimen of this hybrid (also the first involving *Aceras*) was discovered during 1985 in Kent, at the only British locality where its parental species co-exist. Its identity was confirmed by detailed morphometric comparison with its parents, using multivariate analyses, but its origin remains speculative. Photographs and sketches of the hybrid and its parents were exhibited, and implications of the morphometric study were outlined.

R. M. BATEMAN & O. S. FARRINGTON

BRITISH PLANTS AS ALIENS IN MALAYSIA

Specimens were shown of a number of plants from peninsular Malaysia which also occur in Britain. Most of these are weedy species of disturbed soils above 100 m altitude. The following 29 species were noted in 1976 and/or 1985; only those marked * are mentioned in current Floras and the rest may be new records: *Alopecurus aequalis*, *Artemisia vulgaris*, *Briza minor*, *Cardamine hirsuta*, *C. flexuosa*, *Cerastium fontanum*, *C. glomeratum*, *Chrysanthemum segetum*, **Cynodon dactylon*, ?*Fragaria vesca*, *Galinsoga parviflora*, **Gnaphalium luteo-album*, *Hypochoeris radicata*, *Juncus bulbosus*, **Oxalis corniculata*, **Plantago major*, **Poa annua*, **Pteridium aquilinum*, *Raphanus sativus*, *Rumex crispus*, *Sagina procumbens*, *Sambucus nigra*, **Setaria geniculata*, **Solanum nigrum*, *Sonchus oleraceus*, **Stellaria media*, *Trifolium dubium*, ?*Vulpia bromoides*, *V. myuros*.

H. J. M. BOWEN

HAMPSHIRE HIGHLIGHTS, 1985

This exhibit reported notable records within the county during 1985 of flowering plants & ferns. It was illustrated with herbarium material kindly loaned by the British Museum (Natural History) & A. R. G. Mundell, and with specimens provided by the exhibitors.

Plants reported from the geographical county for the first time (or which had apparently become extinct from all known sites) were *Allium oleraceum* L., *Berberis aggregata* Schneid., *Carex elongata* L., *Cotoneaster dielsianus* Pritz., *Cotoneaster frigidus* Wall., *Cotoneaster perpusillus* (Schneid.) Flink & Hylmö, *Cotoneaster salicifolius* Franch., *Cotoneaster* × *watereri* Exell, *Papaver dubium* L. × *P. rhoeas* L., *Potamogeton coloratus* Hornem., *Ruscus hypoglossum* L., *Salvia reflexa* Hornem., *Setaria pumila* (Poir.) Schultes. and *Sisyrinchium iridifolium* subsp. *valdiviense*.

New vice-county records were *Equisetum hyemale* L. (v.c. 12), *Phacelia tanacetifolia* Benth (v.c. 11), and *Typha × glauca* Godr. (v.c. 12). Other rare plants that were seen to thrive in the county during 1985 were *Briza minor* L., *Gastridium ventricosum* (Gouan) Schinz & Thell., *Lycopodiella inundata* (L.) Holub, *Polypogon monspeliensis* (L.) Desf. and *Himantoglossum hircinum* (L.) Sprengel (seen for the first time since 1948).

A. BREWIS, J. D. FRYER, B. A. GALE & F. ROSE

SOME MORE BRITISH SPECIES FROM THE WESTERN HIMALAYA

Herbarium sheets of the following species, found both in Britain and the western Himalaya, were displayed:

Campanula latifolia (Ludlow & Sheriff, 1940), widespread in Pakistan and Kashmir, 2700–3700 m; *Lotus corniculatus* (Polunin, 1956), widespread, 1200–3200 m; *Dactylis glomerata* (Polunin, 1956), very common and variable, from Chitral eastwards, 2–400 m; *Veronica beccabunga* (Robson, 1971), found at springs and stream margins, 1800–3500 m; *Achillea millefolium* (Polunin, 1956), very common in the temperate and lower alpine zones, 1600–4000 m; *Oxyria digyna* (Southampton University Botanical Expedition, 1981), very common in wet soil at high altitudes, 2700–5400 m; *Hippuris vulgaris* (Zino, 1978), cool waters of the northern hemisphere, 1200–4500 m; *Adoxa moschatellina* (Duthie, 1892), forest humus, 2700–3500 m; *Convolvulus arvensis* (Southampton University Botanical Expedition, 1981), a common weed of fields.

C. CHADWELL

THE HAY-MEADOWS OF THE PICOS DE EUROPA, ASTURIAS, SPAIN

The Picos de Europa in northern Spain contain a large number of species-rich hay meadows which are managed in a traditional manner. In May 1985 the students and staff of the Conservation Course M.Sc. at University College London visited the area to study the meadows. The rich plant communities were recorded and the specific management carried out to produce the meadow flora was determined from the local farmers. Spain's entry to the E.E.C. in 1986 may cause the management of these meadows to be altered. Four scenarios were proposed for the future of the meadows. Some of the options available which would lead to the conservation of the haymeadows were discussed. The text of the exhibit was a condensed version of "The Hay Meadows of the Picos de Europa", Discussion Paper in Conservation, no. 43, Conservation Course, 1985, U.C.L., augmented by photographs and herbarium specimens.

A. COLSTON

THE GENUS *OROBANCHE* IN THE BRITISH ISLES

The broomrape genus *Orobanche* is represented in the British Isles by a number of local or rare species with very restricted host ranges, and by a more frequent species, *O. minor* Sm., that parasitizes several dicotyledonous hosts of diverse phylogenetic origin. However, due to the lack of precise morphometric data, the characters that best separate *Orobanche* species are still inadequately defined; as a result the specific identity of some broomrape populations parasitizing *Daucus carota*, *Picris hieracioides* and *Eryngium maritimum* in southern England and Wales is presently in doubt. This photographic exhibit depicted the native *Orobanche* taxa recorded from the British Isles, summarized their known distributions and host ranges in the country, and served to highlight existing areas of controversy within this taxonomically difficult group. Additional records of broomrapes on unusual hosts or outside their accepted geographical ranges were requested.

I. DENHOLM & M. JONES

QUINQUENNIAL REVIEW 1985

During 1985 a field survey of most of the 62 species scheduled under the *Wildlife and Countryside Act 1981* has been carried out. Many other species were considered on request from B.S.B.I. members, N.C.C. staff and other botanists. A list of the species researched, and the criteria used was displayed, together with the recommendations to be given to N.C.C. Council and then to the Secretary of State. It was proposed to add 15 species and to delete one, as it has become extinct. Members were asked for their comments. Distribution maps showing the decline of *Mentha pulegium*, *Pulicaria vulgaris* and *Teucrium botrys* were displayed along with colour pictures of many of the species surveyed.

L. FARRELL & P. WILSON

TOLYPELLA PROLIFERA (ZIZ & BRAUN) LEONH. AT AMBERLEY WILD BROOKS, WEST SUSSEX (V.C. 13)

On 19th August 1985, while assisting Sussex botanists who record regularly at Amberley, I found *Tolypella prolifera* growing with *Groenlandia densa* in a ditch on the south side of the brooks. This species has been recorded from recently cleared ditches and ponds in about a dozen vice-counties, notably Cambridge, Huntingdon, Lincoln and Northants. Always considered rare, its large size and spectacular appearance were apparent in the photographs shown. Specimens from Amberley and other parts of the Arun Valley (BM) show that the plant has been recorded in this area since 1900 but, like other stoneworts, its appearances are spasmodic and unpredictable. Most stoneworts require unpolluted water and the periods of low competition provided by regular ditch cleaning management, so it is particularly pleasing to find this interesting plant at a time when so much wetland habitat is being lost or degraded.

R. FITZGERALD

THE ECOLOGY OF ABNEY PARK CEMETERY, HACKNEY, AND ITS EDUCATIONAL POTENTIAL

Cemeteries in urban areas provide a unique habitat which is extremely valuable both for wildlife and as an educational resource. The 9 ha of Abney Park Cemetery are the only woodland in the London Borough of Hackney. The Cemetery was designed by William Hosking in 1840, and under the direction of George Loddiges developed into one of Europe's most varied arboretums. At present densely overgrown in places, it is in need of management, and the Borough Landscape Architect invited the Urban Spaces Scheme (Polytechnic of North London) to advise on the enhancement of the area's ecological and educational potential. The exhibit showed the early botanical history, current floristic composition, plans for future management and conservation, the geology of the gravestones, an Interpretive Guide, and the cemetery's grasses. A computerized "Town Grass Key" has been developed for children on a BBC microcomputer.

M. HALE

ECOLOGICAL SURVEY OF HAM RIVERSIDE LANDS, RICHMOND

This area of some 74 ha has long been of botanical interest, with a diversity of habitats including river bank, water meadows, gravel excavations and dumps. It is now a metropolitan open space within Richmond-upon-Thames, and various individuals and organizations are co-operating with the Parks Department to manage it as a recreational 'mini-countryside' with an important natural history content. The exhibit showed a series of photographs taken during the past 23 years and a recent detailed ecological study undertaken by students of the School of Horticulture at the Royal Botanic Gardens, Kew.

F. N. HEPPER

The Gurreholm Bjerger Botanical Expedition was a joint British and Irish four-man venture which took place during July and August 1985. The aim of the expedition was to carry out floristic surveys of a number of previously unbotanized valleys and mountain ranges in the Ørsted Dal region of north-eastern Greenland. The flora of this region has comparatively few species (a total of 143 were recorded by the group). However those which do occur are of great interest, particularly as many of the common species (e.g. *Saxifraga oppositifolia* L. and *Betula nana* L.) are local alpine plants in the British Isles.

The exhibit illustrated a range of plants seen during the course of the expedition. Amongst the more notable finds were *Potentilla stipularis* L., an Asiatic species only found rarely in north-eastern Greenland, the sedge hybrid *Carex parallela* (Laest.) Sommerf. × *C. lachenalii* Schkuhr., and *Saxifraga nathorstii* (Dusén) Hayek which is endemic to this area of Greenland.

J. HOLDICH & D. A. SIMPSON

STAGES IN THE LIFE CYCLE OF *OROBANCHE CRENATA* FORSSKÅL

The genus *Orobanche* consists of some 150 or so species of obligate parasites. Much of their development takes place underground since their site of attachment is through the host root, and it is only when they flower (which for perennial species such as *Orobanche rapum-genistae* L. may be several years after seed germination) that they become apparent. For this reason the underground development of British broomrapes has received little attention from most botanists. The exhibit demonstrated the stages in the life cycle of a member of the genus *Orobanche* as shown by *O. crenata*. The stages were shown using preserved specimens, diagrams, and photographs. The role of *O. crenata* as an agricultural pest was also discussed.

M. JONES

DIOECY AND POLLINATION IN *VISCUM ALBUM*

Viscum album L. is dioecious, with marked differences in size and appearance between male and female flowers. Female plants have been found to predominate, with approximately twice as many females as males among flowering plants both in wild populations and among plants raised from seed.

Since 1762, when Koelreuter suggested that *V. album* was insect-pollinated, opinions have differed but there has been little evidence about the mode of pollination of its inconspicuous flowers. Recent workers have stated that it is wind-pollinated. However, observations in Herefordshire, where *V. album* is abundant, during March 1985 showed that both male and female flowers were visited by large numbers of Diptera, especially the common greenbottle, *Dasyphora cyanella*, apparently seeking nectar in female flowers (in which 0.02–0.04 µl of nectar with 48%–55% s.e. concentration was found) but seeking pollen in the nectarless male flowers. Flies caught on female flowers up to 6 m from the nearest male plant carried many *V. album* pollen grains. It was clear that the flowers of *V. album* are well adapted for insect pollination, which was fully adequate in the study area.

Q. O. N. KAY

HAWKWEEDS IN SOUTHERN SCOTLAND

Recent fieldwork has added considerably to the number of records of *Hieracium* species from southern Scotland (v.cc. 72–84), and 74 species have been recorded from the region on good authority. Most species are rare or local, although some are widespread and locally common. The

usual habitat for the majority of species is cliffs and rocks, often by streams. Others may be found in grassland or on the edges of woods and a few in urban situations or on waste ground. It is likely that hawkweeds occur more widely in the region than is suggested by currently available records. Extra records from v.cc. 74–77 and 81–84, in particular, would go far towards producing a comprehensive picture of their distribution in southern Scotland.

D. J. McCOSH

CONSERVATION SECTION, CAMBRIDGE UNIVERSITY BOTANIC GARDEN

The Nature Conservancy Council funds the propagation, display, seed-storage and autecological study of rare British plants in the Garden. Low temperature and moisture content provide seed-storage conditions under which viability can be maintained for years. A list of the contents of the seed-bank is available from the Conservation Propagator. As our populations are under such pressure, only those people specifically requested to do so by the N.C.C. should collect seed of wild Red Data Book species. Rare plants in cultivation can be used to inform visitors about conservation and the autecology of these species, and provide quality material for research scientists or re-introduction. These functions require rigorously careful documentation and labelling. Exhibited were notes and slides, also live and herbarium specimens of some of the species forming the Conservation Collection. Annual changes in the underground morphology of *Himantoglossum hircinum*, Lizard Orchid, were also illustrated.

V. M. MORGAN

THE EAST HAMPSHIRE HANGERS PROJECT

Sponsored by the Countryside Commission, E. Hants. District and Hampshire County Councils, the Project aims to bring back into positive management the 680 ha of Hanger woodlands on the Chalk and Greensand scarps between Petersfield and Alton. Most of these are ancient woodlands, half are S.S.S.I.s.

Due to loss of traditional markets, the inaccessibility of the steep slopes, age and disease, the Hanger structure and landscape is deteriorating. The Project Officer aims to persuade owners to join management schemes, and he will organize grants and help to market produce. Because of the Hangers' unique and diverse biological richness, all are being surveyed initially; small-scale felling will be followed by recoppicing and natural regeneration to maintain stand-types and genetic stock, planting when necessary with native species. Visitors to the Project are very welcome: more information is available from the Project Officer, whose telephone number is Petersfield 66551.

J. OCKENDEN

THE GUERNSEY BAILIWICK, 1985

Herbarium sheets were shown of the more important finds of the year, viz: GUERNSEY: *Davallia canariense* – new to the Channel Islands (C.I.); *Ononis* cf. *alopecuroides* – new to the C.I.; *Symphytum* 'Hidcote Blue' – new to the C.I.; *Juncus bulbosus* f. *viviparus* – first find since the 18th century; *Bromus ramosus* – new to the C.I.; *Brachypodium pinnatum* – in two separate places, known otherwise in the C.I. only from Alderney; *Apera spica-venta* – last seen 1958. SARK: *Myosoton aquaticum* – again as a garden weed; *Stellaria graminea*; *Fragaria vesca* – unaccountably rare in the bailiwick; *Mentha* × *villosa* 'Alopecuroides'; *Luzula forsteri*; *Poa angustifolia*; *Phleum pratense*. HERM: *Conyza sumatrensis* – new to the Herm archipelago; *Chamaemelum nobile* – first find for 148 years; *Allium subhirsutum* – known otherwise in the C.I. only in Sark; *Alopecurus pratensis*. JETHOU: *Portulaca oleracea*; *Phytolacca* cf. *polyandra* – new to the C.I.;

Polygonum persicaria; *Agrostis stolonifera* – first record for 95 years; *Vulpia bromoides* – ditto; *Alopecurus myosuroides* – new to the Herm archipelago.

Also shown were sheets of *Silene vulgaris* subsp. *maritima* with double flowers, found at Jerbourg in 1984; and of this plant with a pallid calyx collected in 1910. Fuller accounts of both, with names for them will appear in the *Transactions of La Société Guernésiaise* for 1985. In this there will also be the first Supplement to the "Wild Flowers of Guernsey", and the new Check-List for Herm, both available separately.

J. PAGE

ORIGINAL DRAWINGS FOR FRYER'S MONOGRAPH OF *POTAMOGETON*

Alfred Fryer began to study *Potamogeton* during the 1880s. He became an acknowledged authority on the genus, and the first parts of his monograph *The Potamogetons (Pond Weeds) of the British Isles* were published in 1898. He died before finishing the work, which was completed by A. Bennett. Fryer's section of the monograph was illustrated by Robert Morgan (1863–1900). Morgan's colour plates delighted Fryer and have been praised by later critics. Eight of his original drawings were exhibited, by kind permission of the British Museum (Natural History).

C. D. PRESTON

THE CARMARTHENSHIRE FLORA DATABASE: A COMPUTER DATA STORAGE AND RETRIEVAL SYSTEM ADAPTABLE FOR ANY HOME-BASED VICE-COUNTY RECORDER

Software to run on the B.B.C. Model B computer, written especially for vice-county recorders, was demonstrated. The database as set up for the Carmarthenshire Flora Project will store the records for each of the 698 tetrads on only two floppy discs. The intended primary use of the system is as a tool to enable fast interrogation of the floral data and not to entirely replace the master card index. When inputting records, the program displays a series of screens of species lists, based on the Biological Record Centre's field card. Plants recorded are selected with the cursor and habitat and status information is appended to each. Interrogation of the database enables a variety of parameters to be extracted including, for example, the compilations of a list and plotting of a distribution map of tetrads in which a selected species or group of species occurs by date, status or habitat.

S. RHODES & R. D. PRYCE

CAPSELLA AND *CARDARIA* IN THE BRITISH ISLES

In a recent study of *Capsella* in Greece, Svensson (*Willdenowia* 13: 267, 1983) showed that no morphological or cytological character could be used to distinguish *C. rubella* Reuter from *C. bursa-pastoris* (L.) Medicus. He concluded that *C. rubella* did not merit specific status and that it should be included within *C. bursa-pastoris* sensu lato. A less detailed survey of British *Capsella* shows many of the same features of variation observed in Greece. Specimens showing this variation were exhibited and the characters traditionally used to separate the species were listed and discussed.

Two subspecies of *Cardaria draba* (L.) Desv. have been introduced to the British Isles. Subspecies *chalepensis* (L.) D. E. Schulz is much rarer than subsp. *draba* and has been recorded from v.cc. 2, 39 and 70 (J. E. Lousley in *Proc. bot. Soc. Br. Isl.* 1: 577, 1955). It is distinguished by its ovate siliculae which have cuneate to narrowly rounded bases. Specimens of the two subspecies were exhibited, and details of further sites and live or dried material were requested.

T. C. G. RICH

ISOZYME VARIATION IN SEXUAL AND ASEXUAL *TARAXACUM*

In northern Europe, all dandelions are asexual, being polyploid agamosperms with diplosporous parthenogenesis. In southern Europe, many dandelions are self-incompatible, diploid, sexual species. It is to be expected that sexuals are more genetically variable than asexuals, and possibly able to fill more environmental niches. This hypothesis was tested for 16 loci in eleven enzyme systems for an asexual population of *T. pseudohamatum* from Newcastle-upon-Tyne, and a sexual population, probably referable to *T. alacre*, from the Auvergne, France. The Mendelian inheritance of all varying loci was tested by experimental crosses in the sexual population.

In the sexual population, eight loci were polymorphic (50%), but the mean level of heterozygosity at each locus was only 12%. In the asexual population, only one locus was polymorphic (6%), but the mean level of heterozygosity at each locus was 43%. At five of the loci which were polymorphic in the sexual, only invariable fixed heterozygotes were found in the asexual population. One monomorphic locus in the sexual was also heterozygously fixed in the asexual. It is concluded that theoretical predictions of low genetic variability but high levels of heterozygous fixation (which might result in vigour) in asexuals are confirmed, at least in these populations.

A. J. RICHARDS & J. HUGHES

SPIRANTHES SPIRALIS (L.) CHEVAL. — FROM SEED TO FLOWERING PLANT IN 5 YEARS

The development of terrestrial orchids from seed to a flowering plant is generally considered to be a lengthy process, involving a long period as an underground protocorm. Summerhayes (1951) states that the first leaf is produced after 11 years in *Spiranthes spiralis*, with another 2–3 years before the plant flowers. In asymbiotic culture, we produced plants with leaves within 6 months after sowing, with a single plant producing an inflorescence within 5 years after transfer to a non-sterile shell-sand soil. While we accept that conditions in a culture tube are different from those encountered in the field, the exhibit suggested that the times for development from seed to flowering plant quoted in most standard works on orchids are excessively long and require re-assessment.

T. C. E. WELLS & R. KRETZ

The following also exhibited:

BOTANY LIBRARY, BRITISH MUSEUM (NATURAL HISTORY). (a) Frank Kingdon-Ward, b. 6th November 1885; a centenary exhibition. (b) History of Botanic Gardens.

D. BURNHAM. Mutation in orchids.

A. J. BYFIELD. *Nitella mucronata* var. *gracillima* J. Groves & Bullock-Webster, a rare charophyte from Co. Avon.

J. H. FREMLIN. Stereophotographs of some Irish plants, including *Minuartia recurva*.

A. N. GIBBY. Botanical postage stamps.

A. C. JERMY, J. M. CAMUS & A. M. PAUL. *Pilularia* in the British Isles.

A. C. JERMY & A. G. KENNETH. *Diphysastrum* × *issleri* (Rouy) J. Holub in Scotland.

V. A. JOHNSTONE. Photographs of wild flowers of southern England.

S. L. M. KARLEY. (a) Help! (b) Galls.

J. M. MULLIN & A. MELDERIS. *Polypogon pumilus* Clarke in Britain.

D. M. PARKER. The dactyloid saxifrages of the British Isles.

M. C. F. & M. E. PROCTOR. Scanning electron micrographs of *Carex* leaf-surfaces.

M. E. & M. C. F. PROCTOR. Fruit characters of Devon *Sorbus* species.

C. M. SAUNDERS & ST CHRISTOPHER'S SCHOOL, BURNHAM-ON-SEA. Operation Orchid.

P. SISSON. A selection of botanical illustrations.

D. R. SLINGSBY. The Keen of Hamar — a Shetland National Nature Reserve in its North Atlantic context.

N. F. STEWART & S. J. LEACH. Fife's disappearing pondweeds.

N. F. STEWART & H. E. STACE. Interesting records from West Perthshire.

O. M. STEWART. (a) *Aira armoricana* Albers. (b) *Senecio squalidus* L. \times *S. sylvaticus* L. on Arthur's Seat? (c) *Senecio* \times *cardinensis* J. E. Lousley and *Vicia tetrasperma* (L.) Schreb. in v.c. 73. (d) Flower paintings.

H. S. THOMPSON. Works in process.

J. TUBBS. Flora by a photographic botanist.

In the lecture-hall, the following members gave short talks illustrated by colour slides:

P. J. HORTON. B.S.B.I. visit to Hungary.

L. FARRELL. Farrell's travels in Scotland.

J. D. HOOPER. Some autumn flowers in Mallorca.

E. MILNE-REDHEAD. A Black Poplar site of special biological interest.

P. F. YEO. British *Euphrasia* species.

M. JONES. Coco-de-Mer, the world's largest seed.