

Presidential Address, 1999

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THE STUDY OF A LOCAL FLORA

An appreciation of the wild plants of the British Isles

The theme of this Address is to show how the study of a local flora can lead one to a greater understanding of the larger themes of botany, and how a local botanist can contribute directly to these larger themes from his or her own local knowledge and investigations. It is based on my own experience as a B.S.B.I. member and as County Recorder for West Sussex.

The B.S.B.I. entered the technological age in our *Atlas of the British Flora* (Perring & Walters 1962). For this, records collected by members from all corners of the British Isles were edited by Max Walters and Frank Perring, and punched onto cards to produce maps. There was immediate excitement as patterns of distribution were clearly demonstrated, often for the first time, as the maps appeared. The Atlas led directly to the first legislation for the protection of wild plants in Great Britain in the *Wild Creatures and Wild Plants Act 1975*, followed by the *Wildlife and Countryside Act 1981*, with the schedules of protected plants reviewed every five years since. The Society was deeply involved with both these Acts of Parliament and the subsequent Quinquennial Reviews. It is difficult for us now to realise that before the first *Atlas*, there was no quick reference to the distribution of individual species across the British Isles. Reference to the distribution of each species gave the first general indication of rarity.

However, in the conservation field, as far back as the “Battle for Teesdale” in the 1960s, when we attempted - without success - to save the rare plants at Cow Green from inundation by a new reservoir (Lousley *et al.* 1965; Tutin *et al.* 1965), we learned then to our disadvantage that learned opinions based on experience were insufficient as legal evidence for Planning Inquiries. In the thirty years since we have steadily endeavoured to assemble our information on plants into a more rigid form, with the statistics required for legislation. This has progressed through the recording methodology used for our *Monitoring Scheme sample survey 1987-1988* organised by Tim Rich and reported in Rich & Woodruff (1990). Currently we have another leap forward in recording, record storage and the availability of records planned for the future through our present *Atlas 2000* project, and on into the next century with the *Threatened Plants Database Project*, in which the B. S.B.I. is heavily committed. Inevitably this standardisation of recording format could well lead to the recording of plant distribution becoming largely a number-crunching exercise.

A sub-theme of this Address is to show that, in spite of advanced modern technology, there can be more to the study of a local flora than just the accumulation of records. My sub-title proposes that there is as much a place for the wider study of the natural history of our plants, and for the *enjoyment* of the plants, at the turn of the millennium as ever before.

For a deeper perspective and understanding of a local flora, an obvious start is with the geology. Taking Sussex in the context of the Weald, we have a number of habitats: chalk downland, coastal plain, narrow bands of upper and lower greensand and extensive heavy weald clay. In small local areas the clay is lightened by bands of Paludina limestone and Horsham stone (Gallois 1965). In Mesozoic times the Weald was a lake, in which a snail, *Viviparus sussexiensis* flourished along with dinosaurs. The snails sank on death into the sediment at the water's edge, and their shells can still be seen now embedded in the local “winkle stone”, which is sufficiently firm to cut into blocks for building. Some local houses were built from this stone, for example Hungerhill House built in 1911 from winkle stone quarried from a nearby field on the farm and the wall blocks clearly show the rounded shells. Winkle stone can also be polished, with the shell outlines giving a marbled marking; it is known locally as Sussex, Petworth or shelly marble. In local churches memorials are framed with polished local “marble”, and many churches have baptismal fonts carved from winkle stone. At the time of the Wealden Lake the vegetation was largely of conifers, cycads, ferns and horsetails; now we look in the bands of winkle stone for plants not common on

the surrounding clay, e.g. *Adoxa moschatellina*, *Lathraea squamaria* and *Asperula cynanchica*. A similar local sandstone is Horsham stone, a thinly bedded ripple-marked calcareous sandstone, which was also used in building, as roof tiles for houses built with oak rafters sufficiently stout to carry the weight of the stone. In long-drained Horsham stone quarries the occasional *Ophrys apifera* has been recorded, far from the usual chalk downland localities for this orchid. *Adoxa moschatellina* has also been recorded in fields marked "brickfield" on old maps at the Records Office. In the north-west of Sussex there is a narrow wedge of Bargate beds, a sandgate bed in the lower greensand; the map for *Fallopia dumetorum* in *Sussex Plant Atlas* (Hall 1980) can be exactly superimposed on the Bargate beds on a geological map of Sussex.

The heavy weald clay supported large areas of deciduous forest, and historically Sussex oaks were used to build the naval sailing ships at the time of the Armada. Still today Sussex has a higher percentage of deciduous woodland than most English counties. For many centuries the sticky clay was impassable in the winter months to men, horses and horse-drawn vehicles, and a Domesday Book map of mid-Sussex shows the absence of human settlements along the Forest Ridge. Ifield and Worth are the only place names mapped in the mid-north Weald in 1086 (Morris 1976). A recently discovered link with geological distribution is in *Tilia platyphyllos* - nationally scarce as a native tree, and until 1987 considered to have been only planted in Sussex. In 1987 Francis Rose realised that a succession of copses of *T. platyphyllos* discovered along north scarps of the South Downs in northwest Sussex all had features of ancient woodland (Rose 1991). Donald Pigott accepted these as native trees and there is a paper in preparation.

Another feature of the local flora is the Mediterranean element. Many Mediterranean species are recorded that are dependent on hot summers for good seed production, this seed in turn being dependent on early spring rainfall for germination. When recording population size of these species from year to year the variation, from a handful of individuals to some thousands in occasional years, is very evident. The unpredictability of orchid populations is well known. This year at a meadow reserve (not in Sussex) a local recorder was apologising for the *Orchis morio* pictured on a notice listing the plants to be seen, saying that this had now not been seen for many years at this site, when in the meadow that day 20,000 plants of *Orchis morio* were counted. Similar variations in population sizes in different years are shown by *Gentianella anglica* in East Sussex, but even more dramatic are figures from Dorset, where in 1994 numbers of this species were estimated at 500,000, but in spite of searches at the same sites in 1996 only 50,000 were recorded. This was referred to by my predecessor, David Pearman, in his Presidential Address (Pearman 1997). To some extent these variations in population size cast doubt on the validity of "snapshot" recording as a monitoring tool.

In the New Naturalist monograph on *Lords and Ladies* by Cecil Prime, the pattern of *Arum italicum* subsp. *neglectum* in southern Britain is explained by a map correlating the distribution with the area in which snow lies for less than five days in the year (Prime 1960). Since then a possible weather pattern change due to global warming could extend the range of this plant further north following a retreating snowline, but the further restrictions of habitat requirements to either the springlines between chalk and greensand, or the coastal plain on brick-earth and gravels, could limit any dramatic change. A recent survey of the distribution of this plant in West Sussex was carried out by members of the Sussex Botanical Recording Society and reported by Ron Clough (1998). The author concluded that additional records on the Downs in this survey were almost certainly due to diligent searching rather than an increase in frequency of the plant.

Phyteuma orbiculare is totally confined to the chalk downs, and the distribution map in the *Sussex Plant Atlas* exactly overlies the line of the South Downs. Locally it is known as "The pride of Sussex" - rather inappropriately, as travelling in Europe we find that it is widespread, being recorded from 15 countries in *Flora Europaea* (Webb *et al.* 1964-1980). More distinctive to Sussex is the wood of *Taxus baccata* at Kingley Vale, recognised as the finest yew wood in Europe. Steep chalk downland slopes provide a stronghold for these woods, and at Kingley Vale the slopes are south- and west-facing which, being dryer, are less favourable to the beech and ash trees which are also typical of downland slopes. For many centuries the yew supplied the wood for Britain's strategic weapon, the longbow; Homer and Virgil had recorded that yew was one of the best woods for bows. On the Reserve there are old gnarled trees and in the main valley at Kingley Bottom there is the dark "sinister and fantastic" forest of Victorian times. Ring counts have shown the older trees now to have been growing for 500 years (Williamson 1978).

In contrast to the strict habitat requirements of these chalk species is *Hypericum hirsutum*. Thinking of this as a downland plant we were surprised to find that the *Sussex Plant Atlas* distribution map shows the species as widespread in West Sussex with many fewer downland records in East Sussex. Norman Robson interpreted this for us by pointing out that the species needs not only neutral soil and good drainage, but also *some shelter*, such as hedgerows and wood edges rather than open fields. The bare downland of East Sussex is too windswept for *Hypericum hirsutum*. Another *Hypericum* species, *H. perforatum* has been in the news as a treatment for depression. Used externally in massage and as an effective wound healer for centuries, modern research has revealed volatile oils, hypericins and prenylated phloroglucinol derivatives, and the plant has been tested for internal use as an anti-depressant with encouraging success.

Ashdown Forest was the Sussex stronghold for *Genista pilosa*, but this species has dwindled in the second half of this century and is now presumed extinct. David Coombe has suggested (pers. comm.) that the heathland ecotype, the form which was found in Sussex and on the Suffolk heaths (where it is also now extinct), was less vigorous than the more robust ecotype of the coastal heaths in Cornwall; the eastern heathland form thus had less potential to recover after fire - a frequent hazard in the Forest. Tim Rich reported on this in the *Flora of Ashdown Forest* (Rich *et al.* 1996).

Cardamine impatiens, another local plant restricted to woodland on neutral soil and to river edges, germinates in sections of ash wood in the year following coppicing. We found it in cleared soil near my home at Slinfold, when collecting springy sucker shoots of the ash (very suitable for bow and arrow play). The *Cardamine* flowered in the second year, but by the third was crowded out by the colonising vegetation. This local species is widespread in the northern hemisphere; I have seen it growing in grykes on limestone pavement at Fell End Clouds in Cumbria (Halliday 1997), also in the Swiss and Italian Alps, and from a pony in a Himalayan wood in Kashmir.

Sussex is still a stronghold for *Carex vulpina*, now a *Red Data Book* species. Only separated in Britain from *C. otrubae* in 1939, the two species can be difficult to distinguish; fruiting plants apparently have a distinctive “jizz”, but comparison of the epidermal cells of the utricle under the microscope, as described in the B.S.B.I. Handbook (Jermy, Chater & David, ed. 2, 1982) is required by the *Carex* referees. The sedge is endangered in Sussex through loss of habitat, especially now that so many river edges have been artificially built up with steep flood banks.

It is always exciting to find a completely unknown flower. *Downingia elegans* at Ardingly Reservoir was a complete mystery, until the clues of *Hordeum jubatum* and a tall robust form of *Mentha pulegium* (now presumed extinct as a Sussex native) suggested an American species. Botanists at Wakehurst Place, Kew were able to find out for us that the edges of the newly constructed reservoir had been sown with a grass mixture from the U.S.A., designed for fluctuating water levels (Briggs 1986). Mary Elizabeth Parsons (1897) described these plants as growing in wet places, “where they often make the ground blue. The showy white-centred flowers are familiar along the roadsides upon the borders of puddles”. Another introduction is *Elodea callitrichoides*, a waterweed from South America. The Sussex site in the Chichester Canal may now be the only English record. There is also one in South Wales (Simpson 1986).

Historical records have a special fascination. In East Sussex *Teucrium chamaedrys* was recorded on Camber Castle in 1690. J. Petiver and J. Sherard (1714) wrote “Upon that side of the castle wall that looks to Rye we saw full plenty of chamaedrys”. It could be seen there still until 1991, but in this century the Castle has been excavated, first by the Ministry of Works, then by the Department of the Environment. Despite the efforts of local plant recorders for 40 years, the last plants were “cleaned off” the castle walls with herbicide spray in 1991. In 1945 A. W. Graveson found *T. chamaedrys* in short cliff-top turf at Cuckmere Haven. Francis Rose (pers. comm) accepts this as native by comparison with chalk grassland sites in France.

A herbarium sheet in the Department of Botany, The Natural History Museum was first labelled *Polypodium vulgare* var *serratum*, “Hbm. of J. Forbes Young MD 1796–1860”, and “from ye old tower of Arundel Castle Sussex”. At the Castle, Sara Rodger researched her archives to identify the “old tower” where the specimen was collected, as the present keep. On a more recent label added to the herbarium sheet, a “redet.” reads: “*P. australe* Fee R. H. Roberts” - the species now known as *Polypodium cambricum* L. It was renamed by our current *Polypodium* referee, R. H. Roberts, as recent work had established the key character of paraphyses mixed with the sporangia, enabling specific distinction. This well demonstrates the value of keeping herbarium specimens in good storage, as reference from the past and for future work.

As a professional pharmacist, my personal interest in medicinal plants has often involved those which are poisonous. A local primary school phoned for advice when a small boy had eaten *Mercurialis perennis*, fortunately with no lasting harm as he had been very sick. However, a tale is told in *Philosophical Transactions* (Anon 1693) of the wife who went into the fields and gathered *M. perennis* as a pot-herb to serve "Fryed with bacon (having first Boyled them)". After eating this all the family were ill, the children vomited and were purged and "slept from Thursday to Monday" when sadly the youngest gave "2 sprunts" (convulsions) and died. The father, W. Matthews, overslept too but went to work saying that "he thought his Chin had bin all the Day in a Fire, and (he) was forced to keep his Hat full of Water by him all the Day long, and frequently dipt his Chin in it as he was at Work." Mother was reported to be "also very sick, but forced to rise to look after her little family concerns".

In 1983, in a modern case of poisoning by *M. perennis* the doctors described the reddening of cheeks and jaw as a "curious malar erythema". That time the *M. perennis* had been eaten in mistake for *Veronica beccabunga* (an edible herb) (Rugman *et al.* 1983), highlighting the importance of correct identification before eating.

In August 1977 three Dutch (botany) students youth hostelling and self-catering in Sussex added *Oenanthe crocata* leaves to their stew, assuming it to be *Apium graveolens* which was familiar to them from their local countryside at home. Although *O. crocata* is widespread in Sussex, and throughout southern and western Britain and Ireland, it is a very rare plant in Holland. There it was first recorded only in 1975. *O. crocata* contains highly dangerous oenantheotoxin and all the young men collapsed within ten minutes and were taken to hospital; one seriously ill (after two helpings) and in intensive care, but happily they all recovered.

Similarly an Eastern European family working in West Sussex went berry-picking and baked a pie of mostly *Atropa belladonna*. All were seriously ill, but recovered after hospital treatment.

Looking to the future, the most advanced work on molecular botany, using characters which are indistinguishable in the field, still relies in many cases on records from old collections, and living material provided by local botanists. An example is the paper by Johannes Vogel, Fred Rumsey *et al.* (1999), which describes *Asplenium ruta-muraria* subsp. *ruta-muraria* as widespread across Europe and autotetraploid, but the diploid *A. ruta-muraria* subsp. *dolomiticum* as coinciding in area with the glacial refugia in northern Italy. The diploid subspecies needs at least two gametophytes produced by different spores, giving a slower rate of colonisation which leads to a restriction of diploid populations to ancient glacial refugia, and the colonisation of the rest of Europe by polyploids. Collections of material by travelling and local botanists are critical for this ongoing work on *Asplenium*.

Also looking to the future, B.S.B.I. records will be included in the World Database mapping scheme at The Natural History Museum to provide information on biogeography. This, when the number of sites, sizes of populations, climate and other factors are taken into consideration, will lead to an improved evaluation of threats to rare species for conservation.

Petrorhagia nanteuilii is a *Red Data Book* species with its only British sites in West Sussex. Morphological, cytological and geographical data strongly suggest that *P. nanteuilii* is an allopolyploid derived from *P. prolifera* and the non-native *P. velutina*. The distribution of *P. nanteuilii* is shown on the *Atlas Florae Europaeae* map as scattered along Mediterranean coastlines, and on the Iberian Peninsula as widespread both on the coast and inland. In the British Isles there are only two localities, both in West Sussex and coastal, at Pagham Harbour and Shoreham; the latter is an old locality refound since the publication of the *Red Data Book* ed. 3 (Wigginton, 1999).

A most valuable section of B.S.B.I. activities is the publication of journals and identification handbooks; these are a continual source of information on our plants, and most local floras are written by B.S.B.I. members. Also informative, a series of B.S.B.I. surveys has been organised through the years, some on a single genus or species e.g. Mistletoe, *Atriplex*, *Sorbus torminalis* and *Populus nigra*; others on arable weeds, churchyards etc. All members can participate in these network research surveys, which often lead to unexpected plant finds locally. The programme of field meetings and conference meetings has enabled me to visit botanically most areas of the British Isles during 39 years as a B.S.B.I. member, so that although this Address refers mainly to my local county of Sussex I have had good opportunity to appreciate the wide variation in the wild plants of Britain and Ireland.

My family learned when young to identify 'pin and thrum' primroses; but only later at B.S.B.I. lectures did I learn the intricate details of their morphology. Jack and Yolande Heslop-Harrison brought scanning electron micrographs of pin and thrum stigma surfaces, showing the long papillae of pin and the short papillae of thrum stigmas, which together with differences in size and shape of the pollen grains effectively ensures that cross-fertilisation is the norm. Further papers with diagrams on this by John Richards (1986, 1989) explained this complex mechanism simply. What wonderful years to have been able to combine family life with the opportunity to learn such detailed information on our plants! But I hope I have shown that, as well as providing such personal enjoyment, careful study of a local flora can contribute to much wider knowledge, and can put local botanists in touch with work of considerable scientific importance. This in turn brings feed-back, leading to a deeper appreciation of the plants recorded locally. Through the B.S.B.I. we all have the means to become active members of the wider botanical community.

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REFERENCES

- ANON., (1693). VIII. Part of a letter from Mr. T.M. in Salop, to Mr. William Baxter, concerning the strange effects from the eating Dog-mercury. *Philosophical Transactions* **17**(203): 875–876.
- BRIGGS, M. (1986). *Downingia elegans* refound in East Sussex. *BSBI News* **44**: 20.
- BRIGGS, M. (1990). *Sussex Plant Atlas Supplement*. Booth Museum of Natural History, Brighton.
- CLOUGH, R. (1998). *Arum italicum* (Italian Lords-and-Ladies) in Sussex v.c. 13 & v.c. 14. *BSBI News* **79**: 55–58.
- GALLOIS, R. W. (1965). *The Wealden District*. Ed. 4. British Regional Geology. H.M.S.O., London.
- HALL, P. C. (1980). *Sussex plant Atlas*. Booth Museum of Natural History, Brighton.
- HALLIDAY, G. (1997). *A Flora of Cumbria*. Centre for North-west regional studies, University of Lancaster.
- JERMY, A. C., CHATER, A. O. & DAVID, R. W. (1982). *Sedges of the British Isles*. B.S.B.I. Handbook No 1. 2nd ed. Botanical Society of the British Isles, London.
- LOUSLEY *et al.*, eds. (1965). *The threat to Upper Teesdale*. Botanical Society of the British Isles, London.
- MORRIS, J., ed. (1976). *Domesday book 2, Sussex*. Phillimore, Chichester.
- PARSONS, M. E. (1897). *The wild flowers of California*. Cunningham, Curtiss & Welch, San Francisco.
- PEARMAN, D. A. (1997). Presidential address, 1996. Towards a new definition of rare and scarce plants. *Watsonia* **21**: 225–245.
- PERRING, F. H. & WALTERS, S. M., eds. (1962). *Atlas of the British flora*. T. Nelson, for Botanical Society of the British Isles, London.
- PETIVER, J. & SHERARD, J. (1714). *Adversaria Petiveriana. Journal to Hastings, a journal of a botanical tour from London to Dover etc., by Tunbridge Wells and Hastings*. Sloane MS. No. 3340, British Library and (1862) in *Phytologist*.
- PRIME, C. T. (1960). *Lords and Ladies*. Collins New Naturalist, London, and (1981) Pendragon, Cambridge.
- RICH, T. C. G. *et al.* (1996). *Flora of Ashdown Forest*. Sussex Botanical Recording Society, East Grinstead.
- RICH T. C. G. & WOODRUFF, E. R. (1990) *The B.S.B.I. Monitoring Scheme 1987–1988*. Nature Conservancy Council CSD Report No. 1265.
- RICHARDS, A. J. (1986). *Plant breeding systems*. Allen & Unwin, London.
- RICHARDS, A. J. (1989). *Primulas of the British Isles*. Shire Natural History. Shire, Aylesbury.
- ROSE, F. (1991). Neolithic trees on West Sussex Downs. *BSBI News* **57**: 10–11.
- RUGMAN, F., MEECHAM, J. & EDMONDSON, J. (1983). *Mercurialis perennis* (dog's mercury) poisoning: a case of mistaken identity. *British medical journal* **287**: 24–31.
- SIMPSON, D. A. (1986). Taxonomy of *Elodea* Michx. in the British Isles. *Watsonia* **16**: 1–14.
- TUTIN, T. G. *et al.*, eds. (1964–1980). *Flora Europaea*. Cambridge University Press, Cambridge.
- VALENTINE, D. H. (1965). *The natural history of Upper Teesdale*. Northumberland & Durham Naturalists' Trust Ltd.
- VOGEL, J. C., RUMSEY, F. J., SCHNELLER, J. J., BARRETT, J. A. & GIBBY, M. (1999). Where are the glacial refugia in Europe? Evidence from pteridophytes. *Biological journal of the Linnean Society* **66**: 23–37.
- WEBB, D. A. *et al.* eds. *Flora Europaea*. (1964–1980). Cambridge University Press, Cambridge.
- WIGGINTON, M. J., ed. (1999). *British Red Data Books 1 Vascular Plants*, ed. 3. Joint Nature Conservation Committee, Peterborough.
- WILLIAMSON, R. (1978). *The great Yew forest*. Macmillan and Reader's Union, London.