Reports

AQUATIC AND MARSH PLANTS SYMPOSIUM, BRATHAY CENTRE FOR EXPLORATION AND FIELD STUDIES, AMBLESIDE, CUMBRIA

27th–29th OCTOBER, 1978

INTRODUCTION

Some 80 participants in the Aquatic and Marsh Plants Symposium assembled on the evening of 27th October, 1978, at Brathay Centre for Exploration and Field Studies, Ambleside, Cumbria. Sherry and dinner were followed by an introductory talk, given by the Director of Studies at Brathay, Mr M. A. E. Mortimer. He welcomed the B.S.B.I. symposium to 'Old Brathay' and gave an account of the Brathay Trust.

The very full programme for the symposium consisted of nine talks, exhibits and displays, an illustrated lecture on Cumbrian aquatic and marsh plants and two afternoons of field excursions.

SATURDAY, 28TH OCTOBER

C. D. K. Cook. *Distribution of aquatic macrophytes.*

Aquatic macrophytes are defined as higher plants whose photosynthetically active parts are either permanently, or at least for several months of the year, submerged in water, or floating on the water surface. Cook *et al.* (1974) compiled an account of all genera with freshwater species, but the following genera were omitted from this work, either through ignorance or their having been described since 1974: Araceae – *Amauriella, Gymnostachys, Jasarum, Urospatha*; Compositae (Asteraceae) – *Gymnocoronis, Jaegeria, Sclerolepis*; Cyperaceae – *Elgeria*; Haloragaceae – *Vinkia*; Zannichelliaceae – *Vlesia*. Today, world-wide, it is estimated that there are about 5,000 aquatic species in about 360 genera. For higher plants about 2% of the species are aquatic, and about 3% of the genera and about 20% of the families contain aquatics. With the exception of the larger woody groups (Gymnospermae and Hamamelidaceae), aquatics are fairly evenly distributed throughout the vascular plants. Of the ten largest families, only the Orchidaceae has no aquatic species. (Species of *Spiranthes* will withstand short periods of submergence but can hardly be called aquatic). The Dicotyledones and Monocotyledones contain about the same proportion of aquatic species.

Clayton (1972) studied the numbers of species in the genera of several plant families, generally finding a quasi-logarithmic distribution, but with rather too many monotypic genera and too few very large genera. A similar analysis with aquatic plants by the speaker gave figures almost fitting those of the Acanthaceae published by Clayton (1972). However, aquatics have, unexpectedly, proportionally fewer monotypic genera (total 112). It is frequently cited that there are proportionally more monotypic aquatics than other types of plants, but this statement is apparently not true. There are relatively few large aquatic genera. The largest predominantly aquatic genera are: *Potamogeton* *c*100 species, *Bacopa* *c*100 (not exclusively aquatic), *Isoetes* *c*75 (of which *c*60 are aquatic), *Marsilea* *c*65, *Cryptocoryne* 52, *Najas* *c*50, *Apinagia* *c*50, *Echinodorus* 47, *Rotala* 44 (reduced from 97 by Cook), *Ottelia* 40, *Nymphaea* *c*40.

It is often said that aquatic environments are relatively stable and that consequently aquatic plants occupy large geographical areas. This is perhaps true for a few species, such as *Potamogeton pectinatus*, but some species, such as *Phragmites australis, Lemna minor, Typha latifolia* and *T. angustifolia*, are less widely distributed than is frequently believed; these species are largely replaced by vicariads in the tropics. Sculthorpe (1967) pointed out that aquatic species, like terrestrial ones, show a high degree of endemism, a view which the speaker's investigations support. Even in Europe, which has relatively few aquatic species (*c*1·5% of the flora), there are two endemic genera (*Luronium* and *Thorella*) and about 31 endemic species.

REFERENCES

CLAYTON, W. D. (1972). Some aspects of the genus concept. *Kew Bull.*, **27**: 281–287.
COOK, C. D. K. *et al.* (1974). *Water plants of the world.* The Hague.
SCULTHORPE, C. D. (1967). *The biology of aquatic vascular plants.* London.

B. A. Seddon. *The lake flora of Wales: studies on depth-distribution and zonation.*
Within all bodies of still or slowly moving water, zonation, related to depth, of water-plants is a conspicuous feature. For the lake flora survey of Wales information on zonation was obtained from measured line-transects, plotting species occurrence at regular intervals from the shore, and noting the depth of water at each point. Six such zonation profiles were shown.

In addition, the depth at which each species occurred, for many points within each lake, was measured, from which the greatest depth obtained by any species within a lake could be seen. Records for a single species from all lakes give a general picture of the plant's capability for growth in a range of

TABLE 1. MAXIMUM DEPTH RECORDED FOR MACROPHYTES IN WELSH LAKES

Life form	Species	Depth in ft
Submerged rosette habit	*Isoetes lacustris*	30
	Littorella uniflora	18
	Isoetes setacea	10
	Luronium natans	10
Submerged broad-leaf habit	*Potamogeton perfoliatus*	15
	P. obtusifolius	15
	P. lucens	15
Submerged dissected-leaf habit	*Myriophyllum alterniflorum*	18
	Ceratophyllum demersum	16
	Myriophyllum spicatum	12
	Utricularia sp.	12
Submerged filamentous habit	*Potamogeton berchtoldii*	16
	Juncus bulbosus	15
	Callitriche hamulata	12
Floating leaf habit	*Nuphar lutea*	12
	Nymphaea alba	12
	Potamogeton natans	10
	Polygonum amphibium	10
Erect emergent habit	*Schoenoplectus lacustris*	7
	Phragmites australis	6
	Typha angustifolia	6
	Equisetum fluviatile	6

depths and conditions. Depth-diagrams were presented for 24 species. Table 1 compares the depth ranges of species of both similar and contrasting life-forms. There appears to be no difference in maximum depth between submerged life-forms, or any correspondence between depth tolerance and zonation.

Lakes can be listed in order of the maximum depth at which a particular species occurs. For example, *Myriophyllum spicatum* has the following maximum depths in five lakes: Llyn Penrhyn, 2ft; Llangorse Lake, 5ft; Llyn Hendref, 6ft; Kenfig Pool, 9ft; Llyn Du Meifod, 12ft. From this it can be deduced that the plant is limited to the shallowest waters in nutrient-rich lakes (the first three) and penetrates to greater depths in the clear, hard-water dune lake at Kenfig. Similarly, *M. alterniflorum* occurs down to only 2ft in eutrophic lakes, to 5ft in lakes of moderate nutrient status, and only at greater depths in nutrient-poor lakes.

Although tendencies in aquatic plant distribution and zonation can be recognized, there are no consistent arrangements associated with a particular type of lake. Indeed, variation in floristic diversity can lead to variation in depth distribution in different places within the same lake.

It is concluded that zonations are the result of competitive interactions between species under water; light penetration at any depth only determines the relative vigour, and therefore only indirectly affects the spatial arrangement.

R. J. Driscoll & M. J. Jackson. *Recent work on the aquatic macrophyte flora of the Norfolk Broads.* The Norfolk Broads are renowned for their rich flora and fauna, and together with the adjacent marshes and fens the area provides an ideal habitat for a wide variety of aquatic plants. One of these plants, *Najas marina* L., is found nowhere else in the British Isles and Broadland is one of the few strongholds in this country for several other species, such as *Stratiotes aloides* L.

By the early 1970s those with interests in Broadland's wildlife were convinced that the aquatic flora of the Broads had deteriorated considerably, although little systematic work had been carried out to provide a factual basis for this assertion. Since this time, however, our understanding has much improved and a recent summary of Broadland Research produced by the Nature Conservancy Council (NCC) included nearly thirty major research projects. In 1978 the NCC financed a field survey of the distribution of aquatic macrophytes in the Broads and a retrospective study of the changes that had taken place in the past based on published and unpublished records and herbarium material (Jackson, M. J., 1978. *Trans. Norf. Nor. Nat. Soc.*, **24** (4): 137–152). The results of this work show that since the 1930s the rich aquatic flora of most of the Broads has become increasingly impoverished although the changes have not taken place simultaneously in all of the Broads affected. The decline usually involved an initial decrease in the number of species present followed by a gradual reduction in the productivity of those remaining.

The water lilies *Nuphar lutea* (L.) Sm. and *Nymphaea alba* L. are often among the last plants to be lost and these were the commonest species found in the 1978 survey. Among the species that have been recorded from the Broads in the past and which are now thought to have disappeared are:

Azolla filiculoides Lam.
Fontinalis antipyretica Hedw.
Hottonia palustris L.
Hydrocharis morsus-ranae L.
Potamogeton compressus L.
Potamogeton friesii Rupr.
Potamogeton lucens L.
Potamogeton obtusifolius Mert. & Koch.
Potamogeton perfoliatus L.
Potamogeton praelongus Wulf.
Ranunculus circinatus Sibth.
Stratiotes aloides L.

A few of the Broads, however, still retain a diverse flora. For example over ten species of aquatic macrophyte were recorded from Ormesby Broad in 1978 including: *Ceratophyllum demersum* L., *Myriophyllum spicatum* L., *Potamogeton berchtoldii* Fieb., *Zannichellia palustris* L. and *Najas marina*.

The reclaimed marshes associated with the Norfolk Broads are drained by an extensive network of dykes. In the early 1970s it was realized that at least some of these dykes supported a rich aquatic flora and during the period 1972–1978 the NCC financed several dyke surveys. Initially this work was concerned with comparing the flora of the dykes with that which used to exist in the Broads as it was thought that the dyke systems might provide a refuge for some of the species that had been lost. In later years more emphasis was placed on factors that might influence the diversity and species composition of the dyke flora.

All the species listed above as having disappeared from the Broads, with the exception of *P. praelongus*, were found to be thriving in the dykes. The diversity and species composition of the dyke flora were found to be influenced by three main factors:

1. *Adjacent land use.* Dykes draining arable land support a much less diverse flora than those draining pasture as in the absence of cattle grazing the marginal vegetation and damaging the banks the dykes become overgrown by *Phragmites australis* (Cav.) Trin. ex Steud.
2. *Dyke management.* Frequent and/or intensive dyke cleaning results in a general impoverishment of the dyke flora.
3. *Salinity.* Brackish dykes support a less diverse flora characterized by the presence of *Potamogeton pectinatus* L., *P. perfoliatus, Hippuris vulgaris* L. and *Myriophyllum* spp.

Several areas of marshland still retain a diverse dyke flora, including species that have never been recorded from the Broads, e.g. *Potamogeton acutifolius* Link. However, the conversion of grazing pasture to arable use and the improvement of land drainage pose a serious threat to such areas, and in the absence of an active conservation policy their long term future remains very much in doubt.

S. M. Haslam. *Identification of watercourse habitats.*
Watercourse plants are very sensitive to the environment in which they live, and the plant communities can be used as indicators of their habitats. Little use has been made of this relationship up to now, mainly because the controlling factors differ from those on land, and are not easily recognized by those without experience in these habitats. There are four main controlling factors for stream vegetation: rock-type, flow-regime, downstream variation, and the activities of man. The last is not used in the basic classification, as it is considered as modifying an existing order.

Rock-type and flow-regime are both of primary importance. Flow-type is intrinsically the most important, but since it is also the more difficult to assess, rock-type is used for the basic classification. Thus a stream is described as a clay stream, or a chalk stream, etc. The categories of rock-type that are used are: soft and hard limestone, soft and hard sandstone, clay, coal measures, resistant rocks (schists, slates, etc.) and alluvium.

In Britain there is a rough correlation between topography and rainfall. Flow-regime depends mainly on these two factors, and can, in a simple way, be classified on the types of landscape surrounding the streams. These landscape categories are: plains, lowlands, uplands, mountains, and very mountainous regions. This is the second classification, allowing a stream to be termed, for example, a lowland clay stream. The changes along a river's length from source to mouth–downstream variation–can be most easily estimated by its width, which corresponds satisfactorily with the vegetation, provided: 1, its use is confined to streams of one rock-plus-flow-type; and 2, it is accompanied by a habitat description which includes the normal stream depth, so that streams which are unusually deep for their width can be reclassified, in vegetation terms, into a larger size category, and *vice versa*.

With this information, descriptions can be given of the typical plant communities of each habitat, for example, large, lowland chalk streams. Conversely, the habitats can be deduced from descriptions of the vegetation (excluding those communities damaged by man's activities). However, in some cases the same plant community can occur in more than one habitat type. Each species has its own range of probable and possible habitats, and the combination of species present leads to either one, or a limited number of possible habitats, provided that either the community is diverse, or the species present have a narrow habitat range. The species list is the most important diagnostic feature but, for more accurate work, species abundance, vegetation cover and, sometimes, species habit, are also used.

J. A. Moore. *Charophytes.*
Most of this talk is incorporated in the first part of the paper in this issue, pp. 297–309.

P. M. Wade. *The flora of drainage channels.*
Areas of reclaimed land, such as the Somerset Levels and the Norfolk river valleys, are drained by networks of permanent drainage channels (dykes, drains, rhines, reens etc.), forming artificial bodies of water which support a large number of aquatic plant species including national rarities such as *Azolla filiculoides* and *Potamogeton acutifolius*. The total length of drainage channels in England and Wales is estimated at 128,000km, draining $1{\cdot}3 \times 10^6$ha of low-lying land.

In order to maintain their drainage efficiency, the channels are periodically managed, usually being mechanically excavated. On the 'moors' or levels of Mon., v.c. 35, the drainage channels are excavated to maintain a network of large main, or arterial channels and smaller subsidiary channels. The aquatic floras are different in the two types of channel. After being dredged, the channels pass through a modified hydroseral succession. The main channels are dredged out as soon as emergent communities appear (once every 5 years) whereas in subsidiary channels this stage is prolonged, being dredged once every 10–20 years. Submerged plant communities are rare or completely absent from subsidiary channels. The maintenance of this modified hydroseral succession is the most important factor in ensuring a diverse aquatic flora. In the drainage channels of the Monmouthshire Levels, as in other similar areas, the succession is modified by cattle trampling and grazing the margins, fluctuations in the salinity of the water, and, in main channels, the use of herbicide sprays.

Fears have been expressed that the increased intensity of dredging since the Second World War and the introduction of herbicide sprays might have impoverished the aquatic flora of the drainage channels. However, research into the past aquatic flora of the channels of the Monmouthshire Levels,

based on herbarium and literature records, has shown that the flora of these channels has remained much the same since the mid-1800s, no changes being attributable to improved maintenance.

The continued existence of these rich aquatic communities is dependent upon the channels draining grazing land, in which case the channels have a secondary function of providing field boundaries and water for stock. However, major improvements in drainage are taking place resulting from the installation of new or improved pumps and the provision of underdrainage, as flood defences are rebuilt and the existing drainage systems renovated. The water levels are therefore lowered, the cattle are watered from troughs and the fields can be enlarged, the disused channels drying out and becoming overgrown. These 'improvements' herald the introduction of arable farming. This has already occurred in such areas as Romney Marsh and the Lincolnshire Fens. There is then further abandonment of channels; those that remain are often only temporary and support few aquatic plant species.

G. Halliday. *Slides of Cumbrian wetland habitats and species.*
Slides were shown of the wide variety of Cumbrian wetland habitats, including the main rivers, upland and lowland tarns, lakes, ponds, canal and brackish ditches. Their characteristic species were illustrated, and also rare and declining species such as *Bidens cernua, B. tripartita, Eleocharis acicularis* and *Pilularia globulifera.*

SUNDAY, 29TH OCTOBER

D. F. Westlake. *The ecology of chalk streams.*
Chalk stream plants are adapted to waters which are hard, rich in nitrogen and phosphorus, and very clear. Their flows and temperatures are relatively stable and moderate. At the upstream, or winterbourne end, the communities are adapted to a period in the summer when there is no flow. At the down-stream end the waters become less stable and more turbid, and change in chemical character, so that the animals and plants are no longer typical of chalk streams.

At a fen site near East Stoke, Wareham, Dorset, v.c. 9, stratigraphic and pollen analyses have shown that for over 10,000 years since the Ice Age, the catchment was dominated by forest. During this period it is very probable that the dominant aquatic vegetation was reed-swamp, containing species such as *Phragmites australis* and *Sparganium erectum*, and that submerged water plants were scarce. Subsequently man drastically altered the river and its catchment by felling forests, constructing water-mills, developing water-meadows, installing land-drains, opening sewage works, constructing flood prevention schemes, cutting water-weed, ploughing land and applying fertilizers. The dominant vegetation now is typically tidy beds of submerged water plant species, tolerant of interference by man.

Throughout most of a chalk stream, species of *Ranunculus* subgenus *Batrachium* (water crowfoots) are dominant. Near the source there are short-leaved species such as *R. aquatilis* and *R. peltatus.* Further downstream *R. penicillatus* var. *calcareus* is usually the most important. In the smaller streams, the emergent plants *Rorippa nasturtium-aquaticum* and *Apium nodiflorum* can often smother neglected reaches. Associated species characteristically change along the rivers, *Myriophyllum spicatum* and *Potamogeton lucens* being typical of the plants appearing downstream.

Ranunculus species overwinter as small plants and grow rapidly in the early spring, reaching a maximum in late spring or early summer, or even earlier nearer the river source. If left alone, the plants then die down, but they are usually cut about this time and this provokes vigorous regrowth. The maximum biomass found at sites which are regularly cut is therefore greater than that at undisturbed sites.

At many sites *Rorippa* only grows by means of floating fragments which invade the beds of *Ranunculus* in May. Once established, *Rorippa* spreads rapidly and maintains a fairly constant biomass for several months, adding a large amount of easily decomposed leaves to the river. The *Ranunculus* beneath is killed off. In the autumn floods the *Rorippa* is washed away and the *Ranunculus* regrows from surviving plants around the edges of the *Rorippa* stands. Thus the beds of *Ranunculus* tend to move each year and the two plants are interdependent. An early flood leads to greater *Ranunculus* survival and the vigorous beds produced the following year allow *Rorippa* to establish early, spread widely and suppress the *Ranunculus.*

Even in chalk streams, flow is one of the major factors affecting plant growth. The distribution of many associated species is related to stream width and slope, which tend to be correlated with depth

and velocity. Another major factor is light. The maximum biomass at a site is a linear function of the light received and the dominant species change in shade. The cutting regime is important and, if changed, the dominant species may change. Grazing can have similar effects. All these factors are affected by man's activities and chalk stream plants are strongly influenced by man.

J. W. G. Lund. *The mystery of* Elodea *Michx in Britain.*

Until recently even the non-specialist could scarcely mistake *Elodea canadensis* Michx for any other aquatic plant in the English Lake District, where other species of this genus, or species of *Egeria* Planchon, *Lagarosiphon* Harvey or *Hydrilla* L. C. M. Richard, were very rare, unrecorded or extinct. It was therefore a surprise when Dr J. H. Marcus brought to me what appeared to be either a modification of this supposedly well-known plant, or even another species. For many years there had been a dense bed of *E. canadensis* in the bay behind our laboratory [Ferry House, Windermere]. Dr Marcus had been sampling this bed frequently for the past two years and had never seen such a plant. In this period, the same or a similar plant appeared in a pool in the Great Stour, E. Kent, v.c. 15, which I had visited each year for the previous 9 years, and which Mr P. Bolas had visited or fished-in frequently for the previous 10 years, and which throughout this period had contained *E. canadensis*. Within a year, both in the Windermere bay and the Great Stour pool, the invader had either replaced *E. canadensis* or was predominant. Information obtained from publications of the B.S.B.I., other bodies, professional botanists and naturalists, showed that an unknown taxon, or taxa, of *Elodea* were becoming more and more common in Britain.

Though I have done no research on this new form of *Elodea*, numerous specimens have now been collected or received. Plants collected from rivers or canals have sometimes been in flower, and appear to be *E. nuttallii* (Planchon) St John, judging by standard Floras; those in standing waters have not yet been seen to flower. It is not clear to me whether these riverine and lacustrine plants represent two taxa or one. I doubt that these are all modifications of *E. canadensis*.

Whatever may be decided concerning the taxonomy of this new and often explosive *Elodea* invasion, it shows a remarkable similarity to the famous invasion of *E. canadensis* into Britain in the last century. Since the reason for the decline of *E. canadensis* in later years to a less 'aggressive' status is unknown, the new invasion (or invasions) offers a challenge to, and an opportunity for ecologists which should be grasped.

It is of interest that, as yet no 'new' *Elodea* has been seen in Esthwaite Water, the richest, most eutrophic, lake in the Lake District, though typical *E. canadensis* is present. The new lacustrine plant has been found in Brothers Water by Mr R. Stokoe. This is a poor, oligotrophic, water. It is now known that the vegetatively similar plant, sometimes called *Hydrilla verticillata* (L. fil.) Royle and sometimes *E. nuttallii*, found by the late Professor W. H. Pearsall in Esthwaite Water over 60 years ago, is indeed a *Hydrilla*. I believe this plant to be extinct, having searched for it on many occasions since 1945.

M. J. Liddle & H. R. A. Scorgie. *The effects of recreation on aquatic habitats.*

There is concern that increasing use of aquatic habitats for recreation is producing changes that are not really understood, even in a qualitative way. Very little research is being carried out except in one or two isolated situations, such as the Norfolk Broads. The changes have been brought about by many different uses, but may be classified as either due to shore-based or water-based activities. The most important of these are fishing and boating.

Fishing is, perhaps, the most popular shore-based activity and there are some three million anglers in Britain. The amount of change they cause will vary, at least in part, according to the nature of the marginal vegetation. At one site it was found that up to 30% of the taller vegetation had been removed to provide access to the water. The removal of vegetation exposes the bank, and in some cases may lead to erosion, but it also provides a site for some species of plants not normally found in this habitat. Other shore-based activities may, of course, have the same effect.

The main effects associated with the use of boats are physical damage to submerged and floating macrophytes caused by wash, propeller action and direct impact. There may also be pollution from outboard motors and sewage. Those pollutants are likely to affect first the phytoplankton, but rooted macrophytes may be affected in turn by the increased turbidity. The extent of such changes depends on the nature of the habitat. This is particularly evident when comparing the effects of the addition of

nutrients to oligotrophic and eutrophic waters. For example, a small increase in nutrient content in an oligotrophic lake in Snowdonia can cause substantial changes in the desmid flora, whereas a similar addition to the Norfolk Broads may well produce no detectable change.

Management of aquatic habitats for recreation use can also have profound effects. The most important are widespread activities such as dragline dredging, reinforcing the banks with piles, cutting, or the addition of aquatic herbicides. There is much need for further research, both into the fundamental changes produced by recreation and into techniques for the management of aquatic habitats which provide a satisfactory experience for the user, but which cause least disruption to the environment.

P. J. Brown. *Some aspects of the Alismataceae.*
No report of this talk was received.

EXCURSIONS HELD IN CONNECTION WITH THE AQUATIC AND MARSH PLANTS SYMPOSIUM

Three excusions were held on the afternoon of Saturday, 28th October. The largest group went by coach to the northern lakes, stopping by Derwentwater, Bassenthwaite, where *Callitriche hermaphroditica* was observed, and Ullswater, where luxuriant material of the rare *Potamogeton praelongus* was found at Glencoyne.

Two other groups left by minibus, one to the south-west of Cumbria, the other to the south-east. The former stopped by Coniston Lake before going on to the Subberthwaite mosses, where *Drosera anglica* was still recognizable. The last stop was at Shaws Moss on the west side of the Duddon estuary. Here an abundance of *Oxycoccus palustris* and *Dryopteris carthusiana* was admired on a largely wooded piece of raised bog. The third group visited Borwick Tarn above Staveley, observing *Potamogeton gramineus* and *P. obtusifolius*, and then a small valley mire and tarn near Winster, with *Drosera intermedia* and *Hypericum elodes* in its only Westmorland locality. At Stainton, the northern end of the Lancaster–Kendal canal, *Ceratophyllum submersum* was observed, luxuriant in its only Cumbrian locality, and also *Myriophyllum spicatum*.

Two of the groups were fortunate in being accompanied by wet-suited divers. All three groups were introduced to the long-leaved *Elodea* discussed earlier by Dr Lund, which was growing in profusion in several places.

On the Sunday afternoon, Professor C. D. Pigott conducted a party of 25 around the Esthwaite North Fen National Nature Reserve, by kind permission of the Nature Conservancy Council. Professor Pigott has studied the site over the last 13 years and has related the changes, which are still occurring, to the detailed survey by Pearsall, early in this century. These changes are the result both of the inevitable plant succession and of increasing eutrophication. The former is far from predictable and occurs more by the stepwise and unphased advances of the various zones than by slow imperceptible advance. The effects of eutrophication are especially evident adjacent to the inflow stream. Members of the party were particularly pleased to see the prominent tussocks of *Carex elongata* in the willow carr.

EXHIBITION MEETING, 1978

The Annual Exhibition Meeting was held in the Department of Botany, British Museum (Natural History), London, on Saturday, 25th November, 1978, from 12.00 to 17.30 hours.

G. E. SMITH'S DRAWINGS OF BRITISH PLANTS

In 1933 the Department of Botany, British Museum (Natural History), acquired a collection of watercolour drawings and pencil sketches, bearing dates from 1827 to 1860, of British plants, many including the locality, mainly from Sussex and Kent. The library catalogue attributed the collection to

a 'Gerard Edwards'. Recent study of botanists of that period has failed to reveal any such person. There was, however, a Rev. Gerard Edwards Smith (1804–1881) who was notably active in those years. Study of the collection has revealed that the surname of Smith was omitted from the library catalogue.

G. E. Smith produced just one publication, a slight local list, but he was one of the outstanding field botanists of his generation. He was responsible for first describing *Filago apiculata* G. E. Sm., *Epipactis phyllanthes* G. E. Sm. and *Limonium binervosum* (G. E. Sm.) C. E. Salmon.

Most of the drawings giving localities date either from ten years he spent in and around Chichester, shortly after his ordination, or from his earlier period in south-eastern Kent. They complement his herbarium specimens from these two areas, which are now in **BM** and **OXF**.

D. E. ALLEN

METEOROLOGICAL ORIGINS OF THE B.S.B.I.

The Botanical Society of London, an ancestor to the B.S.B.I., flourished from 1836 to 1856. The reports of its meetings are brief and austere and an address list of members was published once only, not long after its founding. It had been supposed that the London medical schools were largely responsible for its existence, reflecting the prominent place that botany occupied in their curricula. However, four of the fifteen original officers and Council were meteorologists, and were also at that time office-holders in the Meteorological Society of London. This Society had been in existence since 1823 but for some years had been moribund. In November 1836 it underwent a marked revival after a meeting at which one William Henry White was appointed Hon. Secretary. Significantly, W. H. White had chaired the inaugural meeting of the Botanical Society of London only a week or so earlier. Two other leading members of the Meteorological Society of London also belonged to the Botanical Society from the start. One of these, John Green, acted as printer to both Societies.

In 1850, following the founding of the British (now the Royal) Meteorological Society, the Meteorological Society of London was dissolved, and the links between the sciences of meteorology and botany at that time came to an end. Had they continued, the extensive work on phenology later conducted under the auspices of the Royal Meteorological Society might have helped to introduce British botanists to the potential of 'network research', for purposes other than distribution mapping, a good two generations earlier.

D. E. ALLEN

RECENT RECORDS OF *PUCCINELLIA* PARL. IN E. KENT

Heavy salting of main roads in E. Kent, v.c. 15, in winter has resulted in the destruction of vegetation nearest to the roadside, leaving a strip of soil 5–30cm wide almost completely bare of vegetation. Saltmarsh plants thrive in this man-made saline environment. The roadside verges along the A249 from Sheppey over Detling Hill (198m) to Maidstone have been colonized by *Puccinellia fasciculata* (Torr.) Bicknell and *P. distans* (L.) Parl. All the evidence suggests that this migration inland has occurred within the last eight years. Passing cars act as ideal vectors for disseminating seed as they produce sudden gusts of wind which are likely to detach and carry seed for several metres. Road surveys show that seed-dispersal in late summer coincides with maximum traffic-flow.

J. S. BADMIN

PLANTS, PUBLIC RELATIONS AND FUND-RAISING FOR CONSERVATION

Original watercolours of rare plants, painted from live material, were exhibited, together with cards, notelets and table-mats decorated with prints from the watercolours. The printed material is sold to raise funds for a Naturalists' Trust, and helps to make the public familiar with species needing conservation.

R. J. BANKS

PUCCINELLIA × *PANNONICA* (HACKEL) HOLMBERG IN BRITAIN

Living and herbarium specimens were displayed of a *Puccinellia* discovered in 1975 by Mr R. P. Libbey at Reedham, E. Norfolk, v.c. 27, together with photographs of meiotic and mitotic chromosomes. In morphological details the plant is exactly intermediate between *P. distans* (Jacq.) Parl. and *P. rupestris* (With.) Fernald & Weath.: spikelet 4·5–6· mm, lower glume 1·2–1·7 mm, upper glume 2–2·4 mm, lowest lemma 2·6–3 mm. The chromosome number ($2n = 42$) is the same as that of the parents, but meiosis is irregular (6–11 bivalents) and pollen fertility and seed-set nil. The plant bears some resemblance to the type specimen of *P.* × *pannonica* (Hackel) Holmberg, which is said to be of the same parentage. This is the first record of a cytologically-confirmed *Puccinellia* hybrid in Britain.

C. M. BARKER & C. A. STACE

THE FLORA OF PONDS IN THE LONG EATON AND SAWLEY DISTRICT OF DERBYSHIRE

A series of ponds in the Long Eaton and Sawley district of Derbys., v.c. 57, provide a unique opportunity to study the development of aquatic macrophyte communities. These ponds, created in the late 19th Century, were the subject of an ecological investigation carried out by Godwin (1923). Current ecological studies are being undertaken to determine changes which have taken place since then. The diverse aquatic plant communities supported by these ponds gives them a high conservation value and it is hoped that an understanding of their ecology will enable effective conservation measures to be formulated. The exhibitors would like to contact any members who have ever made records of the flora of these ponds.

REFERENCE

GODWIN, H. (1923). Dispersal of pond floras. *J. Ecol.*, **11**: 160–164.

J. E. BERESFORD & P. M. WADE

SECRETARY'S MISCELLANY , 1978

A selection of photographs from Amberley Wild Brooks, W. Sussex, v.c. 13, was shown. An application for a grant for draining Amberley Wild Brooks was not approved by the Minister following a Public Inquiry in 1978.

Also exhibited were: conservation badges of the Flora's League, 1928, photographs of the Kew Conservation Conference 'Survival or Extinction?', 1978, and designs for a B.S.B.I. emblem.

M. BRIGGS

VERONICA ACINIFOLIA L.

Specimens from British herbaria, and photographs by R. J. Pankhurst, of *Veronica acinifolia* L. were exhibited, with an account of records for the plant from five vice-counties. First recorded in Surrey, v.c. 17, in 1920, and in Dorset, v.c. 9, since 1937, in 1978 there were new records from N. & S. Somerset, v.c. 5 and 6, and W. Sussex, v.c. 13. The early records were as a cornfield weed, but all recent records have been introductions with shrubs from nursery gardens.

M. BRIGGS & R. J. PANKHURST

BIDENS CONNATA MUHL.

Collections of achenes of *Bidens connata* Muhl., *B. cernua* L., *B. frondosa* L. and *B. tripartita* L. were

exhibited to show comparison of diagnostic characters. A map showed records of all known localities for *B. connata* in Britain which are by, or near, the Grand Union Canal, in Middlesex, v.c. 21, just extending into Bucks., v.c. 24, and Herts., v.c. 20. The map was compiled from searches made by R. M. Burton, Dr J. H. Chapman and Mrs M. V. Marsden. Mrs Marsden, who first found the plant in 1977 (see *B.S.B.I. News*, **18**: 15–16), was responsible for the Bucks. records and Dr Chapman for the Herts. records; all three recorders found the plant in Middlesex.

R. M. BURTON

A SPECIES OF *PICRIS* L. NEW TO EUROPE

A coloured drawing by Mrs H. Broad of *Picris cupuligera* (Durieu) Walpers found near Salobreña (Granada, Spain) in the spring of 1978 was exhibited. The species was previously only known from North Africa. The specimen from which the drawing was made is now at the Universidad de Sevilla, and details of its discovery have been accepted for publication in *Lagascalia*.

R. M. BURTON

TWO SPECIES OF *SENECIO* L. FROM E. KENT

Herbarium specimens of *Senecio inaequidens* DC., *S. cineraria* DC., *S. erucifolius* L., and *S. cineraria* × *S. erucifolius*, new to science (see also Short Notes, pp. 333–334), were exhibited. They were collected from a shingle beach at Walmer, E. Kent, v.c. 15, by B. Wurzell in 1978.

Previous records of the South African *S. inaequidens* in Britain have all been undoubted wool-aliens. However, the Walmer plant is more likely to have originated from a seed carried by wind from Calais, 40km to the southeast, where it is abundantly naturalized. Similar dispersal from established colonies in north-eastern Belgium is considered responsible for numerous widely scattered plants in the Rhineland, further east (see GERSTBERGER, P. (1978). *Decheniana*, **131**: 136–138). A colony recently discovered near Ghent (see ROBBRECHT, E. (1977). *Dumortiera*, **6**: 33–34) is perhaps derived from the one at Calais 130km to the west. The species may therefore be expected to become naturalized in Kent.

R. M. BURTON

BARDSEY – AN ISLAND FLORA

Maps of species locations on Bardsey island, Caerns., v.c. 49, and, for comparison, the Lleyn peninsula, Caerns., and their British distributions, were exhibited. Rare species include *Lathyrus japonicus* and *Ranunculus parviflorus*, unknown or scarce elsewhere in Wales, and *Trifolium subterraneum* and *Juncus acutus*, both near their northern British limits. Other restricted species are *Limonium binervosum, Thalictrum minus, Schoenus nigricans, Spiranthes spiralis* and *Hymenophyllum wilsonii*. Trees and shrubs are sparse on Bardsey and mostly introduced. *Prunus spinosa* is a rare cliff-plant. *Geranium robertianum* and *Hedera helix* are restricted to the mountain, and *Silene dioica* and *Oenanthe crocata* to single sites. Changing land-use accounts for the rarity of many arable weeds (e.g. *Spergula arvensis* and *Polygonum persicaria*) but *Lamium amplexicaule* and *Coronopus didymus* are frequent in gardens, although *C. squamatus* is rare. Herbal and medicinal species are conspicuous, including *Conium maculatum, Artemisia absinthium, Ballota nigra, Inula helenium* and *Malva sylvestris*, perhaps of ancient monastic cultivation.

A. P. CONOLLY

THE CAMBRIDGE UNIVERSITY BOTANIC GARDEN CONSERVATION SECTION

The Conservation Section of the Cambridge University Botanic Garden started in 1974, when a contract with the Nature Conservancy Council allowed for the appointment of a conservation

propagator. The section is housed in the private research area of the Garden, but is responsible for the displays of British plants in the public Ecological Area. The primary responsibility of the section is to keep stocks of those perennial species which are nationally rare and still growing wild in eastern England. These stocks are available for research and education, and provide a reserve for any eventual re-introduction which may be necessary if a species becomes extinct. The existence of the living collection reduces the pressure on the surviving wild populations, since for many research purposes, guaranteed cloned material of known wild origin is perfectly adequate.

D. DONALD & S. M. WALTERS

DESCHAMPSIA DANTHONIOIDES (TRIN.) MUNRO EX. BENTH. IN BEDFORDSHIRE AND BUCKINGHAMSHIRE

This north-western American annual was recorded by Miss K. M. Hollick from Derbys., v.c. 57, in 1977, and found in the same year at Woburn, Beds., v.c. 30. It could not be found at either station in 1978. However, it was found in 1978 at an additional site in Beds. and in two sites in Bucks., v.c. 24. In all cases there was sowing or re-seeding with grass-seed (in the Beds. and Bucks. stations on golf-courses) supplied by Mommersteeg International Seed Company. *D. danthonioides* is a rare impurity in the grass-seed and, being an annual, is not likely to persist and become a regular member of the British flora. A specimen, maps and Miss Hollick's original drawing were exhibited.

C. M. DONY

MARITIME SPECIES IN BEDFORDSHIRE

A map was exhibited showing that *Puccinellia distans* (L.) Parl. is now present on the verges of the A1 trunk road in Beds., v.c. 30, for a distance of 20km, the nearest distance to the coast being 100km. Salt has been used to de-ice this stretch of road since 1950. Another map showed *Cerastium diffusum* L. to be still widespread on railways now in use in Beds., having been observed on the whole of the railway system in the war years when the permanent way was not regularly maintained. The railways came to Beds. between 1837 and 1868. *Cochlearia danica* L. was found to be frequent on the railway between 1945 and 1950, but has subsequently disappeared.

C. M. DONY & J. G. DONY

OENOTHERA L. IN WALES

Following a visit to Britain by Dr Krzysztof Rostański, the European expert on the genus *Oenothera* L., it is known that ten species and two hybrids of *Oenothera* have been found in Wales. Specimens of all these were exhibited, with descriptions and notes on their distribution in Wales. A key to the British species of *Oenothera* was also shown.

G. ELLIS

WATERCOLOUR PAINTINGS OF GARDEN WEEDS

The original watercolours for the *Amateur Gardening* (June, 1978) weed guides were exhibited. There are 54 pictures in all of the commonest garden weeds. On the reverse of each printed weed guide there are full details of the appearance, habitat and general characteristics of each weed, and measures for eradication.

B. EVERARD

RECORDING THE FLORA OF CUMBRIA

The exhibit described the progress made during the first five years of a ten-year recording programme. A map showed the distribution of the 1050 tetrads so far started, together with an indication of the number of species recorded from each. Species shown included rarities such as *Carex aquatilis* and *Eleocharis austriaca*, and naturalized species such as the handsome Mediterranean pea *Lathyrus grandiflorus*.

G. HALLIDAY

LACTUCA SALIGNA L. AND *PULICARIA VULGARIS* GAERTN. IN BRITAIN

The ecology of some rare species, particularly *Lactuca saligna* L. and *Pulicaria vulgaris* Gaertn., is the subject of research being carried out at Queen Mary College, University of London. *L. saligna* is mainly confined to sea-walls in the Thames Estuary, although old records indicate that it was previously found in a wider range of habitats. The New Forest contains the main sites of *P. vulgaris* in western Europe. Although it seems to have always been a rare plant, it was previously found in many places in south-eastern England and the Severn Valley. Suitable habitats for both plants appear to be widespread and the reasons for their current very localized occurrences are being investigated. The exhibit featured maps of the past and present distribution of both species, photographs, and information on the research project, including ways in which B.S.B.I. members could help.

A. D. R. HARE & S. D. PRINCE

ORIGINAL FLOWER DRAWINGS BASED ON DISSECTIONS OF LIVING SPECIMENS

The exhibit showed a selection from a total of 111 plants which have been illustrated as examples for 100 selected flowering plant families. Each drawing illustrates a dissection of an individual flower which has been taken from fresh specimens and without any influence by, or reference to, past drawings or diagrams. Checking is only carried out after the drawings have been completed. Each portion of the flower has been carefully measured and recorded. The drawings are to be used as book illustrations for a Cambridge University Press publication, on flowering plant families, by the artist and Clive King, Assistant Taxonomist and Librarian of the Cambridge University Botanic Garden. The Director of the Garden, Dr S. M. Walters, has acted as advisor on the project.

M. HICKEY

A GUIDE TO THE IDENTIFICATION OF SPECIES OF *RANUNCULUS* L. SUBGENUS *BATRACHIUM*

A new tabular key to water buttercups was presented with an exhibit based on the use of photocopying actual plants as an aid in identification. A tabular key is particularly useful for species exhibiting great morphological plasticity. Often identification must be based on a large number of characters together and a subsequent process of elimination. It is preferable to group together species with similar characteristics to facilitate ease of comparison. Silhouettes of all ten British species and one extra variety were displayed together with descriptions of each.

N. T. H. HOLMES

A PRACTICAL LOOK AT THE NORTH-WEST EUROPEAN POLLEN FLORA

In 1975 the Pollen Section in the Botany Department, British Museum (Natural History) and colleagues at the State University, Utrecht, Netherlands, began work on the *Northwest European pollen*

Flora. Individual accounts, consisting of detailed pollen descriptions, keys and micrographs of each family, appear initially in the *Review of Palaeobotany and Palynology* and are later collected into volumes. Volume 1 has been published. An explanation of the techniques used in the preparation of the *pollen Flora* was exhibited together with microscope slides, light micrographs and scanning electron micrographs.

M. R. JONES

THE ULTRAVIOLET COLOURS AND PATTERNS OF FLOWERS

Matched pairs of ultraviolet and colour or full-spectrum monochrome photographs of the flowers of 19 species were exhibited. The photographs included examples of most major types of UV colour and pattern, as follows:

a) Yellow flowers in which the central parts (usually the inner petal lamina, stamens and gynoecium) are UV-absorbing (insect-red) and the outer parts are UV-reflecting (insect-purple). *Blackstonia perfoliata, Caltha palustris, Leontodon hispidus* and *Potentilla anserina* show no visible differentiation of the petal lamina corresponding with the UV pattern, but in *Ranunculus acris* (inner petal dull yellow) and *Rhynchosinapis cheiranthos* (inner petal white) the UV-absorbing parts are differentiated.
b) Yellow flowers which are wholly UV-absorbing (insect-red). Examples are *Diplotaxis tenuifolia, Lysimachia nummularia* and *Potentilla fruticosa.*
c) White or mainly white flowers or inflorescences which are wholly UV-absorbing (insect-yellow) including any areas of other colours (e.g. yellow stamens or petal bases) which may occur. *Calystegia silvatica, Crocus sieberi* var. *sieberi, Potentilla rupestris, Silene alba, Trifolium uniflorum* and *Arum creticum* are in this category.
d) White flowers which reflect UV strongly (insect-white). This is a rare type, exemplified by *Bryonia dioica*, in which the white outer lamina reflects UV strongly and the visible pattern coincides with the UV pattern.
e) Flowers with anthocyanin colouration in which the visible markings of petal bases and veins generally coincide with the UV markings. *Geranium sanguineum* and *Malva sylvestris* are examples.

See also Short Notes, pp. 339–340.

Q. O. N. KAY

CHENOPODIUM BOTRYODES SM. IN W. KENT

Chenopodium botryodes Sm. appears to be confined almost entirely to the Thames estuary. A small colony disappeared from a site near Faversham, W. Kent, v.c. 15, where it had long been known, during 1977. On the night of 11th January, 1978, a severe storm swept the north coast of Kent. The seawalls were breached and there was widespread flooding of the marshlands. A line of mud, rubble, flotsam and clumps of vegetation was left behind the breached seawall when the floodwaters receded. Eight months later, a colony of *C. botryodes* was found on mud, among the debris flung inland, some four miles west of its former site. Seed may well have travelled with the stormwaters.

W. M. KEENS

FRAGARIA MOSCHATA DUCHESNE AND OTHER STRAWBERRIES

The exhibit comprised herbarium sheets and living plants of a number of strawberries: 1. A comparison of *F. moschata* Duchesne and *F. vesca* L. 2. A selection of varieties of *F. vesca*. 3. *F. viridis* L. and *F. vesca* × *F. viridis*. 4. The garden strawberry, *F.* × *ananassa* Duchesne, and its parents. A key was provided to the species and hybrids exhibited.

A. C. LESLIE & J. F. LESLIE

SOME OBSERVATIONS ON *OXALIS* L.

The exhibit illustrated several species of *Oxalis* L. native in the Americas and S. Africa, now established as weeds in the British Isles. The importance of heterostyly for seed production in the rhizomatous species *O. articulata* Savigny was emphasized. In sect. *Ionoxalis*, the often profuse production of bulbils compensates for the absence of capsules. The number of nerves per bulb scale was shown to be an important taxonomic character. A species new to the British Isles, thought to be *O. bulbifera* R. Knuth, was also displayed.

R. P. LIBBEY

THE FLORA OF THE AVON GORGE

The Avon Gorge is well known for its rare and local plants. Its flora was illustrated with photographs, herbarium specimens and live plants, raised from seed.

Sir Joseph Banks was one of the many famous botanists who visited the Gorge and a photocopy of his manuscript Journal describing his visit in 1767 was displayed. The manuscripts of J. W. White's *Flora of the Bristol coalfield* (1881–1886) and *The flora of Bristol* (1912) have been discovered in Bristol University, and extracts concerning *Allium sphaerocephalon* L. were shown.

A series of photographs illustrated the recent development of scrub and woodland in Walcombe Slade, which has reduced the area occupied by some of the rare plants, such as *Carex humilis* Leyss.

A card index of historical records was shown, which will form the basis of a Historical Flora of the Avon Gorge.

C. M. LOVATT

DABOECIA CANTABRICA (HUDS.) C. KOCH WITH A SPLIT COROLLA

Specimens of *Daboecia cantabrica* (Huds.) C. Koch with all their corollas split into four equal segments were exhibited. They stemmed from the original plant, now called 'Covadonga', which was found at a place of that name in northern Spain in July, 1973, by Mr T. Underhill of Dartington. Analagous forms, including var. *schizopetala* of *Erica cinerea, Kalmia latifolia* var. *polypetala, Convolvulus arvensis* var. *stonestreetii, Calystegia sepium* f. *schizopetala* and *E. tetralix* var. *fissa*, were commented upon.

D. MCCLINTOCK

SAXIFRAGA HYPNOIDES L. AND *S. ROSACEA* MOENCH IN BRITAIN

Saxifraga hypnoides L. in the British Isles is a plant of upland districts in the north and west, mostly on wet, calcareous sites. The species has two chromosome races: plants from western Ireland and Wales are diploid ($2n = 26$), while plants from northern England and Scotland are tetraploid ($2n = 52$). The two cytotypes are not always morphologically distinct and both have a similar range of growth-forms and habitats in the wild. It is to be hoped that further work will show consistent morphological differences that can be used by field botanists. Living plants of both cytotypes were exhibited.

S. rosacea Moench in the British Isles is centred on western Ireland with an outlying station in North Wales – a population rediscovered this year after 80 years. In Manchester Museum Herbarium there is a specimen of *S. rosacea* collected by Druce in 1883 from Glen Doll, Forfar, v.c. 90, that was the first record of the species for Scotland. It would be of great interest to refind the species in Glen Doll. Living plants of *S. rosacea* and *S. cespitosa* L. were exhibited with the Druce herbarium specimen to show how *S. rosacea* differs from other dactyloid (mossy) saxifrages.

D. M. PARKER

FUTURE MAP-MAKING AT THE BIOLOGICAL RECORDS CENTRE

The exhibit demonstrated new types of map which will be made either on the 'geagraph' plotter at the Experimental Cartography Unit of the Natural Environment Research Council or on the FR80 microfilm recorder at the Rutherford Laboratory of the Science Research Council. Both will provide a faster and more visually satisfactory product than hitherto. A *Provisional atlas of the bryophytes of the British Isles* plotted by the Experimental Cartography Unit was displayed.

F. H. PERRING

AN APPEAL TO ENSURE THE FUTURE OF *LATHYRUS PALUSTRIS* L. IN WALES

Since its discovery in 1971, the only known Welsh site of *Lathyrus palustris* L. has been threatened by over-grazing, drainage and industrial development. The site, near Pembrey, Carms., v.c. 44, also supports *Ornithopus perpusillus, Oenanthe fistulosa, Menyanthes trifoliata, Hydrocharis morsus-ranae* and *Scirpus fluitans*, all of which are locally rare plants. Attempts to purchase the fen with its associated drainage ditches and low dune ridges have to date been frustrated, but recently the owner agreed to sell about 3 acres of the area. The Llanelli Naturalists' Society has launched an appeal for the £3,000 required for the purchase and subsequent management of the proposed reserve. To date more than £1,500 has been raised.

The location of the site and an account of its flora were displayed, together with appeal material, and donations were gratefully received from B.S.B.I. members.

R. D. PRYCE

THE GUERNSEY BAILIWICK, 1978

Specimens of new records for the islands were exhibited:

GUERNSEY: *Scorpiurus muricatus, Sedum hybridum, Cotula coronopifolia, Dipsacus fullonum* subsp. *sativus, Populus nigra, Glyceria maxima,* and the first record since 1928 of *Scandix pecten-veneris.*

SARK: *Diplotaxis tenuifolia, Rorippa* × *sterilis, Ulmus laevis, Arctotis stoechadifolia, Carex sylvatica,* and the second record after 50 years of *Glyceria declinata.*

P. RYAN

THE CYTOLOGY OF *HYDRILLA VERTICILLATA* (L. FIL.) ROYLE

Plants of *Hydrilla verticillata sensu lato* from two widely separated areas, Renvyle, Galway, v.c. H16, and Suwalki, Poland, were found to be diploid with $2n = 16$ chromosomes. The morphology of the chromosomes was studied in conjunction with those of *Elodea nuttallii* (Planchon) St John, now spreading in Britain and Europe. *E. nuttallii* has $2n = 48$ chromosomes.

M. J. P. SCANNELL & R. CZAPIK

S. ROSAMOND PRAEGER (1867–1954)

S. Rosamond Praeger was born in Hollywood, Co. Down, Ireland. She studied art in Belfast and at the Slade, London. She is best known for her studies, in stone, of children, but plant studies to illustrate works by her brother, Robert Lloyd Praeger, were published in *Weeds* (1913) and in *Open air studies in botany* (1897). The originals are in the archives of the Herbarium (**DBN**), National Botanic Gardens, Glasnevin, Dublin.

M. J. P. SCANNELL

MIMULUS L. IN BRITAIN

Photographs were displayed of species and hybrids of *Mimulus* L. which occur in naturalized populations in Britain, together with herbarium material and a provisional key to the taxa concerned. A distinctive taxon of horticultural origin, well naturalized in central and northern Scotland, is *M. guttatus* DC. × *M. variegatus* Lodd. However, *M. variegatus* is not itself known to be naturalized in Scotland.

A. J. SILVERSIDE

THE PROBLEM OF *ELODEA* MICHX

The recent appearance of longer and narrower-leaved plants of *Elodea* Michx has raised problems concerning the genus in Britain and Europe. Records of such plants go back to 1914, when Pearsall found 'an elongate form of *Elodea canadensis*' in Esthwaite Water, Furness, v.c. 69b. These long-leaved plants have since been identified as *E. nuttallii* (Planchon) St John. However, they may be more closely related to *E. ernstiae* St John, or even to *Hydrilla verticillata* (L. fil.) Royle. Herbarium specimens were exhibited to illustrate this possibility. The long-leaved plant appears to be spreading rapidly and a taxonomic and ecological study of the plant is currently being undertaken at Lancaster University.

D. A. SIMPSON

GETTING TO GRIPS WITH THE UMBELLIFERAE

The exhibit presented a progress report on the fourth year of a study of the Umbelliferae in Europe. Live specimens of over 30 species were exhibited, together with herbarium specimens and colour transparencies. Means of germinating and sustaining southerly species in a cold climate without expensive heating were discussed. Classification and identification using cotyledons and fruits were illustrated. Rapid progress in the next four seasons appears to depend on finding further Continental locations rich in Umbelliferae species.

M. J. SOUTHAM

RECORDS AND DRAWINGS OF PLANTS FROM SCOTLAND

Specimens of species of *Atriplex* L., including hybrids, from Kirkcudbright, v.c. 73, were exhibited. Two other records were *Trifolium aureum* from E. Ross, v.c. 106, and *Crassula helmsii* new to Moray, v.c. 95.

Drawings of flowers to illustrate Miss M. McC. Webster's *Flora of Moray, Nairn and East Inverness* by Mrs O. M. Stewart were shown, and also various watercolours of roses and alien grasses.

O. M. STEWART & M. MCC. WEBSTER

EXPERIMENTAL HYBRIDS IN THE GENUS *ATRIPLEX* L.

During 1977–78 the following diploid hybrids were synthesized at Manchester: *Atriplex littoralis* L. (female parent) × *A. praecox* L. (pollen parent), and *A. littoralis* (female parent) × *A. longipes* L. (pollen parent). Several seedlings of the F_1 hybrid *A. littoralis* × *A. longipes* were treated with colchicine to induce chromosome doubling, to test the hypothesis that the widespread tetraploid species, *A. patula* L., originated from this diploid hybrid. Pollen fertility in the F_1 hybrid plants varied from 20–60% stainable grains. The grain size within each individual was extremely irregular. In the colchicine-treated plants pollen fertility varied from 80–100% stainable grains, a range equal to that of

the parent species. Most of the grains were about the same size. All the plants set plenty of well-formed seed. Herbarium specimens of the hybrid plants and the parent species were displayed. The colchicine-induced allopolyploid was represented by a second-generation living potted plant in flower. None of these hybrids have been found in nature and this is the first report of their artificial synthesis. The attempt to synthesize *A. patula* produced plants vaguely similar to this species but different in many morphological characters. Such plants would never be identified as *A. patula* if found in nature, and further work will be done to test the ability of *A. patula* to cross with this synthetic species.

P. M. TASCHEREAU

THE AQUATIC FLORA OF LLYN GWYNANT, CAERNS.

During a recent survey of the aquatic flora of Llyn Gwynant, Caerns., v.c. 49, underwater photographs were taken of some of the submerged species, such as *Isoetes lacustris, Littorella uniflora, Juncus bulbosus* and *Callitriche hamulata.* The photographs show such features as the growth form of the species, extent of stands, and epiphytic algal growth. The survey was carried out in conjunction with the Loughborough Underwater Research Unit.

P. M. WADE

EPILOBIUM LANCEOLATUM SEB. & MAURI – A PLANT TO LOOK FOR IN YOUR GARDEN

Epilobium lanceolatum Seb. & Mauri is a willow-herb apparently confined, until recent years, to the south of England. Since 1930, however, numerous records north of the Thames and Severn have greatly enlarged its known British distribution. Many of these more recent records, such as the first record for Cambs., v.c. 29, in 1953, are on disturbed ground, and seem to indicate small populations of recent origin.

In June 1978 I recorded the species, previously apparently unknown in Ireland, as a weed in the garden of Prof. D. A. Webb's house in Oughrim, Wicklow, v.c. H20, together with *E. montanum* L., *E. obscurum* Schreb. and *E. adenocaulon* Hausskn. The latter was also seen in a nearby nursery from which garden plants had from time to time been bought by Prof. Webb. It seems likely that both *E. adenocaulon* and *E. lanceolatum* were derived via nurseries and with garden plants from English sources.

It would be very interesting to have more records for *E. lanceolatum*, which is not difficult to recognize. It is the only sub-glabrous willow-herb with a four-cleft stigma and clearly petiolate, elliptic-lanceolate lower leaves with cuneate bases. The likely confusion is with small forms of *E. montanum*, but with a little practice even these two species can be distinguished quite easily. The character given in the *Flora of the British Isles* of having all the upper leaves alternate is not reliable to distinguish *E. lanceolatum* from *E. montanum*, and seems to apply only to well-grown specimens.

S. M. WALTERS

A VARIANT OF *DACTYLORHIZA FUCHSII* (DRUCE) SOÓ IN N. LINCS.

A variant of *Dactylorhiza fuchsii* (Druce) Soó was discovered by I. Weston on a drain bank between Belton and Crowle, N. Lincs., v.c. 54, in 1975. Four plants were seen distributed over a length of about 200 yards. Many hundreds of plants of typical *D. fuchsii* were growing on the side of the drain. The variant has been seen each year since 1975. Five plants were recorded in 1978, but one of these was subsequently, unwittingly destroyed by fishermen. The variant has dark purple leaves and stems. The labellum is unmarked and is of a very dark rich purple with a velvety texture. The other perianth parts are pale pink. The coloration is striking and can be picked out at a distance. The new form appears to have a high overall anthocyanin content. Nothing similar has been found in the literature. No specimen was taken as there are now only four such plants in the area.

The exhibit featured a series of photographs of the plants taken in 1977 and 1978 by Mr & Mrs G. S. Phillips and the exhibitor.

I. WESTON

A *NOTHOFAGUS* HERBARIUM

Foliage specimens of all species of *Nothofagus* Blume (except *N. moorei*) now represented in the British Isles were exhibited. For a full account of this exhibit see Short Notes, pp. 344–345.

D. L. WIGSTON

The following also exhibited:

K. J. ADAMS & P. J. WANSTALL. An introduced *Lemna* in Essex?
E. J. CLEMENT. More adventive news.
E. R. T. CONACHER & P. MACPHERSON. *Coriandrum sativum* L. in Glasgow.
R. W. DAVID. (a) The distribution of *Carex humilis* Leyss. in Britain.
(b) Another British station for *Carex muricata* L. *sensu stricto*.
C. M. DONY. Officers of the B.S.B.I. 1947–1978.
J. M. EDMONDS. B.S.B.I. Black Nightshade Survey.
A. N. GIBBY. Postage stamps of botanical interest.
A. P. HAMILTON. Which helleborine?
T. HINITT. Wild flowers in close-up.
D. W. JEFFREY & W. WALSH. Ireland's first floral stamps.
A. J. SILVERSIDE. *Pulmonaria rubra* Schott naturalized in Scotland
ST CHRISTOPHER'S SCHOOL, BURNHAM-ON-SEA. Operation orchid.

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

C. J. DOYLE. Why herbaria?–a camera can take a closer look.
L. FARRELL. Recent research on the Military Orchid.
J. L. MASON. Water-weeds.
E. MILNE-REDHEAD. Fox fritillary meadow, Framsden.
L. H. PINKESS. Some plant galls found within the City of Birmingham.
R. D. PRYCE. *Muscari comosum*–naturalized at Pembrey, Dyfed.
J. REED. Ohio plants through the seasons.
A. G. SIDE. Plants of Tenerife.
R. C. STERN. B.S.B.I. meetings in Skye and Barra, 1978.