

Presidential Address, 1986

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PART ONE: ON BEING A HUNDRED AND FIFTY

Back in the early 1950s anyone who happened to work in the library of the Department of Botany at the British Museum would be startled every now and again by a fierce volley of expletives that emanated from somewhere on the upper floor. Traced to their source, these would be found to have come from a little, cross-looking, very old man bent over an array of open books and scraps of paper in what appeared at first sight to be a state of total confusion. He was a one-time member of the staff, long since retired, the more curious visitors would be gently informed, who was toiling away at a polyglot dictionary of botanical terms, which, alas, there was no likelihood of his completing before he was taken from this world. And that, sad to say, did in due course turn out to be the case.

The old man was a certain Antony Gepp, who in his time had done distinguished work as the Department's specialist in algology. And unless I am seriously mistaken, a Miss Branfill whose name features in the earliest list of members of our ancestor, the Botanical Society of London, was none other than his mother. A girl of sixteen then, she was to marry at twenty-nine, give birth to him when in her fortieth year – and leave him to live on until he was well into his nineties. Thus some of us here today have been privileged to touch hands, as it were, with the founders of the Society at just a single remove. A hundred and fifty years is not so long as all that: a couple of lifetimes only, at a rather extended stretch.

Yet in other ways 1836 does seem a very long time ago indeed. It was only two years before that that slavery had been abolished – and then only within the British Empire: other Western nations would continue to cling to it for a long time yet. At home meanwhile the penal laws were still horrific. Transportation remained in vogue. The gibbet had only just been abolished. It was only sixteen years since the last execution by beheading.

Politically, too, the scene was hardly a familiar one. William IV was on the throne and Melbourne was in the second year of what was proving to be an agonising premiership. After a period of acute unrest, of rick-burning in the countryside and rioting in the streets, the Reform Bill had eventually been passed, only to leave the radicals as noisy as ever, their appetites merely whetted. As they bayed at Melbourne's heels, the King and the House of Lords growled and snapped at him from above. Two years earlier, as if symbolically, Parliament had been in flames. Now the Prime Minister himself was the subject of a squalid trial, accused of adultery with a leading society beauty. The very next year the economy would collapse, a long depression would start and the Chartist agitation would set in. In another two years there would be a serious uprising in Wales and a chain of conspiracies in Yorkshire. It can hardly have seemed an auspicious time to be founding a national society.

Yet a much more familiar world was also just starting to appear. Already, six years earlier, the first passenger train service had been brought into being – and, soon after that, the first plant-spotting out of train windows. In June 1832, on a journey across Lancashire by this new form of travel, the young William Christy made several interesting records while moving, in his awestruck words, "at a speed which almost precluded any botanical observation" (Christy 1833). Within two years of the Society's founding the first excursion trains had even been introduced and Daniel Cooper, our founder, was leading a group of the members to "a spot . . . called Woking", chosen because it had become easy to reach by the newly-opened London and Southampton Railway (Cooper 1838). Only one year later Mr Bradshaw was to bring out the first of his national timetables.

It would be another four years yet, though, before the members would enjoy the penny post.

Even so, in the Society's inaugural year the crippling stamp duty on paper had been brought down to only a penny a sheet, one of the major spurts forward on the road to the abolition of the much-decried 'taxes on knowledge'. In that same year, too, the first provincial daily came out, and the University of London was established as a national degree-conferring institution. 1836 also witnessed, believe it or not, the first hospital training scheme, the earliest screw-driven steamboat and the foundation of the gas appliance industry. More ominously, the first fatal train derailment occurred, to be followed in the very next year by the earliest death from a parachute jump. Already, too, by 1835 Fox Talbot (a botanist, be it noted) had taken the earliest surviving photograph. Within four years of that even microphotography had been invented. A tremendous transformation in the everyday environment was in progress.

By comparison, science lagged. 1836 was the year of Darwin's return in the *Beagle*: over twenty more would have to elapse before the society in whose rooms we meet today would be the first to be told of its shocking outcome. 1836 was the year too in which Henslow held the last of his famous Friday evening 'at homes' for the science students at Cambridge. Now he was off to be a country vicar – and an absentee occupant of the Professorial Chair. The previous year the Royal College of Physicians had rescinded its rule that only graduates of Oxford and Cambridge could be elected as its Fellows, and the marvellous high summer which the sciences had enjoyed since the 1820s at those two universities as a result was abruptly brought to an end. Within a decade the number of medical students at Cambridge was down to a mere five or six yearly and empty classrooms were greeting the science professors to their embarrassment (Becher 1986). By 1846 Babington would be having to write: "Never was botany at so low an ebb as now in this place" (Babington 1897). At the embryonic London University the Chair of Natural History at King's had been abolished because of the shortage of students; and although the Chair of Botany there survived, the emolument that it carried was so disgracefully low that Edward Forbes would have to hold it in tandem with the Geological Society's Curatorship – which paid half as much again – in order to enjoy more than an artisan's existence (Wilson & Geikie 1861).

But if botany in English Academia was in sad disarray (and matters were very different up in Scotland, we must be careful to remember), it was a halcyon period for the subject elsewhere. Field botany, fashionable since the Linnaean 1770s, was now borne along on a second and much more massive wave, which penetrated far more sweepingly. Of its innumerable catches, almost every one was engaged in forming a personal herbarium, and wore on their roamings through the countryside that by now conventional emblem of the fraternity, the roomier, eighteen-inch students' vasculum (Allen 1959). Before long a member of that ancestral society of ours, Thomas Bentall, would have succeeded in interesting his family firm in producing a special drying-paper to accompany it.

Field botany was well into its great nineteenth-century expansion, brimming over with confidence, tingling with excitement. Additions to the flora were continuing to be turned up in the less well-worked corners of these islands at a not noticeably declining rate; and even if by then most of the more obvious and spectacular species had been discovered, keener discrimination seemed likely to ensure that the stream of novelties would not dry up for a long time yet. In that very year of 1836, indeed, there had again been an impressive haul: *Carex punctata* Gaud., *Cystopteris montana* (Lam.) Desv., *Calamagrostis stricta* (Timm) Koel. and *Spartina alterniflora* Lois. The previous one had yielded *Ononis reclinata* L., *Erica mackaiana* Bab. and *Valerianella carinata* Lois., the next would see the first of Babington's two successive forays to the Channel Isles and two more prizes as a result: *Ornithopus pinnatus* (Mill.) Druce and, most glittering of all, *Spiranthes aestivalis* (Poir.) Rich.

These were the years when the still-youthful Babington was busily making his mark, crisscrossing the British Isles one long summer after another and by his efforts alone considerably augmenting the total of species they were known to possess. Never to be a member of the Botanical Society of London (though he did join the later Botanical Exchange Club), he was twenty-seven when it was born. Watson, his resentful rival, and presently to be its mainstay, was five years older at thirty-two. Babington's *Manual*, the first really critical field handbook, was still nine years off; but Watson's *New Botanist's Guide*, that updated register of what each county held, was in the middle of coming out. Detailed treatments had appeared already of *Mentha*, *Salix* and *Rosa*; *Rubus* had been marginally nibbled; but *Hieracium* was still effectively virgin territory. It was obvious that there was a great deal waiting to be done.

Having set the scene, I must now reluctantly drag you away from it. For if I continue, I can only recapitulate in brief what I have already set out at length in the book (Allen 1986) whose publication we are also celebrating this day. For that same reason this is debarred from being the kind of presidential address in which the president looks back down the road along which his society has travelled and points out the milestones. I know that view too well now, in any case, to be capable of describing it with an appetising freshness. I must leave you to discover it for yourselves under the guidance of the written page.

You will learn that the Society has been lucky to survive for as long as it has. There were two awkward junctures, indeed, at which its continuation was seriously in doubt. It has had to endure periods of autocracy and neglect, civil war, bankruptcy and the loss twice over of all its records. Only a body which met a very insistent need would have displayed such resilience.

All the same we must bear in mind that it has been a normal learned society for only just over a third of its life – that is, for fifteen years or so at its start and for the forty which have passed since the end of the Second World War. For much of the time in between it had a disembodied existence, so disembodied indeed that when the time came for Charles Bailey to lay down the Honorary Secretaryship in 1903 after twenty-four years, there was scarcely a single member who had met him in the flesh. Even after that period, during the years when that postal club grew steadily more accustomed to describing itself as a 'society', it existed as a physical entity more or less only through its annual reports. It never came together for lectures and not until latterly even for field meetings that were other than few, irregular and doubtfully official. Until the late 1940s there was not very much to be proud of – and a history chiefly notable for its heavy punctuation of rows and sniping.

So rather than give way to a *Schwärmerei* of self-congratulation of the kind so tediously traditional to commemorative occasions, it seems more in keeping to consider what the Society has missed. By its failure to enjoy an ordinary existence what has it been deprived of? What gaps in our activities are there still that might usefully be closed?

SOME DEPRIVATIONS

The most obvious of the deprivations is the lack of a library, a lecture-room, somewhere to call our own. Had the Botanical Society of London only continued, instead of dissolving and selling off all its possessions in 1857, there is every likelihood that we would now be in such richly-proprietyed circumstances as the Royal Entomological Society, a body which was founded only three years before us, took off from very much the same starting-point and in its infancy passed through some parallel vicissitudes.

From one point of view, of course, this is a deprivation that has turned into an advantage. All too many of the old-established metropolitan societies have found themselves under siege in recent years from spiralling wage bills and rocketing rents. In all too many cases now the marvellous collections of journal runs and books that they have accumulated through the years are distressingly little-used, largely duplicated as they have come to be by the libraries of the universities and of the major government institutions. Not a few societies, indeed, have found this inherited burden too heavy to sustain and have been forced, or at any rate have opted, to transfer it to some better-endowed pair of shoulders. Even so they have normally been able to arrange for their members to continue to have access, and can thus go on offering this valuable extra privilege to that limited proportion who enjoy no alternative facilities.

While we may have been spared an incubus, therefore, and along with it the expense of housing a staff, we have probably suffered a deprivation on balance. Certainly we have suffered one by having no place of our own in which to forgather before and after meetings of Council and committees. Since the sad demise of '*Domus Linnaei*', of hallowed memory, there has not even been a handy establishment 'just around the corner' to serve as the recognized assembly-point at which the formal business of the evening can be rehearsed or digested. Without a convivial warming-up beforehand, or a no less convivial winding-down afterwards, committee meetings tend to be too clinical and angular. Proceedings begin and end with an almost brusque abruptness;

newcomers are left at sea, unfamiliar with the background to the agenda (or with the identity of who they are sitting opposite or next to); the full inside of issues remains too thinly known. A society without an 'ante-chamber' life is a society without a valuable extra dimension.

Another by-product of having no premises is our lack of a programme of regular winter meetings. For if we were the possessors of a lecture-room of our own, we would surely wish to make use of it frequently. Certainly our ancestor could not have conceived of dispensing with such an activity: it was, after all, of the very essence of a metropolitan society of the kind it aspired to be. On the other hand since that ancestor of ours collapsed we have ceased to be metropolitan, albeit latterly London-based. This has left us without the metropolitan reflexes and so without the urge to restore the *status quo ante* and repair the deficiency. Had we those reflexes, we would surely long since have followed the example of, most notably, the London Natural History Society in not allowing the mere lack of facilities of our own to stand in the way of such a step.

But maybe we have done injury to ourselves by keeping to this non-metropolitan stance. Without a regular forum in which new findings can be critically debated as well as disclosed a scientific society is prone to a certain stunting. It is true that we have our symposia and conferences, but these are but occasional affairs and often on very restricted topics. It is true, too, that the conferences of Vice-county Recorders every other year give rise to ample and sometimes vigorous debate; but, again, these are specialized in their focus and in any case cater for only a limited section of the membership. There is no outlet for papers on non-prescribed topics, for the reporting of work that is still at an early stage, for the airing of general critiques or the mere floating of ideas. And because we do not have one, it has regularly fallen to the Linnean Society, instead of to ourselves, to play host to those one-day gatherings of doctoral students who have theses in train on the biosystematics of British vascular plants. It is excellent that such occasions should occur and excellent that a national society should sponsor them; but it would surely be even better if those engaged in these studies had an opportunity to outline their investigations to an audience that is best placed of all to assist with material, observations and records from all over the British Isles.

Filling this gap need not mean the instituting of a full-scale winter programme. It is doubtful if the supply of suitable material would warrant that in any case; moreover, there are a sizeable number of botanical topics on offer from other societies with just such programmes already. But even just one or two meetings might help to brighten the dark nights and make the annual Exhibition less of an oasis in that long, bleak desert between the end of one plant-hunting season and the opening of another.

There is one further deprivation which I suspect it may not even have occurred to the Society that it suffers. It arises from the fact that we confine ourselves to the flora of the British Isles – just as we do to only certain sections of that flora and to only certain aspects of its study (though it is not with those other limitations that I am here concerned). Had only the Botanical Society of London managed to carry on, the whole of the world – and, for that matter, the whole of the science of botany – might still be our oyster, on the pattern of the metropolitan societies in general. When it folded, the field of vision contracted abruptly to that of its surviving rump of members: a handful of collectors, of very modest means, mostly out in the provinces, whose private herbaria were restricted, more or less of necessity, to the flora of these islands and, by choice, to their vascular plants alone. That new cement set hard, so hard in fact that it has remained in place ever since. And who is to say whether the Society would have done any better had it taken a less insular course?

All the same we should recognize that in settling upon these particular geographical bounds, indeed by putting ourselves in thrall more generally to taxonomy's 'territorial imperative', we have settled our fate in a wider and subtler way. For because there are, unfortunately, so relatively few taxa that the flora of these islands shares with the flora of Canada and the United States, we have deprived ourselves of any chance of participating in what has been termed "the common culture of the North Atlantic triangle" (Berger 1982). In almost every other field of scholarship this English-speaking triangle houses what amounts to a single community, a community in which a specialist based in Britain is as likely to find his closest kindred spirits in Berkeley or Toronto as in Glasgow or Leicester. From both sides of the Atlantic contributors subscribe to, and write for, shared journals; there are frequent transatlantic conferences and symposia; libraries and archives in the British Isles are thick for large stretches of the year with researchers from North America. The

social interpenetration is as wide as it is deep and a source of great enrichment, personally as well as intellectually, for those with the good fortune to be able to partake of it. Alas, though, by the nature of the course we have taken, it can never be for us. All that we can do is to eye it with eternal envy and regret what we have had to miss.

So much for the shortfalls in our ways of functioning that we happen to suffer from by virtue of the particular kind of society that we are. There is little enough that we can do about them, but I have pointed to ways in which that little might be done.

PART TWO: WORK ON INFRASPECIFIC VARIATION

But what about the scientific content of our work? Are there any glaring gaps in that still waiting to be filled? This is something that we shall be discussing this afternoon and I must be careful therefore not to encroach on the area overmuch. There is one suggestion, however, that I would like to put forward which I feel fairly confident no one else plans to propose at that later juncture. It amounts to taking up where one of my predecessors in this office, Professor Valentine, in effect left off in the stimulating Address that he delivered on this same occasion eight years ago. In the course of a wide-ranging review of experimental work on the British flora he remarked upon the fact that "interest in variation below the level of the species and in the naming of taxa at the level of variety and form has tended to decrease in the writing of local Floras" (Valentine 1979a). This is indeed only too true. Someone picking up and leafing through the average local Flora published in recent years might well suppose himself back in the era of the fixity of species, so largely absent is any hint that the entities listed are subject to variation – and to variation that at least in the past has come in for taxonomic recognition.

The reason for the silence, of course, is that writers of local Floras tend to take their cue from the national Floras currently in use, and the national Floras have yet to grow out of the general revulsion between the Wars against the excess to which the earlier 'stamp-collecting' school had taken the naming of minor variants. The experimental studies which came into fashion in the 1930s showed that some of these taxa were quite without substance, reverting to normal when tested in cultivation, while others were no more worthy of a name than many analogous variants that had merely happened to escape notice. More basically, they also showed that the variation in many species is so complicated or so extensive that it is hardly feasible to attempt to do justice to it taxonomically. In any case the established hierarchy of categories – subspecies, variety and form – had come to seem artificially restrictive, even supposing that any broad measure of agreement could be reached on how they were interpreted.

Unnerved by the strictures of the new experimentalists, Flora-writers responded by dropping more or less all mention of infraspecific variants from their pages, doing so indeed with considerable relief, for they secured as a result a less cluttered text and useful savings in space. Left without names and descriptions, recorders in the field in their turn gradually lost the habit of noting the variants that they met with. The widespread use of mapping cards with room only for the names of species (and only for a proportion of those) has merely intensified the trend.

It is a trend, though, that has surely now been allowed to go much too far. The study of micro-evolution is no less important than ever it was and it is a study in which field botanists ought to be contributing their due. For despite the salutary correctives to past simple-mindedness administered by the genecologists and their like, there is in fact a great deal of value that could still be contributed by straightforward observation. Many of the taxa lodged in the past literature have too readily come to be dismissed as no longer worth recording merely because they are based on a departure from the norm in just a single character. Yet it does not need much searching through the older Floras and back numbers of journals to turn up evidence that differences even as slight as this are by no means without interest in the pattern of their occurrence geographically. Thanks to the fact that many of the ablest and most assiduous field botanists of the second half of the nineteenth century were marooned in isolated country parishes or confined to the area they could cover in the course of a Sunday ramble on foot, their explorations tended to become ever more minutely intensive and the many described minor variants, no less than the microspecies, were the beneficiaries of this. There was a rich harvest as a result, which has still been only very partly cut.

There is a form of *Medicago lupulina* L., for example, in which the pods are tubercled instead of smooth. S. F. Gray christened it var. *scabra* as early as 1822. According to workers in the period around the turn of this century this is the prevailing form of the species round Malvern, in Herefordshire and Worcestershire (Towndrow 1911), whereas in Oxfordshire it is scarce (Druce 1890) and in Derbyshire even scarcer (Drabble & Drabble 1911). Should that pattern prove to be confirmed, it is odd enough to need explaining. Similarly there is a form of *Filipendula ulmaria* (L.) Maxim. in which the normal tomentum is missing on the under-surface of the leaves. The character is known to breed true (Druce 1911) and to remain unaltered by differential cultivation (Beeby 1888; Yapp 1912). Yet again, oddly, while rare in some districts it is the prevailing version of the species in others. If we are to believe the old records, a puzzling alternation of this kind is also displayed by the variant of *Leontodon taraxacoides* (Vill.) Mérat with a hairy involucre.

Rarely in such cases have any ecological differences been reported that might provide a clue to the selective factors at work – always assuming there are any and that the patterns are not merely random. One exception is the claim by Druce (1897) that the form of *Polygonum convolvulus* L. which has the calyx segments winged, var. *subalatum* Lej. & Court., is the representative of that species in rich garden ground, bushy places and hedges, while the 'normal' form is characteristic of cornfields. That observation, however, seems hard to square with the finding by Drabble & Long (1932) that the variant is the commoner of the two by far in the Isle of Wight. It may be, though, that *Polygonum convolvulus* is one of those species in which the native, or at least old-established, populations are conveniently distinct in some external way from more recently-arrived ones or from mere casual specimens. Examples of this are to be found in *Papaver rhoeas* L., *Sisymbrium officinale* (L.) Scop., *Silene vulgaris* (Moench) Garcke, *Lapsana communis* L. and *Cirsium arvense* (L.) Scop., in each of which the plants prevailing in more southerly parts of Europe differ in one way or another in their hairiness. Even more conveniently, populations from further south or east in Europe may have different flower colours: in *Raphanus raphanistrum* L., for example, purple as opposed to yellow or white, in *Anagallis arvensis* L. blue as opposed to scarlet. One of the strongest reasons for studying infraspecific variation, it has always seemed to me, is that it can so often help in clarifying status. Indeed it is only thanks to enthusiasts for this line of work, and to the taxonomic trail that they have left behind them, that we know of seemingly native ecotypes of species that otherwise tend to be dismissed as non-indigenous: the condensed, *Erophila*-like form of *Arabidopsis thaliana* (L.) Heynh., for instance, on rocks high up in the central Pennines for which Druce (1924) coined the epithet *brevicaulis*, or the prostrate plants of *Spergula arvensis* L. in short close turf in the Channel Isles which E. F. Linton (1907) first brought to notice and described as var. *nana*.

Spergula arvensis, as it happens, has also been the subject of a model study in recent years (New 1958, 1959) in which the nature of the two main ways in which that species has long been known to vary has now been definitively elucidated. In one of these variants, known as var. *sativa* (Boenn.) Mert. & Koch, the seed-coat lacks the usual papillae; in the other the plant as a whole is densely hairy. It turns out that, although there is no link between the two genetically, both exhibit much of the same geographical trend, increasing proportionately from south-south-east to north-north-west and with increasing altitude, not only within the British Isles but across Europe more generally. It would seem logical to infer from this that both characters are adaptations to a climate combining a greater coldness with a greater wetness, and experiments have indeed shown that the plants with non-papillose seed-coats do germinate more readily at low temperatures.

Many other variants probably occur with increasing frequency in a particular direction like this, in response to a gradual *crescendo* in the environmental tendency that favours them. In some cases the variation takes the form of a more or less steady shift in the proportion of one character at the expense of another sharply contrasting with it – a polymorph-ratio cline in the technical terminology. An example is the gradual outnumbering north-westwards across Europe of blue-flowered *Anagallis arvensis* by the scarlet type. Typically, as in this case, just a single pair of genes is involved; but sometimes the situation is more complex. In *Raphanus raphanistrum* there are four different colour forms, purple, white, pale yellow and deep yellow, which replace one another across Europe in a series of broad but widely overlapping belts. In the south of Britain the white and pale yellow forms commonly grow intermingled and there discrimination between these by insect pollinators has recently been discovered to be extremely marked (Kay 1976). Presumably in this case the influence of climate is at one remove.

After flower colour, in which frequency differences are so much more obvious, the most numerous reported examples of ratio clines seem to be in leaf-marking. The best-known of these is the north-south one in *Arum maculatum* L., the populations of which in the north and west of the British Isles have unspotted leaves almost exclusively (Prime 1955), although even as far south as Wiltshire spotted plants constitute no more than a fifth of the total (Grose 1957). By contrast, in *Dactylorhiza praetermissa* (Druce) S60 the cline is an east-west one, with a lowering in the incidence of leaf-marking across southern England as one travels towards Kent (Heslop-Harrison 1958). Another east-west example, this time in a fruit character, would appear to occur in *Stellaria neglecta* Weihe; for according to Marshall (1914) the form of that with the seeds bluntly instead of acutely tubercled, his var. *decipiens*, is scarce in Somerset but easily predominates in Sussex and Surrey.

We do not know what degree of stability these ratio clines possess, for no measuring of populations has yet taken place over a sufficiently lengthy period. Certainly in butterflies short-term fluctuations of a sometimes startling magnitude have been reported. That they may occur in flowering plants as well might appear to be indicated by the marked increase that has taken place in recent years in the rayless form of *Aster tripolium* L. (var. *discoideus* Reichb.) on many East Coast salt-marshes, at the expense of the normal rayed one. Gray (1966) has proved statistically that the rayless plants are more characteristic of the lower zones of the marshes and believes their greater ability to withstand tidal submergence gives them a selective advantage there. The spread of *Spartina* may have been responsible for changes in the ecology which have provided the necessary opening. On the other hand it seems that there is more than just raylessness to this taxon: according to another author (Burt 1970) it also has a different habit, thicker and more brittle leaves and a shorter pappus. So it is perhaps better classed as an ecotype than as the kind of single-character variant typical of ratio clines.

But not all clinal variation involves clear-cut entities of the sort just described. Very often the graduated response to a graduated environmental influence is expressed developmentally, in stature, say, or leaf shape; and because the genes controlling growth tend to be more numerous and their interaction complex, the variation in that takes the form of a continuous dimensional trend in a particular character or character-cluster. In these cases simple percentage counts are clearly out: measurements have to be made and biometrics grappled with. For that reason the record of the earlier botanists in discriminating such variation is less impressive. In many species indeed they overlooked its existence entirely, simply because of the very gradualness of the changes in appearance. Alternatively, they dismissed it as of no taxonomic worth, with the standard verdict of 'grades into type'. When they did give it recognition, the solution adopted depended on how narrowly or widely the variation ranged. If it was sufficiently narrow, as in the east-west cline in the length of the outer calyx teeth in *Lythrum portula* (L.) D. A. Webb (Druce 1911; Allen 1954b), it was feasible not only to give a varietal name to what was regarded as the extreme (that is, the furthest the character departed in shape or size from whatever was taken to be the norm), but also to capture the whole of the variation in between with a single 'omnibus' varietal name as well. If the variation was much wider, however, as in the leaf-cutting of *Anthriscus sylvestris* (L.) Hoffm. (Druce 1917), no one name could be made to do service for so long a bridge of intermediates and, rather than coin a whole series of names for these, just the two extremes were treated to taxonomic recognition. The futility of doing anything more than this was well illustrated by a study made in Denmark and part of Sweden of the extent of the variation that needed to be accounted for in that same species: it transpired that a total of sixteen different taxa would have had to be created if the taxonomic potential had been pursued to its logical conclusion (Petersen 1915). In a similar study of the leaf-cutting in *Pimpinella saxifraga* L. the artificiality of the practice of giving a name, in this case the so-called 'var. *dissecta* (Retz.) Spreng.', to merely one part of what was shown to be a continuum was reasonably called into question (Petersen 1921). But just how such variation is to be handled taxonomically, if indeed it *can* be accommodated within the established system at all, is something that still remains unresolved.

A clear distinction is often not easy to make out, at any rate from the literature, between truly continuous geographical trends and cases where a variant merely becomes more common in a particular climatic region. For example, is the form of *Sagina subulata* (Sw.) C. Presl without the usual glandular pubescence, var. *glabrata* Gillot, mainly in the north and west of the British Isles (Harrold 1978) as one end of a ratio cline – as the golden yellow form of *Melampyrum pratense* L.,

var. *hians* Druce, so clearly is – or is it a mutant which has been able to colonize those parts thanks to a selective advantage there but scarcely to penetrate the more southern and eastern populations of the species? Exactly the same question has to be asked of the form of *Angelica sylvestris* L. with the upper leaf segments more or less decurrent, var. *decurrens* Fisch., Mey. & Lallém., which is said to prevail in the north and west similarly (N. D. Simpson, pers. comm. 1951). On the other hand it is hard to see why the form of *Gnaphalium uliginosum* L. with hairy fruits, var. *pseudopilulare* Scholtz, should apparently be commoner than the glabrous-fruited form in France (Corbière 1894; Hariot 1895) whereas the paucity of records appears to suggest that the opposite is the case on this side of the Channel. Under-recording is the stumbling-block at present in seeking to interpret such patterns.

All the same some variants are so conspicuous that it is hard to believe that their distribution is not known with tolerable completeness. My favourite in this connection is the colour form of *Iris foetidissima* L. in which the normal livid purple is replaced by clear lemon yellow with merely purple lines. It was named var. *citrina* by Bromfield early last century. There is a strong concentration of it in eastern Dorset, in Purbeck, where five localities had been discovered by 1895. It has also been recorded from two places in the Isle of Wight, from one in central Dorset and from near Newton Abbot in Devon; a single plant was also found near Bath in 1924. Though scattered over quite a wide stretch of country, the finds are sufficiently centred on Purbeck to suggest very strongly that that is where this mutant arose. It is a great pity it escaped being mapped in the *Critical Supplement to the Atlas* (Perring & Sell 1968).

Hardly less conspicuous is the form of *Bidens cernua* L. with ray florets, var. *radiata* (Roth) Lindl. Of this there is a similar clustering of records, this time in Cheshire and South Lancashire; but it has also long been known in a locality in as far from there as Somerset, so in this case independent mutations, perhaps on many occasions (for the variant is known on the Continent), seem likely. The same may be true of the rich magnolia purple form of *Trifolium repens* L., var. *rubescens* Sér., so prevalent in Scilly but also (McClintock 1975) in several places in Guernsey.

Variants less obvious than these, however, must be presumed to have been at best only patchily recorded. Only when there has been cause for a species to be investigated intensively, as in the accounts prepared for the *Biological Flora of the British Isles*, have there been exceptions. It is only thanks to the unusually thorough study carried out for that work by Lewin (1948) of the variation of the species of *Sonchus* that we know that there is a form of *Sonchus asper* (L.) Hill with white achenes which is common in the Orkneys and on the north and west Scottish mainland. It is apparently without a name. Many may think, indeed, that variants as slight as this, probably the product of just a single gene, are too trivial to warrant lumbering the literature with yet further taxa. On the other hand if they are left unnamed, they are likely to go unrecorded (unless they should happen to be the subject of someone's special interest) and the surely not unimportant fact that they have achieved a distinctive, reasonably compact range may consequently be overlooked. It is not unimportant, of course, for the reason that any mutant capable of carving out a range for itself must be presumed to have some selective influence in its favour and may thus be an incipient local race, perhaps in the course of time to accumulate a further measure of distinctiveness sufficient to entitle it to subspecific rank. Just such a process seems to be in the course of happening in the case of the suberect ecotype of *Anagallis arvensis* which occurs mainly on sand dunes in the west of Britain and Ireland. Some of the populations of that, but by no means all, have acquired the additional distinction of flesh-coloured flowers – the so-called var. *carnea* (Schrank) Boenn. (Rilstone 1938; Allen 1954a). The similarly western coastal race of *Calystegia sepium* (L.) R.Br., subsp. *roseata* Brummitt, is one step further on: as well as its rosy corolla it has more acute leaf tips and more pubescent stems (Brummitt 1967).

That brings me to the vexed question of how the three infraspecific categories acceptable under the international rules are most appropriately interpreted. Clearly, hard-and-fast dividing-lines are not to be expected, as we have learned not to expect them between subspecies and species. At the same time it is surely not utopian to look for a reasonable measure of consensus about which level in the hierarchy of taxonomy is appropriate to which level of the hierarchy observable in nature. Until the 1930s we seemed to be making good progress in that direction. Then along came genecology and the advocating of alternative courses. The more extreme of these was the abandonment of the traditional terminology in favour of an entirely new one freed from the shackles of taxonomy altogether. That 'deme' concept, however, despite the appeal of its goods-

train versatility, seems to have proved but a passing vogue. The other course was the compromise one of taking one of the traditional categories and fashioning it anew. The chosen victim was the subspecies. The term 'variety', it was held, had become too irretrievably ambiguous to be usable any longer – and any variation below that level was too trivial to be worth bothering with. But whereas a subspecies had previously been thought of as more or less synonymous with a geographical race, the genecologists took the view that no sustainable distinction could be drawn between the subdivisions of a species created by lengthy isolation or adaptation to a different climatic zone and those subdivisions, typically much smaller and much more restricted in their occurrence, which result from adaptation to particular specialized habitats ('ecotypes', as they have come to be known). This was despite the fact that these latter are, by their very nature, capable of arising independently in more than one place and are thus the very antithesis of what plant geographers have been accustomed to think of subspecies as denoting – namely, broken-off bits of a species which, by virtue of their uniqueness, can serve as valuable historical evidence. An essential part of the coinage, in other words, was damagingly debased. The subspecies became "the dumping ground for many sorts of situations", used for the accommodating of entities as disparate as cryptic or semi-cryptic polyploids, maritime or alpine ecotypes, physiological races and other morphs differing in relatively minor characteristics – in addition to the traditional geographical races (Stace 1976).

This broadening of the subspecies has introduced a further layer of confusion into what was already a more than sufficiently confused state of affairs. What is more, followers of this approach who have made revisionary incursions into our flora in the post-war years have tended to leave behind them an irritating lopsidedness. In the Shetlands, for example, the dwarf ecotype there of *Silene dioica* (L.) Clairv. has been raised to subspecific rank (Baker 1947, 1948) – maybe rightly, in view of its distinctiveness geographically as well – but the no less distinctive race of *Senecio aquaticus* Hill that occurs in such profusion in those islands remains unpromoted from the varietal level at which Druce (1921) described it. More seriously, the heritable forms of *Geranium robertianum* L. that occur on shingle round our coasts have been grouped all together, though according to Yeo (1973: 339) quite unjustifiably, and elevated similarly to a subspecies (Baker 1956) – receiving as a result, ironically, their proper due at last from recorders – but, again, the analogous versions of *Galium aparine* L. and *Solanum dulcamara* L. have been allowed to languish in mere varietal obscurity in contrast. The same goes for the 'cushion' ecotypes of maritime habitats that have been described in a number of species: alone among these that of *Valerianella locusta* (L.) Betcke has been dignified with the higher rank (Sell 1967).

On top of this inconsistency – or rather, lurking beneath it – there is a terrible chaos in the nomenclature. Continental names have long been taken over for similar-sounding British variants without any comparison of specimens, let alone consulting of type material; there has been no thorough searching of even the British literature to check whether earlier valid names exist; descriptions are very often inadequate. Yet better wrong names than no names at all, surely: we should not allow such problems to serve as an excuse for total inaction. For I hope I have said enough by now to have convinced you that there is a major gap here in our knowledge of the flora of these islands, which it is high time that this Society led the way in seeking to close.

An essential preliminary, though, is for us to know what has been discovered already. As I have attempted to demonstrate, there is a vast store of data on the subject buried in the past literature: what we require in the immediate instance, and urgently, is a compendium bringing it all between two covers. When Professor Valentine addressed you on this same topic in 1979, he spoke in the knowledge that the projected five-volume 'Flora of Great Britain and Ireland' would be taking care of that deficiency (Valentine 1979b). Since then, alas, that project has foundered, and the Society now remains the only hope. But it has successfully produced already a bible on British hybrids (Stace 1975): I see no reason why it cannot follow suit now with a companion volume on British infraspecific variation.

REFERENCES

- ALLEN, D. E. (1954a). *Anagallis arvensis* L. *Proc. bot. Soc. Br. Isl.*, **1**: 156–157.
 ALLEN, D. E. (1954b). Variation in *Peplis portula* L. *Watsonia*, **3**: 85–91.

- ALLEN, D. E. (1959). The history of the vasculum. *Proc. bot. Soc. Br. Isl.*, **3**: 135–150.
- ALLEN, D. E. (1986). *The botanists: a history of the Botanical Society of the British Isles through 150 years*. Winchester.
- B(ABINGTON), A. M., ed. (1897). *Memorials, journal and botanical correspondence of Charles Cardale Babington*, p. 297. Cambridge.
- BAKER, H. G. (1947). *Melandrium*, in Biological Flora of the British Isles. *J. Ecol.*, **35**: 283–292.
- BAKER, H. G. (1948). The ecotypes of *Melandrium dioicum* (L. emend.) Coss. & Germ. *New Phytol.*, **47**: 131–145.
- BAKER, H. G. (1956). *Geranium purpureum* Vill. and *G. robertianum* L. in the British flora – II. *Geranium robertianum*. *Watsonia*, **3**: 270–279.
- BECHER, H. W. (1986). Voluntary science in nineteenth century Cambridge University to the 1850's. *Brit. J. Hist. Sci.*, **19**: 57–87.
- BEEBY, W. H. (1888). *Rep. botl Soc. Exch. Club Br. Isl.*, **1**: 170.
- BERGER, C. (1982). *Science, God, and nature in Victorian Canada*, p. 27. Toronto.
- BRUMMITT, R. K. (1967). In SELL, P. D. Taxonomic and nomenclatural notes on the British flora. *Watsonia*, **6**: 292–318.
- BURTT, B. L. (1970). Intraspecific categories in flowering plants. *Biol. J. Linn. Soc.*, **2**: 233–238.
- CHRISTY, W. (1833). Brief notices of the plants observed during a tour through a part of North Wales, and some of the adjoining counties. *Mag. nat. Hist.*, **6**: 51–57.
- COOPER, D. (1838). Details of the First Excursion made this summer by the members of the Botanical Society of London. *Mag. nat. Hist.*, n.s., **2**: 556–559.
- CORBIÈRE, L. (1894). *Nouvelle Flore de Normandie*. Caen.
- DRABBLE, E. & DRABBLE, H. (1911). Notes on the flora of Derbyshire.-II. *J. Bot., Lond.*, **49**: 313–317.
- DRABBLE, E. & LONG, J. W. (1932). A list of plants from the Isle of Wight. *Rep. botl Soc. Exch. Club Br. Isl.*, **9**: 734–757.
- DRUCE, G. C. (1890). Notes on Oxford plants. *J. Bot., Lond.*, **28**: 227–234.
- DRUCE, G. C. (1897). *The flora of Berkshire*. Oxford.
- DRUCE, G. C. (1911). The International Phytogeographical Excursion in the British Isles. III. The floristic results. *New Phytol.*, **10**: 306–328.
- DRUCE, G. C. (1917). Plant notes, etc., for 1916. *Rep. botl Soc. Exch. Club Br. Isl.*, **4**: 397–434.
- DRUCE, G. C. (1921). Plant notes, etc., for 1920. *Rep. botl Soc. Exch. Club Br. Isl.*, **6**: 14–57.
- DRUCE, G. C. (1924). Plant notes, etc., for 1923. *Rep. botl Soc. Exch. Club Br. Isl.*, **7**: 24–76.
- GRAY, A. J. (1966). *Aster tripolium* var. *discoideus*. *Proc. bot. Soc. Br. Isl.*, **6**: 274.
- GROSE, J. D. (1957). *The flora of Wiltshire*. Devizes.
- HARIOT, P. (1895). *Gnaphalium uliginosum* L., in Notes sur les plantes distribuées, et diagnoses des espèces nouvelles ou peu connues. *Bull. Herb. Boissier*, **3**: App. 7–21.
- HARROLD, P. (1978). A glabrous variety of *Sagina subulata* (Sw.) C. Presl in Britain. *Trans. bot. Soc. Edinb.*, **43**: 1–5.
- HESLOP-HARRISON, J. (1958). Ecological variation and ethological isolation, in HEDBERG, O., ed. *Systematics of to-day*, pp. 150–158. Uppsala & Wiesbaden.
- KAY, Q. (1976). Preferential pollination of yellow-flowered morphs of *Raphanus raphanistrum* by *Pieris* and *Eristalis* spp. *Nature*, **261**: 231–232.
- LEWIN, R. A. (1948). *Sonchus*, in Biological Flora of the British Isles. *J. Ecol.*, **36**: 203–223.
- LINTON, E. F. (1907). New variety of *Spergula arvensis* L. *J. Bot., Lond.*, **45**: 380.
- MARSHALL, E. S. (1914). *A supplement to the Flora of Somerset*, p. 35. Taunton.
- MCCCLINTOCK, D. (1975). *The wild flowers of Guernsey*, p. 107. London.
- NEW, J. K. (1958). A population study of *Spergula arvensis*. 1. Two clones and their significance. *Ann. Bot.*, **22**: 457–477.
- NEW, J. K. (1959). A population study of *Spergula arvensis*. 2. Genetics and breeding behaviour. *Ann. Bot.*, **23**: 23–33.
- PERRING, F. H. & SELL, P. D., eds. (1968). *Critical supplement to the atlas of the British flora*. London.
- PETERSEN, H. E. (1915). Indledende studier over polymorphien hos *Anthriscus sylvestris* (L.) Hoffm. *Dansk Bot. Arkiv*, **1** (6): 1–150.
- PETERSEN, H. E. (1911). Nogle studier over *Pimpinella saxifraga* L. *Bot. Tidsskr.*, **37**: 222–240.
- PRIME, C. T. (1955). Variation in *Arum maculatum*. *Watsonia*, **3**: 181–185.
- RILSTONE, F. (1938). *Anagallis arvensis* L. var. *carnea* Schrank. *J. Bot., Lond.*, **76**: 85.
- SELL, P. D. (1967). Taxonomic and nomenclatural notes on the British flora. *Watsonia*, **6**: 292–318.
- STACE, C. A., ed. (1975). *Hybridization and the flora of the British Isles*. London.
- STACE, C. A. (1976). The study of infraspecific variation. *Curr. Adv. Pl. Sci.*, **8**: 513–523.
- TOWNDROW, R. F. (1911). Worcestershire plants. *J. Bot., Lond.*, **49**: 98–99.
- VALENTINE, D. H. (1979a). Experimental work on the British flora. *Watsonia*, **12**: 201–207.
- VALENTINE, D. H. (1979b). Flora of Great Britain and Ireland. *Watsonia*, **12**: 279.

- WILSON, G. & GEIKIE, A. (1861). *Memoir of Professor Edward Forbes*, p. 324. Edinburgh.
- YAPP, R. H. (1912). *Spiraea Ulmaria*, L., and its bearing on the problem of xeromorphy in marsh plants. *Ann. Bot.*, **26**: 815–869.
- YEO, P. F. (1973). The biology and systematics of *Geranium*, Sections *Anemonifolia* Knuth and *Ruberta* Dum. *Bot. J. Linn. Soc.*, **67**: 285–346.