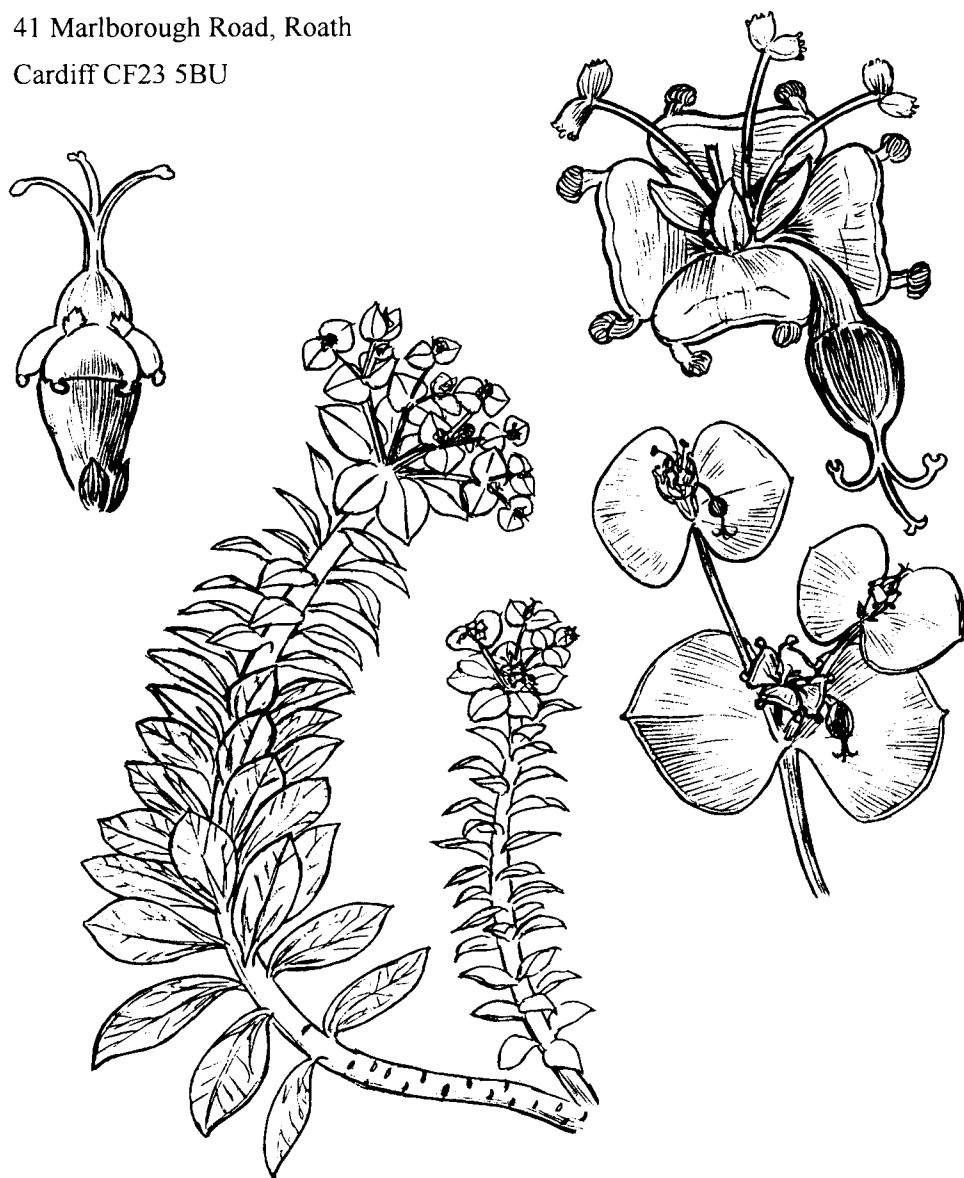


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BSBI NEWS 86

should reach the Editor before

NOVEMBER 5th 2000

IMPORTANT NOTICES

H.M. QUEEN ELIZABETH THE QUEEN MOTHER'S BIRTHDAY PARADE

July 19th 2000

The 21,000 people on Horse Guard's Parade on July 19th for the 100th Birthday Tribute included 21 representatives of BSBI. 12 were in the Parade in the march past of Her Majesty's Organisations, and 9 had seats in the audience.

It was a memorable day – we had been promised that it would be the 'biggest and most exciting Parade ever mounted on Horse Guards' and this it was. Passes and instructions were efficiently organised and we arrived early in the morning on Birdcage Walk to find our banner prepared and waiting at our allotted numbered position. We were joined by two Coldstream Guardsmen also allotted to us for the day as escorts and to brief and guide us. We were incredibly lucky with the weather – a rare perfect British summer day, warm and dry from 8.30 am to 9.45 pm.

We were each issued with a poncho, and although some of us were half wishing to see the 5,000 civilian participants simultaneously donning their ponchos, as there were no drops of rain, they proved to be superfluous. Thameswater tanks provided a continuous supply of cooled drinking water, very welcome as there was a good deal of standing and waiting during the day, with rehearsals in the morning and afternoon. Lunch boxes were also provided and efficiently distributed by the WRVS.

The BSBI walkers were asked to represent botany through 100 years, and we carried an assortment of vascula, *Floras*, a record card, herbarium specimen, plastic bags, a bunch of *Ruscus aculeatus* and a parasol! We also had an assortment of 'costumes' (see photos p. 41).

Our instructions had included a '23 inch pace at 121 paces a minute' but in practice we had to increase speed to 'keep going, keep going, keep smiling' to fit the time and space, and, amazingly, the final show we did achieve to time. In this we had the additional excitements of the 'Fly Pasts', rose petals, etc. One of our members in the audience wrote 'We were bowled over by the sincerity of the day!'

Altogether an amazing day, we were all pleased to have been there, and the lasting memory is of everyone smiling. Like H.M. the Queen Mother, we enjoyed the music, and especially the massed bands of the 2000 military on parade. Those watching on TV will have seen H.M. the Queen Mother enjoying it, but looked in vain for a glimpse of BSBI: only our name on our banner appeared briefly.

In the evening I was the lucky one to represent the Society at a Reception at St James's Palace. I was still carrying the herbarium specimen (*Senecio vulgaris* L. 'collected by H.J. Riddelsdell at Cardiff Docks in May 1902') when the footman at the door enquired if it was a birthday gift for Her Majesty? Perhaps I should have handed it over!!!

MARY BRIGGS, 9 Arun Prospect, Pulborough, West Sussex RH20 1AL

NEW SECRETARY FOR SCIENCE AND RESEARCH COMMITTEE

Will members please note that the new Secretary of the Science and Research Committee is Sarah Whild and all correspondence regarding that Committee and the Research Fund should now be addressed to her at 66 North Street, Castlefields, Shrewsbury SY1 2JL.

EDITOR

BSBI ABSTRACTS – YOUR HELP REQUIRED

The recent obituary of Duggie Kent (*Watsonia* **23**(1) emphasised the pivotal role he played in the gathering of data for *BSBI Abstracts*, work he carried out almost single handily for some 46 years. The contents of *Abstracts* have been incorporated into the BSBI Database and form an important and invaluable source of information relating to many aspects of the British Flora.

The society is most anxious that the literature references continue to be gathered for inclusion in the Database, publication of *Abstracts* is a relatively simple process once the data has been entered. As yet it has not been possible to find anyone with the time, inclination and single minded devotion to take over Duggie's mantle. If any member would like to come forward with help or ideas on who might continue this abstracting role please let us know.

Until such time as we can find a successor to Duggie it is proposed to split the work of data collection. Clive Stace will be responsible for collating material contained in all BSBI publications, Gwynn Ellis will cull other abstracting sources to obtain material from the major national and international journals. Mike Walpole will attempt to gather references from the many journals, newsletters, bulletins published by natural history societies, local recording organisations, County Trusts, etc.

It is in tapping the latter sources of information that we need **YOUR** help. Duggie Kent used to make regular visits to the London Libraries to examine local journals, none of us have the time to do this so we will rely on the BSBI members to supply much of the data.

How can you help?

- IF:** a) you write a paper for a local publication would you supply us with an offprint or photocopy?
 b) your local natural history society or similar organisation publishes a newsletter or magazine containing items of botanical interest could you persuade the editor to place us on the mailing list, or let us have a note of the title of the publication with the editors name and address?
 c) you come across any botanical article in some obscure publication which you think we might overlook, would you send us full details?

Any contribution will be most welcome, material should be sent to Mike Walpole at the address below. On request we will refund the cost of obtaining and supplying the publications.

MIKE WALPOLE, 68 Outwoods Road, Loughborough, Leics, LE11 3LY.

AGM 2001

Please note that next years AGM will be held earlier than in recent years, on the first weekend in May, **May 5th**, rather than the more usual 2nd or 3rd weekend. The AGM will be held in London but the venue will be confirmed later.

EDITOR

BSBI WEB SITE

This is now hosted by the Royal Botanic Gardens, Edinburgh with a new address – www.rbge.org.uk/BSBI, however the old address is still available with a hyperlink to the new site. I would like to thank Mark Atkinson for his help in designing and setting up the original site, but with the BSBI Database going on-line at the Edinburgh site it seemed sensible to transfer the entire BSBI operation there. Upkeep of the site is now the responsibility of the Co-ordinators (see page 11) and all comments should be sent to them.

EDITOR

DIARY

N.B. These dates are supplementary to those in the 2000 Calendar in *BSBI Year Book 2000*.

2000

September 23rd *A meeting to mark the bicentenary of the birth of George Bentham FLS FRs (1800-1884),* Linnean Society, Burlington House, London. (see page 49)

2001

May BSBI Trip to Sicily (see *BSBI News* **84**: 52)

May 5th BSBI AGM London (see page 4)

May 28th - June 3rd *Building bridges with traditional knowledge,* Honolulu, an International Conference organised by the University of Hawaii (see *BSBI News* **83**: 57)

See also page 54 for dates of *Local seeds for local needs* training days, organised by Flora locale

EDITOR

EDITORIAL & NOTES

Colour! – Some time ago Council agreed to the inclusion of a few pages of colour in *BSBI News* ‘when appropriate’ and what more appropriate occasion than the colourful spectacle of our Patron’s 100th birthday parade (see pages 3 & 41). Our Treasurer was happy to authorise the expenditure, provided plants got a look in as well. The 4 pages of colour occupy the centre pages and I would be interested to hear what members think of the experiment.

Thanks to a Cardiff colleague for the following information on members who were spotted ‘on the Box’ at peak viewing times: Dr Fred M. Slater – near Nantmel in Radnorshire explaining how water is being purified naturally using *Phragmites* planted around settlement pools, Mr Dafydd Davies – in a programme about the Red Kite on HTV (Wales) explaining how the species survived in NE Carmarthenshire whilst nearing extinction in the rest of Britain, Dr Goronwy Wynne – repeating himself on ‘Fishlock’s Wild Tracks’ also on HTV (Wales) in Flintshire discussing the survival of grasses on lead waste around mines in the county and the export of these clones for use in restoration schemes around the world; and Mr David Bevan – in ‘Britain’s Wild Invaders’ on Channel 5, talking about the method of spread of some of London’s alien plants including *Buddleja davidii* (Butterfly-bush); *Artemisia verlotiorum* (Chinese Mugwort) and *Rumex crispatus* (Greek Dock).

Watsonia – Volume 23(1). The last line of the *Ludwigia palustris* column in the table at the bottom of page 168 was unfortunately ‘lost’. The full description of the fruit should read: ‘Subrotund and persistent, with 4 dark green bands of puckered tissue’.

Inserts – Annual Exhibition Meeting notice and booking form; Scottish AGM notice; Pre-publication offer for the second supplement to the Kent List and BSBI Publications / Summerfield Books catalogue.

New address – Please note that Clive Jermy’s new home address is: Godwins House, Staunton-on-Arrow, Leominster, Herefordshire HR6 9LE; Tel. 01544 388 500; E-mail: c.jermy@cwcom.net

Grid references – following Alex Lockton’s impassioned plea regarding the style of Grid reference used in BSBI publications (see page 11) I am minded to use the standard OS method in future issues of *BSBI News* unless there are compelling reasons for not doing so.

Contorted Bamboos and chives Neapolitan style – I am constantly amazed at the lack of botanical knowledge shown by some horticulturalists. A classic example appears in a gardening catalogue distributed with a recent issue of *Radio Times* where ‘a fascinating contorted bamboo’ is offered for

sale at £4.50. It is described as reaching 'a height of 60 cm' (a bit short for a bamboo), and will grow anywhere but likes a damp location. A coloured illustration is provided together with a Latin binomial – *Juncus spiralis*. Yes, our 'contorted bamboo' is none other than the spiral form of *Juncus effusus* (Soft-rush). Does it grow true from seed or is it propagated vegetatively? Who knows? but I've ordered one and will report back.

Another example comes from a little pot of a fresh herb sold by a local supermarket. We quite like chives so bought a pot for growing on in our garden. When first seen, the leaves were young and threadlike but after transplanting they became flattened, not really looking like chives (*Allium schoenoprasum*) and not even tasting like chives, having a much more garlicky flavour. They have now started to produce very attractive white flowers and a look at the key in Stace's *New Flora* revealed that they are in fact *Allium neapolitanum* (Neapolitan Garlic). Coming from Southern Italy herself, my wife is quite chuffed to have this new herb in the garden.

And finally: In response to a query from Alan Hill, I should perhaps point out that in *BSBI News*, as in *Watsonia*, all measurements and distances are given in metric form with, occasionally, the imperial measurements/distance in parenthesis.

EDITOR

HON. GENERAL SECRETARY'S NOTES

I have now survived for three months as Hon. Gen. Sec. (acting), and I am very grateful for the help and encouragement I have received, in particular from my predecessors, from Peter Fry, who deals with the Society's post at the Natural History Museum and from Peter Thomson, who does the Council minutes. Although I do realise that things will really start to 'hot up' in the autumn I have already had an interesting and varied time – including advising a man in Dayton, Ohio about growing golden privet and sending the Society's greetings to our Royal Patron on her 100th birthday! This is the acknowledgement I received from Clarence House:

I greatly appreciated your good wishes on my 100th birthday and send my very sincere thanks to all who joined in your kind message.

Elizabeth R, Patron.

I still, just, have time to read the newspapers and I was very pleased to note that Dr Francis Rose has become an MBE (I add my congratulations), and to see the long article in *The Times* on 'The invader, if it's in your garden, panic now' and find in it a photograph of 'Mr Knotweed' known to us as Dr John Bailey. Ann Conolly got honourable mention as well, but the reporters got both their titles and their ages wrong!

It is also worthy of note that Prof. George Swan, elected an Honorary Member of BSBI at last years AGM, received congratulations from the Royal Society of Chemistry on 60 years of membership (see also page 13)

I was very interested to see the item on *Sibthorpia* in the last *News*. I have had this plant in my conservatory for many years, (originally from a piece which, despite my 'we must not pick' injunction, a student had brought back from Dartmoor, I could not let it be thrown away so I struck it!). *Sibthorpia* now seeds itself into all the pots and has survived several winters outside where it grows between the blue bricks of my midland backyard; the confusion here is with two other members of my botanical household, *Geranium lucidum* (Shining Crane's-bill) and *G. pyrenaicum* (Hedgerow Crane's-bill).

AILSA BURNS, Hon. General Secretary

PROFILES OF NEW HONORARY MEMBERS

Dr Eva Crackles

Miss Eva Crackles was already an active member of several local natural history organisations and well known in bird watching circles when she joined the BSBI in 1950. Studies of the flora of bombed sites in Kingston upon Hull, Eva's native city, earned her recognition by several BSBI referees of the day and by the local press. Finding *Calamagrostis stricta* (Narrow Small-reed) with *C. canescens* (Purple Small-reed) and the hybrid between them, provided Eva with a hypothesis and her researches led to an MSc from the University of Hull in 1978.

In the early 1960s Eva was collecting records for the BSBI atlas scheme and developed an understanding of the flora of the East Riding of Yorkshire such that, later, she set about collecting data for a modern County Flora, published in 1990. The product is a compilation of published historical data and the accumulated field records of Eva and several of her contemporary field botanists.

Eva worked on many BSBI projects but after 1990 severe arthritis continued to limit her range in the field. However, Eva continued to serve the Society and latterly worked very hard on Atlas 2000 and on publishing several papers in *Watsonia*, *BSBI News*, *Naturalist* and, currently in press, a floral history of Hull.

I have known and worked with Eva for only ten years and have witnessed her delight on being awarded a DSc (*honora causa*) by Hull University in 1991 and, in recognition of her contribution of knowledge to local conservation effort, the award of MBE in 1992. I suggest that Honorary Membership is an appropriate means by which the Society could acknowledge Eva's work, which included representation of the Society as its Recorder for v.c. 61.

PETER J. COOK, 15 Park Avenue, Withernsea, East Riding of Yorkshire, HU19 2JX

Mr R. Desmond Meikle

It is appropriate that on the first occasion that the BSBI has held its AGM in Northern Ireland, one of the Society's best known members from the Province is nominated for Honorary Membership. Robert Desmond Meikle, always known as Desmond, was born in Newtownards, Co. Down, in 1923. He attended the Royal Belfast Academical Institution, and then studied law at Trinity College Dublin, graduating in 1946.

He developed an early interest in botany and became a member of the Society in 1947. Together with J. McK. Moon, E. N. Carrothers and R. Davidson he compiled records of the flora of Co. Fermanagh and wrote a manuscript flora now at the Ulster Museum. He was vice-county recorder for Co. Fermanagh from 1961 until 1977 but he also contributed records from other parts of Northern Ireland. At Trinity College he became acquainted with D. A. Webb, who was later to take the chair of botany there, and they botanised together in Ireland during the later part of the Second World War.

He discovered an unusual willow, now known as *Salix* × *calodendron* (*S. viminalis* × *S. caprea* × *S. cinerea*) (Holme Willow) just outside his hometown of Newtownards, and went to some trouble scouring botanical works in the libraries of Belfast to find a name for it, so embarking on a life-long study of British willows.

Having graduated in law, he applied to the Civil Service Commission in London for a position, and journeyed from Northern Ireland for an interview. The course of his life hinged upon this, for he was informed that he would have to come back a second time for further discussion. Slightly annoyed by this encounter with officialdom he took the train out to Kew to visit Ernest Nelles, the sedge expert, with whom he had had some correspondence about identifications of Northern Ireland *Carex* species.

Nelmes introduced him to W.B. Turrill, the Keeper of the Herbarium, and Edgar Milne-Redhead, who were apparently so impressed by him that they offered him a job. Seeing the advantages of being paid for doing something he liked doing, he accepted. The loss to the legal profession was to the benefit of botany, for Desmond spent the next 36 years working in the Kew herbarium. He was awarded the OBE in 1983, the year of his retirement, for his services to botany.

At first he worked at Kew with Milne-Redhead in the African section and in 1949 he went to West Africa with a Medical Research Council Medicinal Plants Survey aiming at an alternative vegetable source of cortisone. Soon after his return to Kew in 1950, B.L. Burtt resigned as head of the Europe and Orient section of the herbarium to take up a post in Edinburgh, and Desmond took over the position, remaining there for the rest of his career. His legal training made him the ideal person to take an active role in botanical nomenclature and he served on the International Nomenclatural Committee for Spermatophyta from 1959 to 1969 and was a member of the Editorial Committee for three successive editions of the *International Code of Botanical Nomenclature*. Those familiar with botany of the Mediterranean region will recognise his two-volume *Flora of Cyprus* (1977, 1985) as one of the best Floras written to cover plants of that region.

Generations of British botanists, however, will remember him as the BSBI *Salix* referee, a post he has held for over forty years. During this time he has painstakingly identified willows for members, always replying promptly and with clear reasons for his determinations. Many are indebted to him for his help and encouragement in this difficult group. His *Willows and Poplars of Great Britain and Ireland* (1984) the fourth in the series of BSBI Handbooks, is a classic of its kind. For many years, including most of those when he worked at Kew, Desmond Meikle has lived at Wootton Courtenay in Somerset, where his garden, with many willows growing in it, is renowned and his support of local organisations is greatly appreciated. We hope he will spend many more years there and continue to deal so kindly and patiently with all our willow queries.

R.K. BRUMMITT & E.F. GREENWOOD

Dr Peter Macpherson

It is my privilege to applaud Peter Macpherson's service to the Society.

He has been a member for well over 40 years and a very active member. He has only recently stood down as Chairman of the Committee for Scotland having been first Secretary and then Chairman continuously, since the Committee was inaugurated over 20 years ago. He has been joint editor of the Scottish Newsletter for 22 years and continues as such. He has held office on National Committees including Council having an exemplary attendance record in London and taking on extra duties with enthusiasm. From 1991 to 1993, he served as President of the Society, one of the few Scots to hold that office, presiding over two happy Royal occasions in the process.

He has not only been a Committee man, he is a most active botanist having served now for 15 years as Vice-county Recorder for Lanarkshire. He is joint editor of the forthcoming *Flora of Glasgow*, which is to be a lavish production of considerable scholarship. A *Flora of Lanarkshire* is also in the pipeline and those who have heard him lecture on Lanarkshire know we have a pleasure in store.

BSBI can, at times, be a dauntingly English Society. It has been the achievement of the Committee of Scotland to make BSBI a success in Scotland and to impart a distinctive Scottish flavour to it in the process. Any of you who have attended a Scottish Exhibition meeting cannot fail to have experienced its infectious enthusiasm and fellowship. Behind such a comfortable atmosphere lies sound organisation. Peter has uniquely contributed to that organisation. Punctilious may be, he has kept things right and has never lost the wry sense of humour which has become his hallmark.

It is my pleasure to propose Dr. Peter Macpherson as an Honorary Member of the Society.

MICHAEL BRAITHWAITE

ATLAS 2000

PROGRESS REPORT

My last four summers have been spent almost constantly in the field, undertaking field work and running field meetings for the Atlas. It has therefore come as a bit of a shock to find that it's already September and that summer has passed with hardly a foot placed in any wild place looking for plants! I fear that the lack of experience (and exercise) in the field are beginning to show. Not that I've been idle, of course. With the Atlas deadline looming, David Pearman, Chris Preston and I have been working every day to get the work done. Apologies, therefore, for this somewhat brief report on progress. A huge amount has been achieved since the last report, and I'd like to say that the end is now in sight, but there's a bit more to do before that becomes a reality!

Data Received

We can at last say that all data to be included in the Atlas has now been received and entered at Monks Wood. The last few squares from the Republic of Ireland have all been accounted for, and the database will soon be officially closed to any additional records. Most of the final data to be added were late records sent to Declan Doogue for computerisation, our thanks once again go to him for his immense help with the project in the Republic.

Verification and Discrepancy Lists

These have now been produced for all hectads in Britain and Ireland, and most have been dealt with by the Vice-county Recorders and returned to Monks Wood. These onerous lists, which supply Recorders with a copy of their data and with any additional records at Monks Wood, have been a major part of the project, keeping me, the Recorders, and Jane Croft busy for many months. Many thanks to everyone for dealing with them promptly.

Selection of Taxa for Mapping

Based on the data received and the criteria for selection given in my report in *BSBI News* **84**, 2423 taxa will be mapped in the Atlas. Twenty additional taxa qualified at the last count in June (being recorded from more than 50 10 km squares in all date classes). You can now look forward, therefore, to maps of delights such as *Cotoneaster divaricatus* (Spreading Cotoneaster) and *Griselinia littoralis* (New Zealand Broadleaf).

It has now been agreed that a CD-ROM will be included in the Atlas. This is a real boon, as it allows us to present maps for the alien taxa we don't have room to include in the book (i.e. those alien taxa recorded from less than 50 10 km squares). This amounts to an additional 974 taxa, each of which will also have a brief caption. Maps will not be presented for some poorly recorded native and alien subspecies and hybrids, as the maps and captions would require far more extra work than time allows.

The total count for the Atlas and the CD therefore breaks down into the following:

Category	ATLAS	CD
Native species and subspecies	1497	1497
'Native or alien' or 'Possibly native'	47	47
Alien species and subspecies	713	1625
Native hybrids	91	91
Alien hybrids	54	116
Spontaneous hybrids between native and alien parents	21	21
TOTAL	2423	3397

Captions

Captions have now been received for all taxa that are being mapped in the Atlas, including most of those that have only recently qualified for mapping. Many thanks to those authors of the original captions that were able to undertake these new ones, and have supplied them at such short notice. The brief captions for the additional 974 captions on the CD are being written by me (so they really will be brief!).

Draft of the Maps and Captions

The main thrust of our efforts over the last few months has been the preparation of a draft set of maps and captions for DETR. This was completed in mid-June, with ten copies of 2200 maps and 1000 pages of captions being sent to DETR and the country agencies for comment (quite a pile of paper!). Before this was done, all the maps received a second run of editing to remove errors, and the captions received their second or third phase of editing, thus bringing some editorial uniformity to them.

Copies of the draft have been sent to English Nature, Scottish Natural Heritage, Countryside Council for Wales, Office of Public Works (Republic of Ireland) and the Environment and Heritage Service (Northern Ireland). All these will comment on the maps and captions, contributing a regional flavour to the captions where needed. This is a vital contribution to the project. Not only is it beneficial to have fresh pairs of eyes looking at the maps and captions, but the additional experience and knowledge will contribute much to the final maps and captions. Each caption author has also received a copy of the map and current version of the caption they have written, as their captions have undergone much editing since they were submitted, and they have not seen any maps until now. Their revisions and comments are equally valuable.

Publisher

We are extremely pleased to announce that Oxford University Press will probably be publishing the new Atlas, subject to the negotiation of a formal contract. They have taken up the project with a great deal of enthusiasm, with excellent ideas on format and design. They are also publishing the new Butterfly Atlas, and we are sure their considerable experience and expertise will be reflected in the final publication. They have advised us that publication will take place in 9-12 months following submission of the final maps and text in December 2000 (this date has had to be extended to allow extra time for work on the CD-ROM).

The Final Push

The final draft of the Atlas has to be with DETR and OUP by December 2000. Before this can take place, we have to run the 'final check month'. This will allow Vice-county Recorders a month to complete a definitive check of *all* the taxa in *all* their squares, and make any last-minute amendments as necessary. Any corrections will then need to be made to the database, and a final set of maps produced for checking. All the amendments to the text will also have to be incorporated and checked, and there are still introductory and discussion chapters to be written. It looks like there'll be a few late nights to come!

Acknowledgements

The *Atlas 2000* project is funded by the Department of the Environment, Transport and the Regions (in Great Britain) with additional support from the Environment and Heritage Service (Northern Ireland) and the National Parks and Wildlife Service (Republic of Ireland). Additional support has come from numerous other sources, including Scottish Natural Heritage, English Nature, Countryside Council for Wales, RSPB and the Wild Flower Society. We are grateful to all these bodies for their support.

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e-mail: Trevor@rhydyfowch.freeserve.co.uk

CO-ORDINATORS' CORNER

New BSBI Web Site

Some members may have noticed that we have a new, revamped web site. This is hosted for us by the Royal Botanic Gardens, Edinburgh; hence the address: www.rbge.org.uk/BSBI. It contains, among other things, the BSBI database from the University of Leicester, which you can use for searching for literature sources for particular plants. It also has a lot of information about the Society and its activities, including lists of county recorders and flora groups, and a link to the new BSBI Books. Also within the site are details of the University of Birmingham identification courses and, in future, other training courses supported by the Society.

Recorder 2000

This is now released and on sale. It is a complicated piece of software, and so it is being distributed by a number of software consultants who can offer the support that users will probably need. All the very simplest things – dot maps, for example – can be done by the inbuilt routines, but anything sophisticated – counting the number of taxa recorded in each tetrad, for example – will take a great deal of expertise to do.

A lot of people have been awaiting Recorder 2000 with eagerness, in the assumption that it will be both powerful and easy to use. Well, that illusion is now shattered! The trouble is, biological recording is not simple, because the data itself is complicated. I despair of there ever being a program that is simple yet powerful.

The recommended retail price for Recorder 2000 is £100, but the distributors are free to vary that price if they want to, either to make it cheaper or to offer extra services. You can see a list of distributors on the NBN web site (www.nbn.org.uk). I (Alex) am one of them, but I am at present only supplying it to the members of our data-sharing group, the Pax Botanica. Honestly, I would not recommend it to anyone else just yet – wait until there are botanical species lists and Ordnance Survey maps available before taking the plunge.

NBN Web Site

My personal opinion is that the NBN Web Site is a much more exciting development at the moment. They have now produced a site which you can log on to and produce distribution maps, which you can download and insert into your own documents. Even better, if you are a registered user, you can have access to the underlying records and even produce your own interpretative maps. At present it is just in prototype, with a few sample species available, but eventually it can be expanded to all the flora and fauna of Britain. If we make our information available to this web site, then we can have control of who can access the raw data. I would like to support this plan enthusiastically, and get data for all vascular plants and charophytes onto it, and give all BSBI members access. This way you don't have to worry about what software to buy – it will all be there for you on the Internet, for free. I can design simple software so anyone can database their own records and send them to me for inclusion on the web site. At last computers are beginning to make biological recording both easier and more widely accessible – and it is about time, too!

Threatened Plants Database

The compilation of the TPDB is continuing apace. We have come to realise that the biggest issue that needs to be tackled is standardisation, at all stages in the making and management of biological records. For example, there are dozens of different ways of recording a grid reference, many of them invented for individual publications. Even our own esteemed *Watsonia* has its own, unique way of writing grid references, and I for one have no idea why such an obscure system is used. The best method, without doubt, is the one the Ordnance Survey give on their own maps, two letters followed by an even number of digits, like this: AB123456. No punctuation, no spaces, no decimal points. If all botanists could make the effort to write grid references in a standard way, a lot of errors could be avoided.

Incidentally, it seems that an enormous proportion of grid references given are also wrong in space – people tend to give the square to the north-east of the correct location. Almost all of us would do well to brush up on their map reading skills, or buy a Global Positioning System.

Other methods of standardisation are also potentially beneficial. Computers force us to use more standard methods, because they increase the ways in which analysis can be performed. I find that fairly simple categories are often the most useful. For example, when analysing the data for the Red Hemp-nettle, *Galeopsis angustifolia*, we used five categories of habitat: arable fields, waste, quarry, natural rock exposures and coastal shingle. It turned out that arable fields were not, by any means, the most common habitat type, which means that the Biodiversity Action Plan will have to be rewritten if it is going to work. Something as simple as a habitat classification system can make a big difference, but it does require all of us to collect data that can be analysed in that way.

Data validation

How do we know whether a record is right or wrong? This is something that is particularly topical at the moment, because v.c. recorders are about to receive the final check lists for Atlas 2000. It is unfortunately the case that an awful lot of the data in any database is clearly wrong. My analyses of a number of major botanical databases show that up to 40% of all records are likely to be incorrect in some significant way (wrong 10km square, wrong date class, wrong species) but most of these errors are irrelevant, in that there really is a correct record with those precise details. For example, you might mistake *Trisetum flavescens* for *Arrhenatherum elatius*, and write SJ43 rather than SJ34 down as the grid reference, but if there really is *A. elatius* in SJ43, then it doesn't matter.

But how do we reject records that really are very wrong? There doesn't seem to be any published procedure, or standard method for evaluating incorrectness. It is very much up to the judgement of the v.c. recorders, and this is a very valuable role that they perform. Unfortunately, I suspect that some of the time records are rejected because they are of species that are outside their known range. When you think about it, this is poor science, because it amounts to fixing your data to match your theory. Instead, I propose, records should only be rejected on the basis that they have not been made properly – i.e. that the recorder has not proven that they have made a good record. It is, in the final analysis, the job of the recorder to prove their records, not the job of us to disprove them.

There are interesting consequences of this. In the TPDB project we have been applying this more rigorous approach to data sets and coming up with some surprising conclusions. One example of this is Floating Water-plantain, *Luronium natans*. Almost all accounts of this species since the early 19th century stress that it is an upland species, naturally occurring only in upland lakes in Wales. As a consequence of this deeply-held belief, a lot of records for the lowlands have been rejected or treated as introductions by various authorities. But this is perhaps an unscientific approach – there are records for lowland rivers, lakes and ponds across the Midlands from Herefordshire to Northamptonshire, and as far north as Stranraer, and most of them made by reliable, trustworthy botanists of good reputation. The simple truth is that *Luronium* is, and always has been, a lowland plant at least as much as it is an upland one, and there is no evidence whatsoever that it entered the canal system (where it is now most abundant) solely from upland populations. It seems likely that eutrophication and climate change may currently favour the upland populations more than the lowland ones, but we could do well by looking more thoroughly in lowland sites for it.

Another interesting discovery by the TPDB project was of a specimen of Greater Water-parsnip, *Sium latifolium*, from Cornwall. This is far beyond its known range, and raises interesting questions about the validity of many other records from the western parts of England that have previously been rejected. I cannot guarantee that our assessment of the accuracy of these records will necessarily be correct, but what I would like to achieve is a systematic and documented way of deciding which records we accept and which we reject.

Voucher specimens

I have been asked to give guidance on the collection of voucher material for rare species. For example, Purple Ramping-fumitory, *Fumaria purpurea*, can be a fiendishly difficult plant to identify, and it is really highly desirable that we should have a specimen to support every new record. The rule that you

don't collect a plant unless there are more than twenty is a good one, but in this case you do not need to destroy a plant to collect a sample sufficient for determination. A piece of stem with a few leaves and some flowers is quite sufficient. We don't want roots! As long as you are sure that you are doing no lasting damage to the population, there is no reason not to pick a bit.

If you do collect voucher material, the best thing to do is to make a good-quality herbarium sheet on good-quality paper (don't just squash it between sheets of newspaper!), label it properly, and lodge it in a national collection where it can be seen by experts. The National Museum of Wales, for one, will accept specimens of *Fumaria purpurea*. I can possibly advise on suitable homes for voucher material of other rare taxa. There is nothing as good in biological recording as making a good herbarium sheet and placing it in reputable national collection.

Masters Degree in Biological Recording

The highly acclaimed University of Birmingham Certificate in Biological Recording, which is run in collaboration with the Field Studies Council and the BSBI, is next year going to be expanded into a Postgraduate Certificate, Diploma and MSc. Literally hundreds of students are currently taking the Certificate or have completed it, and the expansion of the programme is by popular demand. The programme is largely residential, based mainly at field centres throughout England & Wales. It will take several years to complete. This is a very welcome development, boosting taxonomy and identification skills in mainstream university education, although the fact that this is a professional development programme reflects the present day reality of training needs, which is largely among working professionals rather than young students. Details are available through the BSBI web site or by contacting the University of Birmingham, The Gateway, Chester Street, Shrewsbury, SY1 1NB.

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RECORDERS AND RECORDING

AMENDMENT NO. 2 TO BSBI YEAR BOOK 2000

Vice-county Recorders

There are impending changes but because of the time spent on the Atlas, plus the fact that Records Committee does not meet until October, none have been finalised. But a letter from Professor G. Swan in Northumberland, prompted an interesting investigation. He enclosed a copy of his appointment letter, signed by Clive Jermy, dated October 1960 which seems to show him as our longest serving recorder.

Research into our card index revealed that others are:

1961	v.c. 9	Dorset	Dr H.J.M. Bowen
	v.c. 48	Merioneth	Mr P.M. Benoit
	v.c. 78	Peebles	Mr D.J. McCosh
	v.c. 112	Shetland	Mr W. Scott
1962	v.c. H04	Mid Cork	Miss M.J.P. Scannell
1963	v.c. 51	Flint	Dr G. Wynne
	v.c. 111	Orkney	Miss E.R. Bullard
1964	v.c. 60	W. Lancs	Mr E.F. Greenwood
1965	v.c. 32	Northants	Mrs G.M. Gent

In addition, F.W. Simpson has been Recorder for E. Suffolk since 1951, and W. Suffolk since 1961, but jointly with others since 1975.

We are, as ever, very grateful to them and their colleagues for so many years of support.

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RECORDERS' CONFERENCE 2000

The biennial Recorders' Conference was held at St Martin's College, Lancaster, on August 25th-27th this year. A total of 81 people attended, despite the Bank Holiday traffic.

Friday evening's lecture was delivered by Dr James Munford, Programme Director of the National Biodiversity Network. He explained how the NBN had come about, who was involved, and what the philosophy of the organisation was all about. The role of naturalists societies such as the BSBI was emphasised, although he admitted that, as a community, we have had too little involvement so far – a deficiency that would soon be corrected. From my perspective as co-ordinator, I was pleased to see how well the members responded to this talk, and it was noticeable that the comments and questions were practical and sensible. For example, one person pointed out that the red and green dots on NBN distribution maps were useless to those with colour-blindness; while another had the explanation for Jim Munford's 'Pillwort anecdote' – why does it occur only in the hole in the middle of the West Lizard SSSI? For readers who were not there, I shall leave this as a challenge to you. The full text of this talk will be posted on the NBN web site: www.nbn.org.uk

Sarah Whild also entertained us for a brief talk on Friday evening, reviewing the progress of the BSBI over the last thirty years, in the light of a paper delivered in 1970 by Max Walters on the future of the Society, and a Presidential Address by David Pearman in 1995. Although it seems to be the norm to grumble about inactivity and shrinking membership numbers, Sarah pointed out that actually the Society has expanded enormously during that time, and has accomplished virtually all of the ambitions set out by those two earlier authors. Most surprisingly, perhaps, Dr Walters' recommendations could, with a little refinement, be adopted again as a concise and topical prescription for the next 30 years.

Saturday's events started with a three-hour session on the Atlas 2000 project, reviewing progress and drawing our attention to the tasks yet to be accomplished. The biggest challenges seem to revolve around status – native, alien and everything in between. I have a feeling that in future distribution and status might be seen as two separate issues, because the current situation appears to be a complete mess. However, a fascinating paper by Dr Chris Preston on archaeophytes, neophytes and natives paves the way towards a more scientific approach to the subject. The Atlas itself will undoubtedly stimulate debate, especially if some of the more dubious maps are actually published, as promised!

The afternoon saw the conference split into three groups. A coach trip to Hutton Roof Crag was well attended, and the explorers tested out rare plant monitoring techniques by plotting the precise position of juniper plants using a Global Positioning System, whilst also making a full site list and recording NVC quadrats. These are three of the standard recording techniques that we will need to start using more widely, as the demands of botanical recording increase. No tetrads or grid squares on that day! The others settled into a laboratory to pore over specimens of sedges, fumitories and roses, or gathered 'round the computer to test out the new Recorder 2000. We found it very interesting and in many ways rather silly. I wish our practical naturalists had been more involved in its design: the number of ludicrous inclusions is amazing. How on earth are we to record the date on which a person moved into their current address, I ask you? And do we even want to? On the other hand, vice-counties have been relegated to the level of irrelevance, on the grounds that they are old-fashioned. That will be regretted. BSBI recorders were given copies of the software to install and test out – we haven't decided yet whether or not it will become a (or the) standard package for the Society to adopt. I am open to persuasion.

The evening talk on Saturday was by Dr Fred Rumsey of the Natural History Museum. He introduced his studies on the *Asplenium* group which, we were told, should reclaim *Phyllitis* and *Ceterach*. The point of most interest to recorders was the identification of the various subspecies of *Asplenium trichomanes* (Maidenhair Spleenwort) that can be found in Britain, and I am sure that several people will have picked up on his prediction that there is another taxon, at present known only in continental Europe, that may be waiting to be discovered.

Sunday morning was the only part of the conference that I felt guilty about. Six fascinating talks had to be crammed into three hours, and I wish I had given them all a bit longer. Tim Rich was first, with an amazing statistical analysis of the last hundred and fifty years of recording. This is going to be written up shortly, so I shall not reveal his conclusions. Ruth Davis followed with a lively account of Plantlife and its relationship with the BSBI. Peter Kelly introduced his researches into *Saxifraga hirculus* (Marsh Saxifrage), a plant which appears to be suffering a terminal decline throughout Europe. Linda Moore, Cardiff's County Ecologist, brought us all down to earth with her account of the realities of delivering local Biodiversity Action Plans to an audience that struggles to name even one species of tree. Finally, David Pearman briefly related his plans for the future of vice-county Recorders, and Sarah Whild explained how local groups can help with the burdens of fieldwork and financing recording at the county level.

It is not for me to say whether people enjoyed the conference or not. I am sure that they are all too polite to grumble to me about my undoubtedly numerous deficiencies in organisational skills. But the staff at St. Martin's are always so helpful and obliging, and the speakers so interesting, that I cannot imagine anyone was really very dissatisfied. You can always tell if people are having a good time by the buzz of conversation filling the halls and corridors. It was also without doubt a botanically worthwhile conference, as John Day discovered a plant of the nationally scarce *Dryopteris submontana* (Rigid Buckler-fern) on one of the walls of the college. It just goes to show that you can make an important discovery almost anywhere, and the extraordinary concentration of botanists in that particular spot for many years makes no difference whatsoever. I wonder if Dr Rich can find a statistical explanation for this curious phenomenon?

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SUITABILITY OF HANDHELD GPS FOR FIELDWORK – AN UPDATE

Introduction. Most users of GPS will already be aware of a recent substantial improvement in accuracy. On May 1st after representations by the US emergency services and other bodies, President Clinton authorised the turning-off of 'Selective Availability' (SA) which was used to degrade the signals available to civilian users. Press reports stated that this measure would give 10× greater accuracy from simple sets – rivaling that previously only obtained by the more expensive and cumbersome differential GPS (DGPS) sets.

To update the article in *BSBI News* 81: 11-13, I started trials with my old 8-channel Garmin GPS45, which proved rather a disappointment – the average error was cut to about 12 m or to one-third. Garmin (Europe) kindly responded to my enquiries and again loaned me their 12-channel GPS12 for comparison and re-testing. The performance of this set was much better, as will be seen below.

Removal of SA has however exposed a host of smaller errors and uncertainties previously hidden in the system. Although most users will not be affected by them, they become important if all the accuracy now available is to be exploited – discussion of them is left to the penultimate section. Also the limited published data to hand implies results from other makes of GPS set may differ from those given here.

Test Results. As before I give the number of fixes falling into each error band relative to the position given to me by the Ordnance Survey, for both sets. The fixes were stored simultaneously at 1 minute intervals in batches of 9-13 over two days, any obviously unstable fixes by the GPS45 were rejected. The GPS12 was started first each time to give it 2 minutes to stabilise, however the results show this to be unnecessary, provided it was allowed a short period to lock on to all the satellites available to it, as indicated by its satellite status page.

Errors from OS position:

Metres:	0-4.9	5-9.9	10-14.9	15-19.9	20-24.9	25-29.9	30+	Total
GPS12	3	124	0	0	0	0	0	127
GPS45	2	44	23	8	9	4	0	100

The average errors were: GPS12 6.8 m and GPS45 11.0 m.

I found that the fixes from both sets were clustered about a point some 6.7 m NNE of the OS trig. point used. This kind of discrepancy has previously been found in tests and surveys using DGPS, and illustrates both the difficulty of representing a complex curved surface on a flat map, and modelling them in the GPS software. As this offset formed a large part of the errors quoted above, I recalculated the data using this point as 'true'. This gives a better picture of the repeatability of fixes now obtainable.

Errors from GPS12 mean position:

Metres:	0-4.9	5-9.9	10-14.9	15-19.9	20-24.9	25-29.9	30+	Total
GPS12	127	0	0	0	0	0	0	127
GPS45	41	29	11	12	6	1	0	100

Average error: GPS12 1.6 m and GPS45 8.3 m.

As the altitude readings seemed far more stable I recorded them at the main site c.300 feet above sea level and at a second site c.1500 feet up. The average figure was about 30 feet more than the OS value with a range c.25 feet about this (viz. +5 to +55), and was the same using the WGS84 map datum. The reason for this discrepancy appears in part to be the use by the GPS12 of the low spring tide datum point preferred by mariners.

In the original article I placed fieldwork activities into four categories which required increasing accuracy levels, and I will attempt to describe the impact of the change on each.

General Navigation (viz. using the GPS set to guide you to stored positions of features or areas taken from maps etc.) There was little obvious change here – position, bearing and speed information should all show less variation. The GPS12 was the more stable, but in practice there was little difference in performance between the 8 and 12 channel sets in fairly open positions. I would expect the 12 channel set to be superior in difficult positions. A simple compass may still be useful when moving slowly over difficult ground.

Position Fixing (viz. using the GPS set to provide OS refs. for recording purposes.) As a guide I have assumed that maps can be read to 0.5 mm which implies the intended position lies in a circle of that radius. At 1:50000 scale this radius represents 25 m, and at 1:25000 is 12.5 m. The position fixing ability of older sets will now approach that of 1:25000 maps with meaningful 8-figure grid references (viz. to 10 m), while modern handheld sets can fix positions to c.3 m. However in most cases there is little point in going beyond 8 figures because of the discrepancies in the representation of the OS Grid by GPS sets.

Location Recovery (viz. re-finding specific plants, permanent quadrats, etc.) This is where the benefits show most. The new level of accuracy would in theory permit re-finding of quite small plants, using the same or similar GPS set. To test this I placed 20p coins amongst vegetation – not hidden but away from paths and landmarks – at 10 sites in woodland and heath on a large local common in a random walk. At each site the position was stored as a waypoint after two minutes averaging by the GPS12. Later, from a random starting point, I recovered 9 of the coins, needing only a few minutes at each site, the 10th, one of 3 in woodland and a severe test for GPS was recovered on a second attempt. A simple compass would have helped orientation to the desired E-W and N-S co-ordinates. Having matched these I found it useful to put a marker on the ground and then search around it – the worst errors were about 3 m. The exercise illustrates the point that a 10^x improvement in linear accuracy cuts a search area by a factor of 100^x.

The test also showed that if there is enough light coming through the woodland canopy to allow ground vegetation to develop, then the GPS12 will probably work there.

Mapping. This category remains problematic. At the new level of accuracy the spread of colonies of bracken or *Spartina* could be reasonably recorded, but for errors to be say less than 10% of the diameter of a colony then that colony would have to be over 50 m across. So for small plants or areas the low-tech solution of simply gridding the area with strings and/or frames from fixed identifiable markers is preferable to the expense of survey class equipment.

Discussion. Now that SA has gone the main errors fall into three groups: firstly variations in the satellite orbits, clocks and signal propagation (which can all be minimised by use of DGPS); secondly chart/map errors (usually out of user control); thirdly receiver errors – including the co-ordinate conversion software.

Some brief test data, and additional background information, can be found in the July 2000 issues either of *Motor Boat and Yachting* pp. 83-4 or *Practical Boat Owner* pp. 54-6. WGS84 is the base datum used by GPS sets, and the four handheld sets tested at a hydrographic marker were most accurate when used in this mode to give latitude and longitude. That greater discrepancies existed when switched to OSGB (1936) lat. and long., or the grid, are probably due to the rather complex conversion to the older map datum.

The results of these tests suggest that WGS84 is the better datum where the greatest accuracy is required for location recovery by a different make or model of GPS set. You cannot mix the WGS84 datum with OS Grid co-ordinates – the errors approach 480 m – so the position should be communicated as degrees lat. and long. to 5 decimal places (*viz.* to c.1 m) with the source OS ref. given for comparison. Also although a search can be done using lat. and long. the Grid is more familiar. In theory there should be no need for the data to be collected in WGS84 – the conversion from/to OSGB and Grid can be done by sender and recipient storing the waypoint in the mode as collected, or communicated – and reconfiguring their sets as needed. You may have to switch off and on for the set to recognise the change. Only members experiences will tell whether this suggestion is useful. They should be aware, if conducting their own tests, that there have been reports of interference between GPS sets operated close together.

The GPS12 has an averaging facility built-in which now works well, users of older sets can manually average positions to achieve greater accuracy, as suggested in the previous article. With older sets 5 to 10 points taken over 30 minutes or so are preferable to more closely spaced fixes, reject fixes showing non-zero speeds on the display.

Conclusions. GPS has undoubtedly become more useful for field work, with more stable and repeatable fixes, and with modern sets most errors are smaller than are discernible on the OS maps in common use. Usable altitudes are now obtainable, albeit requiring a correction factor which is easily determined. Only the most accurate work will require action to minimise the remaining errors.

Acknowledgements. I would like to thank Garmin (Europe) Ltd for the loan of the GPS12, and Tim Bartlett FRIN, author of the articles in the boating press, for his courteous and detailed response to my enquiries. Neil Constable, Coast Path Officer for Cornwall County Council, kindly provided information on survey work using DGPS.

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NOTES AND ARTICLES

POA INFIRMA – A NEW GRASS FOR IRELAND

Early in the year, during a three week business trip to Cork, I was able to get out and around in County Cork. This was in March and so I concentrated on visiting places similar to the sites in South Hampshire where *Poa infirma* (Early Meadow-grass) has recently been found. These are frequently roadsides in the disturbed gravel edge. Often the plants are growing in the shelter of a wall.

I searched many places that appeared suitable and eventually found a single site where there were several hundred plants. The site was at Castlepark near Kinsale to the West of St James's Fort on the roadside at the foot of a wall, with the Bandon River on the other side of the wall. The plants were well sheltered by the wall and the promontory with the Fort on top. This was on the 19th March at W/644.494. Specimens were sent to Dr John Edmonson who confirmed the plant's identity and to the Recorder for H4 Mid Cork, Tom O'Mahony. He subsequently visited the site and found plants on the other side of the same road and informed me that the plants were in fact found in West Cork, H3, as the river is the boundary.

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MORE NOTES ON THE BREEDING BEHAVIOUR OF *VULPIA FASCICULATA*

Introduction An article last September (*BSBI News* **82**: 37-39), was prompted by the unusual prevalence of chasmogamy in the normally self-fertilised (autogamous) sand dune grass *Vulpia fasciculata* (Dune Fescue) growing at Wallasey, Cheshire (v.c. 58). I also commented on other factors which might upset the natural barriers to hybridisation with *Festuca rubra* (Red Fescue) to produce \times *Festulpia hubbardii*. This year has provided the opportunity for closer study and revealed some interesting points.

Flowering of *Vulpia fasciculata*. Chasmogamy was much reduced this year, probably due to less fine weather compared with early May 1999, but open florets were still found. My surmise that plants growing in the shade of poplar scrub might flower later is wrong. They tend to be quite luxuriant, and in consequence produce more florets which extends the flowering period slightly. Because they remain green longer they appear younger, however comparison with similar sized plants not growing in shade showed that in both habitats most florets had well developed seed by the last week of May. Only the higher florets in some spikelets had fresh anthers, and these smaller florets are often male only. The poplar scrub is deciduous so growth of these winter annuals will be little affected by shade earlier in the year, and I suspect that day-length is the main factor in controlling the flowering process.

Flowering of *Festuca rubra* and \times *Festulpia hubbardii*. As an annual, *V. fasciculata* relies on high fertility to maintain or increase populations, cross fertilisation leading to sterile \times *Festulpia* hybrids is clearly a disadvantage. The gap in the flowering time of it and *Festuca rubra* was alluded to previously, and this year anthesis in our local *F. rubra* started on the 14-15th July, and coincided with the national warnings of high pollen counts.

The hybrids trend in many characters towards the *Festuca* parent, and four specimens in cultivation from Talacre, Flint. (v.c. 51) and Wallasey opened their florets on the 19th July. This seems to rule out an early flowering strain of *F. rubra* in their parentage. It also implies that backcrosses, if they exist, would resemble *F. rubra* even more closely, as only that pollen is likely to be available by then.

Is trampling important? A closer search of the Wallasey dunes revealed several more hybrid plants, and also a curious coincidence. Almost all the plants found here, and the few that I have found at Talacre, and Deganwy, Caerns. (v.c. 49), have been by sandy paths or in trampled areas. Even the hybrids in the shade of poplar scrub at Wallasey were probably at the side of the path before it was diverted by growth of the scrub.

Both field and experimental evidence point to the *Vulpia* as being the female parent of the hybrid, and passage of humans and animals undoubtedly helps the spread of its seed along paths. This often brings it into close proximity to *Festuca rubra*, which may be important if pollen life is short. But the number of hybrids found in this habitat, compared with other areas of the dunes where *Vulpia* also grows profusely, leads me to think that trampling may be a significant factor in hybrid formation.

Discussion. That trampling can aid dispersal of *Vulpia fasciculata* and provide it with suitable disturbed habitats is mentioned in the paper by Watkinson (1978, p. 1046) cited previously. He also mentions (p. 1047) that a small amount of seed may remain buried but viable for up to 7 months, and elsewhere (p. 1043) that unvernalisated plants can flower up to 2 months later than normal. From this one may deduce that soil disturbance could result in a few late flowering plants, but if this were the only factor, then I would expect to see more hybrids in *Vulpia* stands on the flanks of mobile dunes.

Because the Wallasey dunes are near an urban area, use for dog walking, etc., goes on for much of the year and the effects on the young plants may be significant. How damage to the plants would help to overcome the normal breeding barriers is not clear – the production of later flowering secondary growth after rabbit grazing is known from other sites – trampling may have the same effect. Other possibilities are that it causes emasculation directly or helps insect or fungal attack. Damage to leaf sheath and florets could in theory assist cross pollination, but my own experience many years ago in dissecting immature florets was that they are easily killed.

Circumstances at Wallasey seem to be conducive to hybrid formation, but I have not yet found it at West Kirby (c.8 km SW) where a smaller colony of *V. fasciculata* exists. *×Festulpia hubbardi* can be difficult to find, especially when growing amongst *Festuca rubra*, but a piece of white card or paper held behind the inflorescences helps to show any longer-awned plants worthy of closer inspection.

Acknowledgements. Computer problems prevented these being added to the earlier article – I owe thanks to the following: The Zoology Dept. of the University of Bristol for identifying the thrips many years ago, to Chris Felton, Curator of Arachnology at Liverpool Museum, for checking the current nomenclature and providing useful literature leads, and finally to the library of the Liverpool School of Tropical Medicine for access to those references.

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MELICA UNIFLORA f. ALBIDA

Those who come to my garden are attracted by what I call White Grass (*Melica uniflora* f. *albida*). It thrives there and has a story.

On 29th May 1955 I was in Larkeyvalley Wood in E. Kent (v.c. 15) with Edgar Milne-Redhead, Noel Sandwith, Victor Summerhayes, Ted Lousley and one or two others, after orchids. At the end of the queue through the wood was Dr Scott of Westwell. He called us back to ask what it was we had all walked by. It proved to be a good patch of the very rare white form of Wood Melick. Most of us had never heard of it, let alone seen it, but Noel said he had. He was driving back from Bristol and stopped for a call of nature: in front of him was just such a grass. But where this was, he did not know. Perhaps someone may come across it thereabouts. Meanwhile I will willingly give some from my garden to anyone who would like it. Best come and fetch it!

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GLECHOMA HEDERACEA f. rosea (alas)

Just now is the time to put on record some help given me by Duggie Kent.

Forty years ago, when the first survey of the garden of Buckingham Palace came out, there was a division of opinion about using capital letters for personal epithets. I was in favour of this courtesy, and I thought I had a good case to press the matter.

Soon after the war, Francis Rose found in N. Kent (at Mounts Wood, Greenhithe, which sadly no longer exists) a Ground-ivy with pink flowers. I have it still with a particularly good colour in bud. I took some to the Palace garden, which ended up on the bank above the Picture Gallery, where it could be spied from the road. Since it was well established, it needed a name in the Report.

I could find no reference to such a plant anywhere. So I drafted a note publishing f. *Rosea* for it, adding that the epithet must be spelt with a capital letter to emphasise that the epithet referred to Dr Rose, the finder and not to its colour. This got into the printed proof. At the last minute, Duggie told me that he had discovered such a plant being called f. *rosea* by Neumann. So my little sally failed.

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RED SPOTS ON LEONTODON HISPIDUS

On three occasions during the last year I have found specimens of *Leontodon hispidus* (Rough Hawkbit) with red dots on the mid-rib of the leaf. In non-flowering specimens the absence of red dots is sometimes used to distinguish *L. hispidus* from *L. saxatilis* (Lesser Hawkbit). My observations would suggest this is an unsafe method. Each time the plants were growing on rather thin soil and it was the lower leaves that had the red dots.

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COCHLEARIA DANICA ON IRISH ROADSIDES

Much has been written, particularly in the pages of the Society's journals, on the presence and spread of halophytes on inland roadsides in Britain – see, for example, articles in *BSBI News* **52**: 15–16; **54**: 48; **55**: 20–21; **56**: 11–12, 15; **59**: 11–12; **64**: 18–19; **65**: 11–12, 12–13, 13; **69**: 17–18, 73–74; **70**: 39; **71**: 25, 25–27; **72**: 23, 24, 25; **73**: 21, 22, 22–23, 23; **74**: 21–22, 22, 23, 23–24; **75**: 19, 29–30; **77**: 38; **79**: 51–52, 52, 52–53; **80**: 29–30; **81**: 36–37; **82**: 37, 39; **83**: 28, 31; **84**: 20, 21; *Watsonia* **11**: 146–147; **12**: 393; **14**: 41–52, 304, 15; 381–386, *Nature in Cambridgeshire* No. **36**: 37–60; *Vegetatio* **62**: 430–440, amongst others.

By contrast, there is much less published on the occurrence of halophytes along inland roads in Ireland. The presence of populations of *Cochlearia danica* (Danish Scurvygrass) occurring along inland roads in Cos Antrim, Armagh and Down was indicated by Leach (1994), while an earlier publication (Leach 1990) mapped records of the species from two inland squares (H86 and H96) straddling Cos Armagh and Tyrone — on the basis of his subsequent article it would appear that both of these records were from Co. Armagh, no doubt associated with the M1 motorway. Beesley (1995) reported the establishment of the species along the M2 motorway and other roadside sites in Belfast, while McNeill (1996) noted it to have spread along the M1 and M2 motorways, reaching Co. Tyrone by

1990. McNeill (*op. cit.*) also noted the presence in Tyrone of a roadside population of another halophytic species, *Spergularia marina* (Lesser Sea-spurrey). Beesley and Wilde (1997) noted the occurrence of roadside populations of *Cochlearia danica* in eight 1 km squares in the area covered by their urban flora of Belfast. Most recently, McNeill (2000) described populations of *Cochlearia danica* occurring both along and away from inland motorways (M1 and M2) and dual carriageways in Cos Antrim, Armagh, Derry, Down and Tyrone (v.cc. H36–H40). A non-roadside population at Gosford Castle, Co. Armagh, c.30 km from the sea, was studied by Wyse Jackson (1983).

All of the above Irish records are from Northern Ireland and, to my knowledge, there has been no published reference to the presence of *Cochlearia danica* from inland roadside sites elsewhere in Ireland. The species has, however, been recorded from a number of non-roadside sites inland in the Republic of Ireland — Webb (1957) noted it on old roofs at Macroom, Co. Cork (35 km inland), while Praeger (1934) reported it from old buildings at Athenry, Co. Galway (c.12 km inland). The species has also been reported from a number of inland sites associated with railway lines, e.g. in Dublin (Dublin Naturalists' Field Club — Doogue *et al.* 1998), Galway (Praeger 1934), Kildare (Doogue 1972), Westmeath (Scannell and Synnott 1987, 1990) and Wicklow (Brunker 1950). Perring and Walters (1962) mapped a record from near Ballyhaunis, Co. Mayo, and it is likely that this record also derives from the railway line, which passes through the town. However, the species is not listed from East Mayo (v.c. H26) by Synnott (1986) or Scannell and Synnott (1987) so there must be some doubt attached to the validity of this record.

Because *Cochlearia danica* has apparently not been previously reported from southern Irish roadsides it was felt, in the interests of establishing a baseline, to be worthwhile drawing attention to the presence of populations of this species growing along a main road in Co. Kildare, some 30 km inland. Site details are as follows: 'Growing abundantly on sandy grit by the central reservation of the N1 dual carriageway c.400 m east of Kill, Co. Kildare, v.c. H19. Gr. N947233. M. Wyse Jackson, 6.2.1999.' A specimen, collected on 12.5.1999, has been lodged in the Trinity College, Dublin Herbarium (TCD). A second population, noted on the above dates, occurs on ballast and sandy grit on the central reservation of this dual carriageway 3–4 km to the west, near the turn-off for Naas (N914213).

How *Cochlearia danica* arrived at these Kildare sites is unclear. Perhaps seeds were carried inland in coastal sand used for road workings — Stelfox (1969), noted how the distribution of plants could be affected by road construction, citing the presence of roadside populations of *Carex arenaria* (Sand Sedge) and *Erodium cicutarium* (Common Stork's-bill) approximately 1.5 km inland in the Mourne Mountains, and suggested that they were derived from coastal sand transported inland for use in road works.

Whatever the history of the arrival of *Cochlearia danica* to its sites along the Naas dual carriageway, it certainly appears to be at home here, suitable conditions encouraged no doubt by road salting. McNeill (1996) referred to it as a species that relishes the salty environments of our modern roads, while road salting was also suggested as a possible reason for the presence of the species along motorways and other major roads in Belfast (Beesley and Wilde 1997).

It will be interesting to see whether *Cochlearia danica* continues to expand its range inland in the Republic of Ireland, as it has in Northern Ireland and Britain. Given the ongoing national development programme of road construction and upgrading it would not surprise me to see *Cochlearia danica* growing by roads near Athlone or Mullingar, well away from its more usual coastal haunts, in the not too distant future.

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AN EXPLOSION OF VALERIANELLA CARINATA?

Until I came to Oxfordshire I regarded *Valerianella carinata* (Keeled-fruited Cornsalad) as a rarity having seen it only once, and at the writing-up stage of the Oxfordshire Flora I found only three post-1927 records to which I myself added three scattered ones from 1993 onwards. Nearly all the *Valerianellas* seemed to be *V. locusta* (Common Cornsalad).

This year the picture has changed. While electioneering in Kidlington I examined fruits in two tetrads and found the 'dugout canoe' shapes of *V. carinata* in both. I thought I would check these against the plants found in my garden, where my original diagnosis years ago had been *V. locusta* and found not the 'flattened egg' shapes of that species but yet more *V. carinata*, the plant in question had been in flower since 31st March. A careful search revealed that my garden now has both species. They are so alike that only viewing the fruits under a lens can separate them: I began to wonder whether in the recent wet weather the 'flattened-egg' fruits had partly aborted giving the 'dugout canoe' kind, but the latter are consistently found on the plants that have them. When I went to Goring to *recce* my BSBI excursion there, I again found *V. carinata* and *V. locusta* in each of two tetrads. Yet another plant on a wall at Brasenose Farm, and one reported to me last year at Sutton Courtenay complete the picture; the number of records near here has more than doubled in a few weeks. Has this happened anywhere else?

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'FREAK' CLOVER IN NORFOLK

On June 16th 2000, whilst plant recording in Stanford Training Area, v.c. 28 West Norfolk, I was walking across some wet grassland known as Hook's Well when, at a distance of at least 50 m, I spotted a number of upstanding pink spikes with the appearance, at that distance, of *Anacamptis pyramidalis* (Pyramidal Orchid). Walking across to the group, I was astonished to discover a plant of a pink clover with all flowers sharply deflexed (see photo page 42). The individual flowers were somewhat smaller than those present on a specimen of *Trifolium pratense* (Red Clover) just a few feet away, and were much more tightly packed in the head than in that plant.

The leaves were indistinguishable from that of red clover, though perhaps slightly smaller, but the stems were rather long and trailing and purplish in colour. They also gave the impression that, given half a chance they might root at the nodes. A specimen has been seen by Mrs G. Beckett, v.c. recorder for West Norfolk, who has seen nothing like it before. As there is no BSBI referee covering *Trifolium*, I would like to offer the matter for discussion with the suggestion that my impression at the time was that it could just be *Trifolium pratense* × *T. repens*.

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MORE ON GENETICALLY MODIFIED CROPS – 1

I expect there will have been a full postbag following the two letters in *BSBI News* 84, so I will confine myself to what I know.

In trials in the USA, maize pollen has been proved to travel 9 miles (14.5 km), and has a detrimental effect on the Monarch butterfly whose food plants had become infected with the pollen, even though it was only on the surface of the food plant. Bees visiting GM rapeseed modified with insecticide are said to reach mortality 2 weeks earlier than uninfected bees.

The present regulations are a shambles. For instance, the government is committed to helping organic farmers establish their businesses. It has, however, licensed a crop of GM sugar beet this summer on a field at Stow Bedon, Norfolk next door to a licensed grower of organic salad crops including red beet, which will be within 150 m of his crop, the minimum stipulated distance is 600 m.

Lyng, in Norfolk was in the news last summer – and again at the present time due to a certain trial that is taking place at the time of writing, concerning a 2.5 ha crop of GM maize – the one with the drifting pollen – and again, a small organic grower nearby was ignored, and, I might add, so were all the gardeners who might be growing their own crops of sweet corn. However, this was not the end of that particular story, as the crop was not due to be destroyed, as is supposed to happen in some cases, but was to be fed to a dairy herd. If, and I would emphasise the if. If there is likely to be anything unpleasant passed into the food chain from GM maize, there is no better way of doing it than by feeding the stuff to dairy cows, as dairy products, and especially milk are the best possible vectors of anything from bad tastes to *Listeria*, TB or what have you. I had a good example of that during the 1960s when a herd I was managing was on a low cost production regime, and had to munch their way through 7 tons of reject cheese and onion potato crisps. The milk was almost undrinkable!

Though not a member of Friends of the Earth, I would not have described it as a 'non-scientific pressure group' as I believe that many of their leading lights have as good scientific qualifications as those who seek to most probably cause irreparable damage, to our environment. For, once such alien characteristics from, say, oil seed rape cross to other wild members of the genus, e.g. *Brassica nigra*, which is common in places in East Anglia where so much rape is grown, our rapidly declining beneficial insect populations, such as bees of various kinds will very quickly be a thing of the past. I have been cataloguing the decline in populations of birds, plants and insects in my diaries for well over half a century now, and am convinced that genetically modifying crops with alien characteristics is a step too far, and a step which may later be greatly regretted by all concerned. If these tests have to be carried out, they should be on a scale small enough so that everything is self-contained and nothing can escape

into the environment, for, once this has happened, there can be no recalling it. Why take risks with what wildlife is left to us, just to justify the existence of mega companies whose only care is for their shareholders?

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MORE ON GENETICALLY MODIFIED CROPS – 2

Defenders of the development of GM crops very often use the dubious argument put forward by Prof. Moore in *BSBI News* 84 that plant-breeding programmes undertaken over many generations are not different from the interspecific transgenic modifications which are the subject of current fears and objections. The concerns which all responsible people should be addressing are of current urgency and seem to be the following:

- a) the introduction of 'terminator' genes into any plant material. Whether or not there is a risk of these genes getting into the natural environment, there are very serious commercial and social implications to such modifications;
- b) 'the possible permanent genetic modification of any of our native species', (James Iliff's note in the same issue);
- c) the serious issues of the effect of genetically modified crops on the ecosystem: (i) herbicide-resistant crops;
(ii) pest-resistant crops.
—both of these developments will extend the damage done to the environment particularly over the last 50 years and at an accelerated rate if, for instance, the use of biocides is made easier for farmers.

These concerns, particularly the last two, seem to be of legitimate consideration for BSBI members. It is, perhaps, unfortunate that Friends of the Earth uses political rather than scientific language, but they have important things to say. It is not enough to bewail the disappearance of our treasured plants. I wonder if, like the Churches, we can afford *not* to get involved in politics.

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MORE ON GENETICALLY MODIFIED CROPS – 3

In *BSBI News* 83, David M. Moore calls for 'no more unscientific, emotive propaganda' on the subject of GM crops.

Happy to oblige, professor, but will you remove the beam from your own eye at the same time? Please do not insult my intelligence by implying that plant-breeding and GM are one and the same thing. This propaganda of the biochemical industry is tiresome and disingenuous at best, calculated and self-serving lies at worst.

The one usually involves no more than accentuation of characteristics inherent to a given species, either solely or in conjunction with a very close natural relative.

The other frequently involves the introduction to a species, in a non-field environment, of genetic material taken from another species in a wholly different phylum. The consequences of genetic interaction in the field on subsequent generations, of both native and non-native species, is wholly unknown.

It might assist 'non-scientific pressure groups' to engage in reasoned debate if some members of the scientific community did not -

- assume that they are the only people qualified to speak on scientific issues;
- believe that they always speak wholly objectively and scientifically; and
- patronize the rest of us with their condescension.

From an amateur trying to do his best to understand.

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MORE ON GENETICALLY MODIFIED CROPS – 4

James Iliff (*BSBI News* 84: 24-25) asks 'how far can pollen be expected to travel' and answers that since this is 'presumably unanswerable', predetermining the sizes of 'buffer zones' is fruitless. This aspect of GM has perplexed me too but I found some help in a paper based on a conspectus of a number of studies published in May last year by staff of the John Innes Centre, Norwich (Moyes and Dale 1999).

Physical distance is only one of four important factors governing degrees of cross contamination in crop plants. Others are the level of inbreeding in the crop, the overlap in flowering period and the area of the crop grown. Pollen mortality is also significant: 'the life span of grass pollen may be as short as 30 minutes and even in insect-pollinated species with sticky pollen, longevity rarely exceeds one day'. Given all that, they conclude that for both wind and insect pollinated species pollen concentration decreases rapidly close to the source but low levels can be detected at much longer distances. They summarise, for 14 different groups of crops, studies of the distances over which levels drop rapidly and the distance over which low levels persist. Clearly, results differ from species to species.

MAFF has issued regulations for minimum isolation distances to be observed for seed production crops. Basic seed for multiplication to produce the certified seed sold to farmers carries the most stringent restriction. Moyes and Dale give excerpts from these regulations for 21 crop species or species groups. The examples show a range of required separation from 2 m (mostly in cereals) to 1000 m (for rye, brassicas and beets). There is a bibliography of over 100 titles.

I conclude from all this that 'how far pollen can be expected to travel' is not completely unanswerable, though it is important to be specific and to remember that observations of dispersions typically show a statistical leptokurtic curve with a long tail. How safe all this is, and how safe is 'safe', are additional questions.

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BOTANY IN SONG

BSBI members with access to the World Wide Web (and a PC that plays sounds) may like to listen to some of a collection of songs for children about science. These were commercially recorded in the USA in the late 1950s and early 1960s, and written by Hy Zaret and, appropriately, Lou Singer.

An American fan of these songs has converted them into a format suitable for transfer over the Internet and has made them available on his Web site, at http://www.acme.com/jef/science_songs/

Among them are ditties on botanical themes, such as:

Why Do Leaves Change Their Color [sic]
 What Are The Parts Of A Tree
 How Do The Seeds Of Plants Travel, and
 What Are The Parts Of A Flower

While no match for 'Der Winterreise', say, they are quite musical and also scientifically accurate. Zaret also wrote the lyrics to the popular song 'Unchained Melody', recorded by Jimmy Young and, later, the Righteous Brothers, so one can guess the level of sophistication. All the same, lines like 'it's time we were explainin' the purpose of the stamen' still make one shudder!

(Technical note: the songs are in MP3 format and each is about half a megabyte in size.)

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BEECH TREE VARIANTS IN SAVERNAKE FOREST

Beech trees (*Fagus sylvatica*) usually have spreading boughs. Savernake Forest is known for a particular beech tree variant, comprising tall graceful trees with narrowly-angled (or very narrowly-angled) main boughs, even when open-grown. On rare occasions these closely angled, almost vertical boughs can coalesce. Normally spreading beech trees are also common in Savernake Forest, even when closely-grown. There is the full range of intermediates in between.

Another distinctive variant was noted by J.T. Wildash in 1951; 'The bark of this remarkable tree is rough & furrowed as an oak' (Grose 1957). The two photos (page 43) show the comparison between this 'Oak-barked' variant (upper) and the normal smooth-barked beech (lower). The tree shown in the upper photo had a girth of 383 cm, at 150 cm from ground level: the lower one is of comparable size, but with a slightly greater girth, and both were healthy. Unlike the normal smooth-barked beeches, the Oak-barked variant is rich in epiphytic bryophytes and lichens.

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LANCASHIRE HOSPITALITY TOO!

In case anybody should imagine that the splendid saying about apples (*Malus domestica*), cheese, kisses and squeezes (see *BSBI News* **84**: 30) only hails from Yorkshire, I should mention that I first heard it from my mother-in-law, who was a Lancashire lass from Blackburn. I have to admit, however, that we may have been in Yorkshire at the time!

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NETTLES IN ICELAND

I read with interest Caroline Mhic Daeid's article about *Urtica dioica* (nettle) in *BSBI News* **84**, and I was reminded of a visit my wife and I made to Iceland a few years ago.

We discovered that there was a botanic garden in Reykjavik. It was a long walk from the town, but well worth the visit. The plants were well presented and at the top of one of the paths was a large bed of nettles, obviously well tended and clearly labeled, ~ a sight which brought a smile to my face.

Later that day we met the lady who was in charge of the garden. We soon discovered that we were 'on the same wavelength' and she asked me whether I had a copy of the *Flora of Iceland*. When I explained that I did not, she offered to lend me her copy for the rest of our stay. I was somewhat taken aback, but she insisted, adding '... take it, botanists are honest people'.

My present copy of the *Flora* (not the one I borrowed!) tells me that *Urtica dioica* is not a native to Iceland, but merely 'naturalized near homesteads in a few places'.

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SEA-BEANS IN THE CAMBRIDGESHIRE FENS, 2000

To coincide, it seems, with the publication of the BSBI's latest handbook, there have been several extraordinary, terrestrial collections of sea-beans within a few kilometres of the home of the handbook's author. These records are noteworthy.

The first was found by Mrs Joan Fowler 'around Christmas 1999 . . . [was] lying on the ground, in a hedge' in Rectory Road, Outwell, Cambridgeshire (v.c. 29), and was reported in *The Fenland citizen* on 1 March 2000 ('Mystery object baffles boffins': p. 10). Although the 'mystery object', alias 'The Millennium Bug', had defeated all attempts by an unnamed botanist to identify it, it was immediately recognised by the author and, independently, by R. Ingram (*The Fenland citizen* 8 March 2000: p. 6), as a well-preserved specimen of the intact endocarp of *Lodoicea maldivica*, an endangered palm endemic in the Seychelles, Indian Ocean. The specimen, judging from the photograph, probably had not floated in the ocean.

Even more remarkable, in some senses, was the collection of a fine – and again intact – specimen of sea-heart (see Figure 1), *Entada gigas*, on 11 April 2000 by Dr Sue Nelson and Miss Emily Robinson 'just outside The Globe', a well-known Upwell hostelry, within about 1.5 km of the locality where *Lodoicea maldivica* was found (Upwell and Outwell are adjacent villages). This specimen, just over 4 cm across, had clearly been floating in the ocean for many months as there are substantial, tell-tale signs of barnacle-encrustation. The specimen is indubitably a genuine long-distance drift-seed. *Entada gigas* is one of the most frequently stranded tropical seeds but is more usually found on Atlantic beaches.

Upwell and Outwell lie about 25 km (as a sea-gull flies) from The Wash, and are 'connected' to it via Well Creek and the River Great Ouse, although it should be noted that Well Creek is not known to be tidal! It is, therefore, rather improbable that these two drift-seeds could have reached Upwell and Outwell directly from the Atlantic via the North Sea and Great Ouse estuary. There have been no reports of tornadoes, water-spouts or similar phenomena that could be invoked to explain the deposition of these two specimens by 'natural causes' so far inland. Most mysterious.

The specimen of *Entada gigas* is in the finders' possession. The present whereabouts of the specimen of *Lodoicea maldivica* is not known.

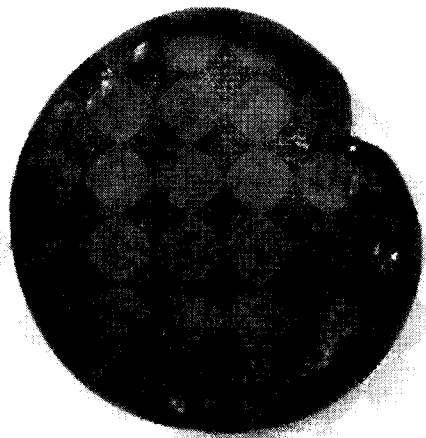


Figure 1. The Upwell sea-bean, *Entada gigas*.

ROUSSEAU REVISITED

The article by Margaret Souchier on J.J. Rousseau and his *Flora Petrinsularis* (*BSBI News* **84**: 22-23) invites two comments:

- First – (serious). At our international Conference at Bailleul in July 1998 (see report by Franklyn Perring in *BSBI News* **80**: 60-63) a German participant pointed out that ‘dividing [a section of] the island into small squares intending to visit them all one after another in every season’ was the earliest known use of the grid system now universally employed for biological recording. Can any reader find an earlier, or was Rousseau a significant inventor?
- Secondly – (relatively trivial). Surely note 2 (on Rousseau’s title) is mistaken in claiming a connection with Petrina or Petra in Sicily. *Petrinsularis* is simply the Latin for ‘of the Île Saint-Pierre’, which remains the name of the island to this day.

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BOTANY IN LITERATURE – 24

The French statesman and writer Chateaubriand came to England as an asylum-seeker to escape the post-revolutionary Terror of 1793. He is well-known for publishing in 1802 *Le Génie du Christianisme* in which (in Book V of Part one) he infers the existence of God from the wonders of Nature. After 3 chapters on animal migration, a brief (4-page) chapter on plant migration (coconuts!) includes the following passage of interest to BSBI members. I don’t risk translating it, as to do so would prejudice the answer to my question: ‘What is he describing?’

On nous a montré au bord de l’*Yar*, petite rivière du comté de Suffolk en Angleterre, une espèce de cresson fort curieux: il change de place, et s’avance comme par bonds et par sauts. Il porte plusieurs chevelus dans ses cimes, lorsque ceux qui se trouvent à l’une des extrémités de la masse sont assez longs pour atteindre au fond de l’eau, ils y prennent racine. Tirées par l’action de la plante qui s’abaisse sur son nouveau pied, les griffes du côté opposé lâchent prise, et la cressonnière, tournant sur son pivot, se déplace de toute la longueur de son banc. Le lendemain on cherche la plante dans l’endroit où on l’a laissée la veille, et on l’aperçoit plus haut ou plus bas sur le cours de l’onde, formant, avec le reste des familles fluviatiles, de nouveaux effets et de nouvelles harmonies. Nous n’avons vu ni la floraison ni la fructification de ce cresson singulière.

Cresson normally means only watercress. We know *Rorippa nasturtium-aquaticum* forms roots (*chevelus*?) along the stems, but not at their tips (*cimes*). *Cresson doré* is the Golden Saxifrage (*Chrysosplenium*), but the habitat seems wrong. *Cresson de cheval* (Brooklime; *Veronica beccabunga*) is less implausible – but it would be strange to find any of these with neither flower nor fruit. This last observation, together with Suffolk, hints at *Stratiotes* (Water Soldier). But that’s much less cressy than any of the others. And then there’s ‘jumping’ upstream as well as down. What do readers think?

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NATURAL HISTORY (ENTOMOLOGY) IN LITERATURE

In her novel *Felix Holt: the radical* (1865-66), George Eliot as in *Middlemarch* (see *BSBI News* **80**: 34-35 (1999)), draws on Darwin’s *The Origin of Species* (1859).

The page numbers for the following two extracts, both of which reflect the then new-found interest in natural history (*cf.* Rousseau’s discovery of botany via Linnaeus: *BSBI News* **84**: 22-23 (2000), refer to the Penguin Classics edition of 1995. The setting is Transome Court as seen through the eyes of the heroine and newly realised heiress Esther, who here reflects on the dangers of the wrong choice of marriage partner.

pp. 14-15

At last, prompted by some sudden thought or by some sound, she rose and went hastily beyond the tapestry curtain into the library. She paused near the door without speaking: apparently she only wished to see that no harm was being done. A man nearer seventy than sixty was in the act of ranging on a large library-table a series of shallow drawers, some of them containing dried insects,¹ others mineralogical² specimens. His pale mild eyes, receding lower jaw, and slight frame, could never have expressed much vigour, either bodily or mental; but he had now the unevenness of gait and feebleness of gesture which tell of a past paralytic seizure. His threadbare clothes were thoroughly brushed, his soft white hair was carefully parted and arranged: he was not a neglected-looking old man; and at his side a fine black retriever, also old, sat on its haunches, and watched him as he went to and fro. But when Mrs Transome appeared within the doorway, her husband paused in his work and shrank like a timid animal looked at in a cage where flight is impossible. He was conscious of a troublesome intention, for which he had been rebuked before – that of disturbing all his specimens with a view to a new arrangement.

pp. 378-9

The old man seemed so happy now in the new world created for him by Dominic and Harry, that he would perhaps have made a holocaust of his flies³ and beetles⁴ if it had been necessary in order to keep this living, lively kindness about him. He no longer confined himself to the library, but shuffled along from room to room, staying and looking on at what was going forward wherever he did not find Mrs Transome alone.

To Esther the sight of this feeble-minded, timid, paralytic man, who had long abdicated all mastery over the things that were his, was something piteous . . . Her thoughts went back in conjecture over the past life of Mr and Mrs Transome, a couple so strangely different from each other. She found it impossible to arrange their existence⁵ in the seclusion of this fine park and in this lofty large-roomed house, where it seemed quite ridiculous to be anything so small as a human being,⁶ without finding it rather dull. Mr Transome had always had his beetles,⁷ but Mrs Transome –? It was not easy to conceive that the husband and wife had ever been very fond of each other.

NOTES

1. *dried insects*: The Class Insecta of the Phylum Arthropoda (classified as a subphylum by some) which comprises ten orders: Lepidoptera (moths and butterflies), Coleoptera (beetles), Diptera (flies), Thysanura (bristletails), Dictyoptera (cockroaches, praying mantises), Orthoptera (Saltatoria) (grasshoppers, crickets, locusts; see *BSBI News* 80: 35 1995), Demaptera (earwigs), Psocoptera ('booklice', 'dustlice', or 'barklice'), Hemiptera (bugs (bedbugs, aphids, leafhoppers and many others)), Hymenoptera (ants, bees, wasps). On page 20 Mr Transome is described by his wife as 'a distracted insect' (*viz.* semblent of his collection as well as a small, wretched, insignificant person).
2. *mineralogical specimens*: The arrangement could well be that used by The Natural History Museum (London) which is as follows: (1) Native elements, (2) Sulphides, (3) Oxides and hydroxides, (4) Halides, (5) Carbonates, (6) Nitrates and borates, (7) Sulphates and chromates, (8) Molybdates and tungstates, (9) Phosphates, (10) Arsenates and vandates, (11) Silicates.
3. *flies*: Order Diptera of the Class Insecta (see above) which comprises 3 sub-orders (Nematocera, Brachycera, Cyclorrhapha, 3 series (Aschiza, Schizophora, Pupipara, 1 section (Calypterae) and 78 families, one of the most picturesquely described being the Platypezidae, flat-footed flies).
4. *beetles*: Order Coleoptera of the Class Insecta (see above) which, with over 350,000 species, is the largest order within the animal kingdom. Space does not permit even an outline classification here, but it comprises 4 sub-orders, 22 superfamilies, and approximately 168 families.

5. *arrange their existence*: Unlike a tidy arrangement of insects and minerals, Esther finds it impossible to explain the notion of Mr and Mrs Transome as husband and wife so neatly; they do not belong to the same 'order'.
6. *small as a human being*: The allusion is also, in the scale of things, to as small as an insect.
7. *Mr Transome had always had his beetles*: yet he has 'long abdicated all mastery over things which were his'. Once Mrs Transome sees him arranging (or planning to rearrange) his specimens, he shrinks 'like a timid animal' or a child playing with a forbidden toy. It does not fit in with Mrs Transome's would-be 'fine- ladyism' order of things: she is no lover of natural history

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AN EXPLOSION OF VALERIANELLA CARINATA?

Until I came to Oxfordshire I regarded *Valerianella carinata* (Keeled-fruited Cornsalad) as a rarity having seen it only once, and at the writing-up stage of the Oxfordshire Flora I found only three post-1927 records to which I myself added three scattered ones from 1993 onwards. Nearly all the *Valerianellas* seemed to be *V. locusta* (Common Cornsalad).

This year the picture has changed. While electioneering in Kidlington I examined fruits in two tetrads and found the 'dugout canoe' shapes of *V. carinata* in both. I thought I would check these against the plants found in my garden, where my original diagnosis years ago had been *V. locusta* and found not the 'flattened egg' shapes of that species but yet more *V. carinata*; the plant in question had been in flower since 31st March. A careful search revealed that my garden now has both species. They are so alike that only viewing the fruits under a lens can separate them: I began to wonder whether in the recent wet weather the 'flattened-egg' fruits had partly aborted giving the 'dugout canoe' kind, but the latter are consistently found on the plants that have them. When I went to Goring to *recce* my BSBI excursion there, I again found *V. carinata* and *V. locusta* in each of two tetrads. Yet another plant on a wall at Brasenose Farm, and one reported to me last year at Sutton Courtenay complete the picture; the number of records near here has more than doubled in a few weeks. Has this happened anywhere else?

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ON VETERAN IVY

One tends to take for granted the fact that ivy, *Hedera helix*, has the potential for achieving substantial stem dimensions. On June 17 2000, in the Cleeve Hill area of Gloucestershire, I encountered an ivy growing up an open-grown Field Maple, *Acer campestre*, evidently of quite extraordinary girth, the primary stem being in the order of 1.25 m circumference some 2 m from the ground. The initial impression was of two trees closely juxtaposed (see photograph p. 42)

Field Maples can be notoriously difficult to age from their general appearance, due to the wide range of variation exhibited by them. Forms planted on and around the Cotswold Hills and their outliers are frequently depauperate with small architectural domed crowns, and were evidently selected for these features. Seedling Field Maples in the same area show a greater variety of size and structure. Some of these depauperate veteran Field Maples are associated with land boundaries at least four centuries old; some of them observed for three decades have shown very little perceptible increase in girth. The Field Maple by Cleeve Hill is thought to be in the order of 220 years old (this figure includes some compensation for the impact of the ivy on its development), and is associated with other maples and apple trees of approximately the same order of age.

The ivy stem appressed to it was found to be completely dead, probably having expired within the last five years. The Field Maple was leaning significantly and progressively more so with height, the upper crown inclining at an angle of some 45° to the ground. This marked lean would undoubtedly be due to the influence of the constricting ivy, but not exclusively. The tree is situated on an escarpment of Jurassic clay, which during the lifetime of such a tree, loses sediment actively, if frequently imperceptibly, mostly by downhill creep. These gravity-effects impact substantially on trees, creating differential root growth and upslope -- downslope variations in ground level above the root zone, sometimes inducing a compensatory lean of the kind noted here. Trees maintaining vigorous crown-growth may encounter difficulty overcoming these gravitational slope effects, and we have records of mature ash (*Fraxinus excelsior*) trees on somewhat unstable clay slopes eventually levering their entire root systems out of the ground. A hypothesis would be that this ivy died from gravity-induced structural or vascular stress, as the two plants leant progressively upslope, and increasing amounts of sediment shifted away from them on the downslope side. That some response to gravity has occurred is demonstrated by the ivy stem now curving under the trunk of the still living maple, which is anciently fractured at ground level.

Although Mr Arthur Chater has kindly provided details (in litt., 11.7.2000) from his own experience of an ivy stem with a maximum girth of 67 cm, there would seem to be little information to hand on the relationship of stem girth and time pertaining to woody plants other than trees. Loudon writing in 1844 in his *Arboretum et Fruticetum* refers to ivies of c.95 cm stem girth close to the ground, supposing them to be 'two or three centuries old'. It is of some interest, in relation to rapidly evolved lowland landscapes, that an ivy stem such as this one could have survived for so long without human interference.

This observation was made during a programme of study undertaken on behalf of English Nature.

P.S. I should like to propagate an apple tree, probably a pippin, growing on the Cotswold Hills near Gotherington, which has a number of unusual features. Should anyone have a few apple seedlings or rooted stock suckers suitable for grafting up next spring, perhaps they could contact me

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COMMON PLANTS SURVEY

Earlier this year Plantlife, in partnership with the National Trust, RSPB, Joint Nature Conservation Committee, and the Centre for Ecology and Hydrology, launched the Common Plants Survey. Members of the public were invited to survey a carefully constituted set of 58 species. The species were chosen because they were considered easy to identify and had been shown by CEH to be indicative of the health of particular habitat-types. The list includes such familiar plants as traveller's-joy (*Clematis vitalba*) from woodland edges, red dead-nettle (*Lamium purpureum*) and common poppy (*Papaver rhoeas*) from arable field margins; heather (*Calluna vulgaris*) from moorland, buck's-horn plantain (*Plantago coronopus*) and thrift (*Armeria maritima*) from the coast; and yellow iris (*Iris pseudacorus*) and marsh-marigold (*Caltha palustris*) from wetlands.

The aim of the project is straightforward – to establish an annual, credible system for surveying our common plants. The intention is to generate a baseline dataset which can then be used to interpret the impacts of climate change, agricultural intensification or any other factor that might affect their abundance over time. This survey has been designed to complement the detailed surveys carried by BSBI and Government's Countryside Survey.

Fantastic information about the distribution of plants already exists thanks to the tireless efforts of the BSBI and the publication of Atlas 2000 is eagerly awaited. However, Plantlife believes that plant conservation has been held back by the lack of regular, reliable data about the change in plant populations. The British Trust for Ornithology has, in partnership with JNCC and RSPB, been doing something similar with birds for many years, carrying out regular surveys of common species' abundance. These have proved to be a barometer of the impact of management change on bird life. The Breeding Bird Survey, and its predecessor the Common Bird Census, has revealed worrying declines in lapwings, skylarks and seed-eating finches, such as the cord bunting, all species that would have once been dismissed as common. The data obtained has been used to underpin policy arguments and has helped to shape Government thinking particularly about the need to reverse agricultural intensification.

Plantlife and its partners intend to refine the survey in collaboration with the BSBI to enable the survey to be even more enjoyable and beneficial to conservation. Over 4,000 survey packs were distributed in 2000, and the deadline for submitting completed survey forms is September 14th. Don't despair if you did not participate this year, further details of how to take part next year will be made available early in 2001.

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MORE INLAND ARMERIA MARITIMA

The note by Tony Marshall on inland *Armeria maritima* (Thrift) in *BSBI News* 84: 21, interested me. Not far from my village is another called Smestow. On a roadside, opposite houses, on a corner, there has been a colony of this plant for at least five years now (GR SO/853.920½). My wife drew my attention to it (car journeys) and I went to check it out later by bicycle. The records are interesting not only because they add to those of Mr Marshall, but also because they are the deeply coloured garden variety, not the true type nor subsp. *elongata*.

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NATIVE BLACK POPLAR?

The letter from Jean Wynne-Jones on Black Poplar in *BSBI News* 83 raises the general question of the status and history of our population. We find in Sussex that many of our 'accepted' natives have an aroma from young leaves, the strength of which varies, albeit nothing like as powerful as Balsam Poplars.

Recent reports and discussions on DNA analysis show a confusing picture, with no clear distinction in either taxonomy or history. It seems to be agreed that our trees have been propagated vegetatively and planted for centuries past and there is evidence of importation of stock. These questions arise:

(a) the relationship of our trees to the European population;

(b) the validity of subsp. *betulifolia*;

(c) the genetic factors which distinguish hybrids.

Research is ongoing into all these matters and conservation is active on a regional basis. But there appears to be a lack of a national direction which could disseminate information and promote guidelines.

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THE WELSH GROUNDSEL AND THE BSBI

In his recent book, *Britain's Rare Flowers*, Peter Marren recounts in fascinating detail the circumstances in which many of those were first added to our flora. I was therefore disappointed that he proved to have so little to say about the initial discovery of the Welsh Groundsel (*Senecio cambrensis*), which as one of only two allopolyploids known to have arisen naturally in these islands within the last two centuries could be claimed as of more than ordinary importance and interest. The date and the name of the finder are not even given in the body of the text but relegated to the chronological appendix.

Soon after I had read the book, however, the author of the Flora of the county in which the discovery was made, Goronwy Wynne, chanced to ring me in another connection and I learned to my surprise that scarcely more of the story had passed down to him. As the BSBI itself accidentally played a key role in it, I feel it deserves to be rescued from the oblivion into which it has seemingly lapsed.

The discoverer, Horace Green (1886-1973), was a pillar of the Liverpool Botanical Society for many years, whose particular interest was plant dispersal mechanisms. Though life assurance provided his livelihood and botany his intellectual stimulus, his real passion was local government politics (he eventually became Chairman of his local urban district council in the Wirral). Like many of his generation, at any rate in the North of England, he had been brought up to regard the Botanical Exchange Club as a body to be firmly cold-shouldered because of its ill reputation for provoking heedless collecting. So when in 1951 he laid eyes on one of the first issues of *Watsonia* and the Yearbook of the reconstituted BSBI, the conversion he promptly experienced was of Damascus-like proportions.

By then Green had become intrigued by the unusually robust plants of the Common Groundsel with unusually large ray florets that he had known since 1948 on the verge of the B5101 at Ffrith, to the north-west of Wrexham. I recall his sending me fresh material of this about 1952, but like everyone else he tried it on I could offer nothing in the way of useful comments.

Around the same time the BSBI, in response to criticism that it was too heavily London-oriented, decided to experiment with a regional exhibition meeting (additional to, not instead of, the by then traditional annual one in the capital). The North West was selected, Manchester University as the venue and October 1953 as the date. Though serious doubts had been expressed whether the occasion would be well enough supported to justify the effort entailed, the turn-out in the event proved impressive and included many, like Green, who had only recently joined.

Green seized the opportunity not only to exhibit fresh specimens of his plant, but also to flourish them at the University's new Professor of Botany, the distinguished geneticist S.C. Harland,

exclaiming: 'Look, we are producing bigger and better Groundsel for you!' Luckily Harland was a great believer in the value of research by amateurs (as his son was to tell me many years later) and he at once arranged for a member of his department, J. Ellis, to carry out a chromosome count. As suspected, the plant proved to have double the number normal in the Common Groundsel (*S. vulgaris*), and that it had arisen from a cross between that and the Oxford Ragwort (*S. squalidus*) was then confirmed by artificially synthesising it by colchicine treatment. Its description as a new species, by the department's taxonomist, Dr Effie Rosser, followed in September 1955.

Had the BSBI not held that meeting, had Green not happened to have become a member by then and had there not happened to be a geneticist present who appreciated the plant's potential interest and was able to make things happen, the Welsh Groundsel might well be languishing in that corner of Flintshire still, dismissed as 'a mere var.' – like all too many others of its kind.

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BIODIVERSITY AND WILDFLOWERS

A long time ago, at the beginning of my working life, I was a language teacher. Although that profession and I soon parted company, I still have an interest in the natural history of language and like to observe how it evolves. One aspect of the evolution of language is the emergence of new words. They can be looked at as one might consider new horticultural varieties. Do they offer any advantages over the ones which were available before? Would we actually be better off without them?

Two words we never saw in 'News' twenty years ago are **biodiversity** and **wildflower**. I doubt if there are still pedants who object to words formed by mixing Greek elements, e.g. 'bios' = 'life', with Latin, e.g. 'diversus'. There can be no other objection to 'biodiversity'. The word meets an obvious need, as foreseen by its coiners. Underlying its use is the awareness of the difference between environments supporting relatively few plant and animal species, often as a result of intensive exploitation by man, and other environments in the same climatic zones which have a greater diversity of life. Use of the word often implies a belief that the ratio of the two kinds of environment should not be allowed to change in favour of the former but should, if possible, be changed in favour of higher biodiversity.

'Wildflower' is different. It is not in any dictionary and I do not know when it was first used; if anyone can produce American examples from before 1965 or British ones from before 1990, excluding book titles which are easily searched in online catalogues, I would be glad to have them. It seems to have arisen from a mistaken notion, particularly prevalent in the USA well before they started worrying about 'political' correctness instead, that ideally words should have distinct meanings. 'Flower' means not only that part of a plant which includes the reproductive organs, but also, by a process called metonymy which occurs in most languages, the plant which has flowers. 'Wildflower' is a way of referring to a wild flowering plant with a single word differing in meaning from 'flower'. 'Wildflowers of the Prairie States' then becomes a way of saying 'Flora of the Prairie States', with the likelihood that the content of a book so entitled will be less technical in expression, and so more suited, in the view of the publisher, to the needs of the amateur. In practice it will probably also exclude plants with inconspicuous flowers such as grasses, which do not lend themselves to eye-catching coloured illustrations, and maybe also large forest trees.

Both words appear in Martin Allen's text in *BSBI News* 84: 36, about the Wildflower Ark project, which 'aims to investigate, conserve and strengthen local plant biodiversity in Teesside ...'. 'The first phase of the project ... is focusing on collecting wildflower species that are known to be locally endangered' for propagation and eventual reintroduction to appropriate habitats. It is noteworthy that the fifteen taxa listed as already having been collected include *Juncus tenuis* (Slender Rush) and *Herniaria glabra* (Smooth Rupturewort), unattractive species which are not native in Teesside.

'Wildflower' also occurs five times in Flora Locale's notice on page 54, and many more in the accompanying programme of their training days. A study of these texts reveals that what their writers mean by 'wildflowers' is 'native plant species raised from seed'. This won't do. A wild plant does not have to be native; and a plant which has been raised from seed is not wild. I am not suggesting that

Flora Locale's customers for their training days will have been misled, and will not understand clearly enough what they have booked for. I am suggesting, however, that the language exposes the confusion in the ethos of Flora Locale (and not only there; I have just had an invitation to a 'wildflower planting' in the newly created wood along the lane from here).

Another lesson from the natural history of language is that change is normal. It is natural that some species should become rare or even extinct while others extend their range. Some of the world's present biodiversity actually results from past human activity, intensifying the effect of natural disturbance or introducing grazing animals. I would not argue with the Teesside botanists if they maintain that the most recent changes, in a period of rapid technological advance, have on balance been catastrophic. I do argue with the narrow view that the appropriate response is always to plant native species back into 'the wild'. I have seen an uncultivated slope with several chalk grassland species which were certainly not there a couple of years before, and might or might not have been there still five or six years after. They were not wild flowers, and putting them there had done nothing for the place's biodiversity.

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FATE OF RECORDS – continued

Jean Wynne-Jones' note in *BSBI News* **84** reminds us that Museums have a duty to safeguard information such as naturalists' notebooks and other associated paper records and botanical specimens. Curators are very willing to discuss the future care of such collections with the owners or their executors and to offer advice on the best course of action to take.

An illustration of the value of such records is given by the Fred Holder Archive which is kept at the National Museums & Galleries on Merseyside. Fred, who lived in Southport, died in 1963 and bequeathed his herbarium, together with over 100 notebooks and other papers, to Liverpool Museum. They covered almost 50 years' continuous observations of the wildlife of the Sefton Coast. In the 1970s his diaries and papers were indexed on record cards, and last year these cards were entered into an Access database. We now have access to 6,689 separate records of plants, animals, people and places cross-referenced to the various different volumes of his notebooks.

These cover records of 1,164 localities, 675 named individuals, and 2,099 scientific names of plants and animals along with 2,004 vernacular names.

His herbarium is also a valuable resource, and the rare and endangered plants in it have also been databased. It contains specimens from other botanists with whom he exchanged material, including J.N. Frankland, Thomas Foggitt, Kit Rob and Reg Wagstaffe. One of the most remarkable parts of his herbarium is known as 'Fred Holder's Calendar'. This is a phenological record of the first flowering of each species of plant he recorded in the Sefton area. Such historical records are now appreciating in importance as a baseline against which global warming induced changes can be assessed.

Fred Holder's notebooks continue to be consulted by naturalists studying one of the north of England's richest areas for wildlife, and the information they yield is often far more detailed than is available from published sources.

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CORALROOT ORCHID IN AN UNUSUAL HABITAT IN KINCARDINESHIRE

This attractive saprophytic orchid (*Corallorhiza trifida*) is described in floras as occurring in wet peaty ground under shrubs or trees, and also in dune slacks. Recently in eastern Scotland new colonies have been found in alder and willow carr (Allan & Woods 1993). But in June 2000 RK spotted a single

inflorescence on a trodden footpath along an abandoned railway near Banchory, Kincardineshire, v.c. 91 (NJ69). Conditions here on the ballast in the middle of the former single track are quite dry, this section being on a shallow embankment. There is however shading from a line of trees – Downy Birch (*Betula pubescens*), Goat Willow (*Salix caprea*) and Larch (*Larix* sp.) that fringe a conifer plantation next to the railway on its south side.

The railway was closed in 1966 and the rails were removed in 1969. Thereafter the section with the coralroot spike has been lightly used as a path, but has become grassy with only occasional lumps of ballast visible. Rabbits help keep the grassland short; the sward height across the 0.5–1.0 m wide path has been approximately 5 cm in the last few years, but to the sides of the path the grass – *Agrostis* spp. (Bent), *Deschampsia flexuosa* (Wavy Hair-grass), *Holcus lanatus* (Yorkshire-fog) – is much taller.

Nearby a colony of *Corallorhiza* has been known in a wet birchwood since June 1995, being discovered by Andy Webb. About 15 inflorescences were then observed, growing in a *Sphagnum* sward in moderate shade. Subsequently other coralroot spikes have been seen in small groups across a 100 × 50 m area of the birchwood, all in wet shaded places with *Sphagnum* dominant. Other trees occurring sparsely in this area are Scots Pine (*Pinus sylvestris*) and Grey Willow (*Salix cinerea*). In June 2000 we found 27 inflorescences in total here, the nearest ones being 70 m distant from the spike on the railway, and the 1995 sub-colony a further 85 m away.

It would seem that coralroot seed from the birchwood was dispersed to the railway, but with a lengthy period of establishment and growth necessary in orchids between germination and flowering (? 15 years in *Corallorhiza*), it appears that the woodland colony was present for many years prior to its discovery. It will be interesting to find out if more plants of *Corallorhiza* become established on the railway and if there are features of the habitat which help colonisation, such as trees (with their associated mycorrhiza) being immediately adjacent.

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NETTLES IN THE OCHIL HILLS

In August 2000 I spent a day botanising in the Ochil Hills north-west of Dollar, Clackmannanshire (v.c. 87), and was surprised by the abundance of common nettles (*Urtica dioica*). They grow along most stream-sides and rills up to 500 m often in dense stands but sometimes as scattered grazed-down shoots in flushes. So when I encountered Mossy Saxifrage (*Saxifraga hypnoides*) in a mesotrophic flush, I had to ponder for a moment that the leaves weren't from a struggling nettle.

The Ochils above Dollar are green hills quite heavily grazed by sheep with only local stands of heather. It could be that the nitrogen enrichment resulting from this stocking has favoured nettles. But other uplands have similar if not higher sheep densities, yet, from Rodwell's *British Plant Communities* Vols 2 & 3, *Urtica dioica* is not a recorded constituent of any upland grassland, flush or spring community.

What I am wondering is whether nitrogen deposition from the nearby large-scale industries in Scotland's Central Belt, including power stations and an oil refinery, has affected soils in the Ochils. This coupled with the natural richness of sub-soils derived from Devonian sandstones, and the impact of the sheep grazing, could have tilted the ecological balance towards nitrophilous plants. And it might be a warning of what might occur more widely in the uplands unless pollution is reduced.

So has anyone any evidence that nettles have spread in the Ochils?

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CONSERVATION NEWS AND VIEWS

CAREX VULPINA BIODIVERSITY ACTION PLAN PROGRESS

Work on this species just seems to get more complicated. As the national 'lead' within the BAP process for *Carex vulpina* (True Fox-sedge), and with the help of local BSBI botanists, I have continued to look at populations across England. The difficulties of separating *C. vulpina* from *C. otrubae* (False Fox-sedge) are all too well known, and the search for more reliable distinguishing characters led to transverse leaf sections (Porley, 1999). However, since then I have examined many more plants and made many more leaf sections, and it became apparent that, based on leaf anatomy, there were plants with intermediate character states. The possibility of hybridisation is one explanation, but I was even beginning to suspect the possible existence of a hitherto unrecognised taxon.

To help resolve the issue Kew are conducting molecular work on material collected with the help of local botanists. The preliminary results were presented by Robyn Cowan at the recent 2-day *C. vulpina* workshop at Oxford University organised by Camilla Lambrick and Susan Erskine of the Ashmolean Natural History Society with the support of English Nature. Based on the populations sampled so far, it seems we are dealing with three distinct groups. Plants from Otmoor, Oxfordshire could not be run as part of the same analysis because they are so distinct and might possibly represent another taxon. It is from this population that the drawing of the transverse leaf section of *C. vulpina* in Porley (1999) is based on. Thus the identity of these plants now has to be questioned. Just as intriguing is that all other English samples seem to separate into two further distinct groups. Surprisingly, samples of *C. otrubae* were grouped by the molecular analysis with all the putative *C. vulpina* from Amberley Wild Brooks, Sussex, often regarded as the locus classicus for the plant. The remaining group consisted of plants I had provisionally called intermediates based on leaf anatomy, and came from sites across England. It is too early to speculate as to what might be happening. I am currently collecting other Carices (particularly *C. riparia* (Greater Pond-sedge)) for molecular investigation, that grow spatially close to *C. vulpina* to pursue the hybridisation issue. It does not look as though *C. otrubae* is hybridising with *C. vulpina*, so another species could be involved.

We also need to look at continental material, and I am open to suggestions as to potential botanical contacts in Europe who might be able to supply material. Julian Starr of Oxford University, a *Carex* specialist, has kindly offered to undertake some preliminary SEM work on ripe achenes as another potentially powerful tool to establish whether the distinct groups, as suggested by the genetics work, are indeed 'good' taxa. Further work is needed on correlating morphological, anatomical and genetic data, and it is clearly desirable to attempt to locate the type specimen of *C. vulpina*.

Thus the work continues on this enigmatic sedge, and there is still some way to go before the position is resolved.

Acknowledgements

In addition to those people I have mentioned already, I would like to thank Mary Briggs, Frances Abraham, Mark & Clare Kitchen, Ian Taylor, Graeme Kay, Stan & Becky Woodell and Chris Pogson for their assistance in showing me sites and acquiring material on my behalf.

Reference

Porley R.D. 1999. Separation of *Carex vulpina* L. and *C. otrubae* Podp. (Cyperaceae) using transverse leaf sections. *Watsonia* 22: 431-432.

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1 IN 4 EURO WILDLIFE SITES UNPROTECTED

Almost a quarter of Europe's important wildlife sites will not be protected under proposals put forward by European Governments. Today WWF, the conservation organisation in association with 5 Irish conservation groups, proposed more than 1500 extra sites for protection in fourteen European Union countries.

EU nature conservation law, the Habitats Directive, obliges member states to propose sites for protection to ensure the survival of Europe's most threatened species and habitats. But according to research by WWF, member states are not nominating enough sites to guarantee the survival of threatened species such as the brown bear, the lynx, wolf, otter, harbour porpoise and loggerhead turtle. WWF is urging the European Commission and member states to add the sites proposed by WWF to the official list of sites to be protected under the Habitats Directive.

'European Governments should not be allowed to exclude almost one in four of Europe's important wildlife sites from protection under the Habitats Directive' said Sandra Jen, WWF's European Biodiversity Policy Officer. 'It would be a tragedy if species like the brown bear, the Iberian lynx and the harbour porpoise became extinct in Europe because member states failed to protect enough sites when they had the chance. WWF believes that at least an additional 1500 sites across Europe need to be protected.'

Four out of every five important wildlife sites in Ireland have been excluded from the Government's official list of sites for protection under the Habitats Directive, compared to over half in the UK, Belgium, Netherlands and Portugal. Additional sites proposed by WWF number 205 in Italy, 181 in Spain, 107 in France, 167 in Sweden, 152 in the UK and 259 in Ireland. The sites for Ireland were proposed jointly by the Irish Peatland Conservation Council, An Taisce, Birdwatch Ireland, Irish Wildlife Trust, and Coastwatch Ireland following consultation with many experts and groups nationally.

Sites proposed by WWF but excluded so far from the official list of sites to be protected under the Habitats Directive include the proposed rowing and canoeing centre for the 2004 Olympic Games in Schinias, Greece, the Kaiser Mountains in Austria, the Pembrokeshire coast in Wales and the Massif de Sesques et de L'Ossau in the French Pyrenees, an important bear habitat. Many sites proposed by member states are too small.

In Ireland sites include areas proposed for the bottlenose dolphin, otter, marsh fritillary, freshwater crayfish, lesser horseshoe bat as well as habitats such as bog woodlands, limestone pavement and raised bogs.

WWF's proposed sites represent only those that are necessary to save 19 species and 25 habitats – from the more than 600 listed in the Habitats Directive. The member states and the European Commission have completed a first series of meetings to choose the sites to be protected, and a second series is due to start in September – probably to be finalised in 2001.

For further information please contact:

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ALIENS

EUPHORBIA MYRSINITES ESTABLISHED IN CAMBS. (v.c. 29)

Euphorbia myrsinites (Broad-leaved Glaucous-spurge) is one of the very many garden plants which freely produce seedlings within British gardens but which are very rarely reported outside them. Possibly those that do manage to escape are uprooted and brought back into captivity: the thick, glabrous and glaucous leaves make, in themselves, a very attractive item for any flower border.

G.M.S. Easy tells me that several plants are established in a rough area of an arable field ditch-side at Wicken, Cambs (TL/572.713). One plant of *Marrubium vulgare* (White Horehound) is also in the same area. On 25th August 1998, GMSE revisited the site and produced a splendid illustration that now adorns our cover. The curious glands of the cyathium which holds the several stamens and the single female flower are diagnostic of each species: here the crescentic glands bear short horns dilated at the apex. There are clearly 4 glands per cyathium: I still have yet to find any *Euphorbia* with the 5 glands mentioned in Stace's *New Flora of the British Isles*, ed. 2: 458.

Apart from the first Surrey record quoted in Clement & Foster, *Alien Plants of the British Isles* (1994), p. 200, no further reports have reached me, bar an unconfirmed record by J.R. Palmer from Greenwich (W. Kent, v.c. 16) back in September 1983. The self-sown plants seen by myself this year on the screes at Sir Harold Hillier Gardens and Arboretum, Ampfield (Hants) certainly do not qualify as an 'in the wild' record.

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ZIZANIA LATIFOLIA – FIT AND FLOURISHING OVER-ABUNDANTLY IN A WEST SUSSEX POND

We were reading through the recent articles by Ken Page and by Eric Clement on Manchurian Wild Rice (*Zizania latifolia*) in southern England (*BSBI News* **84**: 38-9 & 40-41) when we came to the words: 'v.c. 13 (W. Sussex). Lake margin by main road, Patching, nr Worthing, 1947. H.K. Airy Shaw.' Instantly, we sat up with a start; 'that's Patching Pond for Pete's sake', we cried, 'must be'. Wondrous aliens always turn up on the other fellow's patch, yet this one is almost on our doorstep. And how right Eric is to say, 'Look at the leaves', for Patching Pond has been a classical botanising spot for over half a century, yet none of us since Airy Shaw appears to have 'seen' this plant!

Next day (12 April 2000) we were at Patching Pond, a little lake about 250 m N to S by 100 m E to W, well used by the local angling society. The old main road (A27) has now been sidelined by the new dual carriageway, making access and parking beside the pond much easier and quieter, at TQ/087 055. This is along the southern edge of the pond, and the Wonder Grass is growing just beyond the low wooden fence. All along the southern edge, within c.5 m of the shore, were a dozen or more tussocks sticking out of the water, each c.50 cm across by 20 cm high, fairly close to the gentle outflow sluice. Each tussock was a collapsed heap of dry, beige-brown dead leaves from last year, with no sign of any flowering/fruitlets. The sharply toothed margins still had a vicious edge. Numerous new leaf shoots had already pushed up through the tussocks, and others were projecting 15-25 cm directly from the water. All were of a most striking vivid green colour, markedly different from the young leaves of *Typha* and *Phragmites* growing nearby. Several other big areas of *Z. latifolia* were growing around the edges of the pond. (See photos page 44)

It proved quite hard to pull out a piece of a plant with roots and rhizomes attached; the latter were extremely tough and had to be cut with a sharp blade. Indeed, a couple of times we nearly did a natty back-somersault into the wet stuff before eventually getting some samples for photography and further study at home. The leaves and rhizomes were exactly as described by Ken Page and as so beautifully

illustrated by Niki Simpson. At this stage, the young leaves were in-rolled and had not yet developed the rows of forward-pointing spines along the margins, nor the maroon-red patches at the base of each leaf-sheath. A pair of Mute Swans (*Cygnus olor*) swam up, plucked about 7 cm from several leaf tips, and ate them with evident relish. The tips of many other young leaves showed signs of earlier 'grazing'. It all looked a picture of pastoral tranquillity and innocent harmony.

By 24 April, the leaves were 30-40 cm above the water, still showed some in-rolling but had now very slight marginal teeth. By 12 May, the plants were 75-90 cm high, most leaf laminae were completely flat with sharp marginal teeth, and maroon patches had appeared at the bases of a few leaf sheaths. The Mute Swans had now definitely lost interest. On 31 May, nearly all the leaves were quite flat and tapering at each end, and the separate tussocks were now being obscured by more continuous foliage. By June 11 all tussocks had vanished in the solid wall of upright culms, the plants were 90-120 cm high, the leaves broad and the maroon leaf sheath patches very conspicuous. A week later, the plants were 145 cm high, still a bright vivid green, and by 17 July were 210 cm tall; the maximum leaf width was still 42 mm, and individual leaves were c. 125 cm long, tapered at each end. We saw no cross-veins in the leaves we examined.

The chambered rhizomes were up to 22 mm diameter tapering to sharply pointed tips, and exceedingly tough. Roots and culms had developed at many nodes, which were very hard, solid and woody in contrast to the papery septa between nodes. Young roots were very white, brittle and up to 1 mm diameter with no root hairs. By contrast, older roots were a bright tawny-orange, over 60 cm long with numerous fine root hairs.

After 3 months in plastic tubs 48×48 cm, 25 cm deep, and filled with water and some bottom mud, single culms with a few roots had grown virtually to fill the entire space with a dense tangle of roots and rhizomes. Our experience at Patching Pond suggested *Zizania* had done the same in the mud there. So we began making local enquiries.

For many years, the pond has been leased by the Worthing Piscatorial Society, and their Secretary told us that they had been aware of the 'giant rush' for over 40 years. In the 1960s, the plants occupied a very much smaller area than now, but in recent years have caused increasing problems. Mechanical diggers were brought in to remove the roots and rhizomes from successive stretches of the margins, and in 1999, over 80 tons of *Zizania* were removed. Yet the plant bounces back, as vigorous as ever! Indeed, the material dug out and dumped on dry land continued growing. This plant is an absolute menace, a veritable aquatic *Fallopia* (*Reynoutria*) *japonica* and probably impossible to eradicate. It would seem most unwise to consider any measures to preserve it, lest someone should be rash enough to transfer it elsewhere, or to recommend it as a garden aquatic or a novel trendy delicacy.

On the gastronomic front, Joy Larkcom gives helpful comments in '*Oriental vegetables*' (1991, John Murray), p. 125, and points out that, to grow well, *Z. latifolia* needs high temperatures (20-30°C) and intense light with a slightly acidic clay soil. The plants at Patching Pond seem to manage with what W. Sussex has to offer – is this global warming in our midst? In SE Asia, infection with the fungus *Ustilago esculenta* is regarded as essential, producing indoleacetic acid which induces the stem to swell to 17 cm long by 3 cm wide, but the plant must be harvested before the fungus starts to produce spores, for the flesh then deteriorates. Cultivated forms are often preferred, for wild genotypes have developed resistance to this smut fungus. Perhaps infection with the smut fungus inhibits the rampant growth and might even explain the dwarfing to 4 ft (1.2 m) quoted by Eric Clement. Flavour is described as mild, pleasant and reminiscent of celeriac, but it is also widely used in various Chinese dishes to absorb other flavours. However, many fungi produce highly toxic substances, including some of the world's favourite carcinogens, so it might pay to let the other fellow try the culinary delights first! We have seen no sign so far of any swelling of the stem base or fungal infection.

Rather than any need for help or protection, vigorous control measures would seem to be necessary for *Zizania*. Perhaps the folk operating the local Chinese Takeaways might be encouraged to harvest it in a big way!

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The Queen Mother's Birthday Parade

The 'walkers' included: Mary Briggs, Ailsa Burns, Rob Burns, Olive Chamberlin, Joanne Colthup, Gwynn Ellis, Gwyn Lee, Margaret Lindop, Frank Perring, Susan Taylor, Roy Vickery, Elizabeth Young.



Trifolium sp. in West Norfolk, photo © A. Bull, 2000



Near Cleeve Hill, Gloucestershire, 17.6.2000. Stem of ivy c. 1.25 m circumference at head height, ascending open-grown Field Maple, viewed from the north. The ivy stem is substantially wider from the western aspect. Photo © P.F. Whitehead, 2000



Beech with a rough bark



Beech with a smooth bark

Both photos taken in Savernake Forest by Joan M. Davies © 2000



Patching Pond, from S edge looking N, with foliage of *Zizania latifolia* in foreground, 145 cm tall, 18 June



Over-wintered tussock of *Z. latifolia*, with young, bright green shoots, 24 April

Insert - Maroon patches at bases of leaf sheaths 25 June

SURVIVAL OF THE FITTEST?

Spurred on by an exhibit at the Annual Exhibition, I set off on June 3rd to look for *Senecio inaequalis* (Narrow-leaved Ragwort) in Essex. It was not difficult to find but at that date was not in flower, nor anywhere near. However, the locality was so ghastly that I resolved never to return, grabbed a couple of stems to confirm that I had the right thing and fled.

On reaching home, I was able to confirm the identity and stuck the stems in water, wondering if they might survive. They did indeed and 18 days later the first stem produced flowers; the second followed after a few days. Now, at the time of writing (July 9th) I am about to destroy the fruits of this possible terrestrial version of *Crassula helmsii* (New Zealand Pigmyweed) but the stems are flourishing and producing roots.

But the point of this note is to ask whether there are any 'rules' governing the survival of stems removed from plants? We often take a specimen of a plant to examine at home and many people must put it in water afterwards hoping that it will live. Some do, some struggle, some die almost immediately. Is there any way of knowing which will survive (apart from experience) and are there ways of prolonging the life of such specimens? Is there a feed solution which is better than tap or rain water? Or is it all down to luck and green fingers?

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CARDAMINE RAPHANIFOLIA -- NEW TO IRELAND?

On May 14th 2000, Mr Trevor Boyd saw some unusual purple flowers growing on the bank of the River Maine between Gracehill and Galgorm (Grid Ref. D/076.023). He reported seeing three or four established clumps and gave me a portion of a plant which I identified as *Cardamine raphanifolia* (Greater Cuckooflower). My identification was confirmed by Paul Hackney of Ulster Museum and the specimen has been deposited in the Herbarium of the Ulster Museum.

I can find no reference to the plant in Ireland. Rich reports that it is a garden escape occasionally established on lake shores, by streams, etc., and that it is rare in England, Scotland and Wales and absent from Ireland.

Reference

Rich T.C.G. (1991). *Crucifers of Great Britain and Ireland*. BSBI Handbook No. 6.

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CENTAUREA RHENANA ON A YORKSHIRE MOTORWAY

In recent years a new stretch of motorway has been constructed linking the M1 at Lofthouse with the A1 at Aberford in West Yorkshire. The upgrading of sections of the A1 to motorway standard necessitated the construction of several new roads to accommodate local traffic around my home village of Aberford. The seed mixture used in landscaping roadside verges proved most interesting during 1999.

Large numbers of *Sanguisorba minor* subsp. *muricata* (Fodder Burnet) were evident throughout the year with *Trifolium hybridum* (Alsike Clover), *Onobrychis viciifolia* (Sainfoin) and *Cichorium intybus* (Chicory). The colourful annuals *Centaurea cyams* (Cornflower), *Tropaeolum majus* (Nasturtium) and *Calendula officinalis* (Pot Marigold) were also present in numbers. *Daucus carota* (Wild Carrot) and *Erodium cicutarium* (Common Stork's-bill) also occurred and possibly came in with aggregates and other construction materials.

Perhaps the most interesting element in the mix was representatives of the knapweed genus and both *Centaurea nigra* (Common Knapweed) and *C. scabiosa* (Greater Knapweed), were often seen. One particular *Centaurea* species, had unusually small flowers over-topping finely-cut leaves which were covered in a silvery pubescence. Following discussion at local level I sent a specimen to Eric Clement in Hampshire who took my material to the Natural History Museum in London. Checked against herbarium material the specimen was identified as *Centaurea rhenana* (Panicled Knapweed), and proved to be the first British record since c.1930 and therefore something of an important discovery. On 17th October I counted 162 specimens on the verges of a new stretch of service road linking the village with a new motorway access point (Grid ref: SE/432.388).

Aberford lies some 12.5 km east of Leeds on Magnesian limestone and therefore a seed mix suitable for calcareous soils was preferred. Details of various seed mixes have been kindly supplied by landscaping contractors. In a calcareous mix grasses make up 95% of the bulk with *Bromopsis erecta* (Upright Brome), *Festuca rubra* (Red Fescue), and *F. ovina* (Sheep's-fescue) in more or less equal measures, with a small element (2.5%) of *Phleum pratense* (Timothy). The balance specifies 2.4% *Centaurea scabiosa*, 0.5% *Primula veris* (Cowslip) and 1.5% *Sanguisorba minor* (Salad Burnet). I understand that as much seed as possible would be obtained in the UK and that the balance of the requirement would be obtained from European sources.

I would be interested to hear from other members with observations of motorway landscaping.

I am indebted to Eric Clement for his work in identifying *C. rhenana*, to Margaret Lindop and Olive Chamberlin for their guidance and encouragement and to John Priestley of A.T.M. Ltd for his information and comments relating to landscaping.

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THOROW-WAX AS A FLORISTS' ALIEN

Thorow-wax (*Bupleurum rotundifolium*) has been extinct as a cornfield weed in Britain for about 40 years. I have found odd stems of it in three Dorset Churchyards (Alderholt, Dorchester & Morden) and have traced these to local Florists. Batches are imported weekly by Flowers Unlimited and Homer Flowers from Holland, and distributed around southern England by lorries. As *Flora Europaea* says that the wild plant is extinct in the Netherlands, it must either be grown commercially there or imported. So far all of my finds fall into the category of picked sprays, but since some were in seed, the plant could soon be found as a casual near cemeteries or churchyards.

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AN UPDATE OF CARYOPHYLLACEAE IN ALIEN PLANTS

Since the publication of Clement & Foster's *Alien Plants of the British Isles* (1994) no formal errata sheets or updates have been issued. EJC continues to collect the data and hence it seems appropriate to promulgate this information from time to time. This short note attends to the family Caryophyllaceae, and also the references. Errata, thankfully, appear to be scarce throughout the book.

Agrostemma gracilis (p. 58). Alter Girtton to Groton.

Silene shafta (p. 61) is briefly described in Stace's *New Flora*, ed. 2: 175 as well as in Clapham, Tutin & Warburg's *Flora of the British Isles* (CTW), ed. 2: 225 (but without an entry in the index on p. 1261). Its flower colour strongly recalls *Dianthus* spp., but its leaves are clearly *Silene*-like. It is still a little-known plant and is easily overlooked: it is the plant established high up (out of reach) on the walls at Ludlow Castle (Salop, v.c. 40). I recently named a photo of it in full flower on 28

March 1992 [sic] by the late A. Underhill – labelled (and known to others) as '*Dianthus plumarius*'! Yet, it has apparently been present at 'Ludlow' since at least 1915, when E.C. Horrell collected it, det. A. Thellung (**OXF**). This appears to constitute the first Br [British] record, as printed in *B.E.C. Report* 4: 404-405 (1917), and it is still there! The *Flora of Hampshire* (1996) 'expurgates the Beaulieu Abbey (S. Hants, v.c. 11) records from the 1950s – see *Wild Flower Magazine* 328: 19 (1960) and 331: 19 (1961). J.R. Palmer also had it in flower (**Hb EJC**) from the top of an old brick wall at Sutton-at-Hone (W. Kent, v.c. 16) on 15 July 1999, but failed to recognise the genus. Add a further reference to an illustration, viz. 657* [Meikle's *Garden flowers*, 1963], a book invaluable for naming many garden flowers because of its apt descriptions and botanical figures.

Gypsophila muralis (p. 62) is back in vogue in council bedding schemes, at least in S. Hants (v.c. 11). As a consequence I found self-sown plants in pavement cracks on Hayling Island (with P. Selby, in 1999) and in Gosport (also 1999). Surprisingly, I can only track down 5 previous Br records for this species, which occurs as a weedy native annual over much of Europe: viz. v.c. 29 (unlocalised, pre-1930), v.c. 34 (Avonmouth Docks, 1931), v.c. 9 (Grayswood, 1976), v.c. 21 (Kensington, 1990) and v.c. 22 (Reading, 1999). The two most recent records appeared in *London Naturalist* 70: 159 (1991) and *BSBI News* 83: 43 (2000), respectively.

Dianthus superbus (p. 64) Remove the square brackets as one plant was found in 1993 at Grime's Graves (W. Norfolk, v.c. 28) where it was widely rumoured to be a new native species, but it has not been seen since. See *British Wildlife* 5(1): 58 (1993) for a photograph of the plant and full details. In 1995 a solitary plant, the first since 1905, was also found in The Netherlands in 'an area treated with a wildflower seed-mixture,' according to *Gorteria* 23(6): 102-106 (1997). A common alien source is feasible!

Dianthus sylvestris (p. 64), the entry should be enclosed in square brackets. The sole Br record for this plant, in *Naturalist (Hull)*, 920: 42 (1972), remains unconfirmed. The late Miss I.F. Gravestock visited the site in June 1978 and a voucher specimen was later determined at Kew, by Miss S.S. Hooper, as a hybrid. She wrote:

'Your specimen is nearest to *Dianthus gratianopolitanus* but I think from the larger size of the calyx and petals, rather slender acuminate leaves and number of flowers per stem that it is likely to have some *D. plumarius* in it as well. As you know pinks hybridise very freely and these semi-naturalised garden escapes which crop up fairly frequently are generally *D. plumarius* -- *gratianopolitanus* hybrids, sometimes with *D. caryophyllus* characters as well.'

M.J. Yates (*pers. comm.*, 1995) also visited the site; he was convinced that the plants he found were *Dianthus caryophyllus* × *D. plumarius*.

A mixed array of similar hybrids were also collected by Dr P. Macpherson (**Hb PM**, **Hb EJC**) in June 1980 from the end of the A40 dual carriageway at Oxford. Each clump seemed to possess a slightly different combination of genes!

References

Ref. 680 (p. 424) was omitted. It is Perry, F. (1972). *Flowers of the World*. London. This is a table-top book (320 pp) that covers alphabetically, by family, almost all the families that occur in cultivation, with fine, coloured paintings and a text verified by two consultant taxonomists. Please continue to send me corrections and updates to *Alien Plants*, or publish them yourself in *BSBI News* as Julian Shaw has done so admirably for the family Solanaceae.

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REQUESTS

SAXIFRAGA HIRCULUS – A PLEA AND A REQUEST

For the past three years I have been carrying out a project for Scottish Natural Heritage and English Nature on the effect of grazing on the vegetative and flowering performance of *Saxifraga hirculus* (Marsh Saxifrage).

Marsh Saxifrage is a rare and endangered perennial plant of base-rich flushes and mires in Britain and Europe. It is declining and threatened throughout much of Europe, e.g. in Switzerland there is only one remaining site, and only three in France. Although Marsh Saxifrage has disappeared from many recorded sites in Britain during the past century as a result of habitat loss and change, there are probably still 17 sites in England, all in the North Pennines, and also four in Scotland and one in Northern Ireland. Britain is clearly an important European stronghold for this species.

Saxifraga hirculus is one of the few species protected under Schedule 8 of the Wildlife and Countryside Act, 1981. It is also listed on Annexes II and IV of the EC Habitats Directive and Appendix I of the Berne Convention, and is a Natura 2000 Species protected in the UK under Schedule 4 of the Conservation (Natural Habitat, etc.) Regulations 1994.

On one well-known site at near Cross Fell in the Northern Pennines, the grazing pressure is such that very few saxifrage plants ever succeed in flowering, although there are many vegetative plants present. Here English Nature has erected an enclosure fence so that the effects of excluding grazing animals can be clearly demonstrated and a quantitative comparison made between the grazed and ungrazed areas.

Although the enclosure was only put up in June 1999, 22 flowering stems were found in August. It is sad to report that 13 of these disappeared and two had fruits removed. I believe the most likely cause to be human predation.

I am expecting many more flowers this year, and at the risk of advertising this site, I am writing to ask members and their friends to please curb their enthusiasm. As a Schedule 8 protected species, it is an offence to remove any part of this plant and possession of such material could result in a prosecution.

When the plants are in flower it is not difficult to obtain good photographs from outside the enclosure, and if you visit this site I would urge you to do this rather than to trample inside the enclosure, which would damage vegetative plants and confound many of the measurements which I am taking for the benefit of this species.

On a more positive note, I would be very pleased to receive approximate counts of flowering stem numbers from any sites where members may have seen this species. Vegetative records are more tricky. Given the protected status of this species, voucher specimens are definitely not in order, but I would be interested in checking out any reported sites.

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MISSING MAP OF THE BURREN

On the 27th June, 1999, I attended an Irish Field meeting at Cloyne in County Cork led by the well known botanist, Miss M.J.P. Scannell. In this party was an English botanist and his wife. During a conversation I had with them they told me that they were in Ireland on a botanising holiday and after the meeting at Cloyne they were going to the Burren. They asked me about the stations for the various Burren flowers and the most interesting places to visit. I lent them a large scale map of the Burren containing the stations of the various species of Burren flowers which I had accumulated over many years. They promised that the map would be returned by post immediately they returned to England. Alas this was not done and I find that I am now unable to locate many of the botanical stations on my yearly visits to the area.

If the couple are members of the BSBI and read this plea, I would be very grateful for the return of the map, even if anonymously to avoid embarrassment!

MICHAEL TROY, 3 Farleigh Place, Middle Glanmire Road, Montenotte, Cork, Ireland.

TWO MISSING NORFOLK FLORAS

Eric Swann in *Flora of Norfolk* (1968), refers to an unpublished *Flora of Swaffham* written by the Staffordshire botanist E.S. Edees which Edees allowed him to use while the *Flora of Norfolk* was being prepared. Since Swann's death in 1989, this manuscript Swaffham Flora appears to have been lost. Some local botanists are currently working on the flora of this Norfolk market town and it would be very interesting if a comparison could be made with the flora of the area recorded by Edees during the years 1923-1953. If any botanist knows of the present whereabouts of this missing *Flora of Swaffham*, I should be very grateful to hear from them.

I am also working on historical records of Norfolk plants and am anxious to trace a copy of the Rev. Kirby Trimmer's 1866 *Flora of Norfolk* which the author himself annotated. Eric Swann knew of the existence of this copy, though it did not prove possible for him to see it. Again, I should be most interested to know of its present whereabouts and hopefully to be able to consult it.

GILLIAN BECKETT, Bramley Cottage, Docking Road, Stanhoe, King's Lynn, Norfolk, PE31 8QF

NOTICES (NON BSBI)

LIMITED EDITION BOTANICAL PRINTS

I have recently set up a website which currently has 6 botanical illustrations, 4 of British orchids in their full habitats, and 2 of our native Primulas. There are only 200 of each print, and they are printed on 350 g.s.m. fine art 'silk finish' board, using the four-colour process with lightfast inks.

Each print is stamped with my unique embossed design, numbered, titled and signed in pencil. I am passionate about capturing through my art the unique beauty of species in nature. My selection of subjects involves study of their life cycles and habitats, often involving my liaising with wildlife specialists within organisations which have responsibilities for identification, protection and conservation of many species.

It is my long term intention with this website to make high quality, affordable limited edition prints available to an ever widening international public. I hope through widespread distribution and sales that my work will bring pleasure to clients throughout the world and that indirectly wildlife conservation will benefit from increased awareness of nature through my art.

Further illustrations will appear on the site as/when they are painted & printed. The website address is: <http://www.jonathantylor.co.uk>

JONATHAN TYLER, Sycamore Farm, Alphamstone, Bures, Suffolk CO8 5HP

THE BICENTENARY OF THE BIRTH OF GEORGE BENTHAM FLS FRS (1800-1884)

A Joint Linnean Society / Society for the History of Natural History Conference will be held in the Linnean Society's rooms on 23rd September 2000 at a cost of £25 inclusive of tea and coffee. For further information please contact:

Meetings Officer, The Linnean Society of London, Burlington House, Piccadilly, London W1J 0BF,
Tel: 020 7434 4479; e-mail: tina@linnean.org; fax 020 7287 9364

BOOK NOTES

REVIEWS & NOTES

Those that will not be reviewed in *Watsonia* are marked with an asterisk (*). The comments in square brackets are mine.

- Flora Nordica Vol. I, Lycopodiaceae to Polygonaceae*. B. Jonsell, ed. Pp xxii +344. The Bergius Foundation, Royal Swedish Academy of Sciences, Stockholm. 2000. Price c.£49.50 (ISBN 91-7190-033-0).
- Causes of Change in British Vegetation* Ecofact Vol. 3. L.G. Firbank *et al.* Pp 98. DETR. 2000. Price £8.00 (ISBN 1-870393-51-1).
- Flora of North America Vol. 22 (Magnoliophyta: Alismatidae, Arecidae, Commelinidae (in part), and Zingiberidae)*. Flora of North America Editorial Committee. Pp xxiii +352. Oxford University Press, Oxford. 2000. Price £62.50 (ISBN 019-513729-9).
- Mochas: an English Deer Park. The history, wildlife and management of the first parkland National Nature Reserve*. P.T. Harding and T. Wall (eds). Pp 352. English Nature, Peterborough. 2000. Price £20.00 (incl. p. & p.) ISBN 1-85716-511-X.
- A flora of Tieve, Gumma and Coll*. D.A. Pearman & C.D. Preston. Pp 168. Privately published. 2000. Price £9.00 (ISBN 0-953811-1-5). Available from Mrs A.V. Pearman, The Old Rectory, Frome St Quintin, Dorchester, Dorset DT2 0HF plus £1.50 for p. & p.
- Lichens*. O. Gilbert (New Naturalist No 86). Pp 288. Harper Collins, London. 2000. Price £34.99 (ISBN 0-00-220081-3).
- **How to identify Wild Flowers*. C. Grey Wilson and L. Alderson. Pp 256. Harper Collins, London. 2000. Price £12.99 (limpbound) (ISBN 0-00-220107-0).
[The book consists of 115 common plants, with 'lookalike' and species with which they may be confused illustrated opposite ~700 odd species covered in all. There are details on key features and the parts of each flower, and a key at the front, with glossaries. The illustrations are nicely painted, and, to my mind, are clearer than photographs.]
- British Plant Communities Vol. 5. Marine communities and vegetation of open habitats*. J.S. Rodwell, ed. Pp xiv +512. Cambridge University Press, Cambridge. 2000. Price £70.00 (hardback) (ISBN 0-521-39167-9); price £32.50 (paperback) (ISBN 0-521-64476-3).
- Plant Life of the Quaternary Cold Stages – evidence from the British Isles*. R.G. West. Pp xi +320. Cambridge University Press, Cambridge. 2000. Price £65.00 (ISBN 0-521-59397-2).
- **Early observations on the Flora of Southwest Ireland. Selected letters of Ellen Hutchins and Dawson Turner 1807-1814*. M.E. Mitchell (ed.) Pp 124. Occasional paper 12, National Botanic Gardens, Glasnevin, Dublin. 1999. [no price or ISBN].
[An extremely interesting selection of letters between Ellen Hutchins from Balleylickey, Co Cork (between Bantry and Glengarriff) and Dawson Turner of Yarmouth, Norfolk (joint author of the *Botanist's Guide through England and Wales*, and also of volumes on seaweeds, bryophytes and lichens). Hutchins sent him parcels of seaweeds, then bryophytes and lichens, and finally flowering plants. The letters chosen (40 out of a total preserved of 120), are fascinating, contain many first records, and are immaculately edited and annotated with a wealth of detail. Appendices contain her 'Manuscript Catalogue of Irish Plants', including Bryophytes, Lichens and Algae. She died just before reaching 30 and her collections are now at the Natural History Museum and at Kew. I strongly recommend purchase and reading.]
- **Distinguishing Wild Flower Families*. G. Copley. Pp 45. [n.d.]. Price £4.00 (incl. p. & p.), available from the author at 11 Greendale Avenue, Holymoorside, Chesterfield, Derbyshire S42 7DT.
[I have had problems with this booklet which considers twenty two families in some detail but which fails to mention perigyny when discussing Rosaceae or free central placentation as a

characteristic of Caryophyllaceae. I found the 'hand written' style of the text irritating and the illustrations, perhaps as a result of reduction, rather clumsy. The tables of characters at the end are not always properly aligned across the double page which can also make for difficulties.

There are inaccuracies and ambiguities in both the glossary and the descriptions, for example, the leaves of Ranunculaceae are stated to be opposite or in whorls, an ovary is defined as 'the lower part of the carpel which contains embryonic seeds', a capsule as 'a dry fruit which splits to release the seeds', a follicle as 'a dry fruit which splits along one side'; 'pods' are not mentioned in the glossary but the Cabbage family is said to have 'dry pods of various shapes, long narrow to round and flat, with several seeds' and the Pea family 'pods of various shapes with many seeds or few seeds in a row'.

The information is readily available elsewhere and, in the words of an experienced and very good amateur field botanist whose opinion I sought, 'I have been trying to think of a stage in my botanical life when the booklet would have been of use to me; at the beginning, I didn't really want to know all that and, later on, it was not enough'.

On the other hand, three different sets of adult beginners liked this booklet very much indeed; the information was of use to them; they appreciated both the style and the presentation which they found approachable and non-threatening. Ailsa Burns]

DAVID PEARMAN, The Old Rectory, Frome St Quintin, Dorchester, Dorset DT2 0HF

REVIEWS OF RECENT BSBI PUBLICATIONS (4)

The following reviews have come to my attention since the publication of the last list on p. 58 of *BSBI News* 80 in January 1999. I shall be glad to receive details of any others known to members.

1. *Pondweeds of Great Britain and Ireland* by C.D. Preston (1995)

Journal of Practical Ecology and Conservation 2(2): 75 (1998) ('The distribution maps . . . are a considerable advance on any previously published, and are very helpful to surgeons [sic!] etc.').

2. *Insects, Plants and Set-aside* edited by Adrian Colston & Franklyn Perring (1995)

The Naturalist 124(1031): 174 by 'JE' (John Edmondson) ('a significant contribution to the debate'; 'eminently affordable . . . and provides much food for thought').

3. *Dandelions of Great Britain and Ireland* by A.A. Dudman & A.J. Richards (1997)

Bulletin of the Irish Biogeographical Society, No. 22: 238-239 (1998) by David Nash ('maintains the standard of excellence which one has come to expect from the BSBI series'; systematic section: 'well laid out').

Irish Naturalists' Journal 26(1/2): 68-70 ('1998', issued May 1999) by John Parnell (long, detailed review; introduction: 'very well written, being brief, interesting and to the point'; key: 'does work well'; silhouettes and drawings: 'amongst the best I have seen and really . . . very useful'; systematic account: 'I found this entire section excellent and really had to work at it to find any flaws.' 'All in all . . . excellently produced . . . an essential, if seemingly somewhat expensive purchase.').

Watsonia 22(4): 436 (1999) by G. Halliday ('fine and scholarly'; 'a first-rate Handbook, a worthy addition to the series and one of which the authors can be justifiably proud').

Willdenowia 28: 277 (1998) (brief notice).

4. *Plant Crib 1998* by T.C.G. Rich & A.C. Jermy (1998)

Berichte der Bayerischen Botanischen Gesellschaft 69/70: 260 (2000) by W. Lippert (in German).

Bulletin of the Irish Biogeographical Society, No. 23: 167-168 (1999) by Margaret Norton ('an indispensable addition to the library of any serious field botanist').

Edinburgh Journal of Botany 56(2): 315-316 (1999) by D.R. McKean ('very user-friendly and a must for a botanical recorder').

Glasgow Naturalist **23(4)**: 76 (1999) by Allan Stirling ('the most up-to-date information on identification gleaned from the literature or from original contributions').

Krypto News, No. 6 (1998) (bibliographic details and quotation).

The Naturalist **124(1029)**: 66 (1999) by 'PPA' (Mrs P.P. Abbott) ('immensely helpful').

Taxon **48(1)**: 213 (1999) (bibliographic details, long quotation from publicity brochure, and comment: 'Here is a most valuable work to be consulted by taxonomists and flora writers in other lands.').

Urban Nature Magazine, Nos 3 & 4: 121 (Winter 1998) by Martin Spray ('not especially urban orientated; but . . . going to be a boon to urban and suburban naturalists'; 'a fascinatingly browseworthy book').

Watsonia **22(4)**: 440-441 (1999) by C.A. Stace ('a large amount of very useful information that is certainly of enormous assistance in identification'; 'imperfections . . . to be expected rather than criticized, but the user needs to be aware of them'; 'not so much a permanent reference work as a commentary on the current state of knowledge').

Willdenowia **28**: 291 (1998) by Ralf Hand (in German).

PHILIP OSWALD, Editor of BSBI Handbooks, 33 Panton Street, Cambridge CB2 1HL.

THE WILD FLOWERS OF ALDERNEY AND THE CHANNEL ISLANDS ON CD-ROM

After many years of studying the flora of Alderney, Brian Bonnard has published a book on the subject, subtitled *A New Flora and Checklist*, including the Flowering Plants, Trees, Ferns, Mosses, Liverworts & Lichens found in the wild on Alderney and its Off-islets. Due to prohibitive publication costs his manuscript could not be printed as hard copy. So, instead he has translated the whole text into HTML, (the language understood by computers using the Internet), and has published it himself on CD-ROM. The beauty of using HTML is that it can be displayed on virtually any PC or MAC computer and any internet browser software will display the text on screen without fuss or bother.

The storage capacity available on CD-ROM is such that Brian has been able to include a great deal more information than could ever be contemplated in book form. In fact he has included three books on this CD-ROM, plus nearly three thousand images comprising hundreds of photographs, illustrations and maps. This trilogy consists of *The Wild Flowers of Alderney*, *The Wild and Naturalised Flowers of the Channel Islands* and *Channel Island Plant Lore*.

The disc is self starting on a PC and takes the user to a home page with a brief description of each book and options to go directly to their first file by clicking a button. From there the entire volume is easily available for perusing and the pages appear on screen as if it were a lavishly illustrated, full colour, glossy, expensively produced book. Moving from page to page is simple and the extensive links built into the documents greatly assist when going from chapter to chapter or when searching for a particular taxa.

The Wild Flowers of Alderney is laid out just as one would expect in any good Flora, with introductory pages giving an exposition of the geography and geology and vegetation history of the islands accompanied by appropriate maps, photographs and bibliography. The main bulk of this Flora is the illustrated plant list which consists of a checklist, in taxonomic order, giving the scientific and common name along with such details as the Finder/date, Frequency, Fertile period, Squares where found and Notes. Furthermore, a high percentage of the species have an associated distribution map and/or a photograph and these are displayed by choosing the relevant hyperlink.

The Wild and Naturalised Flowers of the Channel Islands covers the Channel Islands as a whole and in consequence has a more substantial introduction, suffused with illustrations, and, as with all of these CD-ROM volumes, one section leads seamlessly to another by hypertext links. The main body of this volume comprises another checklist with invariably several paragraphs about each species

describing how to identify it, where to find it and other interesting notes. These are often accompanied by photographs which illustrate the inflorescence or typical habitat.

In both volumes, the index provides a quick means of finding a particular plant. By simply clicking on the plant serial number in the text the relevant page containing the plant in question is displayed. This feature is much faster than leafing through a hardback book!

The final volume in the set, *Channel Island Plant Lore*, deals with the folklore of Channel Island plants, including patois names, local beliefs, sayings and customs as well as their uses, medicinal or otherwise. These are accompanied by scanned woodcut illustrations by the Elizabethan Herbalist John Gerard. Perhaps not unsurprisingly the isolation of island communities led to a valuable understanding of plants and their uses based on strong traditions and superstitions. Some can be traced to France or Britain, but many are confined to the Channel Islands or even individual islands or communities. These traditions certainly make fascinating reading and are complementary to the technical detail of the other two volumes.

This CD-ROM contains a wealth of information about the flora of the Channel Islands written in a accessible and yet meticulous style. Anyone contemplating visiting the islands would be well advised to obtain a copy to assist in planning their excursions as would anyone considering publishing a flora on CD-ROM. It can be purchased from Brian Bonnard, The Twins, Le Petit Val, Alderney, Channel Islands for £30 including UK & CI p&p, £3 extra for other destinations. (e-mail bjbonnard@aol.com or access Brian's Web page at www.flora.org.gg where you will also find a monthly Alderney Nature Diary for each of the previous 12 months)

COLIN FRENCH, 12 Seton Gardens, Camborne, Cornwall, TR14 7JS

CATALOGUE OF *RUBUS* SPECIMENS AT THE NATIONAL MUSEUM & GALLERY, CARDIFF (NMW)

The catalogue of the 8567 *Rubus* specimens named to species held in National Museum and Gallery, Cardiff (NMW) is now published (Sewell *et al.* 2000). It includes the E. S. Edees collection as well as significant collections from other batologists such as Riddelsdell, Ley, Watson, Shoolbred and Rogers. There are records from v.cc. 1-9, 11-67, 69-78, 80, 108, 110-112, H1, H2, H9, H11, H15, H16, H20, H21, H23, H26, H35, H37-H40. The collections have been extensively revised and checked by Rob Randall and many others checked by A. Newton, B. A. Miles, etc.

The catalogue is available from me at the address below, price £10 for paper copy (cheque payable to National Museum of Wales), or free as an Excel spreadsheet by e-mail (timothy.rich@nmgw.ac.uk) or 3½ inch disk (please send disk).

Any botanists wanting to visit the collections, are of course, very welcome.

References

Sewell, R. M., Evans, M., Randall, R. D. & Rich, T. C. G. (2000). *Catalogue of Rubus specimens, National Museum & Gallery, Cardiff*. National Museums & Galleries of Wales, Cardiff.

TIM RICH, BioSyB, National Museum & Gallery, Cardiff, CF10 3NP

REPORTS OF INDOOR MEETINGS

AGM 1999

THE PHARMACEUTICAL GARDEN AT CHELSEA PHYSIC GARDEN

[This transcript of a talk given by Dr Cutler at last year's AGM held at the Royal Pharmaceutical Society, London, has been edited for publication by Ailsa Burns.]

Thank you very much for the invitation to speak to your meeting today. It is a great honour for me, but it is also a daunting task. I have been asked to speak on the subject of the development of the Pharmaceutical Garden at the Chelsea Physic Garden. I am a Consultant Dermatologist, not a professional Botanist; I had the good fortune, one year ago, to be appointed to the Advisory Committee of Management at the Chelsea Physic Garden by the Royal College of Physicians. My colleagues on the Committee represent the Royal Society, the Society of Apothecaries, the Royal Pharmaceutical Society, where we meet today and several other important institutions; our job is to discuss and make recommendations to the Council of Trustees concerning matters of importance to the Garden in terms of its long term strategy and planning.

I was appointed about 14 months ago, after the retirement of my illustrious predecessor, Dr Arthur Hollman, who had served the Garden as the Royal College of Physicians' representative for over 25 years. His knowledge of medicinal plants is encyclopaedic and I do not begin to compare with him in this respect. My knowledge and love of plants springs from 2 sources; in my personal life, I used to live merely a stone's throw from the Chelsea Physic Garden whilst I was a junior doctor training at Guy's Hospital and then at University College Hospital, it was then that I discovered and came to love the Chelsea Physic Garden; I have since lived and gardened in Suffolk, a very dry place where frosts are liable to remove your runner beans and new potatoes as late as the first week of June!

In my professional life as a Dermatologist, I encounter, more often than not, the more undesirable ability of plants to produce unpleasant, irritant or allergic reactions on the skin, many people will know what a *Primula obconica* can do to the unlucky person who is allergic to it; sometimes the reaction can hospitalise patients! Other conditions which I diagnose and treat are the result of the interaction of plant compounds called psoralens and ultraviolet light – an unlucky contact between one's skin and Giant Hogweed, *Heracleum mantegazzianum* on a summer's day will leave one looking like a burns victim although the usual culprit in the garden in this respect is the pretty little herb, *Ruta graveolens*, commonly known as Rue.

The Chelsea Physic Garden was founded in 1673 by the Society of Apothecaries, 'physic' referring to the old name for the healing arts; the Garden was intended as a teaching garden for their members and apprentices to give them botanical instruction and to help them to identify the plants they would use in compounding and selling medicines. It is the second oldest botanic garden in England, 50 years younger than Oxford but 100 years older than Kew. It lies in about 4 acres of land between the west end of the Royal Hospital Road and the Embankment, bordered on its west side by Swan Walk. The first 50 years of its existence were difficult and it was not until Sir Hans Sloane purchased the manor of Chelsea from Sir Charles Cheyne in 1712 and, therefore, came to own the Garden's freehold, that its future became secure. Fortunately, Sloane had studied at the Garden in his early training as a physician, and, when, in 1722, the Society of Apothecaries appealed to him for help, he leased the Garden to them in perpetuity, providing that 'it be forever kept up and maintained by the company as a Physic Garden'. Sloane's other great achievement was to appoint Philip Miller as Gardener (he would now be called the Curator) who was to become the greatest horticulturist of the century and who really put the Garden on the map. Miller reigned at Chelsea for 50 years, during which time he wrote 8 editions of his famous

'Dictionary of Gardening'; it was Miller who sent seeds of the cotton plant to Georgia in the USA as he felt that the plant would suit the climate – this was the foundation of the cotton industry of the Southern United States. In 1759, also whilst Miller was there, a plant arrived at Chelsea from Madagascar, via Paris, which was to be described by Miller and named by Linnaeus as *Linca rosea*, a periwinkle; this was to become a plant of immense importance in modern cancer therapy. Forsyth, whom we remember in *Forsythia*, came after Miller and, subsequently, Curtis who built the Rock Garden. In the mid 1850s, Nathaniel Ward was examining at the Society of Apothecaries and was experimenting with the growth of plants in closed glass containers; his work produced the Wardian Chambers which allowed the successful transport of huge amounts of plant material, which, hitherto, had perished on long voyages; amongst the successes of the Wardian Chamber were the shipping of bananas from China to Fiji and Samoa, of 20,000 tea plants from Shanghai to the Himalayan foothills to found the Indian tea industry, and, in 1876, Brazilian rubber travelled via Kew and Ceylon to found a new industry; so, the Garden has an illustrious history.

The Garden is now an independent charitable trust with its own endowments; the public now has access to the Garden on two half days per week, when previously they were excluded; the Garden is rented out for private functions during the summer months – can you think of a nicer place for a wedding reception in London? The educational and research elements still continue and are paramount; Glaxo Welcome provide funds for us to grow plants for pharmaceutical screening and this provides a significant income for the Garden. The cost of maintaining the Garden for ever increases and more and more ways are being discovered to produce income without harming the primary functions which remain educational and scientific.

The Garden of World Medicine is one of the successful developments of the past few years, this is an ethno-botanical garden illustrating the use of plants by a wide variety of races and peoples. Here, you will find plants used by North American Indians, such as, *Echinacea* which was used as a snakebite remedy and there is now interest in its properties in stimulating the immune system, *Hamamelis*, witch hazel, used as an astringent on wounds and *Podophyllum* from which we now derive the drug Etoposide for cancer therapy; this is slightly ironic as the American Indians also introduced the noxious habit of tobacco smoking! There are also sections referring to Aboriginal and Maori medicine, Chinese medicine, and the ancient medical techniques in India.

Our present Curator, Sue Minter, gives many talks and presentations on the Garden both here and abroad and she says that she has come to realise that there is a vast lack of appreciation by the public that plants still play a very important role both in the production of modern drugs by the pharmaceutical industry and in the discovery of future ones; many people who visit the Garden believe that it is a relic of the past, rather than being in the real situation of actually playing a part in the development of modern medicines. Several drugs which are at the top end of the world market are still derived from plant origins.

This lack of appreciation has been the stimulus for the development of the new Pharmaceutical Garden; this is an area of planting which is divided into beds according to the medical specialities in which plants can be grown, clearly to illustrate the range of drugs of plant origin which are of clinically proven benefit and upon which we still depend in modern medicine and surgery. (This is in contrast to the large number of plants from which herbal remedies are derived which have never been fully evaluated by modern scientific methods.)

When I joined the Physic Garden in an official capacity, I was presented with a rough diagram of an idea for the Pharmaceutical Garden, given an idea of where it could be fitted in and told to go away and think about appropriate plants to populate the separate beds. The plan is now coming to fruition; this spring, 1999, the beds have been laid out, the paths between them turfed and planting has begun. The launch date will be in the new Millennium but the garden is already beginning to take shape and I hope that we are going to interest members of the medical profession by these plantings as well as the public at large; there are beds relating to most of the specialities and we really have something for everyone in the Garden.

In the ophthalmology plantings, pride of place will, naturally, be given to *Atropa belladonna*, the deadly nightshade from which we derive Atropine; this is still used to dilate the pupil for examination of

the back of the eye and is also used in the treatment of painful iritis. Portraits of beautiful Renaissance ladies often show the widely dilated pupils considered beautiful at the time which were produced by the instillation of an extract of *Atropa*. These portraits cannot, however, be really true to life, as I feel that, with all the pupil dilation caused by the Atropine, those ladies would not have been able to focus their eyes accurately and they would have been walking around in a complete daze, squinting at things.

Moving on, I am just going to highlight some of the plants of interest in the various sections. Under parasitology we have *Artemisia annua* (Annual Mugwort) which is now being investigated as a source of a chemical called Artemisinin which can cure Chloroquine resistant malaria, I believe the Chinese have been using this plant for similar reasons for hundreds, if not thousands of years. Malaria still kills millions of people world-wide every year and the current anti-malarial drugs are not without their problems. Chloroquine on which we depend for most areas of the world has many side effects and makes a skin disease called psoriasis much worse, the modern alternative, Lariam, has numerous neuro-psychiatric side effects, the other alternative, Doxycycline makes people sun sensitive which is not a good idea in sunny climates – a new drug would be very welcome for this disease.

Cardiology has one of the larger beds; this is not only because my predecessor, Dr Hollman, was Consultant Cardiologist at UCH, but because there are, genuinely, a number of plants still involved with the production of cardiological drugs. Naturally, one immediately thinks of *Digitalis lanata*, the hairy foxglove, which is still cropped commercially in Holland for the active ingredient, Digoxin, taken by millions of patients with failing hearts and irregular heartbeats. *Atropa belladonna*, mentioned earlier, is also relevant to cardiology as it is frequently used to slow down a rapid heartbeat after a heart attack. Sweet Clover or Melilot, *Melilotus*, will also be planted in this area. It was a Canadian Vet. who discovered that cattle which ate mouldy Sweet Clover died of haemorrhages due to the presence in the decaying plant of a chemical called Dicoumarol; it was from this chemical that Warfarin was first developed and this is now used as the standard human anti-coagulant and it is the basis of our standard rodenticides.

Ammi visnaga (Toothpick-plant) has been used for centuries in Egypt for skin, lung and kidney complaints; it is known in that part of the world as 'Khella'. In 1945, by chance, it relieved the anginal pains of a medical technician who was taking it in the belief that he had renal colic; this led to the discovery of three important drugs, Nifedipine, now used for high blood pressure and angina, Amiodarone, now used for heart irregularities and Sodium Chromoglycate or Intal, used for asthma.

The bed illustrating plants used in Oncology will be very interesting; we will have *Podophyllum*, as mentioned earlier, it is a source of the anti-cancer drug Etoposide. We will have *Taxus* (Yew) because it is the source of Paclitaxel, now of proven benefit in ovarian cancer and, more recently, discovered to help breast cancer too. Many of you may have been selling the clippings of your yew hedges over the last few years as these have been used as the prime source of this drug – I am scared that synthetic production of the drug may be in the process of being developed because that will remove a useful source of income from my garden! I mentioned the Madagascan periwinkle, *Vinca rosea*, earlier; it arrived at Chelsea 200 years ago and has now been renamed as *Cantharanthus roseus*. Originally, this was used as a herbal remedy for diabetes, but, when scientific evaluation of the plant took place, it was discovered that its extracts had no influence on diabetes at all but that it contained many alkaloids, in excess of 60, I believe. Two of these have formed the basis of the very important drugs, Vinblastine and Vincristine which have revolutionised the treatment of leukaemia and several other malignancies. This plant is not hardy and will probably have to remain inside the glass houses, with occasional outings to the Oncology bed on warm days.

Time will not allow me to go through each planned planting in detail; we have not even finalised all the plantings, however, as a Dermatologist, I cannot complete this talk without reference to two more sections, namely, Anaesthesia and Dermatology. Surgery is a big part of my professional life in the treatment of skin cancer. Skin surgery usually requires local anaesthesia and you will be interested to know that Lignocaine, our standard local anaesthetic, is derived, originally, from a strain of barley, *Hordeum vulgare*. Under the subject of anaesthesia and pain relief, we must include *Papaver somniferum* (Opium Poppy) which remains the standard source of Morphine, Heroin and related analgesic drugs, *Salix* (Willow) and also Meadowsweet (*Filipendula ulmaria*) as the source of Aspirin

and, lastly, the famous Mandrake plant, *Mandragora*, from which the drug Hyoscine is derived. Hyoscine is supposed to have been added to the sponge offered up to crucifixion victims in an act of mercy; it is a potent pain relieving drug. The myth of the Mandrake plant probably arose as an early form of an industrial protection racket, the herb gatherers were keen to protect it from other people. The myth that they developed was that the plant let out an agonising scream when it was pulled up by the roots and this scream was bad enough to kill you; the remedy to this myth was to tie a dog to the plant by a cord and make it rock the plant and, eventually, pull it up whilst one stood by and covered one's ears. Alas, the dog would die! I think we would now receive objections from the RSPCA if we were to try and use this technique.

Lastly, in the plantings of the Dermatological area, mention should be made of the Evening Primrose (*Oenothera*), the oil of this plant is used in the treatment of eczema and also, now, in various other conditions such as premenstrual tension; and of *Ammi majus* (Bullwort) which is still the commercial source of a drug called 8 Methoxy Psoralen which we use in the technique called Puva. This treatment, which combines the drug and ultraviolet light, is used in the treatment of psoriasis, of which we have 3 million sufferers in this country, vitiligo and the cutaneous malignancy called mycosis fungoides.

The new Pharmaceutical Garden is only just underway and we hope it will develop more fully over the coming months so that it will be flourishing for its official launch in our new Millennium, this time next year. I hope you have enjoyed this glimpse at a new, and, I consider, worthwhile project; it pursues and enriches the educational intentions of the Chelsea Physic Garden. For those of you who wish to get to know the Garden, may I recommend that you take out a subscription to the Friends Scheme? This allows regular access for a very modest annual payment and will enable you to get to know this wonderful place. Thank you very much for inviting me today.

Dr TIMOTHY CUTLER, MA, MB, FRCP

A BOTANICAL / ENTOMOLOGICAL LINK

Footnote to the Presidential Address 1999, published in *Watsonia* 23: 231-235

Following the Address, John Badmin, a BSBI member who is also an entomologist, wrote reporting his searches in 1991 for *Pediopsis tiliae* in two of the newly defined native colonies of *Tilia platyphyllos* (Large-leaved Lime). *Pediopsis tiliae* is a local macropsine leafhopper, a species confined to lime trees. It had previously been found in Britain only on planted lime trees in semi-natural habitats and a search of native *Tilia cordata* (Small-leaved Lime) had been unsuccessful until then, suggesting the possibility that the leafhopper might not be native in Britain. However, following the assessment by Francis Rose and Donald Pigott of the *Tilia platyphyllos* colony in West Sussex as **native** Large-leaved Lime trees, he searched for and found some *Pediopsis tiliae* at Rook Clift in Sussex, and their presence on the native *Tilia platyphyllos* in an isolated pocket of ancient woodland limes provides strong evidence that *Pediopsis tiliae* is indeed native to this country. The paucity of records from native lime woodlands is probably due to the leafhopper inhabiting the canopy where it escapes notice (as did the trees themselves for many years). This was published by John Badmin in the *Entomologist's Monthly Magazine* 130 (1994).

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AGM 2000

The following papers were given at the BSBI AGM held in Belfast on May 13th 2000. They are printed in the order in which they appeared on the programme; however, Trevor Dine's Atlas 2000 progress report is not included here as it has been superseded by the report given on pages 10-11. A report of the field meetings held after the AGM follows the papers.

ON THE UNIQUENESS OF THE IRISH BOTANICAL RECORD

The earliest published scientific records of Irish plants are those of Yorkshireman, the Rev. Richard Heaton who contributed to How's *Phytologia* (1650) accounts of rarities that he had found while attending to his pastoral duties in the Midlands and West of Ireland, paying court to his future in-laws and occasional visits to the capital city. Plants listed according to their Irish names had been recorded much earlier but did not become part of the scientific record. Contributions from visitors or emigrants from Great Britain have continued to be an important part of the Irish botanical record to the present day.

The first Irish Flora, *Synopsis Stirpium Hibernicarum* . . . was written by a medical missionary from Cumberland, Caleb Threlkeld. Published about the same time (1726) as Jonathan Swift's *Gulliver's Travels*, it rivalled that publication in popularity and sales in its early years and remains as entertaining and interesting today.

The next important leap forward was made by Dubliner, Walter Wade. His 1804 Catalogue was greatly expanded by a Scotsman appointed as Curator of the Trinity College Garden, James Townsend Mackay. His *Flora Hibernica* contains the results of much of his own fieldwork as well as previous records and those of his contemporaries. Another Scot, David Moore, was curator of the Dublin Society's Botanic Garden at Glasnevin. He combined with Englishman, Alexander Goodman More, to produce the next phase of the Irish botanical record, *Cybele Hibernica*, which was based on Watson's British model. Indigenous botanists Colgan and Scully produced a second, much expanded edition in 1898. Robert Lloyd Praeger in his monumental, *Irish Topographical Botany* (1901) would continue the tradition of using a useful British model.

Notable records by visitors from Great Britain were made by academics and serious botanists such as William Sherrard, Edward Lwyd, Arthur Balfour, E.S. Marshall and David McClintock. War brought Robert Brown to Ireland. Managing to record plants as well as attend to his medical duties for the various garrisons he made contributions to our knowledge of vascular and cryptogamic floras.

The success of Praeger's *Irish Topographical Botany* changed the pattern of plant recording in Ireland. It was clear that reliance on visiting botanists would not yield enough information to keep knowledge of plant distribution in Ireland up to date. Praeger's boundless energy and great organisational ability established him as controller of Irish field botany. He did not have a happy relationship with G.C. Druce and this may have been an important factor in deterring British botanists from carrying out fieldwork in Ireland in the first half of the twentieth century. Praeger with the assistance of a network of amateur botanists throughout Ireland added significantly to knowledge of plant distribution during that time.

In recent times work for the *Atlas of the British Flora* has brought many of the leading botanists in Great Britain to Ireland to assist with recording of underworked areas and with critical groups. The late Professor David Webb of Trinity College Dublin orchestrated the fieldwork for the first *Atlas* in the Republic of Ireland and encouraged visits from his botanical friends. A significant proportion of the

records in the first edition of the *Atlas* can be attributed to Webb's English visitors though he sometimes chided them for their occasional botanical optimism. Northern Ireland has been more fortunate than the Republic in having more active field botanists. The late Patricia Kertland was the organiser of the efforts for the first *Atlas*. A glance at the distribution map of any common plant is enough to illustrate the effectiveness of the plant recording for that project in Northern Ireland. The recent troubles in Northern Ireland have not seriously slowed the pace of plant recording there though most active field botanists have a story or two to tell that might parallel Threlkeld's tale of being apprehended for climbing upon the rocks in Cumberland during the Civil War in England.

Recording of plant distribution on units of the National Grid meant a great leap forward. Botanists in Ireland were never going to be able to produce the completeness of cover that the close network of county recorders and the several botanical societies in Great Britain could achieve. However the benefits for analysis of the Irish flora were so great that every effort would be made to keep up. The effort was worthwhile though it has had its negative side effects.

Irish botanical field studies were being integrated into schemes devised in and for Great Britain. The smaller force of field botanists in Ireland would find that more and more of its time was being spent on network projects and many would find themselves over stretched. The priorities of Irish botany did not always coincide with those of Great Britain. Conservation issues demanded concentrated work on specific areas and habitat types.

In the 1960s, An Foras Forbartha, a semi-state body in the Republic of Ireland, produced a series of county development reports which included inventories of the best botanical areas. Conservation had come of age and would be the principal consideration behind much of the fieldwork of the last quarter of the twentieth century.

The work of the field botanist – the plant records made often as a recreation, sometimes as a duty, occasionally as an obsession – has now assumed a political importance. Protection of the flora now has a legal basis and plant records a strategic importance. Field botany, once regarded as an esoteric pursuit, is now viewed as a practical activity with implications for the kind of environment being planned for the future.

The success of the *Atlas* 2000 scheme in Ireland – I believe it can be described as such – has been achieved with a relatively small force of field workers. Furthermore the organisers of the work have had to put in a huge personal effort to make up for the deficiencies of some of us who have been less efficient and diligent than we should.

As long as Irish botany is linked to schemes devised in and for Great Britain then results here are bound to suffer by comparison. But there will always be a welcome for British botanists in Ireland. The tradition is long established. Recording of the rare and the curious was begun by Richard Heaton in the seventeenth century and continues to the present time. More recently visits by specialists in 'critical' plant groups has added greatly to our knowledge of the flora and its relationship with that of our nearest neighbour. Taxonomic studies have not been a notable feature of Irish botanical studies. For advances in taxonomic understanding of the flora we have depended greatly on the work of British botanists. Given the shortage of taxonomic botanists in Ireland, both now and for the foreseeable future this dependence is likely to continue.

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ATLAS 2000 IN NORTHERN IRELAND

In Northern Ireland the BSBI Atlas 2000 Project was tackled somewhat differently from both the rest of the UK and the Republic of Ireland. Primary funding for the scheme in Great Britain came from DETR, but in Northern Ireland the funding came primarily from the Department of the Environment for Northern Ireland's Environment & Heritage Service (EHS), which is the government agency responsible for nature conservation in the Province. Some funding also came from the BSBI's own research fund for a six-month period.

A contract was agreed between BSBI and EHS whereby field recorders in Northern Ireland could be reimbursed for travel expenses incurred in recording within the Province and the BSBI could employ a person to input data into a Vascular Plant Database for Northern Ireland (VPDNI).

Mrs Fiona Maitland was selected for the post and was employed by BSBI from April 1997 under the supervision of Paul Hackney. Fiona was placed in the Centre for Environmental Data and Recording (CEDaR) within the Ulster Museum. CEDaR holds environmental records for Northern Ireland on several databases including the Recorder database. Vascular plant records were added to Recorder over the period of the contract, which terminated at the end of March 2000.

The contract between BSBI and EHS required, as its primary objective, the compilation of a consolidated database of all vascular plant records from Northern Ireland, including the new records made during the Atlas 2000 fieldwork. In practice this consisted of entering or transferring data from many sources including:

- published floras, the most recent being *The Flora of the Northeast of Ireland* which covers counties Antrim, Down and Londonderry,
- data from the Northern Ireland vice-county recorders, data was entered for every vice county except Fermanagh and Antrim where the vice county recorders undertook the task themselves, entering approximately 300,000 records between them,
- data from surveys by EHS staff and contractors,
- incorporation of the BSBI Monitoring Scheme data which was held at BRC in Monk's Wood,
- transfer of National Trust survey data and
- miscellaneous other sources including local field clubs

The completed database was used to generate hectad-based distribution data which has been passed to Trevor Dines for integration into the overall Atlas maps. The total number of records on the VPDNI now stands at some 710,000 records, making up 68% of the total number of records on CEDaR's terrestrial database.

Management of the Atlas project in Northern Ireland was vested in an Atlas 2000 Committee with representatives from BSBI, EHS and CEDaR. We would like to take this opportunity to thank the members of this committee for their input, and in particular the representatives from EHS, Dr Michael Meharg and Mr. David Mitchel, who showed strong commitment and support to the project throughout

Towards the end of the contract period the committee gave some consideration to local products from the VPDNI. The primary and secondary products of the contract were the compilation of the VPDNI for EHS and the production of hectad-based distribution data for the BSBI Atlas 2000, but it was felt that a local Northern Ireland product might be desirable. Consequently from April 2000 Fiona has been employed by the Ulster Museum on a new contract, funded by EHS, to develop Web pages as a means of providing access to hectad-based distribution maps for the Northern Ireland plant data, together with photographs and ancillary information about each species. At present the Orchidaceae have been completed as a pilot and it is intended that they will be placed on the Ulster Museum web site (<http://www.ulstermuseum.org.uk>) sometime this year. Printouts of sample pages were shown at the AGM in Belfast.

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ROLE OF ENVIRONMENT AND HERITAGE SERVICE IN PLANT CONSERVATION IN NORTHERN IRELAND

1. Background – History and Current Context

Conservation has always been a devolved matter in Northern Ireland. The first major piece of nature conservation legislation in Northern Ireland was the Amenity Lands Act of 1965. This led to the formation of Conservation Branch. In 1984, the Balfour Report reviewed both the legislation and the role of the branch, leading to the 1985 Nature Conservation and Amenity Lands (NI) Order and the subsequent expansion of the Branch in terms of staff and responsibilities. After a series of name changes, in 1996 Environment and Heritage Service (EHS) was created as an executive agency.

EHS has a very broad remit and is unique as an agency responsible for not only nature conservation, but also archaeology, historic buildings, the maintenance of environmental quality in air, water and on land, and also for landscape and countryside recreation matters. The main functions are: -

- Controlling pollution of air, land and water
- Protecting and recording archaeological sites, monuments and historic buildings
- Conserving wildlife and natural landscapes
- Promoting access to and enjoyment of the countryside
- Fostering awareness and understanding of the environment

Like other government departments and agencies, EHS has to bid for resources from central government. A period of growth in funding in the late 1980s and early 90s has been followed by level funding at best. Although finances are controlled by central government, the political context is increasingly determined by factors outside Northern Ireland and even the United Kingdom, for example the Habitats Directive (discussed below), and the Rio Convention on Biological Diversity. Within these wider frameworks, however, policy is determined locally, at a strategic level by the relevant minister, or at an operational level within the Service.

As far as plant conservation is concerned, EHS does not have a specific policy on wild plants. Policies that affect plants are contained within other fields, such as protected sites, research, grant-aid, education and wildlife licensing

2. The Flora of Northern Ireland

Northern Ireland has a typically 'Atlantic' or oceanic climate (i.e. mild and wet). The solid geology is very diverse, producing a mixed range of soil types. For a small country it has a wide range of plant niches. However, there are no truly endemic species and indeed, the most significant factor about the flora of Northern Ireland is that it is generally *impoverished*, with only about half the native British flora. It is clear that there is no convincing case to be made for plant conservation on the grounds of saving endemic species or phenomenal diversity.

This is not to say that the flora is without interest. There are several intriguing cases of species that are found in one or two sites here that are relatively common in the British Isles. It is interesting to speculate on the origins of these species, and clearly these 'edge of range' colonies are important in scientific terms. Closely linked to this, by its geographical position within the British Isles, Northern Ireland tends to act as a 'meeting place' for both northern and southern species. Perhaps of greater significance, some species that are common elsewhere in the British Isles and are either very scarce here, e.g. *Primula veris* (Cowslip), or do not occur naturally at all (e.g. *Mercurialis perennis* (Dog's Mercury)). As a result other species tend to fill the gaps left, producing some interesting - and almost certainly unique - plant associations.

In this context, it should be noted that the National Vegetation Classification (NVC) did not extend to Ireland. Indeed until recently, very little systematic phytosociological work has been carried out in Northern Ireland (in sharp contrast to the situation in the Republic of Ireland). As a result, NVC communities identified for Great Britain do not always 'fit', and it is difficult therefore to assess the wider significance of some of our peculiarly *local* plant communities.

3. Site Protection

Site protection is one of the main statutory duties of EHS. There is a range of different types of protected sites – National Nature Reserves (NNR), Areas of Special Scientific Interest (ASSI), Special Areas of Conservation (SAC) are the main ones relevant to plants. ASSIs are the main form of protection and were set up by the 1985 Order. Special scientific interest is defined very widely and can include everything from geology and landform, to flora or fauna.

Although the flora is generally poor for endemic species, there are some notable Irish or Northern Irish specialities. Where appropriate, such species are protected *directly* through the ASSI system. For example, the first ASSI declared (in 1985) was Carrickbawn in Co. Fermanagh, which is the only known occurrence of *Erica vagans* (Cornish Heath) in Ireland. Another example is *Spiranthes roman-zoffiana* (Irish Lady's-tresses). Although this species also occurs in the Republic of Ireland and in Scotland, it could be argued that its centre of distribution in Europe is the Lough Neagh basin. The species is protected at a number of ASSIs.

Protecting interesting populations of species rare to Ireland is but a small part of the wider contribution that EHS can make to conservation. In practice, the heart of our nature conservation work through the concept of protected sites is directed not towards individual species, but towards the conservation of habitats.

ASSIs are selected using widely accepted criteria – size, diversity, naturalness and rarity – to assess which sites are the best examples of a particular habitat type. This approach often results in the *incidental* selection of sites for rare species, since ASSIs selected as the best examples of particular habitats often include notable plant species.

4. Special places for plants in Northern Ireland

Some places in Northern Ireland are important for plants in the context of the United Kingdom. With such a wet climate, wetland habitats – lakes and their marginal swamps, fens and wet grasslands – are particularly well-developed here.

Lough Neagh is one of the largest wetlands in Europe, and is internationally important for its birdlife. Despite problems of enrichment and habitat destruction, the lough still retains some very good wetlands that include a host of rare plant species. The importance of the Lough Neagh basin for *Spiranthes roman-zoffiana*, has already been mentioned. Other notable plants include *Hierochloa odorata* (Holy-grass) – the only site for the species in Ireland – unfortunately threatened by drying out as a result of past lowering of the lough. The main aim of the ASSI is to protect the lough and all of its communities of animals and plants.

Upper Lough Erne was selected as an ASSI for a variety of reasons. It is very important for birds and invertebrates. Woodland is well-developed, especially to the south of the lough, around the Crom Estate, which is now managed by the National Trust. In addition to these interests, it is one of Northern Ireland's very best wetlands. It is large, with a diverse range of plant communities and is generally in very good condition, being largely natural and unspoilt. Plants species that are scarce in the British Isles can be quite abundant here. For example, *Sisyrinchium bermudiana* (Blue-eyed-grass) occurs in a few places in wet grasslands around the lough shore, *Lathyrus palustris* (Marsh Pea) is rather more common, being scattered around the lough in areas of swamp, fen and wet grassland, while *Sium latifolium* (Greater Water-parsnip) is widespread in fens all around the lough. As with Lough Neagh, the ASSI aims to maintain and enhance the range of habitats and the species associated with them.

Peatland habitats are also particularly well-developed in Northern Ireland, again related to climate. The **Garron Plateau** represents the largest area of unspoilt blanket bog in Northern Ireland. Indeed, it is one of the best peatland areas in the British Isles. As a habitat, blanket bog tends to be rather poor for vascular plants, but the Garron is notably diverse as a result of extensive base-rich flushing from the underlying basalt rocks. As a result there are a number of rarities such as *Hammarbya paludosa* (Bog Orchid), *Carex magellanica* (Tall Bog-sedge), and *Carex pauciflora* (Few-flowered Sedge).

5. The European context – Special Areas of Conservation

ASSIs are a *national* designation – i.e. they apply within Northern Ireland only. But Northern Ireland is part of the wider European Union, and has international obligations to protect important habitats and species. In 1992, the European Community (EC) adopted the *Council Directive 92/43 EEC on the conservation of natural habitats and of wild fauna and flora*, known as the Habitats and Species Directive, or more simply the Habitats Directive. The Directive requires member states to put forward a list of sites from defined habitats and species to become part of a European network of protected areas. These areas are known as Special Areas for Conservation (SACs). The habitat types and species listed in the Directive are those considered to be most in need of conservation at a European level.

Few of the plant species occur in Northern Ireland, but a number of the habitats are well-represented here. Amongst other things, the Directive serves to stress the importance in the European context of some habitats and plants that are common in the British Isles – e.g. heathland and peatland communities; Atlantic oak woodlands. Indeed, for the latter, the habitat is listed as a feature *specific* to the British Isles (i.e. ‘Old oakwoods with *Ilex* and *Blechnum* in the British Isles’). This serves to illustrate how rarity can be considered at different scales.

6. Protection in the Wider Countryside

Nature conservation can be achieved in a variety of ways. Site designation is only one way of conserving plants, animals and habitats. A broad range of measures is likely to be the most effective. Different species, habitats and earth science features all have different requirements – the most successful way of protecting each varies according to such factors as how they are distributed across the country, and the pressures upon them. Although some areas are so important for nature conservation that statutory designation is the best way of protecting them, many of the more common species and habitats are relatively widespread in the countryside, and can best be protected through a variety of measures, like the planning process, or agri-environment schemes.

Biodiversity, Public Awareness and Partnerships

One of the most important tasks for EHS is influencing how people think and what they do. For conservation to be fully effective, it depends upon a change in attitude, with individuals assuming responsibility for the environment, rather than leaving it exclusively to government. EHS is encouraging this trend towards greater individual responsibility through its educational role and especially through the formation of partnerships. Some of these are forged through the mechanism of direct payments, such as ASSI management agreements and grant-aid to councils and other bodies. Others are being fostered through the establishment of broad-based management bodies for special areas of countryside (e.g. Strangford Lough Management Committee).

In the long term, the implementation of the Northern Ireland Biodiversity Strategy (NIBS) may be one of the most effective ways forward. This has been developed by the cross-sectoral Northern Ireland Biodiversity Group and covers everything from farming to fishing to education. The Strategy is currently being finalised after an extensive consultation exercise and is due to be presented to government later in the year. It includes more than 70 proposals to maintain and enhance the biodiversity of Northern Ireland.

Two particularly fruitful partnerships over the years have been those with CEDaR and BSBI. CEDaR – the Centre for Environmental Data and Recording – is not simply the Northern Ireland equivalent of the Biological Recording Centre in Great Britain, but embraces other significant interests, including earth science data. The centre is run by the Ulster Museum with funding from EHS and acts both as a repository and provider of environmental data in Northern Ireland.

Members of BSBI have made a particularly valuable contribution to nature conservation in Northern Ireland. This involves not only the fieldwork and data collection for the production of Atlas 2000 (although this promises to be one of the most influential books of the new millennium for nature conservation), but also in the identification of key sites, both for individual rare species and for habitats. There is limit to the number of sites that EHS staff can cover, and we depend upon the work of others

to highlight sites of conservation importance, and threats to them. The help and co-operation of individual BSBI members is warmly acknowledged.

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IRISH BOGLAND AND ICELANDIC VOLCANOES

Thirty years ago, two palaeobotanists stood on an Irish lowland raised bog and considered whether tephra, or volcanic glass, produced by Icelandic eruptions over the last 10 000 years, had travelled the 1,000 km south to be incorporated into Irish peats. At that time, in Iceland, research to determine the unique geochemistry of each Icelandic eruption and the date of each prehistoric and historic eruption was to lay the foundation for the palaeoenvironmental science of tephrochronology.

When compared to the 10,000 year period since the end of the last glaciation, a volcanic eruption spanning days or months is almost instantaneous, therefore if a thin layer of chemically-identical tephra is found in peats or lake deposits over a wide area, the ash layer marks a time-plane in the deposit. The date of the eruption is then determined by radiocarbon dating the peat in which the layer of tephra is present. This is the means whereby the science of tephrochronology works.

New impetus was given to this work just over a decade ago as, during the late 1980s, scientists in Scotland discovered that peats in Caithness contained microscopic layers of volcanic glass. Analysis of individual glass shards, rarely more than one hundred micrometres in size, showed that the tephra came from a prehistoric eruption of the Icelandic volcano Hekla. The tephra shards were all microscopic and in abundance, but restricted to a horizontal layer too thin to be seen with the naked eye. They could only be seen by using a microscope.

At the same time as the first findings of Icelandic tephra in Scottish peats were being published, scientists at Queen's University, Belfast were investigating growth patterns in the rings of fossil Irish bog oaks. In the Belfast laboratory were samples of ancient oaks which had grown in Ireland over the last 7,000 years. From time to time these trees had grown under adverse conditions which showed as zones of extremely narrow annual rings in the trunks of the trees. Comparable work in America on bristle-cone pines had linked similar ring patterns to ancient volcanism, which was thought to have had a detrimental effect on climate over much of the northern hemisphere and to have affected the growth of Irish oaks and American conifers.

The periods of poor growth in the bog oaks were precisely dendrochronologically dated but there was no direct method whereby the narrow ring events could be irrefutably linked to deteriorated climate following volcanism. To test this hypothesis, links to ancient volcanism were needed. If volcanic glass could also be found in Irish peats and could be precisely dated, then these dates could be compared with the dates of the extremely narrow ring events in the bog oak. If the dates matched then this may provide further evidence of a volcanic cause for the narrow rings.

Peats were obtained from lowland bogs often in excess of 10 m deep. These bogs were cored vertically and each core sampled at 5 cm intervals. Microscope slides were made from the ash which remained after burning these small samples. Microscopic analysis showed that, from time to time, some samples contained the small bubbly glass shards which are the product of Icelandic volcanoes. Many samples had few shards but occasionally some were seen that contained huge quantities of minute glass particles. The peats which contained the largest amounts of volcanic glass were radiocarbon dated while the glass chemistry of the shards was used to determine the source of the eruption.

When the radiocarbon dates of the peats containing the tephra were compared with the dates of the extremely narrow tree-ring events, occasionally a match was found. For example, the narrow ring event in 2,345 BC overlaps with the date of the eruption of the volcano Hekla at about 2,340 BC. This match does not provide direct evidence that the bog oaks were affected by climatic downturn following a volcanic eruption. Such circumstantial evidence must be treated with caution, especially as there are dated eruptions which do not correspond with the dates of extremely narrow ring events in the oaks.

Further research on the links between volcanism and climate change through dendrochronological studies is being carried out in laboratories throughout the world.

Pollen analytical studies of Irish peats containing the products of the prehistoric eruptions of Hekla and the historic eruptions of other volcanoes such as Oraefajokull have contributed to a deepening understanding of the nature of past vegetation systems over the last 10,000 years. Tephra-linked pollen analytical studies of peats which accumulated about 4,000 years ago have contributed to the body of evidence for the virtual extinction of the native Irish population of Scots pine (*Pinus sylvestris*). Similar studies on peats which accumulated over the last two millennia are detailing the complex vegetational history of the historic period in Ireland and shedding new light on deforestation and the development of Irish agriculture.

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FIELD TRIPS ASSOCIATED WITH AGM 2000

Following the BSBI AGM in Belfast on Saturday 13th May, 3 days of field trips were arranged. On Sunday the 14th we went to the North Coast and visited the Giants Causeway which is a spectacular arrangement of Basalt columns. The weather was sunny with a strong southerly wind and despite a serious fire earlier in the month which destroyed the visitor centre we were able to walk down to the bottom of the cliffs botanising on the way. Plants identified included *Orchis mascula* (Early-purple Orchid) and *Anthyllis vulneraria* subsp. *lapponica*, a very robust form of the Kidney Vetch which is common on the north coast of Northern Ireland. Growing on a wall was an extremely hairy and darkish form of *Pilosella officinarum* (Mouse-ear-hawkweed), nearby was an immature spike of *Orobanché alba* (Thyme Broomrape) and several patches of *Saxifraga hypnoides* (Mossy Saxifrage). Down close to the shoreline on a grassy area were several plants of *Ligusticum scoticum* (Scots Lovage).

We then travelled eastwards a few miles to Whitepark Bay, a semicircular area of ancient sand dunes at the base of cliffs. Plants here included *Draba muralis* (Wall Whitlowgrass), three species of *Alchemilla* (*A. glabra* (Smooth Lady's-mantle); *Alchemilla filicaulis* subsp. *vestita* (Hairy Lady's-mantle) and *Alchemilla xanthochlora* (Intermediate Lady's-mantle) and Mark Kitchen found the two subspecies of *Pedicularis sylvatica* (Lousewort) (subsp. *sylvatica* & subsp. *hibernica*) growing within inches of each other. The most memorable sight at Whitepark Bay was a carpet of thousands of *Scilla verna* (Spring Squill) and *Hyacinthoides non-scripta* (Bluebell) which covered parts of the dunes. The day finished with a visit to Carrick-a-Rede where some members braved the swaying rope bridge, erected for salmon fishermen, to reach the nearby island. Then there was the drive down the Antrim Coast Road, famous for its scenery and back to Belfast.

On Monday we travelled westward to Peatlands Park in County Armagh just below the southwest corner of Lough Neagh. From the late 17th Century this area was a private estate used mainly for hunting and shooting but from the beginning of the 20th Century was cut over for peat extraction commercially. This finished about 30 years ago and the estate was purchased by the Department of the Environment and developed into a Country Park with educational facilities in nature conservation and peatland management. The total area covers 275 ha and there are lakes, bogs, marshes, fens and woodland. We had a conducted tour by the warden, Keith Stanfield, who has been at the Park since it was established. While we were early for most of the bog plants we did see *Eriophorum angustifolium* (Common Cottongrass) and *E. vaginatum* (Hare's-tail Cottongrass) both in considerable numbers. *Vaccinium oxycoccos* (Cranberry) and *Andromeda polifolia* (Bog-rosemary) were in flower along with *Lysimachia nemorum* (Yellow Pimpernel), *Carex laevigata* (Smooth-stalked Sedge), and a few bushes of *Frangula alnus* (Alder Buckthorn) one of its few sites in Northern Ireland. *Sarracenia purpurea*

(Pitcherplant), was first planted in Ireland in Roscommon in 1906 and was introduced into Peatlands Park. Some plants were transferred to The Bog Garden to preserve the stock and it has thrived and is spreading well. Some plants were just coming into flower with a hooded solitary flower on an erect stem.

In the afternoon we visited Brackagh Bog, c.3.25 km S of Portadown in County Armagh. This is also a Nature Reserve and a cut-over bog. Again, despite the weather forecast, the day was warm and sunny and a quiet stroll along the paths produced a number of good plants including the local *Cicuta virosa* (Cowbane), many stands of the impressive *Osmunda regalis* (Royal Fern), *Thalictrum flavum* (Common Meadow-rue), *Spirodela polyrhiza* (Greater Duckweed), *Hippuris vulgaris* (Mare's-tail), *Menyanthes trifoliata* (Bogbean) just coming into flower and leaf spikes of *Ranunculus lingua* (Greater Spearwort).

It had to happen! Tuesday the 16th started very wet, after heavy overnight rain and these conditions persisted throughout the day, leaving the 15 or 16 botanists who braved the elements, soaking wet after only a short time in the field. We travelled south into County Down where we stopped at the Quoile Centre at Downpatrick and viewed the range of exhibits in the Interpretative Centre. These included a 2 m high plastic model of a Heron. In a nearby roadside hedge, Mark Kitchen's eagle eye spotted a bush of *Hedera helix* (Ivy) with orange berries persisting from last season. Professor Stace in his *New Flora of the British Isles*, names *Hedera helix* subsp. *poetarum* (Yellow-berried Ivy), a plant from the central and eastern Mediterranean as having yellowish-orange berries and 'is grown and may persist in wild places'. This certainly needs further investigation. We then travelled on to Killard Point, a small low promontory on the east coast of County Down, about 4.8 km south of Strangford Town. This is an area of shingle beach with ancient sand dunes behind and boulder clay cliffs, which although they are low have several pairs of Fulmar Petrels nesting on them. Here again were swards of *Scilla verna* (Spring Squill) and sheets of *Primula vulgaris* (Primrose) making a spectacular sight in spite of the heavy rain. Two plants which are a speciality of Killard are *Cynoglossum officinale* (Hound's-tongue), not yet in flower, and *Orchis morio* (Green-winged Orchid) at its only site in Northern Ireland. It was first discovered in 1977 and the population would now be close to 100 plants. On a small area of shoreline grass we found *Blasmus rufus* (Saltmarsh Flat-sedge) and on the sandy parts of the dune edges, *Calystegia soldanella* (Sea Bindweed), *Leymus arenarius* (Lyme-grass), *Atriplex laciniata* (Frosted Orache), *Armoracia rusticana* (Horse-radish), *Beta vulgaris* subsp. *maritima* (Sea Beet), *Raphanus raphanistrum* subsp. *maritimus* (Sea Radish) and *Thalictrum minus* (Lesser Meadow-rue). On the cliffs *Carduus tenuiflorus* (Slender Thistle) was growing, but as the cliffs are very unstable, a close approach was not possible.

At the end of a very wet but enjoyable day, the majority of the final day botanists repaired to Mr Wong's Welcome Chinese Restaurant for a celebratory dinner.

Many thanks are due to Anne Carter and Paul Hackney for their organisation and leadership on the Field Trips, and to Paul Hackney, The Ulster Museum and Belfast City Council for the provision of venues and hospitality during the AGM.

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BRITISH AND NORDIC BOTANY

A one day Symposium held at The Linnean Society of London on Thursday 9th March 2000

Three of the papers delivered at the above Symposium are reproduced here. It should be remembered that the first two in particular were written primarily for delivery to an audience.

250 YEARS OF NORDIC – BRITISH MEETING POINTS IN BOTANY

It may initially be useful to consider, briefly, the concepts 'Norden' and 'Scandinavia', and the political changes in the area during the three centuries to be covered – a development from two to five independent states. In Linnaeus' time there were two kingdoms, on the one hand Denmark – Norway including Iceland, the Faeroes and the Arctic, and on the other Sweden with Finland as an integrated part, more Swedish in culture and traditions than the comparatively newly conquered south Swedish, formerly Danish, provinces. Copenhagen totally dominated academic life in Denmark and Uppsala held a nearly similar position in Sweden, although the universities in Lund and Åbo (Finnish Turku) also played their roles. Since the beginning of this century we had five independent states, which have developed their own cultural and scientific traditions. It is an ongoing debate how much the 'Scandinavian' or 'Nordic' in language, culture and traditions contributes to feelings of unity, perhaps we ourselves see more of the differences, the world around more of the similarities. Also, the concepts 'Scandinavian' and 'Nordic' are no older than the nationalism of the 19th century and mean different things in different contexts. For the outside world they may be synonymous ways of describing the whole area. In a narrower geographical sense 'Scandinavia' is the peninsula with Sweden and Norway; Denmark may be added on cultural grounds, but not Finland, which is dominated by quite another type of language. 'Fennoscandia' is a concept used in bio- and geo-sciences, and covers Norway, Sweden and Finland. During this century 'Norden' has been launched to cover all five states. These historical – geographical circumstances are reflected in my talk. It will inevitably be rather Swedocentric, for various objective but also subjective reasons. I cannot do full justice to the other countries but will at least include a few glimpses.

The British – Nordic meeting points in the 18th century are with hindsight by far the most important from a general point of view, and a rich literature has evolved about the topic. A solid foundation was laid by Rydberg (1951). The material is so rich and important that it will embrace more than the third of my lecture which would be justified purely by time-scale. Even so my talk will omit several Scandinavians of great importance in Britain – Pehr Kalm, the younger Linnaeus, Martin Vahl and Olof Swartz, – but they will be treated in other talks during this symposium. But the 18th century traffic is almost unidirectional from Norden to Britain. Among Linnaeus' more than 40 foreign disciples only one, John Rotherham, was British. He found himself so at home in Uppsala that his father wrote worried letters to the now very aged Linnaeus demanding that his son return home. He is also known to have quarrelled with Solander over the competence of Linnaeus filius, and eventually became professor at St Andrews (Fries 1903). During the 19th century too the traffic seems to me unidirectional, but from Britain to Norden, at least so far as ideas and inspiration were concerned – travelling in itself was then less remarkable. In the 20th century contacts are established in so many respects that the approach has to become much more generalised – I see however more of an exchange of ideas in both directions.

I will consider only botany in the narrow sense, concerned with natural history and the Linnaean tradition, and leaving out horticulture and gardening. Moreover, I will also exclude cryptogamic botany.

Linnaeus

It is difficult to imagine the fruitful links that subsequently developed between Linnaeus and British naturalists as well as the success of his scientific innovations without his own short visit to Britain in the summer of 1736. Linnaeus' inspiration to ask permission from Clifford at Hartecamp in Holland to

visit England came from his friend and colleague from the Uppsala years, Petrus Artedi. That highly promising man, so tragically drowned in Amsterdam in 1735, had spent about a year in 1734-35 in London, making contact with Sir Hans Sloane to whom he presented a paper on fishes (Nybelin 1966) – ichthyology not botany was Artedi's speciality, although he volunteered to work in the umbellifers.

In contrast to Artedi's time in London, Linnaeus' days in Britain are well known and have often been recounted. His main meetings were with Hans Sloane, John Philip Miller and Johann Jakob Dillenius. All three meetings began unhappily, but turned out well. With Hans Sloane, a slightly tactless letter of recommendation from Boerhaave, equating the nestor and the young unknown, did not exactly pave the way. With Miller, a dispute started in the Chelsea Physic Garden over botanical names and with Johann Jacob Dillenius in the Oxford garden, another dispute started over genera and the confusion Linnaeus had brought into botany (Blunt 1971). One may see here the familiar pattern of the extremely bright and self-confident young man by whom the authorities are at first repelled, but whose oft-reported charm and proven knowledge eventually break the ice.



Chelsea Physic Garden – an important Nordic-British meeting point in the 18th Century; water-colour by James Fuge (d. 1838)

Another acquaintance, Peter Collinson, became in the long run the most important for Linnaeus. Although they had little opportunity to see much of each other in London, in due course Collinson, together with his merchant and naturalist colleague John Ellis, became Linnaeus' most ardent

protagonists and faithful correspondents in Britain (Stafleu 1971). They insisted that Linnaeus should let one of his disciples come to England to promote botany in the Linnaean spirit. As a result Daniel Solander was sent over in 1760 to spread Linnaean ideas and to get the qualification of a year abroad to entitle him to a chair in St Petersburg, which was in turn the qualification for Linnaeus' own chair.

But as we know Uppsala soon fell from his sights, he never saw Sweden again, but of course he more than fulfilled the expectation put upon him to disperse Linnaean botany (Duyker 1998).

We shall in this connection not forget that there is a *Flora Anglica* by Linnaeus (1754). It is a quite modest work, an uncritical list of names, aiming at bringing concordance between the 3rd edition of Ray's *Synopsis* and *Species Plantarum*. It was defended as a thesis in 1754 by a disciple, Isac Grufberg, whose fate was tragic in spite of the fact that he stayed at home – ten years later he committed suicide by cutting his throat with a razor. But we should rather remember that Hudson's well known *Flora Anglica* of 1762 is a proof of Linnaeus' victory in Britain, it was the first work in this country where his system was used throughout (Hudson 1762).

The Solander - Banksian period

There has been so much written and told about Solander and his days in London (Duyker 1998) that I would rather pay attention to the other Linnaean disciples, which Solander undoubtedly attracted here. After becoming established with Sir Joseph Banks, moreover, Solander became so acclimatised that he has been looked upon as British by many later non-Swedish writers.

But first a few words about Banks' only Nordic episode, when his planned visit to Linnaeus in Uppsala failed to materialise. This rather awkward British-Nordic link in Solander's day is the journey to Iceland by Banks and Solander in September 1772, after plans for a second trip to the South Seas had been abandoned. Why then Iceland? Banks gave as reasons its combination of comparative closeness with its exoticism, especially the volcanism, and the fact that it had rarely been visited. In fact this expedition was the first by foreign naturalists to the island which Denmark ruled with a very strict trade monopoly. The expedition was at the last minute joined by another Swede, Uno von Troil, a friend of Solander interested in the Icelandic language. Apart from the lava stones you can see in the Chelsea Physic Garden and a few other items, it is in fact von Troil who has produced results from the trip. Banks and Solander published nothing, while von Troil had printed his *Letters from Iceland* in 1777 in Swedish, regarded as one of the most valuable accounts of the country from that difficult period. But the future archbishop of Sweden paid little regard to natural history, being chiefly concerned with the people (Agnarsdóttir 1994).

Among the Linnaean disciples in London was Anders Berlin (1746-1773), who by means of a grant from Sweden and a recommendation from Linnaeus approached Banks and Solander in 1771, just after their return with the Endeavour. This was well timed – Berlin was set to work on organising the collections and he is indeed one of those who reported, as did Collinson and Ellis, to Linnaeus on the successes of the circumnavigation, so reluctantly reported by Solander himself. Berlin's role as secretary to Banks for a short period seems not to have been much commented upon – he is not even mentioned in Carter's extensive biography. He wished to join the Iceland journey, but Solander seems to have discouraged him because of his weak health. He later though went to a much more unhealthy place, Sierra Leone, with a young naturalist, Henry Smeathman, who was in charge of an expedition supported by Banks and others to establish a settlement and study the natural history. Berlin seems to have done good work, he wrote to Linnaeus and obtained his praise, but could not endure the severe climate and succumbed in June 1773 (Hamberg 1996).

A colleague and friend of Berlin was Henric Gahn (1747 - 1816), likewise a disciple of Linnaeus for whom he had presented a thesis '*Fundamenta agrostographia*', although he later became more interested in mineralogy, which was in the family. He later became a highly esteemed physician to the upper classes in Stockholm. He spent one year in London enjoying the hospitality of Banks and Solander and obtained an offer to join the second Cook expedition, and reported to Franklin and Sir John Pringle about Swedish progress on the knowledge of carbonic acid. He also travelled widely in England and Wales and studied medicine in Edinburgh (Selling 1966).

The Alströmer family was one of the most important in Swedish manufacturing and industry in the 18th century. Three brothers, sons of Jonas Alströmer who introduced the potato to Sweden and who together with Linnaeus founded the Swedish Academy of Sciences, all followed Linnaeus' teaching in Uppsala, most seriously Clas (1736-1794), after whom the genus *Alstroemeria* was named. He visited England on his grand tour of South and Western Europe in the early 1760s. More important in connection with Banks and Solander is the younger brother Johan (1742-1786), who was taken care of by Banks and Solander during his London visit in 1777-78. Recommendations from the two opened many doors to him, not least to businessmen and manufacturers, in fact Johan Alströmer travelled around England much as an industrial spy, eager to bring novelties to the family's factories in Sweden. Botany played a minor role for Johan Alströmer, but he visited Kew and had good talks with Aiton. It is noteworthy that it is only through him that any of the collection of items from the Endeavour expedition reached Sweden (Rydén 1961): quite a large collection of ethnographica from the South Seas was obtained from Banks and is still kept together in the Ethnographical Museum in Stockholm, once belonging to the Academy of Sciences.

The importance of the Banks – Solander circle as a meeting point was again demonstrated by Carl Peter Thunberg (1743-1828). On his way back from Japan and South Africa in 1778, he of course stopped off in Holland – it was as a Dutch naval physician he had travelled – but in December he arrived in London, was warmly received by Banks and Solander, and was given free access to herbarium and library (Nordenstam 1993). Of importance for him was the Kaempfer material in the British Museum, the only botanical collections from Japan brought to Europe before Thunberg's. Kaempfer travelled in Japan in 1690-1692, and the collections were eventually purchased by Hans Sloane (Carter 1988). On his programme was also Kew and Aiton, and the Chelsea Physic Garden as well as visits to the Hammersmith garden of James Lee, who had translated some of Linnaeus' works, e.g. *Philosophia Plantarum*, into English. After a month and a half Thunberg left England for Sweden, which that great traveller never left again for the remaining 50 years of life.

Thunberg also met Johan Dryander (1748-1810), who had in 1777 arrived in England on a grant from Sweden and he too was of course immediately well received by Solander and Banks. His excellent service as a librarian and his role in *Hortus Kewensis* had little to do with his Swedish origins. On the other hand his origins would have been significant for the capacities he held for long times in the Linnean Society, not only as librarian but as vice-president and as the regular leader of meetings after James Edward Smith had left for Norwich. He was instrumental in bringing the Clifford herbarium to the British Museum, and introduced various of his countrymen into the London sphere, although he had little of the social abilities of Solander (Uggla 1944, Svedelius 1946, Du Rietz 1965). Banks' esteem of him was eloquently expressed at his death in 1810 and bibliographical posterity has praised him highly.

Another most important Swedish botanist in London in those years was Adam Afzelius (1750-1837), who, tired of the academic life in Sweden, was tempted by what he knew from colleagues about the Banksian circle, and was not disappointed when in November 1789 he arrived in London. His first occupation was, curiously enough, to write a new Swedish flora, augmenting and modernising Linnaeus' *Flora Suecica* of 1755. The explanation is of course that he had Linnaeus' collections and annotations available, and there are many traces of his work in the Linnaean collections. In spite of his efforts during two years here, the only results of the project are various excerpts, annotations and a publication on *Trifolium* species. But Afzelius served very much as a cultural attaché for Sweden, as a helpful link between the countries. From his arrival in London he seems to have had a desire to go overseas, which for him, as for Berlin, meant Sierra Leone – an expedition with a Swedenborgian inspiration, Afzelius himself being an ardent Swedenborgian (Lindroth 1945). Masterly collections were brought home after his three years there but the much expected narrative of his journey was never written. Afzelius reluctantly left Britain in 1799, where he felt he had had a much better life than in Sweden. He returned because he risked losing his post as demonstrator botanicus in Uppsala after having been so long abroad. He held that post until 1837, when he died at the age of 87 as the last living link with Linnaeus.

To restore some balance I will say a few words about two more Nordic botanists who came under Banks' influence during his last decade, one Dane and one Norwegian. The first was Nathaniel Wallich

(1786-1854) who had served as medical officer at a Danish colony (Tranquebar) in India and had come in close contact with William Roxburgh at the Calcutta Botanic Garden. Wallich was expelled from there in the wartime year of 1813 but four years later he was reinstated after pressure from Banks and went on to become for 30 years the Director of the Botanical Garden in Calcutta, from where he sent numerous collections to Aiton at Kew. He left India for London in 1847, where he became an editor of the *Journal of Botany* and of course lived as a naturalised Englishman (Christensen 1924-26).

The Norwegian's fate is a sad one. Christen Smith (1785-1816), a pioneer investigator of Scandinavian mountain vegetation, landed in 1815 at Portsmouth after an expedition to the Canary Islands. His intention was to complete a Flora before going back to Christiania, but he was induced by Banks to join an expedition to Congo on favourable terms :

'you will have a Peculiar advantage in their Expedition which very few botanists have hitherto been so fortunate as to Enjoy; the demand of firewood for the steam engine on board your vessel, will make it necessary to cut down trees on the banks of the river very frequently. In the hot climate trees are seldom accessible to botanists on account of the labor of felling them, you will have them felld to your hands, & their flowers and fruits laid at your feet, of this valuable privilege you will I am sure make good use in which case your herbarium will probably contain a greater proportion of arborescent specimens than has generally been brought home from any intertropical country.' (Carter 1988, p. 501)

It is an instruction in its spirit very similar to those Linnaeus gave his apostles before they left on their travels, and it is Banks' last instruction for an enterprise of this kind. Almost all the members of the expedition died from fever up the Congo river. The Kew gardener David Lockhart recovered and brought Christen Smith's collections and diaries home to London. Robert Brown published the material, which was rich and valuable with about 250 new species among the 600 collected along the banks of the Congo.



Christen Smith (1785-1816) the first Professor of Botany in Norway

The 19th century

With the end of the long Banksian era the British – Nordic connection in botany disappeared. The Linnaean era comes finally to an end, and throughout the 19th century no similarly broad relations within the discipline are visible. The Nordic outlook turned due south – Germany became a dominating influence on Swedish science as a whole up to World War I, not least in botany. The personal connections were with Germany and when Swedish scientists went abroad to study, German institutes ranked first and French institutes second, few went to Britain. The picture may be more diverse in Western Scandinavia, in particular in Norway, which was nearer to Britain in many respects.

My thesis that the stream of ideas in the 19th century is unidirectional from Britain to Norden is based on the influence from British science, or rather from some of its foremost figures, in spite of the massive German influence. One example, but outside our topic, is Charles Lyell, whom I mention because of Lyell's oak, still going strong 1 km from my office in Stockholm. He made important observations confirming shore displacement and land upheaval around the Baltic (Lyell 1835). Most important for our topic is how the voice from Darwin reached us. The spread and reception of Darwinism is of course a question for biology as a whole and other branches of science as well, and the subject has been quite well studied from the Swedish perspective. A few botanists played a key role, among them my predecessor as the third Professor Bergianus, Nils Johan Andersson (1821-1880). Like Darwin he got the opportunity to circumnavigate the globe with a military ship, the first Swedish one to make such a trip. In 1852 they halted at the Galapagos Islands. Andersson wrote letters that were published in the leading Swedish newspaper, as Darwin's observations from those islands were not generally known. He reflected on the divergence and descent of the forms he observed and wrote a 200 page thesis on the vegetation of the Galapagos (Andersson 1855) which he sent to J.D. Hooker in 1856 (Broberg 1991).



Nils Johan Andersson (1821-1880) the first Darwinian botanist in Sweden

In the following year Andersson was in Britain, visited Kew and made personal contact with Joseph Hooker as well as with George Bentham. He took home and spread in Sweden their views leading to the reduction of numbers of species. 'One thing I have learnt from my visit at Kew and my study of Salices, to naturally reduce the species' he wrote to one of his many Swedish adversaries with whom he had a fierce debate. He continued in close contact with Joseph Hooker until 1874 as long as he enjoyed good health, and visited London again in 1862. There are nearly 50 letters to him from Joseph Hooker, three from William (and a few from Bentham) in the archives of the Academy of Sciences in Stockholm. There are about 70 letters from Andersson to the Hookers in the Kew archives, the great majority addressed to Joseph Hooker. A more detailed study of the correspondence would be worthwhile but beyond the scope of this paper.

At the solemn session of the Swedish Academy of Sciences in 1861 Andersson presented the Darwinian ideas from Hooker's *Flora of Tasmania* to a distinguished assembly and he continued to give lectures on Darwinism in the following years. As far as we can see, however, he hesitated to accept the ultimate step – the complete randomness of the mechanism behind evolution. Darwin himself asked Hooker among others about 'good and speculative foreigners' to whom it would be worth sending the *Origin of Species*. One such dedicated copy went to Jakob Agardh, the algologist at Lund, who nevertheless maintained a negative attitude, about which quite a lot is said in the Hooker – Andersson correspondence. We do not know if Andersson too, obtained a copy, we only know that Darwin asked Hooker 'What about Andersson in Sweden?'. Through Andersson, Darwinism quickly obtained a foothold among botanists at the Natural History Museum in Stockholm, but it was less accepted at the Swedish universities (Danielsson 1965). It might be added in passing that in Denmark Darwinism was introduced through a young research student in botany in Copenhagen, J.P. Jacobsen, who soon abandoned botany to become one of the most prominent Danish novelists of the 19th century (Christensen 1924-26). His best known novel, *Nils Lyhne*, inspired the British composer Frederick Delius to write his opera *Fennimore and Gerda*.

With the other prominent botanist and Darwinist of the first generation in Sweden, Fredrik Areschoug (1830-1908), professor in Lund, Darwinism became first established at one of our universities. Areschoug wrote our first biography of Darwin (Areschoug 1883), a short but interesting booklet of 40 pages, 'a page of memory' as he called it. Areschoug had visited England in 1871 particularly for the study of *Rubus* on which he wrote a large thesis in English (Areschoug 1886), rather unusual for a Swede in those days. He related the Darwinian approach especially to vegetational migration and invasions after the glaciation – in the very first years after the theory of a former glaciation had been generally acknowledged in Scandinavia. Now we are close to the birth of the theory of glacial survival of the Scandinavian mountain flora, initiated by the Norwegian Axel Blytt (1843-1898) in the 1870s and soon effectively propagated by the Swede Rutger Sernander (1866- 1945) in Uppsala. Initially the discussion was confined to Scandinavia, but as it expanded to take in pollen analysis in lakes and bogs, Scotland became a favourite destination for many Nordic botanists. At least in our country, quaternary geology has been very closely linked to botany, with a centre at the 'Vaxtbio' (Department of ecological botany) in Uppsala. Although it is only marginal to my topic, I will just mention the fruitful link between Sir Harry Godwin and workers such as Hugo Osvald and Magnus Fries in Uppsala. When in the 1930s plant systematists tried to tackle the history of the mountain flora by means of case studies in various species groups, Scottish populations became of importance, as in J.A. Nannfeldt's *Poa* studies in Uppsala or some of Gunvor Knaben's work in Bergen and Oslo. A remarkable Anglo-Nordic connection is of course *Primula scandinavica*, the amphidiploid between *P. scotica* and *P. farinosa*, and here the phytogeographical importance of the North Sea continent in glacial times is a topic of high interest for both Britain and Norden. Having mentioned a few Nordic names from previous generations, a few British names from the present should not be forgotten - I think of Drs John and Hillary Birks in Bergen and Professor Honor Prentice in Lund, all now so active in the fields just outlined.

Linnaean tradition

This brings us up to the present day, but there are a few more lines I would like to follow, making it necessary to step back again into the 19th century. It has often been said that there are similarities in the Nordic and British attitudes towards Nature; that in our countries the sense is not only for Nature in a common and scenic way, but for the detailed characteristics of its birds, plants, insects, etc., far beyond what is immediately considered useful, as edible fungi and the like are in eastern and southern Europe. Much advanced knowledge has been and is still being made by amateurs in both Britain and Norden. Many 19th century clergymen, doctors, teachers and apothecaries were experts in their local floras, and collected and wrote about them. At least in Sweden and Finland this is clearly a Linnaean tradition, which also meant that botany was taught at schools, it was obligatory in secondary schools to collect a small herbarium and learn the names (in Latin) of the plants you had gathered (Jonsell 1991, Jonsell & Hultgård 1999). In many cases something of the kind occurred in Britain (Chater, pers. comm.), which might equally have encouraged or discouraged a botanical interest. From amateurs or former students of natural history at the universities rather than from academic professionals there emanated the enormous richness of floristic information built up during that century. A local patriotism founded on one's own pride of discovering rarities and other local peculiarities developed. I am sure that this phenomenon is much more visible in Britain and Norden than in the rest of Europe. Close connections were established between professionals and amateurs, some of the latter becoming the acknowledged experts on critical groups – not least the apomictic ones. In the national botanical societies of all our countries professionals and amateurs can meet on equal terms. Characteristic at least for both Britain and Sweden (less so for the rest of Norden) are the long series of provincial Floras by devoted individuals, or more recently by teams from provincial botanical societies. For Britain I think there has been a steady flow since the 19th century; in Sweden we can see two waves, one during the decades around the turn of the previous century, the other from the 1970s onwards. All in all there is a widespread and similar attitude towards botany and floras, which make Scandinavians feel very much at home on British field trips – I hope the feelings are reciprocal.

Biosystematics

While indicating that during the 20th century the streams of influence between Norden and Britain have gone more in both directions than during the previous century, I think especially of the sub-discipline we call plant biosystematics. This concept, which in the present state of science is becoming more and more difficult to distinguish as a distinct discipline and is probably on its way to the history of science, undoubtedly had its strongholds in Scandinavia and Britain, though highly active centra in the USA and Continental Europe must not be forgotten. There is a particular branch of biosystematics relating to the differentiation of populations of species into ecologically defined units, emanating from close observations in the field followed by extensive experiments, which came to be known as *genecology*.

Reading the survey papers from the leading British scientists in that field, Gregor, Turrill, not to mention Max Walters, they all not only pay tribute to, but refer in much detail to the thoughts and works of Göte Turesson (1892-1970), the geneticist and botanist from the south Swedish province of Scania so important for his scientific achievements. From a three years' training in the United States in the 1910s he brought ideas which back to Scania, where the brand new science of genetics had already, in the first decade of the 20th century, obtained a dynamic centre at the Swedish Agricultural Research Institute led by the crop breeder Herman Nilsson-Ehle. From this institute, Turesson got one part of his inspiration, the genetical one, while the other part he got from Scanian nature, observing the variation of a number of plant species over the varied landscape of that coastal province with all its varied shores from steep cliffs to sand dunes, its beech and spruce forests and its open country. No Swedish province is more diverse within a limited area than Scania, and that was in my opinion a prerequisite for his recognition of ecotypes.

Would it be too much to say that this way of looking at species appealed in a particular way to British minds, so conscious and knowledgeable about their own flora and its detailed variations? Britain, too, offers a diverse landscape with many extreme habitats especially because of its coastal situation, a similarly suitable field for keen observations and rewarding experiments. Walters in his

Plant variation and evolution (Briggs & Walters 1984) devotes a number of pages to Turesson's pioneer experiments and shows that already in the 1920s studies inspired by them were being carried out in Britain, including further studies of species variation in the man-made landscape, for example under different regimes of grazing.

The ecotype concept became much discussed and even developed in papers by Gregor (1948), Turrill (1946) and others, and Gilmour's deme terminology (Gilmour & Gregor 1939) is hardly imaginable without Turesson's example. We cannot here go into the many studies that followed in this field in both our areas under consideration, often performed in close British – Nordic collaboration. Let me only remind you of a few names: Tyge Bocher who followed up Turesson's work but also gave the typically Danish flavour of life-form studies (from Warming and Raunkiaer) to his biosystematics both in Denmark and in Greenland. In this country David Valentine, with his decidedly taxonomic approach of naming the units, collaborated also at times with another leading, though controversial, Nordic biosystematic front figure – Áskell Löve, the Icelandic. It is not unfair to say that the latter has stimulated much discussion and opposition in this country and elsewhere about the relationship between chromosome numbers and taxonomy.



Göte Turesson, the Swedish pioneer genecologist

So we are again and finally in our own time, or at least within 'living memories'. Everyone among us Nordic and British botanists have here our own meeting points and only history can tell which of those will be worth remembering in the future. And as the other papers today will show, there are meeting points in other important topics, e.g., in phylogeography and with molecular methods. One recent platform for such meetings should definitely be recalled here, *Flora Europaea*. Although a splendid example of European collaboration, British initiative and inspiration were decisive throughout the project. Of course botanists all over Europe came much closer to each other, but the deepest bonds were undoubtedly made between botanists from each of the European countries with their British colleagues in the *Flora*. Personally I am deeply grateful to Nils Hylander who asked me to succeed him as the Swedish regional advisor when he felt his health declining. That brought me into close and permanent relations with colleagues in this country and with institutions such as the two behind today's

symposium. *Flora Europaea* has inspired another great parallel Nordic achievement running since the 1970s at the Botanical Museum of Helsinki, *Atlas Florae Europaeae*. *Flora Europaea* was also an important inspiration for *Flora Nordica*, the joint scientific flora project for the five Nordic countries started at the Bergius Foundation of the Swedish Academy of Sciences in the early 1990s. It was partly modelled on the experience of *Flora Europaea*, with district advisers from Nordic provinces, with the wide circulation of manuscripts, and other ideas that correspond to the way that *Flora Europaea* handled the various countries of Europe. Today we can see in the publication of the first volume where that inspiration from Britain has led.

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THREE EARLY NORDIC BOTANICAL VISITORS TO LONDON

Introduction

The earliest Nordic botanists mostly had their training and contacts in Continental Europe, particularly in northern Germany and the Low Countries, as did even Linnaeus himself. He may, however, be seen as the first Nordic botanist to make links with Britain during his visit in 1736, the lasting result of which is found within the walls of the Linnean Society of London. The three botanists which I am going to talk about today were possibly inspired by him, but they arrived here for different reasons though all applied the Linnaean method on the exotic material assembled in London. I shall for this reason have to give some background data about each of them.

Carl von Linnaeus filius

The first one, Carl Linnaeus filius (1741-83) (fig 1), certainly chose London as a start for his first visit abroad. Here he rightly expected a friendly reception. The younger Linnaeus arrived here in 1781, shortly after he had been appointed as his father's successor as professor at Uppsala, after a procedure which gave him much trouble and enhanced the number of envious rumours about him. He said himself to a friend: 'Drat – my fathers successor! I would rather be a soldier.' Certainly he did not have his father's flair for botany, but was in no way as stupid as often recorded. He was well trained and certainly knowledgeable, but was reputed to be lazy and to thrive best in the company of dubious women at the inn. His mother, in particular, was displeased with his conduct and is known to have hit him even after he had become professor. She also tried hard to prevent him taking possession of the Linnaean herbarium. A clear indication that he wanted this is found in a document, now in the Linnaean collections at Burlington House. This states his willingness to give his sisters land that he had inherited, to get hold of his father's herbarium.



Carl von Linnaeus fil. by Jonas Forsslund painted on his return to England

In his student years and thereafter he had not travelled abroad, and certainly felt it was about time to establish foreign contacts. London seemed a suitable place to start, since his father had good contacts there, and indeed it proved to be an excellent choice. He arrived with a passport from the Swedish King (Gustaf III), who recommended this learned, young nobleman strongly, and he was soon absorbed in the circles around Sir Joseph Banks. In a letter home to Abraham Bäck (Uggla 1953) he describes the famous, well-attended, prolonged breakfasts at Banks' house in Soho Square, in which he took part, also as a welcome source of food. He was obviously proud of having managed the rare foreign plants Banks set him to work on, but admits to having had trouble with the exotic fishes. He also reported on his social life generally, and proudly declared (orig. Swedish): 'In no degree have I as yet made allowances for the pleasures of the flesh, even if I have been tempted many times, but I live like a castrato.' This may be interpreted as an admission of not having done so at home. And as for his drinking habits, we have two surviving bills from the King's Arms Inn at Kew (Jørgensen 1999a), showing that he enjoyed a glass or two – but no excess – of wine and spirit. He certainly enjoyed a visit to the tailor's more, as there are several tailor's bills in his personal effects.

He certainly arrived back in Sweden, after having visited France, the Netherlands and Denmark, with strengthened self-esteem, which was just what he needed. Unfortunately he got no use for that as he died soon after his return to Uppsala from a serious fever, so the sad conclusion is that this visit did not render anything of lasting importance.

Martin Vahl

The next Nordic visitor, in 1785, was my fellow countryman Martin Vahl (1749-1804) (fig. 2) who was born in Bergen and who had studied with Linnaeus on the recommendation of Linnaeus filius (Jørgensen 1999b). He was one of the last of Linnaei students and the one who most persistently preached the Linnaean gospel. It is worth mentioning as a prelude to Jarvis's paper (page 80) that Vahl was the first one to understand the importance of types, as he saw how the continental botanists misinterpreted several of the Linnaean species, using the illustrations cited by him as a reference. As the Linnaean herbarium was not yet available in London, he made, however, no contributions in that direction during his visit there.

Vahl came to London from Paris on his grand European tour, on which he had been sent by the Danish King to cool down a heated conflict in the Botanic Garden in Copenhagen, one with political overtones. Vahl had managed to get as far south as Tunis. In a letter from London to his mentor J.C. De Besche in Bergen he describes how he walked over the Alps to see Haller's herbarium in Bern, which he found to be surprisingly poor (Jørgensen 1999b). He regrets in the letter that he will be unable to visit his native city since he had been called back to Copenhagen on urgent business. This we know was his appointment as director of the prestigious project 'Flora Danica'.

In London Vahl was also included in the Banksian gang which he liked less than either of the other two visitors, primarily, I believe, since he appears to have been a rather timid, introverted, exacting personality, quite the opposite of Sir Joseph Banks. In a later letter to his friend Olof Swartz, Vahl also admits to dislike Sir Joseph's attempts to, as he says, 'build a Botanical Empire on the British Isles.' Nevertheless the two men had common scientific interests, and Vahl reports favourably on the Banksian collections from which he described a number of new taxa, particularly from the West Indies. This was a region of interest also to the Danish Crown. Vahl later published several papers on West Indian plants, the most important being '*Eclogae americanae*' (1796-98). He also added to the specimens sent directly to him from the Danish colonies, generous gifts from Banks, which are still to be found in the herbarium in Copenhagen. This is lasting evidence to the importance of Vahl's visit in London. He, however, never returned to London, though he visited Paris several times. Nor did Banks appear to have consulted him later. The only letter from Banks to Vahl which has survived to our times is one dealing with a parcel which has arrived from Paris for Vahl after his departure from London. Here Banks writes that he looks upon science 'rather as an amusement than a fatigue.' No wonder that these two men did not get on so well! Vahl died from a stroke having overworked himself in an attempt to finish a new volume of his '*Enumeratio Plantarum*'.



Martin Vahl, from an etching in Schrader's *Journal für Botanik* (1801)

Olof Swartz

The third and possibly most important visitor to London was the Swede Olof Swartz (1760-1818) (fig. 3). He arrived as a young man from Jamaica in 1786, and stayed until the following summer. Swartz was a student of Linnaeus filius and had defended his thesis under him. He was a friend of Martin Vahl's, though they never met personally.

Swartz was also embraced by Sir Joseph and his circles and in spite of an initial caution, a close friendship developed between the two men. Banks says in a contemporary letter to James Edward Smith: 'Swartz is the best botanist I have seen since Solander.' Swartz on his side, in later letters to Vahl, clearly regarded the activity of the Banksian circles as excellent, and saw no problem in that botany flourished in Britain, rather than in Sweden. He is full of praise, particularly for the newly founded Linnean Society. According to Nordenstam (1991) his friendship with Banks also materialised in a sum of money given to the Royal Swedish Academy in support of the botanical chair which Swartz was holding, the same that Bengt Jonsell holds today (the money originally came as a fund to support the relatives of Solander, and still gives some dividends).

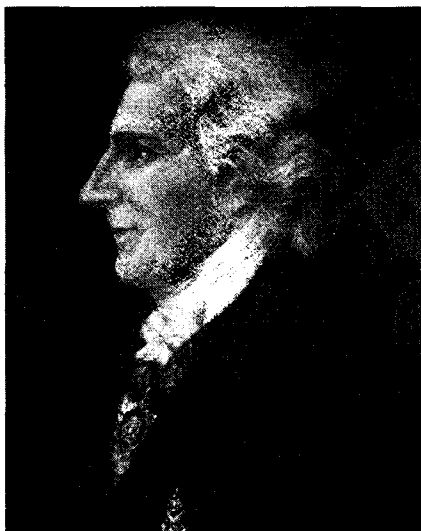
In London Swartz worked on his collections in the Banksian herbarium and laid the foundation of his flora of the West Indies, and he donated many of his own specimens to Banks. They are now at **BM**. He also studied the Linnaean herbarium and made many annotations on the Linnaean specimens, which are important, even today (Jørgensen *et al.* 1994). After his return to Sweden he continued to send specimens, books and ideas to his British friends, often guiding them in questions of the identity of species described by Linnaeus.

Conclusion

These three Nordic visitors in the 1780s all became part of the Banksian establishment. In particular, Swartz and Vahl became engaged in what one may call – the West-Indian flora project – which in today's jargon was a documentation of the biodiversity of those distant islands, which were politically important to many European countries. They managed to finish the work (*Florula Indiae occidentalis*) that Solander left behind when he died in 1782. Their visits also strengthened the British links with Linnaean botany in various ways.

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Olof Swartz, from a painting made at the time when he became secretary of the Royal Swedish Academy (1811)

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THE LINNAEAN PLANT NAME TYPIIFICATION PROJECT

Carl Linnaeus provides an important focus for the long scientific association between the Nordic countries and Britain. During his stay in the Netherlands between 1736 and 1738, Linnaeus made a brief visit to England and met Sir Hans Sloane and Philip Miller in London, and Jacob Dillenius in Oxford. He had a large number of British correspondents, including Peter Collinson, John Ellis, Alexander Garden, Dillenius, Mark Catesby, Joseph Banks, John Mitchell, Francis Masson and William Hudson. One of Linnaeus' most able students, Pehr Kalm, spent just over 6 months in England in 1748 on his way to explore eastern North America, and after Linnaeus' death in 1778, Linnaeus' son made an extended four and a half month visit to London in 1781. Linnaeus filius' sudden death, in 1783, precipitated the well-known series of events that was to result in the Linnaean collections finding their way to England, and their present home in the basement of the Linnean Society of London.

The Linnaean Plant Name Typification Project, which started in 1981, has developed into an international Project that has attracted support and collaboration on a worldwide basis. The Project has as

its aim the production of a critical guide to the typification of all of the plant names described by Linnaeus.

Linnaean names are important because Linnaeus' *Species Plantarum* (1753) provides the starting point in botanical nomenclature for most groups of plants. Linnaeus published some 9,128 names at the ranks of species and variety. The vast majority of these are still in use today, although often in genera other than those in which they were first published. Linnaeus' names include those for almost all of the world's most important crop plants (e.g. rice, wheat, maize, sorghum), many vegetables and fruits, many important forage plants, a large number of the common plants of Europe, and many ornamentals and tropical weeds. As they are amongst the earliest described, most of Linnaeus' names are likely to be senior to any later synonyms that have been described, so if typified incorrectly or without proper care, they can be a major threat to stability in botanical nomenclature.

The concept of types was unheard of in the eighteenth century, and was only adopted about a hundred years ago. Linnaeus frequently based his concept of a given species on a mixture of herbarium material and the published descriptions and illustrations of earlier authors, and sometimes on living material too. Consequently there is rarely any single type specimen in existence, and typification involves identifying each of these original elements, before a choice is made. As Linnaeus often used a very broad species concept, these various elements often represent what we now regard as several different species.

Since 1981 the Linnaean Plant Name Typification Project, based at The Natural History Museum, has been collating and cataloguing information on published type designations for Linnaean plant names and, where none exists, has been collaborating with specialists in designating appropriate types. The Project's main aim is to promote nomenclatural stability in Linnaean plant names by establishing clear typifications for each of the names involved. As it is vital that any designation of a type is carried out in the light of a thorough knowledge of the plant group concerned, the Project tries, wherever possible, to work in collaboration with specialists. This makes the Project necessarily international in scope, and we receive enquiries and requests for information on Linnaean names from all over the world. The purpose of the Project is therefore to establish the correct application of all these Linnaean names through typification, and to publish a definitive catalogue of the names, together with their typifications and reference to relevant literature.

Valid, published, typifications are now known for some 70% of Linnaean plant names, and by the end of 1999, the Project itself had also published 115 papers containing hundreds of new typifications. Recent publications have concentrated on larger taxonomic groups, e.g. the lichens, and the families Fabaceae, Asteraceae, Orchidaceae and Poaceae. Others for the Lamiaceae and Brassicaceae are at an advanced stage of preparation. In addition, the assistance provided by the Project to the many scientists throughout the world who have themselves published on the subject has been formally acknowledged in more than 340 papers. One area that is making substantial changes to the way we are working is the increasing importance of the World Wide Web. The Project has its own website (<http://www.nhm.ac.uk/botany/linnaean/>) which, although fairly modest in the information it is providing initially, will soon provide a list of Linnaean generitypes, with detailed information on the typification of the species involved. As they become available, we hope to be able to add good quality images of the type specimens (or illustrations) to complement this text. Many herbaria are beginning to do this, e.g. images of specimens, with associated information, for the type-rich herbaria of Paul Hermann and John Clayton, and the Jamaican specimens of Sir Hans Sloane, are all available online via The Natural History Museum's website (<http://www.nhm.ac.uk>).

New technology is providing us with tools with which we can make our important collections much more widely available, which can reduce handling, and the associated wear and tear on the specimens. Additionally, we have a valuable addition to conventional publication, particularly if we associate specimen images with our on-line catalogues.

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