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Edited by
E. F. WARBURG, M.A., Ph.D.



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Correction to *Watsonia*, Vol. II.

p. 322. Lines 11 and 12, for 'lower glume', read 'lemma'.

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PART I

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ON CUSCUTA EPITHYMUM var. TRIFOLII Bab.

By S. J. VAN OOSTSTROOM.

(Translated by W. C. WORSDELL from The Genus *Cuscuta* in the Netherlands, *Ned. Kruidk. Arch.*, 52, pp. 190-198, 1942)

[Reproduced by kind permission of the author. He asks that it should be made clear that he was unable to examine the type of *Cuscuta Trifolii* owing to the War.]

Yuncker, 1932, distinguishes besides the typical *C. epithymum* (L.) Murr. seven varieties, none of which occur with us. They are mainly confined to the region of the Mediterranean Sea.

The typical form occurs, according to Hegi (1927), throughout Europe, northwards to S. Norway and Sweden (Halland, Schonen, Gotland), Aland and Livland, southwards to N. Spain, Italy and S. Russia (Taurus); also in Asia (Caucasus and Altai).

In Holland the typical form occurs on diluvial ground in the east and south, in S. Limburg and in the dunes; the so-called var. *Trifolii* is found mainly on alluvial ground (Zeeland, Betuwe), and in Limburg on the chalk (see also De Wever in *Year Book 1917 Limburg Natural History Society*).

A summary of the host-plants on which *C. epithymum* has been found in Gotland (no less than 91 species!) is given by Johansson (1914, *Gotländska värdväxter för Cuscuta epithymum* Murr., *Svensk Botanisk Tidskrift*, 8, 379-382). Hegi also (*l.c.*, p. 2095) gives a list of plants on which *C. epithymum* occurs. With us the species (incl. the so-called var. *Trifolii*) is found on *Achillea Millefolium*, *Agrostis*, *Anthyllis Vulneraria*, *Calluna vulgaris*, *Centaurea Jacea*, *Chrysanthemum indicum*, *Convolvulus arvensis*, *Daucus Carota*, *Erica Tetralix*, *Euphorbia Gerardiana*, *Euphrasia*, *Galium hercynicum*, *G. Mollugo*, *G. verum*, *Genista anglica*, *G. pilosa*, *Gramineae*, *Hieracium umbellatum*, *Juncus*, *Knautia arvensis*, *Lotus*, incl. *L. corniculatus*, *Medicago Lupulina*, *M. sativa*, *Ononis*, *Origanum vulgare*, *Ornithopus perpusillus*, *Phleum arenarium*, *Picris?*, *Pinus sylvestris*, *Plantago*, incl. *P. lanceolata*, *Polygala serpyllacea*, *Potentilla Tormentilla*, *Ranunculus Flammula*, *Rosa*, *Salix repens*, *Sanguisorba minor*, *Sarothamnus vulgaris*, *Senecio Jacobaea*, *Succisa pratensis*, *Teucrium Scorodonia*, *Thymus Serpyllum*, *Trifolium arvense*, *T. pratense*, *T. repens*, *Vaccinium Myrtillus*, *Verbena officinalis*, *Veronica officinalis* and *Vicia*.

In the Dutch floras (Suringar, Heukels) and in the *Prodromus Florae Batavae*, ed. alt., besides the species itself, the var. *Trifolii* Babingt. is given, which should differ from the typical *C. epithymum* (L.) Murr. in more robust build, larger and paler flowers and more divergent, shorter

styles. This variety was described by Babington (1843, *Phytologist*, **1**, 467) as a species under the name *Uscuta Trifolii* Babingt.

I have not been able to lay hands on Babington's original description except for that which is to be found in his *Manual of British Botany*, ed. 4 (1856), p. 225. Here he gives principally the following distinctions from *C. epithymum*:

C. Trifolii Babingt.

Scales converging, equalling half the tube of the corolla, fimbriated and rounded at the end, distant below with rounded spaces.

Calyx narrowed below, about as long as the tube of the corolla.

Flowers small, white. Calyx fleshy, usually tipped with red.

Sepals lanceolate, about as long as their tube, adpressed.

Anthers apiculate.

Scales narrow; the connecting membrane not adpressed, but forming cup-like spaces between itself and the corolla.

Parasitical upon clover chiefly.

C. epithymum (L.) Murr.

Scales converging, equalling the tube of the corolla, fimbriated and rounded at the end, approximate below with narrow acute spaces.

Calyx bell-shaped, shorter than the tube of the corolla.

Flowers small, with a reddish thin calyx, and white corolla.

Sepals broad, ovate-apiculate, longer than their tube, with patent tips.

Anthers blunt or notched at the end.

Scales broad; the connecting membrane adpressed throughout.

Parasitic upon small shrubby plants.

When we now study what a number of later authors have held with regard to Babington's species, it appears that Choisy regards it as a variety of *C. minor* (= *C. epithymum* (L.) Murr.) under the name *C. minor* var. *trifolii* (1845, in DC. *Prodr.*, **9**, 453). As characters Choisy only gives, "limbo recto, calyce corollam subaequante".

Grenier & Godron (1850, *Flore de France*, **2**, 505) also, like Babington, regard *C. Trifolii* as a separate species, differing from *C. epithymum* by the following characters: "fleurs de moitié plus grandes, plus pâles, en glomérules plus gros et plus serrés; calice à divisions appliquées sur la corolle, et non étalées au sommet; corolle à lobes plus longs que larges, et non aussi larges que longs; écailles fimbriées, séparées par un espace plus large et ne recouvrant pas complètement l'ovaire (ce qui a lieu dans le *C. epithymum*); styles divergents dès la floraison, et ne dépassant jamais les étamines, tandis qu'ils sont dressés et dépassent à la fin les étamines dans le *C. epithymum*. Le *C. trifolii* a en outre un mode spécial de développement: il s'étend en cercles réguliers, et étreint si fortement le trèfle, qu'il le fait périr. Le *C. epithymum*, au contraire, se développe d'une manière vague, et ne fait pas périr les plantes qu'il embrasse".

Rouy (1908, *Flore de France*, **10**, 357) falls in with this. It is true he does not consider *C. Trifolii* a separate species, but, nevertheless, he regards it as a well-marked race, Race I, differing from *C. epithymum*

and its varieties by: "Calice obconique¹, plus profondement partit (env. jusqu'au milieu), muni à la base de 5 gibbosités alternant avec les lobes plus étroits; écailles¹ plus courtes, ne fermant pas complètement le tube de la corolle et séparées par des sinus très obtus, plus larges qu'elles; stigmates souvent jaunâtres¹; capsule plus large que longue, subglobuleuse-déprimée¹, fleurs plus grandes et plus pâles, en glomérules plus gros; pédicelles plus longs, égalant à peu près le calice; corolle à lobes souvent presque dressés¹; mode de végétation différent" (here follows a note, referring to a difference in manner of growth alleged by Lamotte; on this difference in growth Grenier & Godron had already commented; see above).

Hegi, *l.c.*, divides the species *C. epithymum* (L.) Murr. (Hegi writes *C. Epithymus*) into two subspecies, viz., subsp. *eu-Epithymus* Beger and subsp. *Trifolii* (Babingt. & Gibs.)² Hegi. If we compare the descriptions of these two with each other, the following differences appear:

Subsp. <i>Trifolii</i> .	Subsp. <i>eu-Epithymus</i> .
Plant vigorous.	Plant less vigorous.
Flowers 4-5 mm. long, mostly distinctly stalked, in 12-18-flowered glomérules 8-12 mm. in diameter.	Flowers small, usually sessile or shortly stalked, in 8-10-flowered glomérules 5-8 mm. in diameter.
Calyx half as long as the corolla.	Calyx-segments usually a little longer than half the corolla.
Anthers always protruding far out of the corolla-tube.	Anthers \pm distinctly protruding from corolla-tube.
Styles 2 or frequently 3-4, not or only slightly overtopping the anthers.	Styles 2, mostly distinctly projecting above the anthers.

Hegi emphasizes further the difference in mode of life of the two subspecies, which, according to him, are systematically hardly to be sharply separated and are connected by transitions. He regards subsp. *Trifolii* as a biological race of *C. epithymum*, growing chiefly on clover, but also on a number of other plants.

Yuncker, 1932, mentions *C. Trifolii* Babingt. simply as a synonym of *C. epithymum*, without further discussion of the matter.

Engelmann (1859, 461) terms the common European form of *C. epithymum* var. *a. vulgaris*. This he regards as somewhat variable, especially as concerns the shape and measurements of the calyx and calyx-segments. It is connected by the other varieties cited by him.

¹In *C. epithymum*: "Calice largement campanulé. Ecailles grandes, arquées-convinentes sur l'ovaire et fermant le tube, séparées par des sinus étroits et aigus. Stigmates d'un rouge foncé. Capsule globuleuse. Corolle à lobes ovales-triangulaires, aigus, très étalés et à la fin réfléchis".

²As I have been unable to see the original description of *C. Trifolii*, I have likewise been unable to discover whether it was actually described by the two authors together, or by Babington alone, as is usually given. [See note by H. K. Airy Shaw, *infra*, p. 8].

C. Trifolii Babingt. is regarded by Engelmann as "a luxuriant form [of var. *vulgaris*], overgrown at the expense of the succulent herb, which it destroys".

Crépin also (1863, Notes sur quelques plantes rares ou critiques de la Belgique, *Bulletin de l'Académie Royale etc., de Belgique*, 2me série, 16, 532-536) gives a detailed discussion on the relation of *C. Trifolii* and *C. epithymum* and arrives at the result that *C. Trifolii* must probably be regarded as "une variété robuste et plus florifère du *C. Epithymum* implantée sur le Trèfle, où elle trouve plus d'ombre, de là fleurs pâles et tiges souvent jaunâtres, une nourriture plus abondante, de là un développement plus considérable dans ses diverses parties et enfin une aire plus régulière et plus fournie, de là un envahissement parasitaire régulier et en cercles."

In conclusion, he is of the opinion of Simkovics (1878, *Magyar Növénytani Lapok*, 2, 148) that *C. Trifolii* is a hybrid between *C. epithymum* and *C. europaea*.

Resuming, we have the following views as to the relation of *C. Trifolii* and *C. epithymum*.

1. *C. Trifolii* Babingt. is a separate species (e.g. Babington, Grenier & Godron).

2. *C. Trifolii* Babingt. must be regarded as a var. of *C. epithymum* (L.) Murr. (e.g. Choisy, also Suringar, Heukels, the *Prodromus Florae Batavae*) or as a morphologically distinct race of *C. epithymum* (L.) Murr. (Rouy).

3. *C. Trifolii* Babingt. is a biological race of *C. epithymum* (L.) Murr. which is difficult to separate systematically from this species, and is united to it by transitional forms (Hegi).

4. *C. Trifolii* Babingt. only includes luxuriant specimens of *C. epithymum* (L.) Murr. growing on clover and lucerne. The matter resolves itself into a question of nutrition (Engelmann, Crépin). This is very close to the view in Yuncker's monograph, which, according to his synonymy, considers the two as identical.

5. *C. Trifolii* Babingt. is a hybrid between *C. epithymum* (L.) Murr. and *C. europaea* L. (Simkovics).

Owing to the circumstances of war it was impossible to get hold of Babington's original specimen, so that in passing judgment as to what the author understood under the name *C. Trifolii*, we have to go entirely by his description. Before comparing this with the plants found growing with us on clover and lucerne I must first point out the fact that Babington cites some characters for *C. epithymum* (which species he places close to *C. Trifolii*) which do not entirely conform to the Dutch material of this species. Babington states for *C. epithymum* that the calyx is shorter than the corolla-tube, whilst in *C. Trifolii* the calyx should be about as long as the corolla-tube. This character does not always hold for the true *C. epithymum*; here the calyx is in many cases certainly of the same length as the tube of the corolla, which thus would hold good for *C. Trifolii*. Moreover, Babington describes the

calyx-lobes of *C. epithymum* as broad, ovate, apiculate, whilst in *C. Trifolii* they should be lanceolate. In typical *C. epithymum* they may actually sometimes be broad, ovate and abruptly pointed. But they may also be much narrower, up to lanceolate, so that here also the distinguishing character fails.

We must now investigate as to how far the other characters cited by Babington for *C. Trifolii* agree with the plants that with us are parasitic on clover and lucerne. Babington states that the corolla-scales are half as long as the corolla-tube. This does not entirely conform to Dutch material, but neither does it to the foreign material in the Rijks-herbarium under *C. Trifolii*. In these plants, just as in the typical *C. epithymum*, the scales extend to, or nearly to, the base of the stamens, i.e. to the top of the corolla-tube. The intermediate areas between the corolla-scales should be, according to Babington, broad and rounded in *C. Trifolii* and narrow and pointed in *C. epithymum*. In the plants investigated by me this difference between the two is very indistinct; I find the intermediate areas in both rather pointed and sometimes not strikingly narrow. Crépin also points this out. Moreover, the breadth of the corolla-scales is not very different. Also in the shape of the calyx, and whether the calyx-lobes are adpressed or not, there is no difference to be found. The only differential character given by Babington, that is more or less clear, is that in the specimens from clover and lucerne the anthers are always furnished with an apiculate tip, and rather more pointed. These in the typical *C. epithymum* are blunt or somewhat emarginate; an apiculate tip may be present, but is always extremely small.

When we once more investigate how the various authors since Babington distinguished *C. Trifolii* (as species, subspecies, variety or race) and *C. epithymum* from each other, it appears that they mostly in their descriptions cited other differential characters than Babington himself did. These characters are, in the main, as follows. *C. Trifolii* should be stronger in build, more floriferous, possessing paler stems and flowers and with a more regular mode of growth than *C. epithymum*. It is further stated that the flowers are larger and more distinctly stalked, the lobes of the more deeply-cut, obconical calyx (in *C. epithymum* more campanulate) adpressed (in *C. epithymum* with lobes divergent at the top); the corolla-lobes more erect (in *C. epithymum* divergent to reflexed) and longer than broad (in *C. epithymum*, e.g. according to Grenier and Godron, as long as broad, ovate-triangular); the corolla-scales shorter, not entirely covering the ovary (in *C. epithymum* entirely covering the ovary); the styles divergent, not, or only slightly, projecting above the anthers (in *C. epithymum* erect and at length projecting above the anthers); the stigmas often yellowish (in *C. epithymum* mostly red) and the fruit broader than long, depressed-globose (in *C. epithymum* more globose). Further, the difference in mode of growth is pointed out (see e.g. Grenier and Godron, Rouy).

These characters we can also compare with those which occur in the Dutch material of the typical *C. epithymum* and of the so-called *C. Trifolii*. Actually the specimens of the latter make a stronger impression on the whole, not so much by possessing thicker stems as by their size; moreover they are in a number of cases more floriferous, though certainly not always. Some specimens (e.g. from Nieuw and St. Joosland, July 1876, *Walraven & Lako*; *Wissekerke*, 1878, *Schipper*; and a number of examples from Valburg, July 1874, *Abeleven*) certainly cannot be called very floriferous; some (leg. *Abeleven*) even bear few flowers. Moreover, there sometimes occur in the typical *C. epithymum*, e.g. on *Calluna* and *Sarothamnus*, very fine copiously-flowering specimens. Whether the stems are always paler is not easy to judge in herbarium-material; a number of plants give the impression of having possessed red-tinged stems. The flowers appear paler than is the case with typical *C. epithymum*, although in these too the flower-colour may be pale. If we compare the size of the flowers, it appears that these in typical *C. epithymum* may vary greatly, and flowers which equal in size the so-called *C. Trifolii* certainly occur; also stalked flowers may be met with in typical specimens of *C. epithymum*. In the shape of the calyx also I can detect no constantly deciding differences. The calyx, in flowers with a distinctly developed stalk, is more or less narrowed into this latter and thereby obconical in shape; this may occur in both; if the flowers are unstalked, as is the case in typical *C. epithymum*, then the calyx is more campanulate. That actually the calyx-lobes constantly diverge in *C. epithymum* in contrast to the adpressed ones of *C. Trifolii* is certainly not correct, for even in typical *C. epithymum* they are often quite adpressed to the corolla-tube. Further, in many cases in *C. Trifolii* the corolla-lobes are divergent, or they are even reflexed, just as is customarily the case in the typical *C. epithymum*. The corolla-lobes of *C. Trifolii* should be longer than broad, at least according to Grenier and Godron, or "ovales-triangulaires" as Rouy writes. In typical *C. epithymum* they are somewhat variable and both broad and narrow corolla-lobes occur. They are certainly not always as long as broad, but often also longer, even much longer than broad. In the shape of the corolla scales and the manner in which these cover the ovary, I see very little or no difference. The character of the diverging or not diverging styles, which should or should not project beyond the anthers, constitutes no clear difference in the Dutch material, neither does the colour of the stigmas. A collector of a specimen from Nieuw and St. Joosland, on clover, D. Lako, 1887, remarks as follows: "about the length of the styles with reference to the stamens there is but little to say with certainty. At one time I found the styles longer, at another time shorter than the stamens; once nearly erect, then again reflexed; but always red (and not white, as Gillet & Magne in their *Nouvelle Flore française* give as character of the var. *Trifolii* Choisy)". The fruit should in *C. Trifolii* be broader than long and depressed-globose. In the Dutch specimens I saw no good fruits. In typical *C. epithymum* they are sometimes globose, at other times more depressed-globose!

Finally, there is the peculiar mode of growth of *C. Trifolii*, mentioned by various authors. As already stated, Crépin ascribes this difference to the occurrence of the parasite in the clover-fields, which are covered by a regular, uniform plant-cover. De Wever, *Year Book 1917 Limburg Natural History Society*, p. 43, adds, that on heaths also the injurious plant often has a circular mode of growth, and that in clover one may observe plants which possess partly the character of *epithymum* and partly that of *Trifolii*.

If we take all these facts into account, we reach the result that, between the typical *C. epithymum* (L.) Murr. and the *Cuscuta* which is found with us on clover and lucerne, in a number of cases some differences can be shown to exist, but that these differences are not constant and cannot be sharply and definitely stated. The matter is very often such, that a character which *most often* occurs in the one form is occasionally also found in the other, and vice versa. There are, however, two features which more or less characterize the plants which are found on clover and lucerne. These are, chiefly, the mostly larger, paler and distinctly stalked flowers and the distinctly apiculate anthers. One should really, on the basis of a statistical investigation of much living material, first determined whether, and how far, the so-called var. *Trifolii* and the true *C. epithymum* in actuality differ from each other. Cultural experiments on an extensive scale are, however, necessary for this. At the same time it should be investigated how far we have to do with an influence of the food-plant on the parasite, or how far the var. *Trifolii* represents a biological race. Moreover, the statement by Hegi that *C. Trifolii* also occurs on other plants than clover and lucerne should be capable of further investigation.

The appearance of the parasite in clover and lucerne-cultures in definite parts of the country, often far from the natural habitat of the typical *C. epithymum* (L.) Murr. (in Zeeland, the Betuwe), and chiefly in the second half of the last century (between 1860 and 1890), might possibly indicate that actually a specialized race occurs on clover and lucerne (and a number of other host-plants?), that has perhaps been introduced by seed, has maintained itself for a number of years, and thereafter again largely disappeared. The existence of such a race is suggested by the fact that it rarely or never appears to happen that the heath form passes over to clover, although the opportunity for this certainly occurs. De Wever also indicates as much. The few specimens I saw on wild clover-species from the Eastern diluvial territories and from the dunes, agree moreover entirely with the typical *C. epithymum* of *Calluna*, etc.

NOTE ON THE PUBLICATION OF THE NAME *CUSCUTA TRIFOLII*

By H. K. AIRY SHAW.

The name *Cuscuta Trifolii* provides one of the best possible examples of how *not* to publish new names. It first appeared in *The Phytologist*, 1 (21), 467 (Feb. 1843), in an article entitled: "Note on a supposed New British *Cuscuta*; by Charles C. Babington, Esq., M.A., F.L.S., F.G.S. Communicated, with Additional Observations, by G. S. Gibson, Esq.*" The asterisk* indicated a footnote: "* In a letter to E. Newman."

The article consisted of a letter from G. S. Gibson, of Saffron Walden, Essex, to E. Newman, the 'owner' of *The Phytologist*, enclosing an extract from a letter from C. C. Babington to Gibson, "any part of which," said Gibson, "you [i.e. Newman] are of course at Liberty to insert in 'The Phytologist'."

It appears probable that the whole of Gibson's letter, with the whole of the extract from Babington's letter, were printed as they stood. Some quotations from Babington's part are illuminating. He was giving his views to Gibson on the *Cuscuta* which the latter had sent him. ". . . I suspect [it] will prove to be a new species . . . I am not, however, prepared to give it as new, without more acquaintance with it than I have yet obtained . . . I add the character of the plant, according to my present ideas . . . The provisional name that I have adopted is *C. Trifolii*."

"*C. Trifolii*, (Bab. MSS.) Clusters of flowers bracteated, sessile: tube of the corolla cylindrical, *limb erect*, scales palmately cut, converging; *calyx nearly or quite as long as the corolla*. *Calyx* and corolla *whitish*, with acute segments."

Now if anything is clear, it is that Babington himself had at that time no intention of publishing the name *Cuscuta Trifolii*. "I suspect . . . a new species;" "I am not . . . prepared to give it as new;" "The provisional name that I have adopted . . .", all plainly point to a mind not yet made up. Quite shortly afterwards, in his *Manual of British Botany*, which appeared in May of the same year (see *Phytologist*, 1 (25), 623, 1st June 1843; *id.* (26), 636, 1st July 1843), he had decided to treat it as *C. Epithymum* β *trifolii* (*Man. Brit. Bot.*, 203).

It would seem, therefore, that both Gibson and Newman, and also G. Luxford, the 'avowed' or managing Editor (see Preface, p. vi), were much at fault in publishing this purely provisional name of Babington's, and the question arises as to whether the name was in any sense validly published. It is fortunate that the matter is of no great moment. Evidently the name cannot be cited as '*Cuscuta Trifolii* Babington in *Phytologist* . . .' Could one write '*C. Trifolii* Bab. ex Gibson . . .'? No, because Gibson did not express any views as to the status of the plant: he passed on Babington's remarks to Newman with

a take-it-or-leave-it air—"C.C.B.'s remarks . . ., any part of which you are . . . at liberty to insert . . ." He did not "definitely accept" the name, as required by Art. 37 of the International Rules (amended at Amsterdam, 1935), any more than Babington did. Choisy (1845, in DC. *Prodr.*, 9, 453), cited it as "*C. trifolii* Babingt. et Gibs." (pro syn. *C. minoris* β *trifolii*), but this is equally unjustifiable, for the same reason. Could we then write '*C. Trifolii* Bab. ex Newman . . .' or '*Bab. ex Luxford* . . .'; thereby bringing in the persons directly responsible for the *publication* of the name in print? No, because neither owner nor editor *definitely accepted* the name, or expressed any views on it whatever.

It would take us beyond the limits of this note to try to discover who first gave valid publication to the name *Cuscuta Trifolii**. We are only concerned here to point out the unfortunate circumstances that surrounded the original appearance of this name in print. The moral seems to be never to publish 'provisional' names of any kind—whether one's own or other people's! They invariably lead to disputes and uncertainty; indeed, it is probable that on the merits of the present case there may well be *quot botanici tot sententiae*!

*Actually it was probably Babington himself, in 1845 (May), *Suppl. Engl. Bot.*, 4, t. 2898; 1847, *Man. Brit. Bot.*, ed. 2, 216.

FOUR DAYS CHAROPHYTE COLLECTING IN THE ELY DISTRICT

By G. O. ALLEN.

My previous acquaintance with the Cambridgeshire fens being limited to two brief visits some fifteen years ago, I welcomed the proposal of Mr L. C. Lyon to join him for a few days in exploring some of the localities that Canon Bullock-Webster searched so thoroughly for charophytes from 1894 to about 1904.

The first week in August was evidently too late for several species, as we did not find a single *Tolypella* or *Nitella*, and the exceptionally dry summer (1949) did not improve matters. The increase in motor roads since the war made the area much more accessible, but many of the smaller ditches had become overgrown. We were guided to a considerable extent by Bullock-Webster's diary as to what places were best worth visiting.

In Wicken Lode, the first locality tried, charophytes were at once in evidence, amid a pretty setting of yellow and white waterlilies, and comprised *C. vulgaris* L. and var. *papillata* Wallr., *C. hispida* L., *C. aspera* Willd. in quantity, *C. globularis* Thuill. var. *capillacea* (Thuill.) Zanev. and some fine plants of *C. aculeolata* Kuetz.; peaty pools in the Fen yielded *C. delicatula* Ag.

Though not altogether unexpected, it was a disappointment to find no trace of *N. tenuissima* Kuetz. In 1896 Bullock-Webster found it abundant there even as late as October. He continued to find it there and in the neighbourhood for some years, his diary for July 2, 1902, describing the Lode as "covered along its bed with a thick growth of *Nitella tenuissima* from end to end, good green colour in excellent condition." On June 25, 1904, however, he found this species there "very poor, hardly growing at all" and on a visit in July 1922 he could only with difficulty find a few specimens of it. This is the last record I have of its being collected in this area.

The counterdrain between Sutton Gault and Mepal, another rich locality, produced *C. vulgaris* L. var. *longibracteata* Kuetz., *C. globularis* Thuill. and *C. hispida* L. The attractive yellow flowers of *Nymphoides peltatum* were a novel sight to me though they had a vaguely familiar look. Later, on looking up my old records, I recalled how I had so often admired its little white counterpart in India, *Limnanthemum indicum*.

In the Gault Hole near Mepal and in pits by the New Bedford River were further splendid growths of *C. vulgaris* L. var. *papillata* Wallr., the charophyte that we found the prevalent one at that time of year; the pits also contained *C. globularis* var. *capillacea* and *C. hispida*.

The Quy coprolite pits figure so often in Bullock-Webster's diary that we were anxious to visit them too. The ones in the fields to the

north side, though highly popular with wild duck, were unsuitable for our purposes as they were so shaded by large trees. There was one, however, on some rough land that was particularly attractive. This we reached via Quy station and then on beyond Lower Farm across some grassland. It contained a fine mass of *C. aculeolata* but past its best, and a quantity of *C. delirata*; in this and other smaller pits near-by *C. hispida* was plentiful. This is no doubt the large pit in which Bullock-Webster has recorded finding, in all, ten species and varieties.

Bottisham Lode at its southern end was dry but further up it had become so choked with chara growth that it had been dragged out. It proved to be mainly *C. contraria* Kuetz. var. *hispidula* Br. with some *C. vulgaris* var. *refracta* Gr. & B.-W.

In all we found eleven species and varieties of *Chara*.

THE FLORA OF BOMBED SITES IN CANTERBURY

By DOUGLAS H. KENT.

Canterbury, the ecclesiastical capital of England, is situated on the River Stour in East Kent, 62 miles south-east of London. Few English towns can boast of greater antiquity, and there is good evidence that a Romano-British town existed on the site of the present City. The great cathedral was founded in 597 A.D., and the City was probably almost entirely built up by the end of the 13th century. The area contained within the City walls is about 143 acres, and it is probable that, except for short periods when rebuilding took place, many of the sites now levelled must have been covered with houses, churches and shops for nearly seven hundred years.

During the recent war Canterbury, owing to its geographical situation, was in the front line and suffered severe damage from enemy action. Although "tip and run" raiders caused damage as early as the summer of 1940, the first serious air raid took place on the night of May 31, 1942, as a reprisal for the Allied 1000 bomber raid on Cologne the previous night. As a result of this attack and continuous raids during the following week an area of approximately 15 acres bounded by Burgate Street, Butchery Lane, St Margaret's Street, Watling Street, St George's Lane and Burgate Lane was largely devastated by fire. A daylight attack on 31st October 1943 caused further widespread damage in various other parts of the town.

The bombed sites of Canterbury present, therefore, an interesting parallel with those of the City of London, the flora of which has been dealt with by J. E. Lousley (1944, *B.E.C. 1941-2 Rep.*, 528-31; 1946, *1943-44 Rep.*, 875-83). Whereas, however, the City of London is surrounded by the built-up area of the metropolis, Canterbury is, in contrast, apart from its small area of suburbs, surrounded by orchards, hop gardens, small holdings, fields, pastures, woods and downs. Thus the chance of a plant being introduced on to the Canterbury sites is probably considerably greater than in London. Another important factor is that many more species existed in the open spaces of pre-war Canterbury than in the similar areas of the City of London. The walls of the City of Canterbury also maintained an interesting denizen flora, the most notable plants being *Cheiranthus Cheiri* L., *Sagina procumbens* L., *Kentranthus ruber* (L.) DC., *Linaria Cymbalaria* (L.) Mill., *Parietaria diffusa* Mert. & Koch and *Festuca rigida* (L.) Kunth. Various churchyards, the cathedral precincts and Dane John, produced various other plants among which may be mentioned *Sambucus nigra* L., *Erigeron canadensis* L. and *Buddleja Davidii* Franch. The banks of the Stour and allotments to the north of the river also provided a

number of weeds, e.g. *Capsella Bursa-pastoris* (L.) Medik., *Achillea Millefolium* L., *Artemisia vulgaris* L., *Senecio vulgaris* L., etc.

The records contained in this paper were made during many visits to Canterbury between the Spring of 1943 and the Summer of 1950, and although the area of the survey has been confined to the old City, i.e. within the walls, plants of special interest which have occurred just outside the boundaries are included within square brackets. Although I believe the following list to be fairly complete it is possible that a number of plants may have escaped my notice and that additional species will continue to arrive on the sites.

In conclusion I should like to offer my sincere thanks to Mr John Boyle, LL.B., Town Clerk of Canterbury, for statistical information relating to the City and to Mr C. E. Hubbard for assistance in naming certain species of Gramineae.

- 1/1. *Clematis Vitalba* L. Rare. Watling Street, Gravel Walk and near St George's Lane.
- 6/2. *Ranunculus repens* L. Apparently rare. Seen only in Watling Street.
- 6/3. *R. acris* L. Rare. St George's Street and Stour Street.
- †13/3. *Delphinium Gayanum* Wilmott. Near the West Gate, 1944; St Peter's Street, 1945.
- †21/1. *Papaver somniferum* L. St George's Street, 1944-45, possibly deliberately sown.
- 21/2. *P. Rhoas* L. Frequent.
- †21/13. *P. lateritium* Koch. Not uncommon in Burgate Street and St Peter's Street. [Abundant on several sites in St George's Place from whence it has probably spread into the old city.]
- [25/1. *Chelidonium majus* L. Broad Street.]
- 34/1. *Cheiranthus Cheiri* L. Rare. Sparingly naturalised on brick rubble in St George's Street.
- †41/1. *Aubrieta deltoidea* DC. Near the West Gate, 1945, probably deliberately introduced; it has not persisted.
- †45/1. *Cochlearia Armoracia* L. Rare. Pound Lane.
- †49/3. *Sisymbrium altissimum* L. Rare. Two plants on brick rubble, Burgate Lane, 1949.
- †49/4. *S. orientale* L. Burgate Lane, abundant.
- 49/6. *S. officinale* (L.) Scop. Frequent.
- 49/8. *S. Alliaria* Scop. Rare. St George's Street.
- 54/14. *Brassica Kaber* (DC.) Wheeler. Common.
- 54/15. *B. hirta* Moench. Rare. St George's Street.
- [†54/16. *B. juncea* Coss. Rare. Lower Chantry Lane, 1950.]
- 55/1. *Diplotaxis tenuifolia* (L.) DC. Rare. St George's Terrace and Burgate Lane.
- 55/2b. *D. muralis* (L.) DC. var. *caulescens* Kittel. Very rare. St George's Lane, 1949.
- 59/1. *Capsella Bursa-pastoris* (L.) Medik. Frequent.
- †60/1. *Coronopus didymus* (L.) Sm. Rare. St Margaret's Street, 1944.
- †60/2. *C. procumbens* Gilib. Rare. Burgate Street, 1948.
- 61/3. *Lepidium Draba* L. Not common, though locally abundant at the junction of Watling Street and Marlowe Avenue. [Common outside the City as at Old Ruttington Lane, Union Street, Borough, etc.]
- †61/4. *L. ruderale* L. Burgate Lane, one plant, 1950.
- [†61/12. *L. sativum* L. Station Road West, a solitary plant, 1949.]
- †65/2. *Iberis umbellata* L. Near the Cattle Market, 1944, deliberately sown.

- †74/2. *Bunias orientalis* L. St George's Street, a single large plant, 1949.
 95/1. *Reseda luteola* L. Near the West Gate, 1944-47.
 95/1. *Saponaria officinalis* L. Rare. Near Burgate Lane, 1949.
 [96/2. *Silene cucubalus* Wibel. Opposite St Paul's Church.]
 98/3. *Melandrium album* (Mill.) Garcke. Occasional.
 98/4. *M. dioicum* (L.) Coss. & Germ. Rare. St George's Street.
 100/5. *Cerastium vulgatum* L. Frequent.
 †100/12. *C. tomentosum* L. Abundant and well established near the Cattle Market, 1946.
 101/3. *Stellaria media* Vill. Very common.
 102/5. *Arenaria serpyllifolia* L. Frequent on stony rubble in St George's Street and Burgate Lane.
 102/6. *A. leptoclados* (Rchb.) Guss. Occasional.
 103/11. *Sagina procumbens* L. Not uncommon on stony ground.
 [112/14. *Hypericum perforatum* L. St George's Place.]
 †115/3. *Althaea rosea* L. Occasional.
 117/2. *Malva sylvestris* L. Rare. Burgate Street.
 117/3. *M. neglecta* Wallr. Rare. Watling Street and St Peter's Lane.
 127/7. *Geranium pyrenaicum* Burm. f. Several large patches near the site of the Cathedral Library. [Monastery Street, in profusion.]
 †140/1. *Vitis vinifera* L. St George's Terrace.
 †140/2. *V. hederacea* L. Burgate Street and St Peter's Street.
 [†141/1. *Aesculus hippocastanum* L. Havelock Street, a single large seedling, 1949.]
 †142/1. *Acer pseudo-platanus* L. Abundant throughout the city as seedlings and saplings.
 †146/1. *Laburnum anagyroides* Medik. Several seedlings by St George's Church, 1949; a single seedling, Watling Street, 1949.
 †153/3. *Medicago sativa* L. St George's Street.
 [153/5. *M. arabica* (L.) Huds. St George's Place, Union Street and Broad Street.]
 153/7. *M. lupulina* L. Occasional.
 †154/2. *Melilotus alba* Desr. Rare. Near the Cattle Market, 1944.
 155/2. *Trifolium pratense* L. Occasional.
 155/16. *T. repens* L. Frequent.
 155/21. *T. dubium* Sibth. Rare. Watling Street.
 160/5. *Lotus corniculatus* L. Rare. Sparingly on grass-covered sites in St George's Street and St George's Lane.
 [†163/1. *Galega officinalis* L. A large patch nearly opposite the Baptist Church, 1946.]
 176/13. *Vicia angustifolia* (L.) Reichard. St George's Street and Watling Street.
 †178/1. *Lathyrus latifolius* L. St George's Terrace, 1944. Not there in 1947.
 183/. *Prunus* sp. Cherry seedlings are frequent as the result of stones being thrown on to the sites.
 185/. *Rubus* sp. Rare. St George's Street and Burgate Street.
 187/1. *Geum urbanum* L. Rare. St George's Street.
 [188/2. *Fragaria vesca* L. St George's Place, 1949.]
 [189/7. *Potentilla reptans* L. Broad Street and Monastery Street.]
 196/1. *Crataegus monogyna* Jacq. St George's Street, a single seedling, 1950.
 211/6. *Sedum acre* L. Stony rubble, St George's Street and Burgate Street.
 220/1. *Chamaenerion angustifolium* (L.) Scop. In the greatest abundance throughout the City.
 220/3. *Epilobium hirsutum* L. Rare. Iron Bar Lane and Canterbury Lane.
 220/5. *E. tetragonum* L. Gravel Lane.
 220/8. *E. roseum* Schreb. St Peter's Street, 1945.
 220/10. *E. montanum* L. Common.
 223/. *Oenothera* spp. Frequent. There appear to be several distinct plants within the radius of the City.
 243/1. *Conium maculatum* L. Rare. Watling Street.

- 244/1. *Smyrniolobos Olusatrum* L. Rare. Several large plants by St George's Church; Rose Lane; by the West Gate.
- 251/1. *Sison Amomum* L. Rare. Opposite St George's Church, 1945.
- [254/1. *Aegopodium Podagraria* L. St George's Place and Havelock Street.]
- 259/1. *Scandix Pecten-veneris* L. Rare. Watling Street.
- 261/1. *Anthriscus sylvestris* (L.) Hoffm. Rare. St George's Street.
- 266/1. *Aethusa Cynapium* L. Rare. Knotts Lane, 1950.
- [276/3. *Peucedanum sativum* (L.) Bent. & Hook. Broad Street.]
- 277/2. *Heracleum Sphondylium* L. Occasional.
- 283/3. *Torilis Anthriscus* (L.) C. C. Gmel. Rare. Near Rose Lane, 1950.
- 284/1. *Hedera Helix* L. Occasional.
- 287/2. *Sambucus nigra* L. Frequent.
- [287/2b. — var. *laciniata* L. West Gate Street.]
- 296/9. *Galium verum* L. Rare. A small patch on a grass-covered site near St George's Street.
- 296/11. *G. Aparine* L. Abundant.
- †302/1. *Kentranthus ruber* (L.) DC. In the greatest abundance on broken walls and brick rubble.
- 306/1. *Dipsacus fullonum* L. Watling Street and Pound Lane.
- †312/6. *Solidago canadensis* L. Occasional.
- 314/1. *Bellis perennis* L. Rare. Marlowe Avenue.
- †318/2. *Aster paniculatus* Lam. Occasional.
- †318/4. *A. novi-belgii* L. Occasional.
- †320/3. *Erigeron canadensis* L. Frequent.
- †347/4. *Helianthus annuus* L. Occasional.
- 365/1. *Achillea Millefolium* L. Frequent.
- 365/11. *A. Ptarmica* L. St George's Street.
- 368/4. *Anthemis Cotula* L. St George's Street and Burgate Street.
- [370/4. *Chrysanthemum Leucanthemum* L. St George's Place.]
- 370/13. *C. Parthenium* (L.) Bernh. f. *hortense* (Schur) Beck. Common.
- 371/1. *Matricaria inodora* L. Occasional.
- 371/2. *M. Chamomilla* L. Occasional.
- 371/3. *M. matricarioides* (Less.) Porter. Frequent.
- 378/3. *Artemisia vulgaris* L. Abundant.
- [†378/21. *A. Vertolorum* Lam. About 15-20 small patches on a grass-covered site at the Borough by Union Street.]
- 379/1. *Tussilago Farfara* L. Frequent.
- 383/5. *Senecio Jacobaea* L. Frequent.
- †383/7. *S. squalidus* L. A few plants on the floor of the bombed St George's Church, 1944. In 1945 the plants increased in number and by 1946 had spread to two other sites in St George's Street. By 1948 the plant had formed colonies on about a dozen sites in the area. It is now abundant and still spreading.
- 383/10. *S. vulgaris* L. Frequent.
- †385/1. *Calendula officinalis* L. Occasional.
- 393/3. *Arctium minus* (L.) Bernh. Rare. Watling Street.
- 396/2. *Cirsium vulgare* (Savi) Ten. Frequent.
- 396/8. *C. arvense* (L.) Scop. Frequent.
- 411/1. *Lapsana communis* L. St Peter's Street.
- [416/3. *Crepis biennis* L. St George's Place.]
- 416/5. *C. capillaris* (L.) Wallr. Common.
- 416/10. *C. taraxacifolia* Thuill. Abundant.
- 419/1. *Hieracium Pilosella* L. Rare. St George's Street.
- 421/2. *Hypochoeris radicata* L. Frequent
- [422/1. *Leontodon hispidus* L. St George's Place.]
- 423/1. *Taraxacum officinale* Weber. Common.
- 425/1. *Lactuca virosa* L. St George's Street.
- 425/2. *L. Serriola* L. Frequent.
- 427/2. *Sonchus arvensis* L. St George's Street and St Peter's Street.
- 427/3. *S. asper* Hill. Near the West Gate, and King Street.

- 427/4. *S. oleraceus* L. Occasional.
 428/2b. *Tragopogon minor* Mill. St George's Street and St George's Lane.
 471/1. *Fraxinus excelsior* L. St George's Street, seedlings and saplings.
 †474/2. *Buddleja Davidii* Franch. In the greatest abundance throughout the City.
 †500/1. *Anchusa sempervirens* L. Canterbury Lane.
 507/3. *Lithospermum arvense* L. Rare. Watling Street, 1949.
 509/1. *Echium vulgare* L. Rare. Knotts Lane, three plants, 1949.
 511/1. *Calystegia sepium* (L.) R.Br. St George's Street.
 †511/2. *C. sylvestris* (Willd.) Roem. & Schult. Watling Street, Best Lane and Castle Row.
 513/1. *Convolvulus arvensis* L. Occasional.
 †516/1. *Lycopersicon esculentum* Hill. St George's Street.
 517/1. *Solanum Dulcamara* L. St George's Street, St John's Lane and Watling Street.
 517/2. *S. nigrum* L. Frequent.
 †517/10. *S. tuberosum* L. St George's Street and Burgate Street.
 †527/1. *Verbascum phlomoides* L. St George's Street.
 527/3. *V. Thapsus* L. Watling Street.
 532/1. *Linaria vulgaris* Mill. St George's Street and St George's Lane.
 †532/2. *L. purpurea* (L.) Mill. Abundant on the site of the White Lion Inn, St George's Street; Gravel Lane.
 †532/2b. *L. Cymbataria* (L.) Mill. Frequent on brick rubble.
 †534/1. *Antirrhinum majus* L. St George's Street.
 577/3. *Stachys sylvatica* L. Rare. Rose Lane, 1950.
 581/1. *Lamium album* L. Best Lane.
 581/3. *L. purpureum* L. St George's Lane.
 583/1. *Ballota nigra* L. St George's Street.
 587/1. *Ajuga reptans* L. Rare. Grass-covered site, St George's Street.
 588/8. *Plantago lanceolata* L. Canterbury Lane and Rose Lane.
 588/10. *P. major* L. Common.
 600/8. *Chenopodium album* L. Frequent.
 604/4. *Beta maritima* L. Pound Lane, 1950.
 606/3. *Atriplex patula* L. Common.
 606/5. *A. hastata* L. Common.
 615/2. *Polygonum Convolvulus* L. Burgate Street and Stour Street.
 615/7. *P. Persicaria* L. Occasional.
 615/14. *P. aviculare* L. Frequent.
 †615/32. *P. cuspidatum* Sieb. & Zucc. St George's Street and Iron Bar Lane.
 618/3. *Rumex crispus* L. St George's Lane.
 [618/3×6. *R. crispus* × *obtusifolius*. Broad Street.]
 618/6. *R. obtusifolius* L. St George's Street.
 [618/9. *R. conglomeratus* Murr. St George's Place.]
 618/16. *R. Acetosella* L. St George's Street.
 628/7. *Euphorbia Helioscopia* L. St Peter's Street.
 632/2. *Mercurialis annua* L. St George's Street and St George's Terrace.
 [634/1. *Humulus Lupulus* L. Opposite St Paul's Church.]
 637/1. *Urtica dioica* L. Frequent.
 637/2. *U. urens* L. Rare. Knotts Lane, 1950.
 638/1. *Parietaria diffusa* Mert. & Koch. Frequent.
 642/. *Betula* sp. St George's Street, seedlings and saplings.
 646/1. *Quercus Robur* L. St George's Street and Burgate Street, seedlings.
 650/2. *Salix fragilis* L. St George's Street, saplings.
 650/8. *S. caprea* L. Frequent.
 650/10. *S. atrocinerea* Brot. Occasional.
 706/3. *Scilla non-scripta* (L.) Hoffgg. & Link. Rare. St George's Lane.
 770/1. *Atopocurus pratensis* L. Rare. Watling Street.
 777/1g. *Phleum nodosum* L. Frequent.
 780/2f. *Agrostis stolonifera* L. var. *stolonifera*. Frequent.
 780/3. *A. tenuis* Sibth. Common.

- 792/2. *Holcus lanatus* L. St George's Street, St George's Lane and Gravel Walk
- 793/1. *Trisetum flavescens* (L.) Beauv. Burgate Street.
- 794/2. *Helictotrichon pubescens* (Huds.) Pilger. Rare. A single clump in St George's Lane.
- 794/3. *H. pratense* (L.) Pilger. Rare. St George's Lane.
- †794/7. *Avena sativa* L. Occasional.
- 795/1. *Arrhenatherum elatius* (L.) J. & C. Presl. St George's Street and Burgate Lane.
- 819/1. *Dactylis glomerata* L. Frequent.
- 824/2. *Poa pratensis* L. Common.
- 824/2b. *P. angustifolia* L. Common.
- 824/6. *P. trivialis* L. Frequent.
- 824/10. *P. compressa* L. St George's Lane.
- 826/1. *Festuca rigida* (L.) Kunth. On stony ground at The Friars, St George's Lane, St John's Lane and Rose Lane.
- [826/3b. *F. arundinacea* Schreb. subvar. *strictior* (Hack.): Near St Paul's Church, 1949, confirmed by C. E. Hubbard.]
- 826/7. *F. rubra* L. Occasional.
- 826/17. *Vulpia bromoides* (L.) S. F. Gray. Frequent.
- 826/18. *V. myuros* (L.) C. C. Gmel. St John's Lane.
- 827/3. *Bromus sterilis* L. Abundant.
- [827/7. *B. erectus* Huds. St George's Place.]
- 827/19. *B. mollis* L. Frequent.
- 827/19b. — var. *leiostachyus* Hartm. St George's Street, det. C. E. Hubbard.
- 827/19(3). *B. Thominii* Hard. St George's Street, confirmed by C. E. Hubbard.
- 829/1. *Lolium perenne* L. Frequent.
- 829/4. *L. multiflorum* Lam. Occasional.
- 830/4. *Agropyron repens* (L.) Beauv. Common.
- †831/1. *Secale cereale* L. Canterbury Lane, 1950.
- †832/4. *Triticum aestivum* L. Canterbury Lane, 1950.
- 835/2. *Hordeum murinum* L. Frequent.
- 847/1. *Pteridium aquilinum* (L.) Kuhn. Frequent.
- 856/1. *Dryopteris Filix-mas* (L.) Schott. Rare. Watling Street.

SCUTELLARIA HASTIFOLIA IN BRITAIN

By C. D. PIGOTT.

In June 1948, Dr A. S. Watt collected some specimens of a *Scutellaria* from a small wood north of Brandon in W. Norfolk and these were subsequently identified by the late Mr A. J. Wilmott as *Scutellaria hastifolia* L., a plant which had not previously been recorded with certainty from the British Isles.

Scutellaria hastifolia belongs to the section *Galericularia* A. Ham., which includes both the British species, *S. galericulata* L. and *S. minor* Huds.; it is, however, at once recognised by the hastate leaves and the large bright blue corolla. The following description is drawn up from plants gathered in the Norfolk locality:

SCUTELLARIA HASTIFOLIA L., 1753, *Sp. Pl.*, 599.

Rhizome subterranean, creamy white, succulent, about 1-3 mm. in diameter extensively branched and rooting freely from the nodes, with pairs of small, triangular scale-leaves situated at 1-10 cm. intervals. Stem ascending, generally simple but on vigorous shoots sometimes bearing branches from the lower leaf-axils, quadrangular, glabrous on the lower internodes becoming hairy in the inflorescence and with tufts of hair on the nodes, purple-tinged, 20-40 cm. high at flowering time. Leaves thin-textured; the lowermost ovate, obscurely hastate, with long petioles, becoming distinctly hastate upwards; the middle leaves hastate, frequently with one or two, small, triangular teeth next to the cusps, otherwise entire, almost glabrous; uppermost leaves ovate-lanceolate, without cusps. Petioles decreasing in length up the shoot, covered with short, white hairs. Flowers situated in pairs in the axil of each bract, more or less aggregated into a short, secund, false spike. Bracts leaf-like. Peduncles about 2 mm. long, curved, densely covered with short, white, frequently gland-tipped hairs. Calyx with two entire lips, dorsally folded into a ridge, covered with short, white, frequently gland-tipped hairs. Corolla bright blue, covered with a dense glandular down, 12-20 mm. long, exceeding the subtending bracts; tube long, slender, slightly dilated upwards; lobes crenulate at the margin; the lower lip semi-circular with scattered white hairs on the upper surface; the upper lip divided into three lobes. Stamens four, epipetalous. Filaments 8-9 mm. long, with tufts of hair 4 mm. from the anthers. Nutlets covered with conical tubercles.

The distribution of *Scutellaria hastifolia* is of considerable interest, especially with regard to the status of the plant in the British flora. The species is predominantly a Pontic steppe plant, often occurring in *Alpecurus pratensis* grassland in the south of European Russia and



Scutellaria hastifolia—Habit (Nat. size). A.—Single flower enlarged.
B.—Nutlet, $\times 15$.

characteristic of steppe on deep chernozem (Keller, 1927). In common with a large number of steppe plants it extends into Europe, becoming progressively rarer westward. In Scandinavia it is generally a plant of shore meadows and river banks, distributed along the Baltic coast of Sweden from Uppland southwards to Skåne, and inland in Östergötland and Västergötland. It is frequent on the Baltic Islands of Åland, Gotland and Öland, where it is often to be found in the moist hollows on the *alvar* (limestone pavements), as well as on stream banks, screes and in thickets (Sterner, 1922, with map of Scandinavian distribution; 1938). In Germany *Scutellaria hastifolia* is locally abundant in wet meadows, ditches and on river banks, but is confined almost entirely to the larger river valleys, a distribution which is attributed by Hegi to dispersal by water-fowl (Hegi, 1927). In France the plant behaves in a similar way and is found along the valleys of the Rhône and the Loire (Rouy, 1909). The species is absent from Switzerland, but occurs in north Italy and north-east Spain and throughout almost the whole of the Balkans.

In the English locality near Brandon, the *Scutellaria* occurs in a large oval patch (about 11 m. × 20 m.) with a small detached colony nearby, beside a trackway under a large opening in the tree canopy in a *Quercus Robur*—*Fraxinus excelsior*—*Betula verrucosa* wood. The soil is a typical Breckland podsol of the Grassland C type (Watt, 1940), with about 40 cm. of sand overlying the chalky boulder clay. The upper 12 cm., in which the *Scutellaria* is rooted, consists of a grey humified sand with pH 6.6 and containing a low quantity of Calcium (21.5 M.E.). The soil is well drained and is dominated by *Pteridium aquilinum*, but *Betula verrucosa* is already regenerating and a few scattered saplings are present. The associated species, neglecting those on the trackway only, are:

Shrubs, etc.

Rubus idaeus
Rubus caesius
Sambucus nigra
Viburnum Opulus
Betula verrucosa

Herbs

Silene Cucubalus
Moehringia trinervia
Epilobium parviflorum
Arctium minus
Cynoglossum officinale
Myosotis arvensis
Veronica Chamaedrys
Clinopodium vulgare

Glechoma hederacea
Prunella vulgaris
Teucrium Scorodonia
Urtica dioica
Carex spicata
Agrostis stolonifera
Poa trivialis
Pteridium aquilinum

Bryophytes

Mnium rostratum
Climacium dendroides
Brachythecium rutabulum
Cirriphyllum piliferum
Eurhynchium praetongum
Pleurozium Schreberi

Finally, there remains the question as to whether the species is an introduction or a true native in the Brandon locality. Two previous records for the species are quoted by Druce (1919) and the locality on Ickelton Common in Hertfordshire (Pryor, 1887) requires investiga-

tion. The distribution in Europe does not make the occurrence of this species in the British Isles seem improbable, and indeed one might well expect a plant of such a continental nature to occur in Breckland. The nature of the habitat, however, immediately raises doubts. Although little is known concerning the history of this area of woodland, it would appear to have been planted comparatively recently. There is no depth of woodland humus, and the absence of a true woodland flora is notable. Much of the *Quercus* has been coppiced, and alien trees (*Picea Abies*) and shrubs (*Mahonia* and *Symphoricarpos*) are plentiful. The wood has for many years been used for rearing pheasants. The limitation of the plant to a small area, and the oval patch which is expanding rapidly, are both suggestive of recent introduction. *Scutellaria hastifolia* is a very invasive garden plant and rapidly spreads by vegetative growth into a large patch. Small fragments of the rhizome will take root and grow and the seed produced in Britain is fertile. As a garden plant, the species appears to be very rare, although its name occurs in a few catalogues and gardening books.

Thus from the field evidence it would seem that *Scutellaria hastifolia* is almost certainly a recent arrival in its Norfolk locality (of perhaps fifteen years' standing), but whether it came by natural or human agency it is not possible to judge.

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THE MOSSY SAXIFRAGES OF THE BRITISH ISLES

By D. A. WEBB

The taxonomy of the Britannic species of the section *Dactyloides* of the genus *Saxifraga* has long been uncertain and confused. Marshall (1917; 1918), who died over thirty years ago, was the last man in these islands who was prepared to name a specimen with confidence, and this confidence was not always justified. Engler & Irmscher (1916-9) provided in the *Pflanzenreich* an exhaustive monograph of the genus, but valuable as much of this is, it has never been followed in the British Isles as far as the dactyloids were concerned, since it was very clear that the authors' knowledge of British and Irish forms was imperfect.

It was a realization of this situation, when I had occasion in 1943 to attempt to determine the saxifrages of the Galtee Mts., that induced me to proceed to a fairly thorough investigation and revision. This has now been published (Webb, 1948; 1950), but as the papers in question are rather bulky, and are perhaps not readily accessible to many readers of this journal, a summary of my principal conclusions is presented here for the benefit of British readers.

HISTORICAL SKETCH

The hey-day for species-making in the dactyloid saxifrages of western Europe was the early nineteenth century, and in the British Isles Haworth and David Don were particularly active, followed more cautiously by Smith. Haworth's work never carried much conviction to anyone but himself, but of the twelve species listed by Don (1821) as native to the British Isles the majority were generally accepted, and eight were illustrated in *English Botany* (*S. cespitosa*, *palmata*, *incurvifolia*, *affinis*, *hirta*, *hypnoides*, *platypetala*, *elongella*). By the middle of the century it had been discovered that specimens were constantly turning up which could not be located exactly in any of these species with their current definitions, and the attempt to correlate British with continental nomenclature ran into greater and greater difficulties. A reaction therefore set in; the supposed species were successively reduced to varieties and forms, till Bentham and Hooker recognized only two and Baker (1870) only one. The same tendency was at work in Central Europe, and there the matter rested till Marshall resuscitated most of the earlier species, added a few from continental authors (notably *S. Sternbergii* and *S. sponhemica*) and described a new one himself (*S. Drucei*). Engler and Irmscher recognized only two species in the British Isles, but manfully classified under these all the named plants in an imposing, if Procrustean, hierarchy of sub-species, varieties, subvarieties, forms and subforms.

Of these authors Marshall alone systematically cultivated specimens, and he seems to have been curiously blind to the phenotypic nature of many of the supposed specific distinctions which this cultivation should have made clear.

GENERAL PRINCIPLES.

The first step in mastering the taxonomy of a difficult group must always be the determination of the source from which the difficulty arises. Six years' experience of the study of these saxifrages in the field, the garden and the herbarium has led me to conclude that there are three factors which between them account for the difficulties in their taxonomy.

(1) They are very plastic. Habit, leaf-form, length of flowering stem, size and shape of petals can all vary greatly in the same clone.

(2) Apart from this phenotypic variability, a wide range of genetic variation (often reproducing or overlapping the former) may be found within a wholly or partly interfertile series. This may possibly be correlated with the high polyploidy of the group.

(3) The group has a discontinuous and relict distribution. This obscures the distinction between species and subspecies.

The first of these difficulties can, of course, be allowed for by observation in garden culture, and even to some extent by noting in the field the degree of variation between different branches of a single clone (which can be very striking). The second makes it necessary to have regard continually to the interbreeding population and not the individual plant (still less the individual herbarium sheet) as the unit for taxonomic consideration. Brandon Mountain, for example, the reputed home of six species, is clearly occupied by a single convivium. To the third difficulty there is no real solution, and it means that the subjective elements of taste and judgment must enter into the decision whether each taxon must be given specific or subspecific rank.

RELATED CONTINENTAL FORMS.

Numerous species of dactyloid saxifrages are found in the Alps and Pyrenees, and some of these are taxonomically difficult; but fortunately they are quite clearly distinct from the British forms and need not be considered here. There are, however, in Iceland, the Faeroes, Scandinavia and Arctic Russia, Belgium and the Rhineland, Central and South Germany and Czechoslovakia, Eastern, Central and Southern France, and Northern Spain and Portugal, plants which have been or reasonably may be considered conspecific with those of the British Isles. A revision of the latter must, therefore, take cognizance of the dactyloids of all northern and western Europe except for the Alps and Pyrenees.

SPECIES RECOGNIZED

Baker (1870) maintained that the dactyloids of the British Isles presented a linear pattern of variation, ranging from the *S. cespitosa* of

the Cairngorms to the gemmiferous *S. hypnoides* of Cheddar and Dove Dale. This is in broad outline true, though in the central part of the series considerable reticulation of characters is found and a linear sequence cannot be recognized. If one reviews the European populations, however, it would seem that the pattern of variation is not quite continuous, and that there are five discontinuities, preserved by geographical or occasionally by ecological separation, which justify the discrimination of six species, of which four are found in the British Isles.

1. *S. CESPITOSA* L. (*S. groenlandica* L.)

Rather densely tufted, with short, nearly erect barren shoots which develop into small rosettes with usually incurved leaves. Leaves small, uniformly and densely clothed with short, glandular hairs, divided into 3 (seldom 5, never more) obtuse, somewhat parallel-sided lobes, which are never very divaricate. Flowers usually protogynous; petals rather small, dirty, creamy or greenish white; ovary more nearly inferior than in the other species. Seeds very finely tuberculate.

Distribution. Circumpolar. Throughout the Arctic, extending southwards in America to Oregon and perhaps to Arizona, in Asia to southern Siberia, and in Europe to Iceland, Scandinavia and Great Britain. Very rare in Great Britain, being restricted to the Cairngorms, the Ben Nevis area and Cwm Idwal. Unknown in Ireland.

Notes. A very variable species, especially in America, but in the Old World much of the variation seems to be phenotypic. There is no doubt at all as to the identity of the British with Scandinavian and Arctic plants. The glandular hairs, the flower-colour, and the protogyny are all constant and characteristic.

2. *S. HARTII* D. A. Webb (1950).

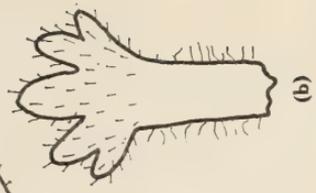
Loosely tufted, or somewhat straggling if growing among other plants. Barren shoots typically short, nearly erect, developing into flat rosettes with flattened, spreading leaves. Leaves medium-sized, uniformly and densely clothed with short glandular hairs, divided into 5 or more (up to 11 in robust cultivated plants) rather acute, somewhat triangular lobes. Flowers protandrous; petals fairly large, thick, pure dead white with conspicuous green veins. Seeds very finely tuberculate.

EXPLANATION OF FIGURES. $\times 2.5$.

1. Leaves from the winter rosettes of cultivated plants of (a) *Saxifraga Hartii*. (b) *S. cespitosa*.
2. Leaves from the winter rosettes of cultivated plants of *Saxifraga rosacea* from different parts of Ireland: (a) from the Galtee Mts., (b) from Clare Island, Co. Mayo (c) from Brandon Mt., Co. Kerry, (d) from the Twelve Pins, Co. Galway, (e) from Black Head, Co. Clare.
3. Leaves from the winter rosettes of cultivated plants of *Saxifraga hypnoides*
4. Leaves from herbarium specimens of *Saxifraga continentalis*.



3

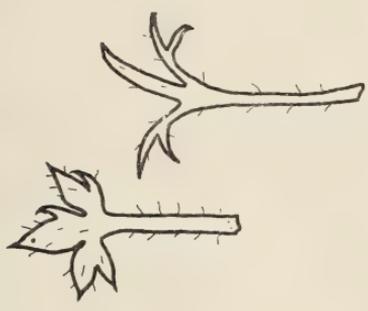


(b)

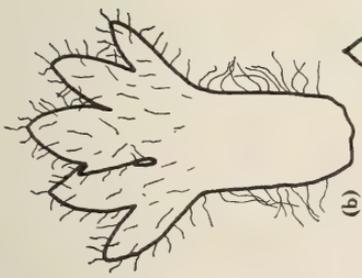


(a)

1



4



(b)

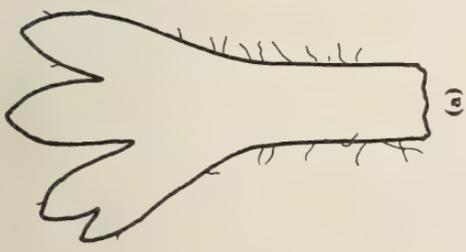


(e)

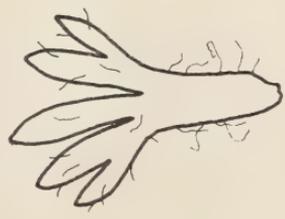


(d)

2



(a)



(c)

Distribution. Known only from Arranmore Island, off the west coast of Donegal, Ireland (not to be confused with the Aran Islands further south). It has been found here on four occasions, in at least three separate stations, and has been variously named *S. hirta*, *S. Sternbergii* and *S. Drucei*.

Notes. Intermediate between the foregoing and the following species, and very possibly the last relic of a hybrid population. But as it is now geographically isolated and does not fall within the variation-range of either of the supposed parents it seems best to give it specific rank. From *S. cespitosa* it differs in leaf-shape, protandrous habit, and size, texture and colour of the petals. From *S. rosacea* it is at once distinguished by the investment of glandular hairs. The form of *S. rosacea* which it most closely approaches is that which is geographically nearest—the hairy plant of Clare Island, Co. Mayo.

3. *S. ROSACEA* Moench (*S. decipiens* Ehrh., *S. palmata* Sm., *S. Sternbergii* Willd., *S. hirta* Sm., *S. affinis* Don, *S. incurrifolia* Don).

Very variable in habit, leaf-form and indumentum. Compact or straggling, but in plants with straggling or mat-like habit the prostrate barren shoots are stronger and coarser than in *S. hypnoides*. Leaves large or small, hairy or nearly glabrous, but with few or none of the hairs gland-tipped; divided into 3, 5, 7, or rarely up to 11 segments, which are very variable in form, but seldom as obtuse as in *S. cespitosa*, and never as distinctly apiculate-aristate as in *S. hypnoides*. Flowers protandrous, erect in bud; petals delicate, pure shining white. Seeds finely or coarsely tuberculate.

Distribution. (1) Iceland and the Faeroes. (2) Western Ireland and N. Wales. (3) South-central Germany and western Czechoslovakia, with an outlying station in the Vosges. In Ireland it is widespread in the Kerry mountains but very local elsewhere; it has been found in late-glacial deposits in Co. Dublin. It appears to be extinct in Caernarvonshire.

Notes. The most variable of all the species. Plants from Clare, Mayo, the Galtees and the summit of Brandon Mt. (Kerry) differ from each other widely and invite specific discrimination, but they are connected by a host of inter-breeding intermediates. In view of the disjunct distribution there is a curious lack of geographical subspeciation. The plants of Czechoslovakia on the one hand and western Germany on the other are hard to match exactly, but Irish plants may be very accurately matched with those from Iceland, the Faeroes, the Harz, Thuringia and Bavaria.

4. *S. SPONHEMICA* Gmelin (incl. *S. condensata* Gmelin; *S. hirta* Haworth non Smith; *S. palmata* Lejeune non Smith).

Loosely tufted or somewhat spreading, with weak but semi-erect or ascending barren shoots rather densely clothed with trifid leaves. Leaves and stem nearly glabrous. Rosette-leaves divided into 3 or 5

narrow, shortly but distinctly acuminate-aristate segments, which are never very divaricate. Dormant buds not present in axils of barren shoots. Flowers much as in *S. rosacea*; position of buds and ornamentation of seeds not noted.

Distribution. Rhineland and Palatinate, Luxembourg, south-east Belgium and the French Ardennes, with an outlying station in the French Jura.

Notes. It is possible that this should be reduced to a subspecies of *S. rosacea* which in Hesse manifests itself in a very acute-leaved form which is not easy to discriminate from *S. sponhemica*. The gap between the two populations, which now coincides with the valley of the Rhine, may be fairly recent, and there has doubtless been infiltration of *sponhemica* genes into the western populations of *S. rosacea*. The Rhineland plant certainly does not occur in the British Isles, and the identification of it with Smith's *S. platypetala* cannot be sustained.

5. *S. HYPNOIDES* L. emend. D. A. Webb.

Spreading, with usually long, prostrate barren shoots, rather sparsely clothed with leaves, which may be simple or trifid, and which sometimes bear dormant, but green and herbaceous, buds in their axils; frequently, however, these buds are absent. Leaves and stem nearly glabrous. Rosette-leaves with 3 to 9 narrow, acuminate-aristate, rather divaricate segments. Flowers nodding in bud, protandrous; petals delicate, pure shining white, rather narrower than is usual in *S. rosacea*. Seeds coarsely tuberculate.

Distribution. Iceland, the Faeroes and the British Isles, with outlying stations in western Norway and the Vosges. Widespread in Scotland, northern England, and much of Wales, with a few additional stations in western England; scattered through much of Ireland, especially the north and west.

Notes. The gemmiferous plant, which is usually considered the "typical" state of this species, shades off very gradually into the non-gemmiferous forms that have been given various names, among which *S. platypetala* Sm. has been most widely used. The breadth of the petals seems to be of no taxonomic value. Gemmiferous forms usually have at least some of the leaves on the barren shoots undivided, but the exact correlation which has sometimes been postulated between dormant buds and undivided leaves, and between trifid leaves and absence of buds, certainly does not exist.

6. *S. CONTINENTALIS* (Engl. & Irmsch.) D. A. Webb (*S. hypnoides*, subsp. *continentalis* Engl. & Irmsch.).

Loosely tufted, with prostrate but rather short barren shoots. Leaves rather rigid, with 3 to 7 lobes, very variable in shape; segments acuminate-aristate. Dormant buds always present, very rigid, pointed, and silvery by virtue of the completely scarios bud-scales. Flowers much as in *S. hypnoides*.

Distribution. Central and southern France, northern Spain, northern Portugal.

Notes. The difference in habit and general appearance between this species and *S. hypnoides* is very striking, although it is not very easy to put into words, and there is never any difficulty in discriminating them. This constant morphological difference, coupled with a clear-cut geographical separation without overlap, justifies specific rather than subspecific separation.

REJECTED SPECIES

The following names that have been used at one time or another for dactyloids of the British Isles are rejected in this revision.

S. groenlandica L. Synonym of *S. cespitosa* (v. *infra*).

S. decipiens Ehrh. *Nomen nudum*, to be rejected in favour of *S. rosacea* Moench (v. *infra*).

S. incurvifolia D. Don

S. affinis D. Don

S. palmata Sm.

S. Sternbergii Willd.

S. hirta Sm.

S. Drucei E. S. Marshall

} Forms or variants of *S. rosacea*, not worth taxonomic recognition.

S. elongella Sm. A phenotypic modification of *S. hypnoides*.

S. platypetala Sm.

S. laetevirens D. Don

S. leptophylla D. Don

S. spathulata Haw.

S. angustifolia Haw.

} Forms of *S. hypnoides*, in most cases not adequately diagnosed, and not worth taxonomic recognition.

S. viscosa Haw.

S. quinquefida Haw

S. hirta Haw.

S. sponhemica Gmel.

} Names given to foreign plants and transferred in error to the British list.

NOMENCLATORIAL NOTES

Three nomenclatorial problems arose in the course of this revision, which can only be very briefly summarized here.

(1) *S. groenlandica* is widely used on the Continent for the species here named *S. cespitosa*. Linnaeus is responsible for both names, and for the eventual reduction of the former under the latter. If, therefore, it can be shown that *S. cespitosa* (1753) is valid, it is not necessary to decide whether *S. groenlandica* is or is not a *nomen confusum*. It is argued from the type-specimens and the description that *S. cespitosa* is valid, and the erroneous citation of synonyms by Linnaeus does not upset this conclusion.

(2) *S. decipiens* is widely used for the species here named *S. rosacea*. The former is accompanied by no description, but by a reference to *S. petraea* of Roth. But in the volume of Roth's *Tentamen* to which Ehrhart makes reference there is no description of *S. petraea*. The

fact that in a later volume Roth adds a description is irrelevant; one cannot argue that Ehrhart's reference is a *lapsus calami*, since he was writing less than a year after Roth's second volume appeared and may well not have seen it.

(3) In splitting *S. continentalis* from *S. hypnoides* the choice of the northern plant as lectotype rather than the southern is justified by the fact that in the Linnaean herbarium (where both are present) it is against the northern plant that the serial number of the species in *Species Plantarum* has been written.

HYBRIDS

As far as is known all the Britannic species are to some extent interfertile. Occasional plants intermediate between *S. hypnoides* and *S. rosacea* have been found in Co. Clare and in the Galtees (the only regions of the British Isles where the two parents grow together) and are doubtless natural hybrids between the two. It is also perhaps significant that certain plants of *S. hypnoides* from Cwm Idwal deviate somewhat in the direction of *S. rosacea* (which once grew there), indicating perhaps some degree of introgressive hybridization.

The following hybrids (all fertile) have been artificially produced in culture:

S. hypnoides × *S. rosacea*.

S. Hartii × *S. hypnoides*.

S. Hartii × *S. rosacea*.

Difficulties experienced in maintaining *S. cespitosa* in cultivation, and in inducing it to flower at the same time as the other species, have so far prevented any attempt at crossing it with other species.

KEY TO THE BRITANNIC SPECIES

- Leaves covered at all seasons by a dense pile of short glandular hairs:
- Leaf-segments 3 or 5, obtuse; petals creamy, greenish or dirty white *S. cespitosa*
- Leaf-segments more or less acute, often exceeding 5 on the leaves of the larger rosettes; petals pure white *S. Hartii*
- Leaves glabrous, or with woolly, eglandular hairs; glandular hairs few or absent:
- Leaf-segments obtuse or acute, but scarcely acuminate; flower-buds erect *S. rosacea*
- Leaf-segments acuminate-aristate; flower-buds nodding *S. hypnoides*

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MINT NOTES

By R. A. GRAHAM.

IV. MENTHA PIPERITA L. AND THE BRITISH PEPPERMINTS.

Peppermints, in spite of capitate forms, are classed as spicate mints, and differ from all other British groups in this division (except the *aquatica-longifolia* hybrids) in having clearly stalked leaves. They are considered by many authorities as hybrids of *M. spicata* L. emend. Huds. with *M. aquatica* L., and their morphological characters support this view to a considerable extent (see Fraser, 1934, *Rep. Bot. Soc. & E.C.*, **10**, 590; Still, 1936, *Rep. Bot. Soc. & E.C.*, **11**, 106-108). Reproduction would appear to be mainly vegetatively by runners, and the rarity of fertile seeds perhaps indicates a hybrid origin. *Mentha crispa* L. and *Mentha citrata* Ehrh. are also considered by some to have arisen as hybrids from the same two parents; these will be discussed in a later paper.

The British peppermints have been divided into several closely allied varieties, the elucidation of which is the object of this paper. As with most mint groups there is considerable variation in certain characters, and the proximity of one variety to another has led to some difficulty in determination, which is augmented by the frequency of intermediates.

It is difficult to be sure of their status—native or introduced. There has been considerable local cultivation as a crop as a source of menthol (used as a flavour in various sweetmeats and medicines, and for other purposes) and in gardens for mint sauce, though spearmint is more generally used for this purpose and is perhaps more satisfactory owing to its stronger and sweeter flavour. Peppermints, however, are found in most parts of the British Isles, often in situations where they have at least the appearance of being native.

I am indebted to Mr J. E. Dandy and Mr H. K. Airy Shaw for advice on nomenclature and typification, and to many friends who have allowed me to see their specimens. In fact, a great wealth of material has been seen during a period of over a year. I wish also to express sincere thanks to Mr S. Savage for a great measure of kindly help and advice when working at the Linnean Society during the preparation of this and other papers on mints.

MENTHA PIPERITA L., 1753, *Sp. Pl.*, ed. 1, 576.

1. var. PIPERITA.

Mentha floribus capitatis, foliis lanceolatis serratis subpetiolatis L., *l.c.*

Mentha spicis brevioribus et habitioribus, foliis menthae fuscae, sapore fervido piperis. Ray, *Syn.*, ed. 3, 234, t. 10, fig. 2.

Mentha piperita officinalis Sole, 1798, *Menth. Brit.*, 15. Herb. Linn., spec. No. 730/12. (Savage, 1945, *Catalogue*).

Stem greenish-purple, with a very few scattered deflexed white hairs below, almost glabrous above. *Leaves* stalked, narrow-lanceolate, acute, with a few scattered white hairs above (and with rather more hairs on the veins below) the under-surface as in all peppermints covered with yellowish glands, attenuate at the base; serratures up to about 14, shallow but sharp and rather salient, irregular in number, size and spacing. *Inflorescence* an elongated, thick spike, the lower whorls separated. *Calyx tubular*, greenish-purple, glandular, with the teeth about two-thirds the length of the tube and ciliate with white hairs, otherwise glabrous. *Pedicels* glabrous. *Corolla* glabrous, the stamens apparently included.

The above description is based on a specimen in Herb. Buddle. A certain Dr Eales was, according to Ray, the first recorded finder of this mint, and as this specimen bears his name as well as Ray's Latin description it is most probably from the original gathering. It can therefore be regarded as Ray's type. Linnaeus quoted only Ray's name (see above) under *M. piperita*, and wrote also "*Habitat in Anglia*", thus clearly defining his peppermint as a British plant. The specimen can, therefore, also be accepted as the type of *M. piperita* L.

As, however, the specimen is somewhat fragmentary and immature, it is advisable also to consult other examples of typical material, and the two specimens named as *Mentha piperita officinalis* in Sole's collection at the Linnean Society are recommended in that one of them indicates an additional character of this variety which is not apparent in the type. In var. *piperita* the leaf-bases are usually attenuate, but, occasionally specimens with a rounded leaf-base occur, as one of Sole's specimens indicates. There is, in fact, a gradation in this variety from an attenuate leaf-base to a rounded, both extremes being sometimes found on one plant.

In this variety the leaves are essentially *long and narrow*. Sometimes, however, a broadening, more usually of upper leaves, will be found. The inflorescence is typically a *long, thick, rather blunt spike* on the main axis, often deeply coloured owing to reddening of the calyces, with the lower whorls becoming separated at maturity and usually pedunculate. Sometimes, however, the spike is short, even on mature plants, and has the appearance of a capitulum though it is less broad and thick than the capitulum of a water mint. On occasions both spikes and capitula will occur on one plant, though the main axis is usually spicate. In luxuriant specimens there is considerably more branching than the type shows.

There was evidently some early confusion in references. Both Sole and Smith cited Ray in reference to var. *vulgaris* (below), but a glance at the Herb. Buddle specimen is enough to show that reference would have more correctly been made to Sole's *Mentha piperita officinalis*, which, despite Sole's references, is undoubtedly synonymous with var. *piperita*. Another specimen in this same herbarium, *Mentha aquatica nigricans, fervido sapore*, is also clearly the same sort of peppermint, and, in this case, Smith's citation is correct.

Var. *piperita* is represented in the Linnean herbarium by a specimen (No. 730/12) which bears no identification in Linnaeus' handwriting. Another specimen (No. 730/10), which Linnaeus named as *piperita*, was described by Smith as a variety of *M. hirsuta* L. with the flavour of a peppermint, which he believed to be the peppermint of northern Europe. Smith states that it came from the Uppsala garden though I can find no definite evidence for this. However, as peppermints are apparently always plants of cultivation in Sweden one must assume a garden origin. It is a strange mint, by no means easy to fit into the peppermint group. Except in its long and rather narrow leaves it bears considerable resemblance to a water mint, having also a capitate inflorescence. It is on Smith's evidence that it had a strong peppermint flavour (no longer traceable) that it must, I think, be excluded from the water mint group and be regarded as a peppermint. The stalks, calyces and pedicels are covered with hairs, and yet the leaves are nearly glabrous, thus it can scarcely be regarded as a normal hairy form of var. *piperita* (f. *hirsuta*, below). In general character it is perhaps nearest to var. *vulgaris*, from which it may have arisen as a sport. If peppermints are hybrids of the suggested parents a sport reverting to *M. aquatica* might produce a mint such as this. Whereas Smith believed this specimen to represent the mint which Linnaeus described as his *M. piperita*, he preferred to retain the name for British material which he regarded as true peppermint. This, according to modern rules of nomenclature, would be incorrect, though in the last instance Smith was right. Coincidentally this specimen agrees with Linnaeus' description, but it is clear that Linnaeus named his peppermint on the evidence provided by Ray, and his "*floribus capitatis*" is undoubtedly due to his consultation of Ray's figure which Sole correctly described as a "centaur", the artist having apparently muddled his subjects to the extent of drawing an obvious capitate head of a water mint on the stem and leaves of a typical peppermint. Moreover, there is evidence that this specimen was added to the Linnean herbarium at some date later than 1753; thus, though it may perhaps be regarded as "illustrative" of Linnaeus' opinion, it cannot be regarded as Linnaeus' type. Sole disagreed with Smith that the peppermint which Linnaeus described was different from that described by Ray, and his lively and acrimonious comments on this and other similar matters are worth reading (Savage, 1937, *Proc. Linn. Soc.*, 105, 31), though he erroneously cited Linnaeus and Ray in reference to his var. *vulgaris*, owing, no doubt, to his not having seen the important specimen in Herb. Buddle.

forma *HIRSUTA* (Fraser) comb. nov.

× *Mentha hircina* Hull var. *hirsuta* Fraser (1927, *Rep. Bot. Soc. & E.C.*, 8, 221).

This hairy peppermint, called by Still (1938, *J. Bot.*, 76, 55) "*lusus pilosus*", is clearly a hirsute form of var. *piperita*. (Fraser's treatment of *Mentha hircina* Hull was erroneous as neither the specimen from

which he drew his description nor his var. *hirsuta* are hybrids of *M. aquatica* with *M. longifolia*.) It differs from var. *piperita* only in the abundance of whitish hairs that cover the stalks, leaves (especially the undersides), pedicels and calyces; and in a somewhat reduced pungency—a normal phenomenon in *Mentha* where a glabrous or subglabrous form can be compared with a corresponding hirsute one.

It is rarer than var. *piperita*, but probably extends to all areas where this variety, with which it sometimes grows, is found.

2. var. *VULGARIS* Sole.

Mentha piperita vulgaris Sole, 1798, *Menth. Brit.*, 19.

Mentha piperita L. var. *Druceana* Briquet ex Fraser, 1925, *Rep. Bot. Soc. & E.C.*, 7, 613.

Stem purple, much branched with flexuous branches. *Leaves* rather broadly ovate-lanceolate, rounded or cuneate at the base, the larger ones 6.7 × 3.4 cms. and rather obtuse; serratures shallow but rather sharp, not salient. *Inflorescence* a blunt capitulum, rounded or, sometimes, becoming elongated at maturity. *Calyx* tube glabrous, the teeth shortly and sparsely ciliate. *Stamens* included.

Sole's description is inadequate for a critical mint, and the above description is taken from the two specimens among his set of mints at the Linnean Society. By comparison with var. *piperita* the leaves are broader, often shorter, less acute, and less sharply serrated; while the inflorescence is essentially capitate, never an elongated spike. The flexuous branches, a character which Sole emphasises, certainly occur in this variety to which, however, they are not restricted. Hirsute forms, unless Linnaeus' named specimen is such, have not been recorded, but would be expected.

Owing to past confusion with Fraser's var. *subcordata* (see below) it is difficult to be accurate over distribution. But var. *vulgaris* is apparently rarer than var. *piperita*, though there are occurrences here and there throughout the country. I possess specimens from v.cs. 1, 3, 17, 28 and 64.

I have also a specimen of a hairy intermediate between this variety and var. *piperita*, having the rather broad, shallowly serrate leaves (lower cuneate, upper rounded) of the former, and the elongated spike of the latter. It was gathered by Francis Druce at Halton Holgate, Lincs.

The type, and probably only authentic, specimens of Briquet's var. *Druceana* are at Oxford. The original description is slightly amended in Fraser's Monograph (1927, *Rep. Bot. Soc. & E.C.*, 8, 225), but having compared these specimens side by side with var. *vulgaris* I have been unable to find sufficient evidence to warrant varietal differentiation. It therefore seems best to relegate Briquet's variety to synonymy.

3. var. SYLVESTRIS Sole.

Mentha piperita sylvestris Sole, 1798, *Menth. Brit.*, 53.

Mentha hircina Hull, 1799, *Brit. Fl.*, 1, 127.

Mentha spicis oblongis latioribus, interruptis, foliis latis ovatis acutis, petiolatis serratis subhirsutis, nervis albis, caule erecto rigido subramoso, ex albido rubescente piperis odore gravi, staminibus corolla brevioribus—Sole.

Stem reddish, thinly covered with deflexed hairs. *Leaves* markedly broadly ovate-lanceolate, up to 8 × 4 cms., truncate or rounded to a small wedge at the base, sometimes nearly subcordate, glabrous above and very thinly hairy beneath; serratures irregular in number and spacing, up to 12, sharp but shallow; nerves of the undersurface whitish. *Inflorescence* a strong, elongated, thick spike, the lower whorls becoming separated. *Calyx* with a few hairs on the tube, the teeth very hairy. *Stamens* included.

The above is taken from the specimen among Sole's mints at the Linnean Society, which bears the name "*latifolia sive sylvestris*." Evidently a strong-growing mint, it differs from var. *piperita* in the much broader leaves, and from var. *vulgaris* in general larger size, elongated spike and in the truncate tendency of the leaf bases; and from both in the very hairy calyx teeth. Sole's illustration gives the appearance of a very hairy mint, but this is misleading. Further specimens in Smith's herbarium show leaves with a more attenuate leaf-base, but no peppermints have an absolute monopoly in any leaf-base character. Unfortunately it is no longer possible to comment on the "goatish" smell which Sole alludes to—by no means a normal character in a peppermint.

It must be noted in passing that the *Mentha hircina* described by Fraser (1927, *Rep. Bot. Soc. & E.C.*, 8, 221) is not Hull's plant, but a hairy form of the next variety.

4. var. SUBCORDATA Fraser, 1927, *Rep. Bot. Soc. & E.C.*, 8, 226.

In his description Fraser stresses the lower leaves as being ovate to ovate-oblong, and subcordate, and the upper ones rounded or truncate; and the inflorescence as being a shortly oblong, very obtuse spike.

There are four specimens in the type folder at Kew among Fraser's mints. What may be the original specimen seems to be a starved plant, the remaining three being derived from the cultivation of a root from the original locality. The starved specimen has long, rather narrow leaves with subcordate bases, and saw-like edges due to the many, sharp serratures; and the inflorescence on the main axis is a starved spike with lateral branches terminating in short, ± capitate heads. Generally speaking, this specimen has the appearance of a starved form of var. *piperita* but with the added character that the rounded leaf bases, which sometimes occur in this variety, are developed a stage further to become subcordate. The three cultivated specimens are remarkably

near to var. *vulgaris* in leaf shape, though the subcordate bases persist to a considerable extent, varying to cuneate; and the inflorescences are shortly spicate. In these three the saw-like edges are less apparent. There are several more specimens, not in the type folder but again from cultivation from the type locality, all of which show a subcordate base to the lower leaves, and the saw-like edges; with inflorescences either clearly spicate or short and almost capitate.

It is a most odd circumstance that among Fraser's mints there are no specimens left by him named as var. *vulgaris*, although some are certainly this variety, and one is driven to the conclusion that having named his new variety he found it difficult to separate it from var. *vulgaris*, which was then relegated to the background. Indeed, separation from both var. *vulgaris* and var. *piperita* often difficult, especially in view of intermediates. Further, some of Fraser's var. *subcordata* is undoubtedly var. *piperita*. It is very perplexing, but Fraser evidently used his new variety very widely.

The best characters of this variety are the *subcordate bases of the lower leaves* (somewhat intermediate between var. *piperita* and var. *vulgaris* in shape), and the *many small serratures*. It is clear that the inflorescence is somewhat intermediate between the two.

As with var. *vulgaris* it is hard to be accurate over distribution. Fraser's variety is less common than var. *piperita*, but would seem to be well distributed in Britain.

SUMMARY.

Peppermint varieties, undoubtedly closely allied, are distinguished by two criteria, (1) form of inflorescence, (2) leaf shape. By way of a summary I give below an analytical key to the varieties described above. Where the leaf shape is given, attention should primarily be paid to the lower or more mature leaves. But the characters given in the key should only be regarded as indicative of a variety in the first instance, and the descriptions given above should afterwards be consulted.

1	{	Inflorescence on main axis spicate	2
		Inflorescence on main axis capitate	5
2	{	Leaves long and narrow	3
		Leaves broadly ovate-lanceolate	var. <i>sylvestris</i>
3	{	Leaves attenuate or rounded at the base	4
		Leaves, at least the lower, subcordate at the base	var. <i>subcordata</i>
4	{	Whole plant subglabrous	var. <i>piperita</i>
		Whole plant hirsute	f. <i>hirsuta</i>
5	{	Leaves cuneate or rounded at the base	var. <i>vulgaris</i>
		Leaves, at least the lower, subcordate at the base	var. <i>subcordata</i>

PLANT RECORDS

Compiled by E. C. WALLACE.

Records are for the year 1949 when no date is given.

The following signs are used:—

- § before the *B.P.L.* number: to indicate that the paragraph contains information necessitating a correction in the annotated copy of the *Comital Flora*.
- † before the *B.P.L.* number: to indicate that the plant is not a native species in the British Isles.
- † before the record: to indicate a native species which is not native in the locality recorded.
- * before the record: to indicate new vice-county records, not previously published.
- ‡ before the record: to indicate records additional to an annotated copy of *Comital Flora*, previously published elsewhere.
- [] enclosing a record: to indicate doubt as to the validity of the record, either of identification or locality.

It will be useful if, in future, National Grid Co-ordinates, made as accurate as is thought advisable, are added to all records.

§2/5. *THALICTRUM ALPINUM* L. †48, Mer.; above Llyn y Gafr, 1948 (see *Year Book*, 1950, 46). 97, [Argyll]; north rocks of Ben Hiant, Ardnamurchan, 1948, J. E. RAVEN.

3/2b. *ANEMONE NEMOROSA* L. var. *PURPUREA* DC. 107, E. Suth.; Doll, Brora, W. A. TOD.

§6/26. *RANUNCULUS PSEUDO-FLUITANS* (Syme) Baker & Foggitt. †48, Mer.; Llanelltyd, 1948, det. R. W. Butcher (see *Year Book*, 1950, 46).

8/1. *TROLLIUS EUROPAEUS* L. 97, [Argyll]; north rocks of Ben Hiant, Ardnamurchan, 1948, J. E. RAVEN.

†12/2. *NIGELLA ARVENSIS* L. 17, Surrey; cornfield on old meadowland, Mickleham, 1946, A. W. WESTRUP.

21/5. *PAPAVER ARGEMONE* L. 21, Middx.; fallow field, Ken Wood, B. WELCH, H. C. HARRIS and D. H. KENT.

§22/1. *MECONOPSIS CAMBRICA* (L.) Vig. ††96, Easternness; edge of roadside wood between Ferry Brae and Balbair, 1947, M. S. Campbell (see *Year Book*, 1949, 37).

23/1. *GLAUCIUM FLAVUM* Crantz. 69b, N. Lancs.; Foulney Island, A. MILLARD, comm. CARLISLE MUSEUM.

†28/1. *ESCHSCHOLTZIA CALIFORNICA* Cham. *sensu lato*, sec. Jepson. 3, S. Devon; on the beach at Slapton, far from houses, perhaps a relic of U.S. Army, 1947, J. OUNSTED and J. ROBERTS.

32/5×10. *FUMARIA* × *PAINTERI* Pugsl. 16, W. Kent; cultivated ground, Cox Heath, 1948, C. WEST, confirmed by J. E. LOUSLEY.

32/11. *FUMARIA MICRANTHA* Lag. 15, E. Kent; Adisham, J. E. LOUSLEY and D. McCLINTOCK.

32/12. *FUMARIA VAILLANTII* Lois. 33, E. Glos.; (7a) stony ground by quarry on oolite, Snowhill Hill, 1933, E. MILNE-REDHEAD, comm. W. R. PRICE. det. N. Y. SANDWITH.

32/13. *FUMARIA PARVIFLORA* Lam. 15, E. Kent; Adisham, J. E. LOUSLEY and D. McCLINTOCK.

†33/4. *MATHIOLA BICORNIS* DC. 28, W. Norf.; carrot-field at Sculthorpe, R. P. LIBBEY, det. E. L. SWANN.

†35/5. *RORIPPA AUSTRIACA* (Crantz) R. Br. 32, Northants.; (7) abundant in an orchard near the Nene, Wansford, 1948 and 1949, J. L. GILBERT, det. A. J. WILMOTT.

†36/2. *BARBAREA VERNA* Asch. 38, Warw.; (1) waste ground at Edgbaston, annually 1942-7, J. OUNSTED.

37/5. *ARABIS PETRAEA* (L.) Lam. 97, [Argyll]; abundant on Ben Hiant, Ardnamurchan, 1948, A. R. CLAPHAM and J. E. RAVEN.

†39/8. *CARDAMINE LATIFOLIA* Vahl. 62, N.E. York; Goathland, 1930, R. J. FLINTOFF; Church Becks, Scalby, 1949, F. C. RIMINGTON, det. and comm. J. E. LOUSLEY. 69, Westm.; profusely in small mountain stream on lower slopes of Loughrigg, Ambleside, 1932, E. P. GOULDING—sec *B.E.C.* 1946/7 *Rep.*, 257, 1948, for later Ambleside records; naturalised on damp waste ground, Storrs, near Bowness, Windermere, 1939, W. C. WORSDELL, comm. J. E. LOUSLEY.

†40/2. *LUNARIA ANNUA* L. 107, E. Suth.; Brochrobie, Brora, W. A. Tod.

45/5. *COCHLEARIA ANGLICA* L. 10, Wight; on top of Bembridge Down, by the cliff edge; a plant much dwarfed by its abnormal locality, but having the radical leaves typically shaped, J. OUNSTED.

§45/7. *COCHLEARIA DANICA* L. †*39, Staffs.; ballast of railway track, Hamstead, West Bromwich, 1948, V. JACOBS.

†49/4. *SISYMBRIUM ORIENTALE* L. 37, Worcs.; waste ground at Kings Norton, 1943, J. OUNSTED.

49/6b. *SISYMBRIUM OFFICINALE* (L.) Scop. var. *LEIOCARPUM* DC. 39, Staffs.; margin of old coal tip (now recreation ground), Greets Green, West Bromwich, 1948, V. JACOBS, det. R. C. L. BURGESS.

†49/15. *SISYMBRIUM POLYGERATIUM* L. 28, W. Norf.; in cracks of broken concrete paving on site of St. James' Cinema, King's Lynn, J. L. GILBERT, comm. E. L. SWANN.

53/1. *SUBULARIA AQUATICA* L. 48, Mer.; Tal-y-llyn (east end of Lake), R. B. ABELL. 70, Cumb.; Tewfit Tarn, near Threlkeld, Miss N. M. STALKER, comm. CARLISLE MUSEUM.

†54/4d. *BRASSICA RAPA* L. var. *BRIGGSII* H. C. Wats. 107, E. Suth.; Badnellan, Brora, W. A. TOD, det. A. J. WILMOTT.

54/16. *BRASSICA JUNCEA* COSS. 34, W. Glos.; (2b) Sharpness Docks, R. B. ABELL, comm. W. R. PRICE.

§55/1. *DIPLOTAXIS TENUIFOLIA* (L.) DC. *59, S. Lancs.; bank of R. Tame on coal measures, near Haughton Green, 250', T. R. LAYCOCK and D. W. JOWETT.

†61/3. *LEPIDIUM DRABA* L. 37, Worcs.; well established in several waste places at King's Norton, Birmingham, 1942-7, J. OUNSTED.

64/3. *THLASPI ALPESTRE* L., *sensu lato*. 88, Mid Perth; on a limestone outcrop on Ben a' Chuallaich, above Loch Rannoch, M. McCALLUM WEBSTER and D. SPENCE (on B.S.B.I. excursion), det. A. J. WILMOTT—no record since that in F. Buchanan White, 1898, *Flora of Perthshire*.

†74/2. *BUNIAS ORIENTALIS* L. 24, Bucks.; in quantity on waste ground by Chalfont Road Station, J. E. LOUSLEY, R. A. GRAHAM and D. McCLINTOCK.

†76/3. *RAPISTRUM RUGOSUM* (L.) All. 32, Northants.; (7) a few plants, Bishop's Road, Fengate, Peterborough, 1948 and 1949. J. L. GILBERT, det. J. P. M. BRENNAN. 39, Staffs.; slaggy banks, Hill Top, West Bromwich, V. JACOBS, det. A. J. WILMOTT. 70, Cumb.; Silloth docks, Miss N. M. STALKER, comm. CARLISLE MUSEUM.

88/8h. *VIOLA ODORATA* L. var. *SUBCARNEA* (Jord.). 37, Worcs.; Brotheridge Green, Upton-upon-Severn, F. M. DAY.

88/19. *VIOLA LEJEUNEI* Jord. 107, E. Suth.; Badnellan, Brora, 1948, W. A. TOD, det. A. J. WILMOTT.

92/2. *DIANTHUS DELTOIDES* L. 22, Berks.; a single plant, apparently native, sandy ground, Bear Wood, near Wokingham, 1945, B. VERDCOURT.

+92/5. *DIANTHUS BARBATUS* L. 107, E. Suth.; river bank at Brochrobie, Brora, about 20 plants, W. A. TOD.

100/4. *CERASTIUM EDMONDSTONII* (Edmondst.) Murb. & Ostenf. 98, Argyll; several places on Bidean nam Bian, towards the summit ridges, R. MACKECHNIE, W. A. SLEDGE and E. C. WALLACE.

100/5m. *CERASTIUM VULGATUM* L. var. *MURALE* (Desv. ex DC.) Gren. 15, E. Kent; gravel pit near Swanton Farm, Littlebourne, under similar conditions of lack of moisture and rabbit attack to the Worgret Heath plants recorded in *B.E.C. 1933 Rep.*, 583-588, 1934, J. E. LOUSLEY and D. McCLINTOCK.

100/7. *CERASTIUM PUMILUM* Curt. 22, Berks.; (1) Wytham Great Wood, old quarry in grassland, F. A. WHITEHEAD.

§100/11. *CERASTIUM CERASTOIDES* (L.) Britton. ‡106, E. Ross; S.W. of summit of Mam Soul, 1947, E. F. Warburg (see *Year Book*, 1949, 39).

101/6. *STELLARIA DILLENIANA* Moench. 70, Cumb.; Southerfield Moss, near Abbeytown, C. W. MUIRHEAD, comm. CARLISLE MUSEUM.

102/5. *ARENARIA SERPYLLIFOLIA* L. 32, Northants.; (7) meadow, Wansford, some flowers with nine petals, 1947, J. L. GILBERT; "A curious form, requiring investigation," A. J. WILMOTT.

103/2. *SAGINA SUBULATA* (Sw.) C. Presl. 97, [Argyll]; promontory in Sanna Bay, Ardnamurchan, 1948, M. S. CAMPBELL, A. R. CLAPHAM and J. E. RAVEN.

§103/7. *SAGINA CILIATA* Fr. *70, Cumb.; Silloth Docks, R. A. BOYD, comm. CARLISLE MUSEUM.

§†108/1. *CLAYTONIA ALSINOIDES* Sims. *105, W. Ross; in a ditch near Ullapool, M. McCALLUM WEBSTER. *107, E. Suth.; Brochrobie, Brora, W. A. TOD, det. A. J. WILMOTT.

§†108/2. *CLAYTONIA PERFOLIATA* Don. 22, Berks.; in a hedge at Leighton Park, Reading; *37, Worcs.; plentiful near Kidderminster, 1945, J. OUNSTED.

§111/2. *ELATINE HEXANDRA* (Lapierre) DC. *2, E. Cornw.; shallow water in Dozmary Pool, A. W. GRAVESON. 48, Mer.; Tal-y-llyn (east end of lake), R. B. ABELL.

§†115/2. *ALTHAEA HIRSUTA* L. *28, W. Norf.; in field of lucerne at West Newton, N. Y. SANDWITH, comm. E. L. SWANN.

117/2. *MALVA SYLVESTRIS* L. 107, E. Suth.; Badnellan, Brora, W. A. TOD.

†122/1. *HIBISCUS TRIONUM* L. 18, S. Essex; waste ground, Dagenham, N. Y. SANDWITH.

127/4. *GERANIUM PRATENSE* L. 33, E. Glos.; side of the Fosse Way between Beech Pike and Cirencester, two patches with the petals pencilled and coloured exactly as in *G. versicolor*, Mrs M. ARMITAGE, comm. C. C. TOWNSEND.

§†127/6. *GERANIUM ENDRESSI* Gay. *22, Berks.; well established on the border of a copse, Tidmarsh, near Reading, 1946, L. H. WILLIAMS and C. C. TOWNSEND. †96, Easternness: by path on S. side of Beauly River, 1947, M. McCallum Webster (see *Year Book*, 1949, 37).

127/7. *GERANIUM PYRENAICUM* Burm. f. 18, S. Essex; farm land at Foulness Island, S. T. JERMYN.

127/8. *GERANIUM COLUMBINUM* L. 61, S.E. York; railway bank between South Cave Station and East Dale, 1947, R. LEWIS, confirmed by W. A. SLEDGE.

§†133/3. *IMPATIENS PARVIFLORA* DC. †8, S. Wilts.; damp wood between Lower Whitbourne and Timbers Hill, 1948, J. D. GROSE (1949, *Wilts. Arch. & N.H. Mag.*, 53, 90). 17, Surrey; (IIIa) roadside, Peperharrow Park and Somerset Farm, 1948, O. POLUNIN. *28, W. Norf.; on rubbish dump at rear of King's Lynn Docks, D. P. YOUNG, comm. E. L. SWANN (B.S.B.I. Excursion). 69b., N. Lancs.; roadside, Ferry Inn, Windermere to High Wray, G. WILSON, comm. BARROW FIELD NATURALISTS.

§†133/4. *IMPATIENS GLANDULIFERA* Royle. *38, Warw.; (1, 2) by R. Tame and R. Blythe, 1942-7, J. OUNSTED. *58, Ches.; wayside on trias. Bramhall, 252', 1947, K. M. NEILL, comm. T. R. LAYCOCK.

†145/1(2). *LUPINUS ARBOREUS* Sims. 10, Wight; abundantly established on cliffs between Shanklin and Sandown, 1947; to correct record as *L. luteus* L. in *Proc. I. of W. N.H. & Arch. Soc.*, 4, 1948; I am grateful to Mr N. Y. Sandwith for pointing out this correction, J. E. LOUSLEY.

†145/3. *LUPINUS LUTEUS* L. 22, Berks.; a number of plants in a sandy cornfield on Frilford Heath, J. W. GOUGH and N. Y. SANDWITH.

†151/4. *ONONIS NATRIX* L. 13, W. Sussex; Charlton Forest, Singleton, D. G. RANWELL, comm. D. METCALFE.

†154/3. *MELILOTUS ARVENSIS* Wallr. 32, Northants.; (7) not uncommon, Wansford, 1947, J. L. GILBERT.

167/2. *OXYTROPIS CAMPESTRIS* (L.) DC. 89, E. Perth; still near Loch Loch, J. E. LOUSLEY, R. A. GRAHAM and D. McCLINTOCK.

†169/1. *SCORPIURUS SULCATUS* L. 10, Wight; vegetable garden, Ryde, Miss ANN DAVIDGE, det. and comm. J. E. LOUSLEY.

176/4. *VICIA OROBUS* DC. 97, [Argyll]; around Kilchoan Bay, Ardnamurchan, 1948, J. E. RAVEN.

178/4. *LATHYRUS MARITIMUS* Bigel. 1, W. Cornw.; two young plants, with *Crambe maritima* L., on the beach between Penzance and Marazion, 1948, J. E. RAVEN. 14, E. Sussex; in very small quantity and not flowering, between Bexhill and St Leonards, J. E. LOUSLEY and D. McCLINTOCK.

178/9. *LATHYRUS APHACA* L. 23, Oxon.; (5) old quarry, North Leigh, P. P. C. WARBURG.

§†184/10. *SPIRAEA SALICIFOLIA* L. *58, Ches.; amongst bracken, edge of pinewood near Oak Mere, B. HOPKINS. *107, E. Suth.; Upper Brochobie, Brora, growing with *Ulex* and *Rubus*, W. A. TOD.

184/12. *SPIRAEA FILIPENDULA* L. 16, W. Kent; recent records are desired for this species in this vice-county—it does not appear to have been recorded for W. Kent for over half a century, F. ROSE.

185. *RUBUS*. All gatherings determined by W. C. R. WATSON unless stated otherwise.

185/18(2). *RUBUS VULGARIS* Weihe & Nees. 70, Cumb.; roadside near Calthwaite, 1948, M. HENDERSON and C. W. MUIRHEAD, comm. CARLISLE MUSEUM.

185/27(3). *RUBUS FURNARIUS* Bart. & Ridd. 70, Cumb.; bank between Newbiggin Quarry and Wreay Woods, 1948, C. W. MUIRHEAD, comm. CARLISLE MUSEUM.

185/26. *RUBUS ERRABUNDUS* W. Wats. 70, Cumb.; Lessonhall Lane, near Wigton, 1947; Kingmoor, Carlisle, 1948, C. W. MUIRHEAD, comm. CARLISLE MUSEUM.

185/37. *RUBUS NEMORALIS* P. J. Muell. 70, Cumb.; Kingmoor, Carlisle, 1946, C. W. MUIRHEAD, comm. CARLISLE MUSEUM.

†185/38. *RUBUS LACINIATUS* Willd. 107, E. Suth.; roadside between Brora and Gordonbush, 1948, W. A. TOD, det. A. J. WILMOTT.

185/45(2). *RUBUS PROPINQUUS* P. J. Muell. *70, Cumb.; Kingmoor, Carlisle, 1947, C. W. MUIRHEAD, comm. CARLISLE MUSEUM.

185/45(2). *RUBUS PSEUDO-BIFRONS* (Sudre) Bouv. *35, Mon.; near Llan-y-nani, Llanthewy Fach, 1943, A. E. WADE, comm. NAT. MUS. WALES.

185/98(3). *RUBUS MELANOXYLON* Muell. & Wirtg. 35, Mon.; Cwm Big, Aberbeeg, 1925, A. E. WADE, comm. NAT. MUS. WALES.

185/110(5). *RUBUS FUSCIFORMIS* Sudre. *35, Mon.; The Forest, Llangibby, 1943, A. E. WADE, comm. NAT. MUS. WALES.

185/141. *RUBUS SCHLEICHERI* Weihe. *62, N.E. York; Oldstead, 1865, J. G. BAKER (as *R. hirtus* W. & K.), comm. E. F. WARBURG.

185/148. *RUBUS ARISTISEPALUS* (Sudre) W. Wats. *35, Mon.; The Narth, 1909, W. A. SHOOLBRED (as *R. anglosaxonicus* Gelert var. *setulosus* Rog.), comm. NAT. MUS. WALES.

185/149(3). *RUBUS PURPUREICAILIS* W. Wats. 70, Cumb.; bank between Newbiggin Quarry and Wreay Woods, 1943, C. W. MUIRHEAD, comm. CARLISLE MUSEUM.

185/149(5). *RUBUS TENUIARMATUS* E. Lees. 102, S. Ebudes; roadside at Kiloran, Isle of Colonsay, 1948, C. W. MUIRHEAD, comm. CARLISLE MUSEUM.

§186/1. *DRYAS OCTOPETALA* L. *97, Westernness; near the summit of Beinn na Socaich, Glen Spean, A. SLACK, comm. J. E. LOUSLEY. 98, Argyll; on calcareous rocks in several places near Ballachulish, W. A. SLEDGE and E. C. WALLACE.

189/1. *POTENTILLA FRUTICOSA* L. 70; Cumb.; Pillar, Ennerdale, R. A. BOYD, comm. CARLISLE MUSEUM.

189/5. *POTENTILLA CRANTZII* (Crantz) Beck. 98, Argyll; limestone rocks, Creag Bhan, Glencoe, R. MACKECHNIE and E. C. WALLACE.

†189/13b. *POTENTILLA RECTA* L. var. *SULFUREA* DC. 34, W. Glos.; (2b) Sharpness Docks, R. B. ABELL, comm. W. R. PRICE, det. at Kew.

190/2. *ALCHEMILLA XANTHOCHLORA* Rothm. 97, [Argyll]; Doire Dharroch, by Loch Mudle, Ardnamurchan, 1948, M. S. CAMPBELL, A. R. CLAPHAM and J. E. RAVEN.

190/4. *ALCHEMILLA VESTITA* (Bus.) Raunk. 104, Mid Ebudes; c. 1250 ft., Meall Odhar, Cuillins, Skye, 1948, E. F. WARBURG. 107, E. Suth.; Doll, Brora, 1948, W. A. TOD, det. A. J. WILMOTT.

190/4(2). *ALCHEMILLA FILICAULIS* Buser. 104, Mid Ebudes; Coir a' Mhadaidh, Cuillins, Skye, 1948: 105, W. Ross; rocks above Loch a' Choir Uaine, The Saddle, Glenshiel, 1948: E. F. WARBURG.

§190/8. *ALCHEMILLA GLABRA* Neygenf. *35, Mon.; grassy bank, roadside between Llanthony and Capel-y-ffin, Vale of Ewyas, 1944, R. LEWIS, det. S. M. WALTERS. 97, [Argyll]; Doire Dharroch, by Loch Mudle, Ardnamurchan, 1948, M. S. CAMPBELL, A. R. CLAPHAM and J. E. RAVEN. 105, W. Ross; Allt a Bhuilg, Sgurr Fhuaran, 1948, E. F. WARBURG.

§190/10. *ALCHEMILLA GLOMERULANS* Buser. †106, E. Ross; rocks, W. of L. Tuill Bhearnach, c. 3000', 1947, S. M. Walters and E. F. Warburg (see *Year Book*, 1949, 39).

§190(2)/2. *APHANES MICROCARPA* (Boiss. & Reut.) Rothm. *30, Bedford; Heath and Reach, J. G. DONY, det. S. M. WALTERS.

§191/2. *AGRIMONIA ODORATA* (Gouan) Mill. †96, Easternness; near Drumnadrochit, 1947, A. J. Wilmott (see *Year Book*, 1949, 37). *98, Argyll; limestone cliff, east coast of Lismore, E. C. WALLACE.

194/11b. *ROSA DUMETORUM* Thuill. var. *INCERTA* (Déségl.) W.-Dod. 59, S. Lancs.; hedge on coal measures, near Arden Mill (Cotton), Haughton Green, 250', 1949, T. R. LAYCOCK and D. W. JOWETT, det. R. MELVILLE.

194/15×19. *ROSA RUBIGINOSA* L. × *R. TOMENTOSA* Sm. 8, S. Wilts.; Urchfont, J. D. GROSE, det. R. MELVILLE.

§195/1. *PYRUS MALUS* L. †96, Easternness; Crinaglack, Strath Glass, 1947, M. S. Campbell (see *Year Book*, 1949, 37).

†197/2. *COTONEASTER MICROPHYLLA* Wall. 97, Westernness; rocks by the railway line, Glasnacardoch, near Mallaig, J. ROBERTSON and C. W. MUIRHEAD, comm. CARLISLE MUSEUM.

§199/10. *SAXIFRAGA HYPNOIDES* L. *sensu lato*. 97, [Argyll]; north rocks of Ben Hiant, Ardnamurchan, 1948, J. E. RAVEN. 105, W. Ross; gully on west side of Sgurr Mhic Bharraich, Glenshiel; above Loch a' Coir Uaine, The Saddle, Glenshiel; 1948, E. F. WARBURG. †106, E. Ross; rocks W. of L. Tuill Bhearnach, c. 3200, 1947, S. M. Walters and E. F. Warburg (see *Year Book*, 1949, 39).

199/17. *SAXIFRAGA GRANULATA* L. 43, Radnor; Radnorshire bank of R. Wye in copses E. and W. of Iron bridge, R. B. ABELL.

§199/18. *SAXIFRAGA CERNUA* L. *98, Argyll; on calcareous rocks in the parish of Lismore and Appin, P. R. BELL and E. C. WALLACE.

217/2. *CALLITRICHE OBTUSANGULA* Le Gall. 35, Mon.; seen near New House, Ruminney, A. E. WADE, comm. NAT. MUS. WALES.

†219/3. *LYTHRUM MEONANTHUM* Link. 17, Surrey; cornfield on old meadowland, Mickleham, 1946, A. W. WESTRUP.

†220/7(2). *EPILOBIUM ADENOCAULON* Hausskn. 22, Berks; along a stream at Beenham, July 1949, N. Y. SANDWICH.

220/7(2)×7. *EPILOBIUM ADENOCAULON* Hausskn. × *E. OBSCURUM* Schreb. 30, Beds.; West Wood, Knotting, 1948, J. G. DONY, det. G. M. ASH.

†220/17. *EPILOBIUM PEDUNCULARE* A. Cunn. 69, Westm.; plentifully by a stream coming down to the Lune from Hoargill Fells, Rev. M. L. WILLIAMS, det. and comm. A. J. WILMOTT: 69b, N. Lancs.; Furness Abbey, G. WILSON, comm. BARROW FIELD NATURALISTS. 88, Mid Perth; along shore road at eastern end of Loch Katrine, A. W. ROBSON. 97, Westernness; R. Callop, Glenfinnan, C. W. MUIRHEAD, comm. CARLISLE MUSEUM.

225/2. *CIRCAEA INTERMEDIA* Ehrh. 98, Argyll; thickets of hazel in Glen Stockdale, E. C. WALLACE.

†257/1. *MYRRHIS ODORATA* (L.) Scop. 17, Surrey; (IIIa), entrance to Puttenham Golf Course, 1948, O. POLUNIN, det. N. Y. SANDWICH.

265/6. *OENANTHE LACHENALII* C. C. Gmel. 97, [Argyll]; promontory in Sanna Bay, Ardnamurchan, 1948, M. S. CAMPBELL, A. R. CLAPHAM and J. E. RAVEN.

†285/4. *CORNUS MAS* L. 7, N. Wilts.; in hedgerows and coverts "a mile or so from the nearest house of any size" between Aldbourne and Baydon, Mrs A. GRESHAM COOKE, det. and comm. J. E. LOUSLEY.

†298/5. *ASPERULA ARVENSIENSIS* L. 14, E. Sussex; in potato field, Forest Row, M. PARSONS.

†301/4. *VALERIANA PYRENAICA* L. 99, Dumb.; Milngavie, 1948, W. THOMAS, det. A. J. WILMOTT.

§304/2. *VALERIANELLA ERIOCARPA* Desv. *30, Beds.; heath near Baker's Wood, Heath and Reach, remote from arable land, etc., J. G. DONY.

§304/5. *VALERIANELLA RIMOSA* Bast. *30, Beds.; arable field, Barton, 1949, W. D. COALES, comm. J. G. DONY.

- †318/11. *ASTER VERSICOLOR* Willd. 13, W. Sussex; downs near Patcham, Brighton, far from habitation, 1948, Miss J. E. HIBBARD, comm. T. G. TUTIN.
- §†320/3. *ERIGERON CANADENSIS* L. *37, Worcs.; plentiful near Kidderminster, 1946, J. OUNSTED.
- †335/1. *BUPHTHALMUM SPECIOSUM* Schreb. 48, Mer.; near Bala Lake, 1941, J. A. WEBB, comm. NAT. MUS. WALES.
- †341/3. *XANTHIUM SPINOSUM* L. 17, Surrey; weed in garden at Guildford, 1949, Miss MARGARET EDE, det. N. K. GOULD, comm. J. S. L. GILMOUR.
- 347/4. *HELIANTHUS ANNUUS* L. 28, W. Norf.; in carrot-field at East Winch, 1949, R. P. LIBBEY and E. L. SWANN. 29, Cambs.; carrot-field alien, La Hogue, Chippenham, J. E. LOUSLEY, R. GRAHAM and D. McCLINTOCK.
- †354/1. *GALINSOGA PARVIFLORA* Cav. 27, E. Norf.; on a bombed site in Great Yarmouth, J. OUNSTED.
- †354/2. *GALINSOGA CILIATA* (Raf.) Blake. 17, Surrey; gravel pit at Thorpe, J. OUNSTED. 30, Beds.; railway siding, Flitwick, J. G. DONY.
- †362/2. *TAGETES MINUTA* L. 30, Beds.; railway siding, Flitwick, where it has appeared for a number of years but has not previously flowered; railway siding, Luton; J. G. DONY.
- §†368/1. *ANTHEMIS TINCTORIA* L. ‡23, Oxon.; near Oxford by-pass, 1942-7; add to *C.F.*, but see Druce, 1927, *Fl. Oxfordsh.* for earlier record, J. OUNSTED.
- §†370/13. *CHRYSANTHEMUM PARTHENIUM* L. *107, E. Suth.; at two localities near Brora, 1949, W. A. TOD.
- †380/2. *PETASITES ALBUS* (L.) Gaertn. 69b, N. Lancs.; roadside near Colton, W. WILSON, also at Kents Bank and Lancs. side of Brathay near Skelwith Bridge, comm. BARROW FIELD NATURALISTS.
- 383/5. *SENECIO JACOBAEA* L. 32, Northants.; covered with cottony down, mixed with normal plants on exposed sub-soil, Wansford and Yarwell, (7) 1947, J. L. GILBERT; "a form of *S. Jacobaea*, but there is no specimen in the Museum, which approaches this in woolliness," A. J. WILMOTT.
- 383/7×8. *SENECIO* ×*LONDINENSIS* Lousley. 17, Surrey; railway embankment, Witley, G. M. ASH, det. J. E. LOUSLEY.

383/7×10. *SENECIO SQUALIDUS* L. × *S. VULGARIS* L. 17, Surrey; near Lower Birtley Farm, Witley, G. M. ASH: 33, E. Glos.; a single plant with parents, Tewkesbury, C. W. BANNISTER: both det. and comm. J. E. LOUSLEY. 37, Worcs.; rubbish tip, Priory road, Yardley Wood, Birmingham (one plant), V. JACOBS, det. A. J. WILMOTT.

§395/1. *CARDUS NUTANS* L. †*108, W. Suth.; one plant in a waste field opposite the Youth Hostel at Achmelvich, M. MCCALLUM WEBSTER.

396/4. *CIRSIUM ACAULON* (L.) Weber. 57, Derby; (L) Wolfscote Hill; Ladmanlow near Buxton; K. HOLLIČEK.

§397/1. *ONOPORDON ACANTHIUM* L. 32, Northants.; Staverton, nine feet high, 1948, Miss N. JACKSON, comm. A. J. WILMOTT. †*42, Brecon; by the wells at Builth, adventive, 1944, J. OUNSTED.

401. *SAUSSUREA ALPINA* (L.) DC. 70, Cumb.; Pillar, c. 2000 ft., Ennerdale, R. A. BOYD, comm. CARLISLE MUSEUM. 97, [Argyll]; north rocks of Ben Hiant, Ardnamurchan, 1948, J. E. RAVEN.

405/12. *CENTAUREA CYANUS* L. 22, Berks.; cornfield near Abingdon, abundant, 1948, J. OUNSTED: persistent in sandy cornfields at Beenham, N. Y. SANDWITH. 23, Oxon.; cornfield, Stadhampton, E. F. WARBURG.

†405/31. *CENTAUREA SOLSTITIALIS* L. 69b, N. Lancs.; garden weed, Coniston, Miss MACARTHUR, comm. BARROW FIELD NATURALISTS.

†408/1. *SCOLYMUS HISPANICUS* L. 30, Beds.; waste ground, Vauxhall Works, Luton, 1948, A. J. NEWSON, comm. J. G. DONY.

§415/2. *PICRIS HIERACIODES* L. *59, S. Lancs.; dry sunny canal-bank on trias (bunter sandstone), Reddish, T. R. LAYCOCK.

†419/6. *HIERACIUM PRAEALTUM* Vill. *3, S. Devon; railway bank, branch line to Princetown, 1943-1949, C. WEST.

§419/8. *HIERACIUM BRUNNEOCROCEUM* Pugsley. 49, Caern.; Glyders, on grass slope, 3100', 1948, Col. R. MEINERTZHAGEN, comm. A. J. WILMOTT. *107, E. Suth.; Badnellan, Brora, hillside amongst bracken, W. A. TOD, det. A. J. WILMOTT.

§419/9. *HIERACIUM AURANTIACUM* L. sec. Pugsley. *95, Moray; coniferous wood near Grantown, J. W. CARDEW and C. WEST, confirmed by J. E. LOUSLEY.

†435/13. *CAMPANULA ALLIARIIFOLIA* Willd. 3, S. Devon; railway bank, Princetown branch line, C. WEST, det. H. GILBERT-CARTER.

445/1. *CALLUNA VULGARIS* L. 62, N.E. York.; Silpho Moor, Harkness, near Scarborough, a large white-flowered plant some $2 \times 1\frac{1}{2}$ ft., with a spray of purple flowers on it (cf. 1949, Abstracts from Literature, *Watsonia*, 1, 173), c. 1907, H. J. BURKILL.

463/5. *LYSIMACHIA NEMORUM* L. 104, N. Ebudes; Kildonan, Isle of Eigg, C. W. MUIRHEAD, comm. CARLISLE MUSEUM.

§466/1. *GLAUX MARITIMA* L. †37, Worcs.; by canal near Stoke Salt Works, 1942, J. OUNSTED; add to *C.F.*, but see Amphlett and Rea, *F'l. Worcs.*, 240-41, for earlier records, E.C.W.

467/1. *ANAGALLIS TENELLA* Murr. 35, Mon.; boggy places on mountainside, Sugar Loaf Mountain, near Abergavenny, 1947, R. LEWIS.

468/1. *CENTUNCULUS MINIMUS* L. 70, Cumb.; Thurstonfield Lough, C. W. MUIRHEAD, comm. CARLISLE MUSEUM. 97, [Argyll]; promontory in Sanna Bay, Ardnamurchan, 1948, M. S. CAMPBELL, A. R. CLAPHAM and J. E. RAVEN.

§486/1. **POLEMONIUM CAERULEUM* L. ††96, Easternness; by Loch Affric near Affric Lodge, 1947 (see *Year Book*, 1949, 38).

†490/2. *OMPHALODES VERNA* Moench. 30, Beds.; naturalised in spinney near Rectory garden, Houghton Conquest, J. G. DONY. 37, Worcs.; roadside outside a cottage, Callow End, Powick, F. M. DAY.

§497/1b. *SYMPHYTUM OFFICINALE* L. var. *PATENS* Sibth. †*107, E. Suth.; Achrimsdale, Brofa, W. A. TOD, det. A. J. WILMOTT.

497/2. *SYMPHYTUM TUBEROSUM* L. †12, N. Hants.; Alice Holt Forest near Bentley, W. H. SPREADBURY, det. J. E. LOUSLEY. †13, W. Sussex; Clapham Wood, Worthing, 1946, A. W. WESTRUP.

†497/3. *SYMPHYTUM ORIENTALE* L. 17, Surrey; (IIIa) roadside and copse, Charterhouse Hill, 1948, O. POLUNIN, det. N. Y. SANDWITH.

†497/9. *SYMPHYTUM GRANDIFLORUM* DC. 17, Surrey; (IIIa) well established colony 2-3 sq. yds. in area, thicket, Hurtmore Bottom, Hindhead, 1948, O. POLUNIN.

505/1. *MERTENSIA MARITIMA* (L.) S. F. Gray. 108, W. Suth.; among Torridon sandstone stones above the three split rocks at Clach-toll, plentiful, but only in one locality, M. McCALLUM WEBSTER, det. A. J. WILMOTT. 111, Orkney; east shore of South Ronaldshay, C. TURNER.

§511/1. *CALYSTEZIA SEPIUM* (L.) R.Br. ††96, Easternness; rubbish dump, by the Beaully River, Beaully, 1947, A. J. Wilmott (see *Year Book*, 1949, 38).

†511/2. *CALYSTEGIA SYLVESTRIS* (Willd.) R. & S. 70, Cumb.; Stanwix Bank, Carlisle, C. W. MUIRHEAD; Dalston, D. GRAHAM; Scotby, R. A. BOYD: 97, Westerness; garden fence on the railway line, Mallaig, J. ROBERTSON and C. W. MUIRHEAD: all comm. CARLISLE MUSEUM.

†517/17. *SOLANUM SARRACHOIDES* Sendtn. 28, W. Norf.; both entire- and toothed-leaved forms, in carrot-field at Appleton, E. I. SWANN, det. N. Y. SANDWITH.

527/4. *VERBASCUM VIRGATUM* Stokes. †34, W. Glos.; (2b) Sharpness Docks, 1947, R. B. ABELL, comm. W. R. PRICE.

§532/1. *LINARIA VULGARIS* Mill. †96, Easterness; E. of L. Meikle, Glen Urquhart. M. S. CAMPBELL and E. F. WARBURG, 1947 (see *Year Book*, 1949, 38).

539/1. *LIMOSELLA AQUATICA* L. 37, Worcs.; pond on Castlemorton Common, F. M. DAY. 70, Cumb.; village pond, Salt Cotes, near Newton Arlosh, C. W. MUIRHEAD, comm. CARLISLE MUSEUM.

543/6. *VERONICA SCUTELLATA* L. 108, W. Suth.; in a bog by Loch Culag, Lochinver, M. McCALLUM WEBSTER.

†543/41. *VERONICA FILIFORMIS* Sm. 10, Wight; footpath near Bembridge, J. OUNSTED. 23, Oxon.; persistent garden weed, St Margaret's Road, Oxford, 1948, A. P. CONOLLY, comm. T. G. TUTIN. 29, Cambs.; persistent garden weed, Storey's Way, Cambridge, 1948, T. G. TUTIN. 67, S. Northumb.; banks of the Pont near Ponteland, J. W. HESLOP-HARRISON. H.21, Dublin; near the club-house, golf links, Howth, S. M. SOCKETT FOSTER, det. and comm. E. F. WARBURG.

†543/38. *VERONICA SPECIOSA* R. Cunn. 71, Isle of Man; by footpath, near top of grassy sea cliff on Cambrian, Port Erin, T. R. LAYCOCK.

545. *EUPHRASIA* L. All specimens determined by E. F. WARBURG.

§545/3. *EUPHRASIA BREVIPILO* Burnat & Greml. *102, S. Ebudes; Jura: pasture behind foreshore, Corran House; dry cliff top opposite Brosdale Island; damp meadows, north of Craighouse; etc., J. K. MORTON.

545/5c. *EUPHRASIA NEMOROSA* (Pers.) H. Mart. emend. Löhr var. *CALCAREA* Pugsl. 33, E. Glos.; common in a grassy bottom east of the Fosse Way, Beech Pike, 1947, C. C. TOWNSEND.

§545/5d. *EUPHRASIA NEMOROSA* (Pers.) H. Mart. emend. Löhr var. *COLLINA* Pugsl. 69b, N. Lancs.; limestone outcrops, Grange-over-Sands, 1948, J. K. MORTON. *H.34, E. Donegal; Carrowkeel, T. G. B. OSBORN, comm. E. F. WARBURG.

§545/5f. *EUPHRASIA NEMOROSA* (Pers.) H. Mart. emend. Löhr var. *TRANSIENS* Pugsl. *26, W. Suff.; Elveden, 1941, E. F. WARBURG.

§545/5(2). *EUPHRASIA HESLOP-HARRISONI* Pugsl. *105, W. Ross; grass at upper edge of salt marsh near mouth of R. Shiel, 1948, E. F. WARBURG.

§545/9. *EUPHRASIA CURTA* Wettst. *88, Mid Perth; near Allt Leathan, c. 1100 ft., Fortingall parish, 1947, M. S. CAMPBELL, E. F. WARBURG and A. J. WILMOTT; shingle by Allt Cailliche, Glen Lyon, c. 1500 ft., 1947, M. S. CAMPBELL and E. F. WARBURG. *96, Easternness; river shingle bank, near Loch Affric, 1947, M. S. CAMPBELL. *104, N. Ebudes; dry grassy slopes, The Quiraing, Skye; between road and Old Man of Storr, Skye, J. K. MORTON.

§545/10. *EUPHRASIA OCCIDENTALIS* Wettst. *68, Chev.; dunes, Ross Links, J. K. MORTON. *H.9, Clare; heavily grazed sward above flood level in turlough, near Corofin, T. G. B. OSBORN, comm. E. F. WARBURG. *H.27, W. Mayo; low turf with *Plantago*, east end of Keel Bay, Achill Island, T. G. B. OSBORN, comm. E. F. WARBURG.

§545/10d. *EUPHRASIA OCCIDENTALIS* Wettst. var. *CALVESCENS* Pugsl. *48, Mer.; sand dunes, Harlech, 1946, P. W. RICHARDS. *74, Wigt.; grassy ground near sea, Barsalloch, Luce Bay, 1939, E. F. WARBURG. *102, S. Ebudes; on turf on foreshore, south of pier, Craighouse, Jura, J. K. MORTON. *H.9, Clare; dunes, Ballyvaughan, T. G. B. OSBORN, comm. E. F. WARBURG.

§545/12. *EUPHRASIA FRIGIDA* Pugsl. *102, S. Ebudes; short turf on slopes of Paps over Loch Ant Siol, Beinn Shiantaidh, Jura, J. K. MORTON.

§545/15. *EUPHRASIA MICRANTHA* Rehb. *24, Bucks.; Naphill Common, 1945, E. F. WARBURG. *H.2, N. Kerry; Ross Island, Killarney, T. G. B. OSBORN, comm. E. F. WARBURG. *H.14, Leix; esker-bog junction, Clonaslee, T. G. B. OSBORN, comm. E. F. WARBURG.

§545/18f. *EUPHRASIA CONFUSA* Pugsl. var. *ALBIDA* (Pugsl.) Wilmott. *24, Bucks.; Turville Heath, 1945: *75, Ayr; moor near Loch Doon, 1939: *80, Roxb.; grass by roadside, South Dean, 1947: all E. F. WARBURG.

545/19. *EUPHRASIA ROSTKOVIANA* Hayne var. *OBSCURA* Pugsl. 35, Mon.; in meadow at Wyndcliff, near Chepstow, 1944, R. LEWIS.

§545/19(4). *EUPHRASIA ANGLICA* Pugsl. *69b, N. Lancs.; Water Yeat, Blawith, 1946, T. G. TUTIN. *H.34, E. Donegal; Carrowkeel, T. G. B. OSBORN, comm. E. F. WARBURG.

546/4. *PARENTUCHELLIA VISCOSA* (L.) Caruel. †28, W. Norf.; introduced as impurity in grass-mixture used for village cricket-pitch, East Winch, R. P. LIBBEY, comm. E. L. SWANN.

548/8(1). *RHINANTHUS LINTONI* Wilmott. 88, Mid Perth; Ben Lawers, in bogs in an apparently restricted area, c. 1200-1500 ft., growing with *Saxifraga aizoides*, *Tofieldia*, *Carex dioica* and *C. capillaris*, July 1936 and July 1948; a very distinct-looking plant, locally plentiful and uniform; previously recorded from the N. side of Creag Mhor, Lawers (1913, C. E. Salmon); N. Y. SANDWITH—the later gathering confirmed by A. J. WILMOTT.

550/3. *OROBANCHE ALBA* Steph. 97, Westernness; Sanna Bay, Ardnamurchan, 1948, M. S. CAMPBELL, A. R. CLAPHAM and J. E. RAVEN.

558. *MENTHA*. All specimens determined or confirmed by R. A. GRAHAM unless otherwise stated.

558/1×4. *MENTHA* × *CORDIFOLIA* Opiz. 9, Dorset; waste ground, near Landsfoot, Weymouth, D. O. JONES, comm. C. C. TOWNSEND.

‡558/2. *MENTHA ALOPECUROIDES* Hull. *107, E. Suth.; Badnellan, Brora, W. A. TOD, det. A. J. WILMOTT.

558/3. *MENTHA LONGIFOLIA* (L.) Huds. 28, W. Norf.; dykeside in shade, Westacre, E. L. SWANN.

558/3i. *MENTHA LONGIFOLIA* (L.) Huds. var. *HORRIDULA* Briq. 28, W. Norf.; in the roadside "rough" near Leziat Golf Course, E. L. SWANN.

‡558/4. *MENTHA SPICATA* L. em. Huds. *107, E. Suth.; Badnellan, Brora, W. A. TOD, det. A. J. WILMOTT.

558/6a. *MENTHA PIPERITA* L. var. *PIPERITA* f. *HIRSUTA* (Fraser) R. A. Graham. 28, W. Norf.; dykeside at Dersingham Marsh, 1948, R. P. LIBBEY, det. E. L. SWANN.

558/6e. *MENTHA CITRATA* Ehrh. 1, W. Cornw.; damp heathland near Newlyn, 1948, E. A. LEES and C. WEST.

558/7j. *MENTHA AQUATICA* L. var. *DENTICULATA* H. Braun. 28, W. Norfolk; by damp woodland path in shade, Reffley Wood, 1948, E. L. SWANN.

558/10. *MENTHA* × *GENTILIS* L. 28, W. Norf.; on rubbish dump in a chalk pit at Appleton, 1949, E. L. SWANN. 70, Cumb.; R. Eden, Cargo Hill, near Carlisle; R. Eden, Corby; Skirwith Beck, Skirwith; C. W. MUIRHEAD, comm. CARLISLE MUSEUM.

558/13j. *MENTHA ARVENSIS* L. var. *DENSIFOLIOLATA* Briq. 28, W. Norf.; by side of track through wood, Bawsey, 1944, E. L. SWANN.

558/13×1. *MENTHA* × *MUELLERIANA* F. Schultz. 3, S. Devon, Kingskerswell, 1940, Dr. T. STEPHENSON; a specimen in my herbarium of a mint gathered by Dr. T. Stephenson in August 1940 at Kingskerswell, and named by Mr A. L. Still *M. arvensis* L. var. *agrestis* (Sole) Sm., has been examined by Mr R. A. Graham and identified as above; unfortunately I do not know the exact spot where it was gathered, but it has no connection with the plant recorded from Salcombe (Martin and Fraser, *Flora of Devon*, p. 519), F. M. DAY.

†586/4. *TEUCRIUM CHAMAEDRYIS* L. 14, E. Sussex; a small form looking quite wild, downs east of Cuckmere Haven, 1945, A. W. GRAVESON; also 1949, J. OUNSTED.

†596/4. *AMARANTHUS CHLOROSTACHYS* Willd. 28, W. Norf.; in carrot-field at Appleton, E. L. SWANN.

†596/4b. *AMARANTHUS CHLOROSTACHYS* (Willd.) Thell. var. *PSEUDORETROFLEXUS* Thell. 18, S. Essex; market gardens, Clements Hall, Hawkwell, S. T. JERMYN, det. N. Y. SANDWITH and J. P. M. BRENNAN.

596/4c. *AMARANTHUS CHLOROSTACHYS* WILLD. var. *ARISTULATUS* Thell. 29, Cambs.; carrot-field, La Hogue, Chippenham, J. E. LOUSLEY, R. A. GRAHAM and D. McCLINTOCK, det. A. W. KLOOS (as *A. retroflexus* L. subsp. *pseudoretroflexus* Thell. f. *aristulatus* Thell.).

†596/5. *AMARANTHUS QUITENSIS* H.B.K. 29, Cambs.; carrot-field, La Hogue, Chippenham, J. E. LOUSLEY, R. GRAHAM and D. McCLINTOCK, det. J. P. M. BRENNAN, confirmed by A. W. KLOOS.

†596/6. *AMARANTHUS RETROFLEXUS* L. 28, W. Norf.; in carrot-field at Appleton, E. L. SWANN, det. J. P. M. BRENNAN.

†596/6b. *AMARANTHUS RETROFLEXUS* L. var. *DELLEI* (Richt. & Loret) Thell. 18, S. Essex; Dagenham Dock, 1948, J. E. LOUSLEY: Rochford, S. T. JERMYN, det. N. Y. SANDWITH and J. P. M. BRENNAN: 21, Middlx.; Harefield, 1945: Northolt rubbish-dump, 1947; J. E. LOUSLEY: 26, W. Suff.; carrot-field east of Brandon, J. E. LOUSLEY, R. A. GRAHAM and D. McCLINTOCK: all det. J. P. M. BRENNAN.

†596/9. *AMARANTHUS ALBUS* L. 28, W. Norf.; in carrot-field at Appleton, E. L. SWANN.

†596/9(2). *AMARANTHUS BLITOIDES* S. Watson. 25, E. Suff.; carrot-field, Capel St. Andrew, J. E. LOUSLEY, R. GRAHAM and D. McCLINTOCK, det. J. P. M. BRENNAN, confirmed by A. W. KLOOS. 28, W. Norf.; carrot-field at Appleton, E. L. SWANN, det. N. Y. SANDWITH. 29, Cambs.; carrot-field, La Hogue, Chippenham, J. E. LOUSLEY, R. GRAHAM and D. McCLINTOCK, det. J. P. M. BRENNAN, confirmed by A. W. KLOOS.

- 600/1. *CHENOPODIUM RUBRUM* L. 70, Cumb.; margin of pond, Salt Cotes village, near Newton Arlosh, C. W. MUIRHEAD, comm. CARLISLE MUSEUM.
- 600/4. *CHENOPODIUM HYBRIDUM* L. 30, Beds.; very weedy allotment land, Woburn, 1943, B. VERDCOURT.
- 600/6. *CHENOPODIUM MURALE* L. 28, W. Norf.; in carrot-field at Sculthorpe; R. P. LIBBEY.
- §600/13. *CHENOPODIUM GLAUCUM* L. 57, Derby; (T.1) manure heap, Hulland, K. HOLLICK. *85, Fife; Tents Muir, R. A. BONIFACE and F. ROSE.
- 600/14. *CHENOPODIUM VULVARIA* L. 5, S. Somerset; in plenty. sandy hollows by trackway, Dunster Beach—"almost lost as a Somerset plant", W. D. MILLER (1933, *B.E.C. 1932 Rep.*, 274)—F. ROSE. 9, Dorset; near the railway, Weymouth, 1947, J. OUNSTED, confirmed by J. P. M. BRENNAN.
- †613/3. *SALSOLA PESTIFERA* Nelson. 28, W. Norf.; carrot-field at Gt. Bircham, E. L. SWANN. 29, Cambs.; carrot-field near La Hogue, Chippenham, J. E. LOUSLEY, R. GRAHAM and D. McCLINTOCK.
- 615/1. *POLYGONUM DUMETORUM* L. 15, E. Kent; Cuckoo Wood, Sandling, near Maidstone, 1948, H. W. B. BARLOW and C. WEST.
- 615/4. *POLYGONUM VIVIPARUM* L. 97, [Argyll]; coastal rocks and sand, Sanna Bay, Ardnamurchan, 1948, M. S. CAMPBELL, A. R. CLAPHAM and J. E. RAVEN.
- §615/10. *POLYGONUM MITE* Schrank. †66, Durham; marshy ground west of Birtley, J. W. Heslop Harrison (1949, *Vasc. Subst.*, 34, 31).
- 615/11. *POLYGONUM MINUS* Huds. 70, Cumb.; margin of Loweswater, C. W. MUIRHEAD, comm. CARLISLE MUSEUM.
- †615/19. *POLYGONUM PATULUM* M. Bieb. 28, W. Norf.; carrot-field at Little Massingham, R. P. LIBBEY, comm. E. L. SWANN, det. N. Y. SANDWITH.
- 618/3×7. *RUMEX CRISPUS* L. × *SANGUINEUS* L. 30, Beds.; gravel-pit, Eaton Socon, J. E. LOUSLEY, comm. J. G. DONY.
- 618/16(2). *RUMEX TENUIFOLIUS* (Wallr.) Löve. 17, Surrey; sandy common, Whitmoor, Worplesdon, E. C. WALLACE.
- †618/20 2). *RUMEX CRISTATUS* DC. 18, S. Essex; Hadleigh, D. H. KENT, det. J. E. LOUSLEY; hybrids with *R. crispus* and *R. obtusifolius* also occurred.

†628/3. *EUPHORBIA CORALLIODES* L. 23, Oxon.; (5) lane between Canal and Port Meadow, Oxford, Mrs H. N. CLOKIE, comm. E. F. WARBURG.

§628/5. *EUPHORBIA PLATYPHYLLOS* L. Delete record for 6, N. Som., in *Watsonia*, 1, 258, which was *E. stricta*, see *Watsonia*, 1, 53; Barhampton should read Bathampton.—E.C.W.

†639/1. *HELXINE SOLEIROLII* Req. 1, W. Cornw.; wall of Helston Church facing road; very luxuriant specimens, 1948, C. WEST.

642/3. *BETULA NANA* L. 88, Mid Perth.; heathy bog at the back of Ben a' Chuallaich, Loch Rannoch, M. McCALLUM WEBSTER, det. A. J. WILMOTT.

650/8×12. *SALIX* × *LATIFOLIA* Forbes. 104, N. Ebudes; by the burn above the Manse, Isle of Eigg, C. W. MUIRHEAD, comm. CARLISLE MUSEUM, det. R. MELVILLE.

650/11(2)×11. *SALIX ARENARIA* L. × *REPENS* L. 104, N. Ebudes; by the Pier, Isle of Eigg, C. W. MUIRHEAD, comm. CARLISLE MUSEUM, det. R. MELVILLE.

§†651/8. *POPULUS ALBA* L. †96, Easternness; Drumnadrochit, J. Gibbons, 1947 (see *Year Book*, 1949, 38).

§652/2. *EMPETRUM HERMAPHRODITUM* (Lange) Hagerup. †106, E. Ross; by Allt Taige, Glen Cannich, S. M. Walters and E. F. Warburg, 1947 (see *Year Book*, 1949, 40).

§655/1. *STRATIOTES ALOIDES* L. ††7, N. Wilts.; pond near Gastard, 1948, A. G. Spencer (1949, *Wilts. Arch. & N.H. Mag.*, 53, 92).

†656/1. *ELODEA CANADENSIS* Michx. 89, E. Perth.; in Loch Loch, at about 1450 ft., J. E. LOUSLEY, R. GRAHAM and D. McCLINTOCK.

†657/1. *VALLISNERIA SPIRALIS* L. 59, S. Lancs.; canal, Droylesden, near Manchester, T. R. LAYCOCK and B. HOPKINS.

659/1. *HAMMARBYA PALUDOSA* (L.) O. Kuntze. 9, Dorset; near Wareham, about 30 plants, 1947, J. OUNSTED. 96, Easternness; at 1500 ft. in Glen Einich, 1948, J. & I. OUNSTED.

668/3(4). *EPIPACTIS PENDULA* C. Thoms. 51, Flint; near Llyn Helig, 1906, J. A. WHELDON, det. and comm. D. P. YOUNG.

668/5. *EPIPACTIS ATROPURPUREA* Raf. 108, W. Suth.; rocks opposite Ardreck Castle (one plant), 1949; on the cliffs at Keoldale near Durness, 1948; M. McCALLUM WEBSTER, det. A. J. WILMOTT.

669/2. *ORCHIS MILITARIS* L. 24, Bucks.; "a fine colony" in the southern part of the county is reported by J. E. Lousley (*The Naturalist*, 1947, 157); a further account of this important discovery is promised. (See-Plate 1.)

669/9. *ORCHIS PURPURELLA* T. & T. A. Steph. 97, [Argyll]; around Kilchoan Bay, Ardnamurchan, 1948, M. S. CAMPBELL, A. R. CLAPHAM and J. E. RAVEN. 107, E. Suth.; North Brora Muir, W. A. TOD.

§669/11. *ORCHIS FUCHSII* Druce. *97, [Argyll]; fields at Kilchoan Bay, Ardnamurchan, 1948, A. R. CLAPHAM and M. S. CAMPBELL.

§672/5. *OPHRYS MUSCIFERA* Huds. †H.14, Leix; Clonaslee, G. F. Mitchell and D. A. Webb (1950, *Irish Nat. Journ.*, 10, 107).

674(1)1×669/10. *GYMNADENIA CONOPSEA* (L.) R.Br. × *ORCHIS ERICETORUM* (Linton) E. S. Marshall. 89, E. Perth.; by Shee Water, 1½ miles below Spital of Glen Shee, J. E. LOUSLEY, R. GRAHAM and D. McCLEINTOCK.

674/4. *COELOGLOSSUM VIRIDE* (L.) Hartm. 11, S. Hants.; Old Winchester Hill, C. W. MUSGRAVE BURTON. 15, E. Kent; Mrs Verschoyle's record of this species (reported by me in *Watsonia*, 1, 54) has proved to be erroneous, the plant being *Aceras*; *Coeloglossum* was, however, found in quantity near Dover by J. LLOYD in 1943, and seen again in 1948—F. ROSE.

680/1. *SISYRINCHUM ANGUSTIFOLIUM* Mill. sec. Fernald. †30, Beds.; gravel pit, Eaton Socon, W. DURANT and J. G. DONY.

†683/1. *CROCOSMIA CROCOSMIIFLORA* (Lem.) N.E.Br. 107, E. Suth.; well established on riverbank at Brochrobie, Brora, 1949, W. A. TOD.

†690/2. *ASPARAGUS OFFICINALIS* L. 61, S.E. York; just above high water mark on foreshore of River Humber at Ferriby, 1948, R. LEWIS.

†702/19. *ALLIUM PARADOXUM* G. Don. 70, Cumb.; in the orchard at Blaitwaite House, Wigton, J. PARKIN, comm. CARLISLE MUSEUM.

†704/1. *HYACINTHUS COMOSUS* L. 69b, N. Lancs.; sand dunes at Roanhead, near Barrow-in-Furness, 1948, G. WILSON, comm. BARROW FIELD NATURALISTS.

§707/2. *ORNITHOGALUM UMBELLATUM* L. †*107, E. Suth.; well established on riverbank at Brochrobie, Brora, W. A. TOD.

715/1. *TOFIELDIA PUSILLA* (Michx.) Pers. 98, Argyll; several places on calcareous grassy areas about Ballachulish, W. H. PEARSALL, W. A. SLEDGE and R. MACKECHNIE.

PLATE 1.



O. militaris L. Buckinghamshire, v.c. 24, June 1st, 1947.

Photo. by J. E. Lousley.

718/9×10. *JUNCUS ACUTIFLORUS* Ehrh. × *ARTICULATUS* L. 70, Cumb.; below Hudson Place, Loweswater. C. W. MUIRHEAD, comm. CARLISLE MUSEUM, det. P. W. RICHARDS.

718/11. *JUNCUS ALPINUS* Vill. 89, E. Perth.; shingle by Shee Water, 1½ miles below Spital of Glen Shee, J. E. LOUSLEY, R. GRAHAM and D. McCLINTOCK.

§718/14. *JUNCUS COMPRESSUS* Jacq. *98, Argyll; grassy roadside, Lismore, W. A. SLEDGE and E. C. WALLACE.

718/16. *JUNCUS TENUIS* Willd. †S., Guernsey; disused quarry near L'Anresse Common, a large patch with abundant remains of last year's fruits, T. G. TUTIN.

718/22. *JUNCUS BIGLUMIS* L. 98, Argyll; Bidean nam Bian, Glencoe, E. C. WALLACE.

719/8. *LUZULA SPICATA* (L.) DC. 105, W. Ross; near top of Sgurr nan Saighead. Five Sisters, 1948, E. F. WARBURG: Meall a Chrasgaidh, Fannich; Ben Alligin, Torridon, 1948; E. C. WALLACE.

722/3. *SPARGANIUM SIMPLEX* Huds. 37, Wores.; ditch on north of main road to Tewkesbury, Bushley, F. M. DAY.

722/5. *SPARGANIUM MINIMUM* Fr. 70, Cumb.; small pond on the outskirts of a wood north of Dalston, D. GRAHAM, comm. CARLISLE MUSEUM. 108, W. Suth.; in a bog by Loch Eilianach between Drumbeg and Clashnessie, M. McCALLUM WEBSTER.

§728/1. *WOLFFIA ARRHIZA* (L.) Wimm. †8, S. Wilts.; Wincombe Park, 1946, J. D. GROSE, (1949, *Wilts. Arch. & N.H. Mag.*, 53, 93).

731/1. *LURONIUM NATANS* (L.) Raf. 59, S. Lancs.; still water of canal on coal measures, by Medlock Vale, T. R. LAYCOCK.

737/2. *POTAMOGETON POLYGONIFOLIUS* POUIT. 98, Argyll; several places on limestone island of Lismore, E. C. WALLACE.

737/4. *POTAMOGETON COLORATUS* Hornem. 98, Argyll; in all three lochs on Lismore, W. A. SLEDGE and E. C. WALLACE.

737/17×22. *POTAMOGETON* × *LINTONI* Fryer. 39, Staffs.; in marl pit and on nearby soggy ground, Marychurch, West Bromwich, 1948, V. JACOBS, det. J. E. DANDY.

737/22. *POTAMOGETON FRIESII* Rupr. 21, Middx.; Hampstead Ponds, 1949, H. C. HARRIS and D. H. KENT, det. J. E. DANDY and G. TAYLOR.

737/23. *POTAMOGETON BERCHTOLDII* Fieb. 98, Argyll; deep, highly calcareous water, Loch Fiart, Lismore, W. A. SLEDGE and E. C. WALLACE.

737/25. *POTAMOGETON PUSILLUS* L. 61, S.E. York; in ponds, disused gravel pits, Kelsey Hill, near Burstwick. 1947, R. LEWIS, det. J. E. DANDY and G. TAYLOR.

§739/3. *ZANNICHELLIA GIBBEROSA* Reichb. ‡66, Durham; clay pit near Birtley, J. W. Heslop Harrison (1949, *Vasc. Subst.*, 34, 31).

745/1B. *ELEOCHARIS PALUSTRIS* (L.) R. Br. em. R. & S. subsp. *MICROCARPA* S. M. Walters. 30, Beds.; water meadow, Eaton Socon, S. M. WALTERS.

§745/2. *ELEOCHARIS UNIGLUMIS* (Link) Schult. *30, Beds.; water meadow. Eaton Socon, S. M. WALTERS. ‡48, Mer.; Penmaenpool, 1948, det. S. M. Walters (see *Year Book*, 1950, 50).

746/3. *SCIRPUS LACUSTRIS* L. 105, W. Ross; lochan near Loch Osgaig, Achiltibuie; 108, W. Suth.; Loch an Ordain near Lochinver. M. McCALLUM WEBSTER.

§746/4. *SCIRPUS TABERNAEMONTANI* Gmel. *30, Beds.; gravel pit, Eaton Socon, J. G. DONY.

746/13. *SCIRPUS FLUITANS* L. 105, W. Ross; small pool by the road between Achiltibuie and Stac Polly, M. McCALLUM WEBSTER.

747/1. *ERIOPHORUM LATIFOLIUM* Hoppe. 98, Argyll; several places on moorland in Appin, as in Glen Stockdale, E. C. WALLACE.

748/1. *RHYNCHOSPORA FUSCA* (L.) Ait. f. 97, Westernness; Ach-
aracle, 1948, M. S. CAMPBELL, A. R. CLAPHAM and J. E. RAVEN.

753/4. *CAREX VESICARIA* L. 107, E. Suth.; Badnellan, Brora, W. A. Tod, det. A. J. WILMOTT.

753/6. *CAREX SAXATILIS* L. 98, Argyll; Sgar na L-Ulaidh, south of Glencoe, W. A. SLEDGE. 105, W. Ross; above Loch a' Choir Uaine, The Saddle, Glenshiel, 1948, E. F. WARBURG.

753/7×4. *CAREX ROSTRATA* Stokes × *VESICARIA* L. 107, E. Suth.; Loch na Lean, Doll, Brora, W. A. Tod, det. A. J. WILMOTT.

753/14. *CAREX CAPILLARIS* L. 98, Argyll; several places on limestone near Ballachulish, R. MACKECHNIE and E. C. WALLACE.

753/17. *CAREX DISTANS* L. 97, [Argyll]; coastal rocks, Sanna Bay, 1948, M. S. CAMPBELL, A. R. CLAPHAM and J. E. RAVEN.

§753/18. *CAREX PUNCTATA* Gaud. *H.35, W. Donegal; Dunfanaghy Estuary, E. A. G. DUFFEY, comm. T. G. TUTIN.

753/19×20(2). *CAREX HOSTIANA* DC. × *TUMIDICARPA* Anderss. 28, W. Norf.; damp peat overlying glacial gravel, East Winch Common, Mrs B. WELCH, comm. and det. R. P. LIBBEY and E. L. SWANN, confirmed by E. NELMES.

753/22. *CAREX SEROTINA* Mérat. 29, Cambs.; by pond in Fulbourn village, T. G. TUTIN. 70, Cumb.; shingly margin of Thurstonfield Lough, near Carlisle, C. W. MUIRHEAD, comm. CARLISLE MUSEUM, det. E. NELMES. S., Guernsey; L'Anresse Common, T. G. TUTIN.

753/23. *CAREX EXTENSA* Good. 34, W. Glos.; salt marshes by River Wye, Beachley, C. C. TOWNSEND.

753/27. *CAREX HUMILIS* Leysser. 34, W. Glos.; (4) Symond's Yat, promontory near the Bowlers Hole, E. W. JONES.

§753/28. *CAREX CARYOPHYLLEA* Latour. *97, [Argyll]; around Kilchoan Bay, 1948, M. S. CAMPBELL, A. R. CLAPHAM and J. E. RAVEN.

§753/29. *CAREX ERICETORUM* Poll. *66, Durham; Widdybank Fell, on sugar limestone with *Viola rupestris*, *Carex capillaris*, *Kobresia simpliciuscula* and *Sesleria caerulea*, T. G. TUTIN.

§753/37. *CAREX PAUPERCULA* Michx. ‡96, Easternness; S. of L. Affric, 1947; ‡106. E. Ross; S. side of Loch Mullardoch, 1947, M. McCallum Webster; (see *Year Book*, 1949, 39).

753/45. *CAREX ELATA* All. 23, Oxon.; (5) Steeple Barton, E. W. JONES.

753/51. *CAREX BIGELOWII* Torr. 97, [Argyll]; north rocks of Ben Hiant, Ardnamurchan, 1948, J. E. RAVEN.

§753/52. *CAREX ELONGATA* L. *24, Bucks.; ditch in small wood north of road from Slough to Uxbridge, 1940, Mrs I. W. DAVIES, det. E. NELMES.

753/57. *CAREX REMOTA* L. 105, W. Ross; in a damp birch wood near the road at Loch an Eisg-Brachaidh by Inverkirkaig, M. McCallum Webster, det. A. J. WILMOTT.

§753/61. *CAREX PAIRAEI* F. Schultz. *57, Derby; (T.1) Clifton; also Holland; K. HOLLICK, det. E. NELMES.

753/65b. *CAREX DIANDRA* Schrank var. MAJOR (Koch) Asch. & Graebn. 38, Warw.; in marshy area of old canal near Cosford, 1948, P. FALK and D. E. ALLEN.

§753/66. *CAREX DISTICHA* Huds. †110, Outer Hebrides; dune flats near Barvas, Lewis, J. W. Heslop Harrison (1949, *Vasc. Subst.*, 34, 31).

753/75. *CAREX DIOICA* Linn. 33, E. Glos.; still at the bog at Seven Springs, Naunton, in small quantity, C. C. TOWNSEND.

†754/8. *ECHINOCHLOA CRUS-GALLI* (L.) Beauv. 28, W. Norf.; carrot field at Gt. Bircham, R. P. LIBBEY and E. L. SWANN; a stiff and erect form which, C. E. Hubbard writes, "appears to be the plant known to some North American botanists as *E. pungens* (Poir.) Rydb."

†754/8b. *ECHINOCHLOA CRUS-GALLI* (L.) Beauv. var. *ARISTATA* Rchb. 28, W. Norf.; in carrot field at Gt. Bircham, R. P. LIBBEY and E. L. SWANN.

†754/9(2). *ECHINOCHLOA CRUS-PAVONIS* (H.B.K.) Schult. 28, W. Norf.; in carrot field at Gt. Bircham, R. P. LIBBEY and E. L. SWANN.

†756/2. *SETARIA VIRIDIS* (L.) Beauv. 28, W. Norf.; in carrot field at Bawsey, R. P. LIBBEY and E. L. SWANN.

†756/3. *SETARIA GLAUCA* (L.) Beauv. 28, W. Norf.; carrot field at Bawsey, R. P. LIBBEY and E. L. SWANN.

†756/4. *SETARIA VERTICILLATA* (L.) Beauv. 30, Beds.; railway siding, Flitwick, J. G. DONY, det. C. E. HUBBARD.

†760/1. *TRAGUS RACEMOSUS* (L.) All. 30, Beds.; railway siding, Flitwick, J. G. DONY, det. C. E. HUBBARD.

†762/1. *ELEUSINE INDICA* (L.) Gaertn. 30, Beds.; railway siding, Flitwick, J. G. DONY, det. C. E. HUBBARD.

782/1. *POLYPOGON MONSPELIENSIS* (L.) Desf. 27, E. Norf.; dunes north of Winterton, J. OUNSTED.

†794/1c. *AVENA FATUA* Linn. var. *GLABRATA* Peterm. 33, E. Glos.; waste ground by the Gloucester Ring Road, 1948, in a flax field. Harp Mill, Cheltenham, 1948, C. C. TOWNSEND, det. C. E. HUBBARD.

†794/1d. *AVENA FATUA* Linn. var. *PILOSISSIMA* S. F. Gray. 33, E. Glos.; Tewkesbury Flour Mills, abundant, C. C. TOWNSEND, det. C. E. HUBBARD.

†794/5(2). *AVENA LUDOVICIANA* Durieu. 37, Wores.; Defford Common, F. M. DAY, det. C. E. HUBBARD.

795/1b. *ARRHENATHERUM ELATIUS* (L.) Mert. & Koch var. *BIARIS-TATUM* (Peterm.) Druce. 33, E. Glos.; Mythe Tute, Tewkesbury, F. M. DAY, det. C. E. HUBBARD.

†796/1. *GAUDINIA FRAGILIS* (L.) Beauv. 4, N. Devon; a small patch on rough ground surrounding a small pond near the sea at Fremington, M. McCALLUM WEBSTER, det. C. E. HUBBARD.

†798/2. *CHLORIS VIRGATA* Swartz. 30, Beds.; railway siding, Flitwick, J. P. M. BRENNAN and J. G. DONY, det. C. E. HUBBARD.

†798/5. *CHLORIS TRUNCATA* R. Br. 30, Beds.; arable field, Beeston, Sandy, G. COPE; railway siding, Flitwick, J. P. M. BRENNAN and J. G. DONY, det. C. E. HUBBARD.

§809/4. *KOELERIA ALBESCENS* DC. *49, Caern.; limestone slope, Gloddaerth, 1947, J. E. LOUSLEY, J. E. WOODHEAD and C. WEST, det. P. JANSEN, who writes, "Very similar to the Dutch forms but densely caespitose. In my country *K. albescens* is loosely caespitose with pseudo-stolons and usually large whitish more or less loose lower sheaths."

§822/1. *BRIZA MEDIA* L. *108, W. Suth.; pasture by Ardvreck Castle, Inchnadamph, M. McCALLUM WEBSTER.

†822/3. *BRIZA MAXIMA* L. 22, Berks.; (5) roadside adjacent to Leighton Park School, Reading, J. OUNSTED.

§826/5. *FESTUCA ALTISSIMA* All. *98, Argyll; ravine of Glen Stockdale, Appin, W. A. SLEDGE and E. C. WALLACE.

§826/18. *VULPIA MYUROS* (L.) Gmel. †48, Mer.; Penmaenpool, 1948, (see *Year Book*, 1950, 50).

†827/1(2). *BROMUS GUSSONEI* Parl. 30, Beds.; rubbish dump, Sundon, J. P. M. BRENNAN and N. Y. SANDWICH.

†827/9. *BROMUS INERMIS* Leyss. 59, S. Lancs.; estuary bank near River Ribble, close to Bottom of Hulton, near Preston, first noticed 1940, still there 1949, H. E. BUNKER.

†827/13. *BROMUS UNIOLOIDES* H.B. & K. 30, Beds.; railway siding, Flitwick, 1948, J. G. DONY, det. C. E. HUBBARD.

§827/19(2). *BROMUS LEPIDUS* Holmb. 32, E. Glos.; Bourton Down, Bourton on the Hill, F. M. DAY, det. C. E. HUBBARD. †48, Mer.; Llanfacreth, 1949 (see *Year Book*, 1950, 50). †92, Easternness; meadow near mouth of R. Coiltie, Drumnadrochit, A. J. Wilmott (see *Year Book*, 1949, 39).

†827/27. *BROMUS SQUARROSUS* L. 34, W. Glos.; Avonmouth Docks, 1931, H. J. GIBBONS, confirmed by C. E. HUBBARD, comm. N. Y. SANDWICH—see 1948, Bristol Botany in 1948, *Proc. Brist. Nat. Soc.*, 27, 389, for remarks on previous erroneous record.

829/1f. *LOLIUM PERENNE* L. var. *CRISTATUM* Pers. 33, E. Glos.; (2a) in dry grass verges, Cheltenham, 1948, T. A. SPRAGUE, comm. W. R. PRICE, det. C. E. HUBBARD, who writes:—"It would be most useful if some cultural experiments with this grass could be conducted over a period of three or four years, to see whether climatic conditions (light, as well as temperature and rainfall) have anything to do with the congested inflorescences. It seems to me that the spike commences to develop in a normal fashion, then, due to some unexplained cause, growth takes place very slowly, with the result that the internodes between the spikelets are much abbreviated. I have found inflorescences, apparently normal, growing on the same plants as the abnormal ones; whether they were produced earlier or later, I cannot say. Of course, it may be due to nematode attack, but I have seen no evidence that this is so."

829/4×1. *LOLIUM MULTIFLORUM* Lam. × *PERENNE* L. 33, E. Glos.; waste ground, Tewkesbury Flour Mills, common, C. C. TOWNSEND, det. C. E. HUBBARD.

830/1×2. *AGROPYRON JUNCEUM* (L.) Beauv. × *PUNGENS* (Pers.) Roem. et Schult. 61, S.E. York; sand dunes, Spurn Head, 1947, R. LEWIS, det. C. E. HUBBARD.

§840/1. *TAXUS BACCATA* L. †*107, E. Suth.; hillside above Crackaig, Loth, 1948, W. A. TOD.

†842/1. *LARIX DECIDUA* Mill. 88, Mid Perth.; rocks at about 2750' above Lochan-nan-Cat, Ben Lawers, a single seedling, J. E. LOUSLEY.

§844/2×5. *EQUISETUM* × *LITORALE* Kühl. †48, Mer.; Mynydd Gwernraig, 1948, det. P. Taylor (see *Year Book*, 1950, 50).

851/2. *ASPLENIUM TRICHOMANES* L. 17, Surrey; (IIIa) four localities on bridges and old walls in Godalming district, 1948, O. POLUNIN.

851/3. *ASPLENIUM VIRIDE* Huds. 73, Kirke.; Millyea, above Loch Dungeon. H. MILNE-REDHEAD and E. C. WALLACE. 105, W. Ross; rocks near waterfall, wood above Ratagan, Glenshiel, 1948, E. F. WARBURG.

§851/9. *ASPLENIUM SEPTENTRIONALE* (L.) Hoffm. *97, [Argyll]; about a dozen plants on a single large boulder in a gully above Sanna Bay, Ardnamurchan, 1948, J. E. RAVEN.

853/2. *ATHYRIUM ALPESTRE* Rylands. 105, W. Ross; rocks above Loch a' Choir Uaine, The Saddle, Glenshiel, 1948, E. F. WARBURG.

§854/1. *POLYSTICHUM SETIFERUM* (Forsk.) Woyнар. *61, S.E. York; in small plantation c. 100 yards from the sea at Holmpton Hall, near Withernsea, 1947, R. LEWIS, confirmed by W. A. SLEDGE.

856/1(3). *DRYOPTERIS ABBREVIATA* (DC.) C.Chr. 104, Mid Ebudes; Coir a Mhadaidh, Cuillins, Skye, 1948, E. F. WARBURG.

§*856/10. *DRYOPTERIS LINNEANA* (L.) Druce. *†30, Beds.; brickwork, Leagrave; 1948, P. TAYLOR and J. G. DONY (as *Gymnocarpium Dryopteris* (L.) Newm.).

§856/11. *DRYOPTERIS ROBERTIANA* (Hoffm.) Christ. *†30, Beds.; brickwork, Leagrave, 1948, P. TAYLOR and J. G. DONY (as *Gymnocarpium Robertianum* (Hoffm.) Newm.).

857/1. *CYSTOPTERIS MONTANA* (Lam.) Desv. 88, Mid Perth.; three quite separate colonies, one nearly a mile distant from the other two, on Ben Lawers, 1947 and 1948, J. E. RAVEN. 98, Argyll; Glencoe Mts. in a few gullies, 1949, P. R. BELL and E. C. WALLACE.

*§957/4. *CYSTOPTERIS FRAGILIS* (L.) Bernh. *†30, Beds.; brickwork, Leagrave, 1948, P. TAYLOR and J. G. DONY.

864/1. *OSMUNDA REGALIS* L. 105, W. Ross; several places about Torridon and Wester Alligin, 1948, R. MACKECHNIE and E. C. WALLACE; by a burn running from Loch Osgaig into Garvie bay, by Achiltibuie, M. McCALLUM WEBSTER.

†868/1. *AZOLLA FILICULOIDES* Lam. 38, Warw.; abundant in canal N. of Majors Green, Solihull, V. JACOBS, det. A. J. WILMOTT.

870/6. *LYCOPODIUM INUNDATUM* L. - 22, Berks.; damp track in woodland near Penny Hill, Bracknell, E. C. WALLACE.

CHAROPHYTA. All gatherings determined or confirmed by G. O. ALLEN.

872/2. *NITELLA OPACA* Ag. 70, Cumb.; Ennerdale, C. W. MUIR-HEAD, comm. CARLISLE MUSEUM.

§872/6b. *NITELLA MUCRONATA* Miq. var. *GRACILLIMA* Gr. & B.-W. *38, Warw.; old arm of Oxford Canal, Newbold-on-Avon, near Rugby, J. L. LYON, comm. G. O. ALLEN.

§873/1. *TOLYPELLA INTRICATA* Leonh. *27, E. Norf.; ditch, Gillingham, G. H. ROCKE and C. WEST.

§876/3. *CHARA VULGARIS* L. *79, Selk.; near Ashkirk, L. C. LYON and J. L. LYON.

876/3b. *CHARA VULGARIS* L. var. *LONGIBRACTEATA* (Kuetz.) Kuetz. 61, S.E. York; in pond, Kellythorpe Marsh, near Driffeld, 1948, R. LEWIS. 64, M.W. York; in old river course near Coniston in Wharfedale; J. N. FRANKLAND.

876/3c. *CHARA VULGARIS* L. var. *PAPILLATA* Wallr. 29, Cambs.; pit near Bottisham, D. COOMBE and C. WEST: Adventurers Lode; pools by New Bedford River, between Mepal and Sutton Gault, L. C. LYON and G. O. ALLEN. 61, S.E. York; in pond, cliff top, south end of Withernsea, 1948, R. LEWIS, det. G. O. ALLEN, who comments, "It is an excep

tionally small plant for this variety which is generally large, but it agrees in other respects." 79, Selk.; near Ashkirk, L. C. LYON and J. L. LYON. "H.21, Dublin; pond in Botanic Garden, Glasnevin, 1871, "W.J.D.", det. G. O. ALLEN.

876/3d. *CHARA VULGARIS* L. var. *REFRACTA* (Kuetz.) Gr. & B.-W. 15, E. Kent; ditches between Stodmarsh and Grove Ferry, L. W. WILSON and G. O. ALLEN.

876/3e. *CHARA VULGARIS* L. var. *CRASSICAULIS* Kuetz. 79, Selk.; near Ashkirk, L. C. LYON and J. L. LYON.

§876/5. *CHARA HISPIDA* L. *79, Selk.; near Ashkirk, L. C. LYON and J. L. LYON.

§876/7. *CHARA CONTRARIA* Kuetz. *21, Middx.; Longwater, Hampton Court Park, D. H. KENT.

876/7b. *CHARA CONTRARIA* Kuetz. var. *HISPIDULA* Br. 29, Cambs.; near Bottisham, D. COOMBE and C. WEST. 102, S. Ebudes; shore pools, Uragai, Isle of Colonsay, C. W. MUIRHEAD, comm. CARLISLE MUSEUM.

876/12b. *CHARA ASPERA* Willd. var. *SUBINERMIS* Kuetz. 70, Cumb.; R. Irthing, near the Popping Stone, Gilsland, R. A. BOYD, comm. C. W. MUIRHEAD.

§876/16a. *CHARA GLOBULARIS* Thuill. var. *CAPILLACEA* (Thuill.) Zanev. *64, M.W. York; shallow muddy backwater pools by R. Ure, 1946, C. M. ROB.

876/16b. *CHARA GLOBULARIS* Thuill. var. *GLOBULARIS*. 65, N.W. York; small pool near R. Ure, near Jervaulx, C. M. ROB.

§876/17. *CHARA DELICATULA* Ag. *79, Selk.; Ashkirk, L. C. LYON and J. L. LYON. *89, E. Perth.; Loch Marlee, L. C. LYON and J. L. LYON. *97, Westerness; An Leth Allt, above Glasnacardoch, Mallaig: 104, N. Ebudes; peaty pool below the Sgurr of Eigg, J. ROBERTSON and C. W. MUIRHEAD, comm. CARLISLE MUSEUM.

PLATE 2.



A. J. WILMOTT (right) with H. W. PUGSLEY (left), at the B.E.C. Excursion,
Sheppey, 1938.

Photo. M. S. Campbell.

OBITUARY

ALFRED JAMES WILMOTT (1888-1950) was born at Tottenham, Middlesex, on December 31st, 1888. He was the elder son of Alfred John Wilmott, M.A., and had one brother (Bernard) and two sisters. Wilmott's father was a teacher of classics and English at Homerton Training College, Cambridge—a scholarly man interested in many things, including natural history.

From the County High School at Cambridge he went with a scholarship to St John's College, Cambridge. Here a teacher—Maria Dawson—interested him in botany. In 1910 he held the Hutchinson Research Scholarship. He obtained a first in both parts of the Natural Science Tripos. At Cambridge he became a field naturalist and was at first interested in lepidoptera rather than in plants. With kindred spirits he made long expeditions by bicycle to see plants and by night sugaring for moths. He won the Frank Smart prize for the best botany student of his year.

His interest in the taxonomy of the British Flora was stimulated by C. E. Moss, who was then engaged on the *Cambridge British Flora*. To this Wilmott contributed the account of the genus *Atriplex*. When Moss left for South Africa he hoped that Wilmott would carry on the Flora, but the reception of the earlier volumes was not very favourable and the work was discontinued owing to the rise in the cost of printing brought about by the war. Another piece of work done at Cambridge was his method of estimating the evolution of oxygen from water-plants during photosynthesis by counting the bubbles given off by the plant.

After a short time as a demonstrator at Cambridge, Wilmott went to Merton, where he lived with C. B. Williams of the John Innes Horticultural Institution; here he came into close contact with William Bateson—a man for whom he had always the highest esteem, and whose opinion he often quoted with respect in after years.

In 1911 he joined the botanical staff of the British Museum (Natural History). The Keeper at that time was the late Dr. A. B. Rendle, F.R.S., and his colleagues were Mr E. G. Baker, Dr. H. F. Wernham, Mr A. Gepp, and Mr (now Dr.) J. Ramsbottom.

Wilmott's work at first consisted in the removal of the European Phanerogams from the General Herbarium. They were added to the separate British Herbarium in the so-called New Room at the Museum. To the development of this collection he devoted the greater part of his working life and his energies, and, in the course of this work, he achieved a reputation among scientists in this country as the leading student of the taxonomy of the British Flora. Many herbaria, especially those of Salmon, Lacaita and Pugsley, came in as legacies, and the British collection at the Museum became the largest and most complete of its kind—it is his real monument. A less conscientious man might

easily have laid his herbarium work aside to write impressive books, and Wilmott seemed to be conscious of this, as he often said that, while he had built up the herbarium, only his successor would have the time to do much research work with it. His diaries show much time devoted to laying out and cutting up herbarium sheets. During his early years at the Museum he edited the tenth edition of Babington's *Manual of British Botany*, which is still a standard work on the flora. In this he was strictly bound by Mrs Babington's instructions. He worked out the collections made near Salonika, in the 1914 war, by J. Ramsbottom and others, but unfortunately, unlike many smaller collections from the area, the records were never published in full. Later he became friendly with Mr C. C. Lacaita, an Anglo-Italian botanist, once member of parliament for Dundee, who resided sometimes at Selham (Sussex) and sometimes in Calabria, and was a man of great distinction and intelligence. With Lacaita, Wilmott made, in 1927, a collecting expedition to Spain, and brought back 2000 specimens, collected in the short space of ten weeks. They were continuously on the move and Wilmott had often to work till midnight drying his plants. He did not get quite as many as in 1916 when he went with T. Lofthouse to the Sierra Nevada and collected 3000 specimens. Pressure of other work, mainly naming collections for other people, made him lay much of this material aside unnamed. However, a few new species were described. A number of the collections he named were from the Arctic and included the Cambridge Expedition to Spitzbergen, and expeditions to Iceland, Jan Mayen, and Greenland. He became Deputy Keeper of the Department on 1 April 1931, and much of his time was taken up with naming single specimens for all kinds of visitors.

His best discovery in Britain was probably *Myosotis sicula*, which he recognised in the field; he also pointed out the difference between the two Irish orchids referred to *Spiranthes Romanzoffiana*, and worked on critical genera such as *Sorbus*, *Rhinanthus*, and *Salicornia*. He had very lucid ideas on the philosophic basis of taxonomic botany, but was rather liable to be led by preconceived phytogeographical theories into assuming that every British plant was likely to be slightly different from its continental representative and therefore to be a potential unsegregated species. He once said: "Only when geneticists and cytologists are also competent taxonomists shall we obtain useful results. Good taxonomists are anxious to use genetical, cytological, and ecological knowledge." Over a period of many years he made collecting trips with the late Mr F. Druce in Britain. He was a believer in the survival of a relict glacial flora and the chief exponent of this theory in this country.

The Botanical Society owes much to Wilmott. He edited the *Report*, at first jointly with E. C. Wallace from 1941 to 1944, and later, 1945-1947, alone. He also became acting Honorary Secretary during the difficult period 1941-1946, when he helped to keep the society alive. For years he was a familiar figure at Field Meetings and named at sight many

critical plants for members of the society. Latterly he sought release from these activities to allow more time for his botanical work. He planned a revision of *Salicornia*, which he had studied for many years, and was starting to collect material of *Erophila* and *Ranunculus auricomus*. His photographs of Orchids and Salicornias, taken with a Leica camera, were very fine. He had a fine library, and hoped that, after his retirement from the Museum, it would enable him to write a new British Flora. The idea of a new edition of Nyman's *Conspetus*, which had appealed to him in his early days, had been abandoned. Wilmott was interested in the protection of rare British species, and strongly opposed to the deliberate naturalisation of foreign species.

He was elected a Fellow of the Linnean Society in 1911 and was a regular attendant at their meetings, where he often contributed to the discussions. Wilmott served on the council and gave two of the lectures on systematics in recent series. He was a member of the committee, which arranged for the photographing of the Linnean collections in 1941. At the meeting following his death, the Vice-President (Mr F. Stern) paid a handsome tribute to his memory. He was an F.R.G.S., member of the School Nature Study Union, and at one time lectured at Birkbeck College.

Wilmott was a very considerable athlete. At Cambridge he played football, but a displaced cartilage in his knee incapacitated him from the more violent forms of exercise at an early age. He was also a fine cricketer and athlete; a good billiards player and shot with a miniature rifle. At table tennis he played for England, and was Veteran Singles Champion in 1934-35. In addition he contributed to the mechanics of the game and invented the system of testing balls at International matches. He was very musical and played the piano.

Wilmott's appearance was extremely robust, with a fresh complexion and a thick mat of stiffly erect grey hairs. He was, however, suffering from angina, and latterly had to rest even on the short walk from the station to the museum. After lecturing at the Linnean Society, he complained of feeling tired and he died quite suddenly in the early hours of January 27th 1950 from coronary thrombosis.

He married Jessie Eveline, daughter of the late Daniel Bell, in 1914, and they had one son, John Wilmott, now with the Anglo-Iranian Oil Company in Persia.

Obituaries have appeared in *The Times*, 28th January 1950, and *Table Tennis*, 8, no. 8 (April 1950).

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A. H. G. ALSTON.

ALFRED JAMES WILMOTT. With the sudden departure from our midst of A. J. Wilmott, often known as the "Great Man", not only has Systematic Botany in Britain lost the great man of this century, but many people, and especially a large number of members, both professional and amateur of this Society, have lost a great friend. As I write these words, I am reminded that a year ago to-day (June 11th, 1949) he attempted to ascend Ben a' Chuallach, to join in the search for *Thlaspi alpestre*—a sick man, warned to avoid undue exertion, his determination, his love of Highland hills coupled with his youthful mind which heeded no warnings, took him far up, alone so that he would not hinder others. He so thoroughly enjoyed that day, and it gave him renewed confidence and revived hopes of reaching greater heights.

I am also reminded that as he wandered over the slopes of Schiehallion the day before, pointing out the likes and dislikes of *Pyrola*, or *Listera cordata*, he demonstrated dandelion species based on what he had learned from continental botanists—a prelude to a promised Field Meeting of the future, now alas, an unfinished symphony. As I write that phrase, I realise how it would please him, or how he might have written it, for interwoven with that knowledge and love of flora there were multitudes of melodies. He was no mean musician, could have been a composer, sometimes was an accompanist, and frequently a pianist.

On those summer journeys with the late Mr Francis Druce, to which I was admitted in 1935—they began in 1919—music was a part of the programme after the day's botanising—Chopin Nocturnes beside Loch Rannoch, Greig's "Spring Song" on the north coast near to *Dryas* and *Oxytropis* and *Ajuga pyramidalis*. The tragic death of Mr Druce made a profound impression and he felt the loss of his counsel and was ever grateful for the quiet friendship that evolved from those visits to interesting and remote parts of the British Isles. The contrast was, of course, invaluable, for A.J.W. was highly strung, almost volcanic, and like so many who boast an Irish great-grandmother—he attributed all his irascibility to her. He was himself composed of those contrasts which build up into greatness. Besides his gifts of perception and under-

standing, he had great self-confidence in much that he did—often misinterpreted as conceit—but in the twenty years I knew him I have never met the occasion when his sureness had been misplaced. He was supremely honest, much disliking artifice and exaggeration, and the modern misapplication of such words as terrible, terrific, or tremendous, filled him either with annoyance or amusement. His extraordinary memory—not visual at all, which he constantly regretted—served him so well and was perhaps his most disciplined faculty and valued asset.

He had a working knowledge of several European languages and was fond of travel. He went to Spain twice, first with Lofthouse and in 1927 with Lacaita, and had a week's spring botanising in the Alpes Maritimes, but most of his foreign journeys belonged to his table-tennis activities (see *Table Tennis*, April 1950, p. 7). As a British botanist he was of the few who recognised the indispensability of a knowledge of Foreign and particularly European floras.

He had little time for horticultural ventures but his small garden at Wimbledon was filled with experimental fragments, the most interesting being, perhaps, the collection of *Pulmonaria* species and forms.

In teaching he was always generous and interesting, but was unaware that those seeking information often could not take in the vast amount he was prepared to give as quickly as he himself could have assimilated it. It just did not occur to him that he might be required to say it all over again!

This Society rather tardily made him an Honorary Member in recognition of the great services he rendered it, especially in the war years. It is a matter for regret that he received no wider acknowledgment of his inestimable value in British botany.

Comment has been made that much of his great knowledge died with him, but the very high standards at which he aimed and frequently achieved, coupled with his insistence on accuracy in all that he said or wrote, were not conducive to frequent production of major works. So much, however, remains and much is wrapped up in the writings of other botanists to whom he generously gave from the storehouse of his mind. The enthusiasm with which he inspired many of his colleagues lives on, together with the gratitude that we, who are left, feel for having known him.

M. S. CAMPBELL.

REVIEW

Drawings of British Plants. Stella Ross-Craig. Part IV: Resedaceae, Cistaceae, Violaceae, Polygalaceae, Frankeniaceae; 26 Plates. 1950. London: G. Bell & Sons, Ltd.; 5/- net.

Reviewers of earlier parts have already described fully the method and form of this series; and it can be said at once that the drawings in this part, like their predecessors, are of a high standard, and fully adequate for the purposes of the general botanist. I propose to deal in this review only with the section *Nomimum* of the genus *Viola*, and to comment upon the drawings from the point of view of one who has studied this section in some detail.

Violets are difficult to draw; unless the greatest attention is paid to detail, characteristic differences are lost and the drawings mislead. I think that Miss Ross-Craig's drawings are the best that have been published in this country, but there are still some imperfections, to which attention should be drawn.

The plant of *V. odorata* which is illustrated is rather densely covered with spreading hairs; typically the hairs are fewer and more adpressed, and the peduncles are more or less glabrous. In *V. hirta*, the bracts are shown above the middle of the peduncle, and the dissected flower is shown with a straight spur; typically, the bracts are below the middle of the peduncle, and the spur is curved or hooked. In view of its very uncertain status, it might have been wise to omit the drawing of *V. calcarea*; in any case, the plant shown does not correspond closely with Gregory's description of the "species."

The drawing of *V. Reichenbachiana* is good, though a single-flowered plant is hardly typical. *V. Riviniana* is also good, but the omission of drawings of undehisced, ripe fruits of these two species is unfortunate. The petal drawings are presumably made from herbarium specimens; examination of fresh material would have revealed the characteristic difference between the species in the venation of the lower, spurred petals. *V. rupestris* is fairly successful, but the elusive yet characteristic shape of the rosette leaves has not quite been given.

I should have preferred to see *V. canina* var. *ericetorum* shown as a rather smaller plant. One regrets here, as so often in this series, that the locality and habitat of the specimen figured are not given. *V. lactea* is good, but the spur in drawing E is surely abnormal; it should be longer. *V. stagnina* is fairly well done; but it is not made clear that the species is soboliferous; and one of the fruiting branches shown (M) is possibly that of the hybrid *V. stagnina* × *canina*.

It would perhaps be unreasonable to ask for the inclusion of drawings of the commoner hybrids, such as *V. Reichenbachiana* × *Riviniana* and *V. canina* × *Riviniana*; but it might sometimes be possible to devote two plates to a single species. Many of these violets, such as *V. hirta*, *V. Riviniana* and *V. canina*, are polymorphic; and if two or three of the commoner variants of each were shown, it would aid greatly in identification. It is noteworthy that the fenland form of *V. canina*, sometimes known as *V. montana* L., has been omitted.

These criticisms indicate the difficulties inherent in an attempt by one artist to cover a field as wide as that of the British Flora. Such a general work can hardly satisfy the specialists, who will always be able to pick holes in it. Nevertheless, provided a high standard is aimed at, it is right that the attempt should be made. Certainly Miss Ross-Craig is to be congratulated on this part, and I look forward to a series of worthy successors.

D. H. VALENTINE.

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A BINARY NAME FOR THE HYBRID WATERCRESS

By H. K. AIRY SHAW.

It is clear that the wild triploid hybrid watercress, *Nasturtium microphyllum* (Boenn.) Reichb. \times *N. officinale* R. Br., is, at least in Britain, almost as important an element, both floristically and ecologically, as either of the parent species (Howard & Manton, 1946, 8). According to Howard (1947, 454), moreover, it is one of the two forms of watercress of economic importance, for it is the source of the 'brown,' or 'winter,' cress of commerce, 'green' cress being *N. officinale*. The tetraploid species, *N. microphyllum*, is apparently not grown commercially.

Binary names have undoubtedly, in the past, been bestowed much too freely on hybrids of rare or ephemeral occurrence. Where, however, a hybrid forms a significant component of the natural vegetation or (as, for example, in *Ulmus* or *Salix*) of the scenery, there would seem to be a good case for giving a binary name, and such case is strengthened when, as with the watercresses, commercial interests also are concerned. The hybrid formula, though informative and frequently necessary for precision, is too cumbersome and inconvenient for repeated use.

The following binomial is therefore proposed for the hybrid watercress. In deference to the taxonomic views of Schulz (1936, 551-5) and Hylander (1950, 1-13), the genus *Nasturtium* R. Br., 1812, is united with *Rorippa* Scop., 1760. On a world view of the group there would appear to be good reasons for this course. The correct name for the combined genus, is thus (contrary to Schulz and in agreement with Hylander), *Rorippa*.

***Rorippa* \times *sterilis* Airy Shaw, nom. nov.**

Nasturtium uniseriatum How. & Mant. \times *N. officinalis* R. Br., Howard & Manton, 1946, *Ann. Bot.*, n. ser., **10**, 11-12; Howard, 1947, *Agriculture*, **53**, 454-5, tab. opp. 451.

N. officinale \times *uniseriatum*, [Hyde], 1948, *Rep. Bot. Soc. & E.C.*, **13** (3), 257.

N. microphyllum Boenn. ex Reichb. \times *N. officinale* R. Br., Airy Shaw, 1947, *Kew Bull.*, **1947** (1), 45, [et] 1948 [in] Riddelsdell, Hedley & Price, *Fl. Glos.*, 610; Carrothers, Meikle & Moon, 1949, *Irish Nats. Journ.*, **9**, 225, 304; Airy Shaw in Wilmott (ed.), 1949, *Brit. Fl. Pl. & Mod. Syst. Meth.*, t. X; Howard & Lyon, 1950, *Watsonia*, **1** (4), 232, fig. 1.

N. officinale \times *microphyllum*, Wilmott, 1948, *Rep. Bot. Soc. & E.C.*, **13** (3), 248; Lawalrée, 1950, *Les Naturalistes Belges*, **31** (2), 31.

Rorippa microphylla (Boenn.) Hyl. \times *Nasturtium-aquaticum* (L.) Hayek, Hylander, 1950, *Bot. Not.*, **1950** (1), t. V.

Rorippa Nasturtium-aquaticum × *microphylla*, Lawalrée, 1951, *Bull. Soc. Bot. France*, **97**, 213.

Habitus varius. *Infructescentia* saepe valde elongata, usque 30 cm. vel ultra. *Siliquae* imperfectae, irregulariter formatae, usque 1.6 (plerumque circiter 1.2) cm. longae, usque 1.5 (rarissime vix 2) mm. latae, apicem versus saepe attenuatae velut rostratae, plerumque cassae. *Semina* in quaque siliqua 0-2 (plerumque 0, et ubi formata saepe imperfecta); reticulationis testalis areolae per faciem 50-60, i.e. inter parentes medium tenentes.

Typus nominis *Rorippae sterilis* A.S.:—

ENGLAND. W. Norfolk (v.-c. 28); Gatton Water, Hillington, in chalk stream, 21 Aug. 1946, *E. L. Swann* 1533 in Herb. Kew (holotypus cum 3 isotypis). (For detailed British distribution, see Howard & Lyon, 1950, 232-3.)

Regarding the choice of the above-cited specimen to typify the new binomial, it was at first proposed to designate as type one of the specimens of the hybrid produced artificially by Howard & Manton, as represented by material deposited by Howard in Herb. Kew., linking it with Howard & Manton's (1946, 12) Latin diagnosis. It was, however, pointed out by a colleague that the parentage of this artificial cross was peculiarly 'disjunct,' the *officinale* parent originating from Zürich, Switzerland, while the *microphyllum* (*uniseriatum*) came from Wareham, Dorset. (See Howard & Manton, 1946, 2, footnote.) As the binomial is required expressly for the wild-growing hybrid, it is felt more appropriate that it should be typified by wild, rather than by experimentally produced, material.

NOTE ON THE OCCURRENCE OF THE HYBRID ON THE CONTINENT OF EUROPE.

Although Howard & Manton (1946, 8) refer to all three watercress types—diploid, tetraploid, and triploid hybrid—as being "important and widespread elements in the European flora," the extreme paucity of specimens of the *hybrid* in the large herbaria is very marked. At Kew, for example, there are approximately 35 continental gatherings of *officinale* (incl. var. *sifolium*), 11 of *microphyllum*, and only the two following of *R. × sterilis*:—

GERMANY. Thuringia: Immelborn, "Rhönbrunn," 27 June 1876, *G. Ruhmer* (Baenitz, Herb. Europaeum). Pommerania: Callies, pr. Gutzdorf, 18 July 1876, *P. Sydow* (Baenitz, Herb. Eur.).

In the herbarium of the British Museum (Natural History) the only certain specimen representing the hybrid appears to be the following:—

FRANCE. Hautes Alpes: ruisseaux aux environs de Gap, July 1853, *B. Blanc* (in *C. Billot, Fl. Gall. & Germ. exsicc.*, no. 1604).

It is not clear as to how far this reflects the relative frequency of occurrence of the three forms, or whether it may be due in some measure

to unconscious avoidance or rejection of hybrid material on the part of collectors, because of the badly formed fruit.

It is probable that one of Irmisch's observations (cf. Airy Shaw, 1947, 44) contains a reference to the hybrid: he remarks that, in his var. *brevisiliqua*, "frequently a number of seeds abort and the valves consequently present an uneven appearance." The form described by Glück (1936, 268) as 'var. *brevisiliqua*,' with fruits only 5-7.5 mm. long, is, as has already been suggested elsewhere (Airy Shaw, 1947, 45), almost certainly the hybrid.

Attention may be drawn to the fact that Sondershausen, where Irmisch studied the watercresses, is in Thuringia, only 25 miles N. of Erfurt, the principal centre of watercress growing in Germany (Manton, 1935, 134). It is also noteworthy that one of the only two continental specimens of the hybrid in the Kew Herbarium should originate from Thuringia.

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NOTE ON THE TERMS "LECTOTYPE" AND "NEOTYPE"

By H. K. AIRY SHAW.

In the last volume of *Watsonia*, Dr. J. Heslop Harrison (1950, 366) refers to Vermeulen's (1947, 110, 116, 121) designation of a specimen of *Orchis cruenta* O. F. Muell., collected by Warodell in Jämtland, Sweden, in 1908, as the 'lectotype' or 'electotype' (sic!) of Mueller's (1782) species, originally described and figured from the adjacent part of central Norway. As Vermeulen's action involves a misconception of the meaning of the term 'lectotype,' a few words of clarification may be appropriate.

The essential point about a lectotype is that it must be chosen from the *original* material—whether specimens, figures or descriptions—at the disposal of the original author of the name of the taxon*. The following (subject to minor editorial modification) is the definition of 'lectotype' adopted, after considerable discussion, by the Nomenclature Section of the International Botanical Congress at Stockholm in 1950:—

A *lectotype* is a specimen or other element selected from the original material to serve as nomenclatural type when the holotype was not designated at the time of publication or so long as it is missing. [Cf. de Wit, 1950, 220, 203.]

It thus clearly follows that material collected in 1908 cannot possibly be designated as the lectotype of a species described in 1782!

The only possible 'lectotype' of *Orchis cruenta* that could be chosen, in the absence of the original specimens, would be Mueller's plate in the *Flora Danica*†. So long as this is available, it is not even possible to indicate a 'neotype,' though this is a term that Vermeulen might, at a stretch, have applied to the 1908 material with rather more justification. The definition of 'neotype' adopted at Stockholm is as follows:—

A *neotype* is a specimen selected to serve as nomenclatural type so long as all of the material on which the name of the taxon was based is missing. [Cf. de Wit, l.c. 201, 203.]

It is true (apparently), in the case of *Orchis cruenta*, that "all of the material"—in the sense of *specimens*—"on which the name of the

*"Taxon—a taxonomic group of any rank generally." "Taxonomic groups of any rank will, in the Rules, generally be referred to as taxa (singular: taxon)" (Art. 8).—de Wit, 1950, 201.

†The term "lectotype" is, however, not properly applicable in this case, since in the absence of specimens the plate plus description become practically equivalent to a holotype.

taxon was based is missing," but it is clear that those who framed the definition would have regarded a painting, drawing or photograph of the original material as equivalent, for this purpose, to the material itself. No true neotype for *O. cruenta* is therefore necessary.

It does not, moreover, appear to have been realised, or at least not clearly pointed out, by Vermeulen, that the variety *subelliptica* of Neuman (1906, 156), of which the latter author cited the Warodell material from Jämtland as being a "typical example," was in fact proposed by Neuman as the 'type variety' of *O. cruenta*, for he (Neuman) published it as follows:—"a *subelliptica* nov. nomen; fig. fl. D. n:o 876; . . . [3-line description] . . . Typiska exemplar samlade på Frösön i Jmtl. af Warodell." The type of var. *subelliptica* Neum. therefore coincides with the type of *O. cruenta* itself; it is (now) the plate in *Flora Danica*. The expression "nov. nomen," instead of "nov. var." as in other varieties proposed by Neuman, clearly indicates the author's intention. Under a new rule (Art. 28 *bis*; cf. de Wit, l.c. 209) passed at Stockholm last year, this type variety will become *O. cruenta* O. F. Muell. var. *cruenta* (without name of authority), with var. *subelliptica* Neum. as synonym. The Jämtland specimen collected by Warodell will merely be illustrative material regarded by Neuman as referable to the type variety.

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ADDITIONS AND CORRECTIONS TO THE COMITAL FLORA, FOR MIDDLESEX, II

By DOUGLAS H. KENT.

Since my paper in *Watsonia*, 1, 92-101 (1949), a number of additional records and corrections have been made. These are now brought together in an endeavour to bring up to date the list of species so far found in v.-c. 21.

As previously, alien species are marked with a dagger, and records new to the county with an asterisk.

I am indebted to the following specialists for determination of critical material:—Mr. J. H. Burnett (*Veronica*), and Mr. G. O. Allen (*Characeae*). My best thanks are also due to Mr. E. B. Bangarter for much assistance when working at the British Museum (Natural History).

- *+2/2. *THALICTRUM MINUS* L. A few plants established on West Heath, Hampstead, 1948; *H. C. Harris*. Add (21) to *C.F.*
- *+37/1. *ARABIS HIRSUTA* Scop. Hackney Marshes, 1914; *J. E. Cooper* (Herb. Mus. Brit.). Add (21) to *C.F.*
- *+54/20. *BRASSICA GALLICA* (Willd.) Druce. Waste ground, Church End, Finchley, 1926; *J. E. Cooper* (Herb. Mus. Brit.). Add to *C.F.*
- [96/10. *SILENE NUTANS* L. Recorded for Hackney Marshes by *J. E. Cooper* (1914, *J. Bot.*, 52, 127), and cited by me (1949, *Watsonia*, 1, 93). The specimen in Herb. Mus. Brit. on which the record was founded is, however, *Silene dichotoma* Ehrh. Delete from *C.F.*]
- *+1/5/3. *SPERGULARIA SALINA* J. & C. Presl. Rubbish tip, Hanwell, 1950; *D. H. Kent*. Add (21) to *C.F.*
- *+155/19. *TRIFOLIUM AGRARIUM* L. Waste ground, North Circular Road, Finchley, 1929; *J. E. Cooper* (Herb. Mus. Brit.). Add to *C.F.*
- †176/36. *VICIA GRACILIS* Lois. Garden weed, Ealing, 1949; *T. C. Collett* (Herb. Kent). Add (21) to *C.F.*
- †189/25. *POTENTILLA PALUSTRIS* L. "It thrives very well at the head of the lesser bog on Hampstead Heath, where it was planted some years ago by Mr. Rand" (Blackstone, 1746, 70). The plant apparently survived until about 1810.
- 194/16. *ROSA AGRESTIS* Savi. Green Lanes, 1818; *J. Woods* (Herb. Linn. Soc.). Add (21) to *C.F.*
- *203/1. *CHRYSOSPLENIUM ALTERNIFOLIUM* L. Harefield, 1839; *H. Kingsley* (Herb. Melvill). Add 21 to *C.F.*

- 217/3. *CALLITRICHE PALUSTRIS* L. Pinner; *W. R. Linton (B.E.C. 1884 Rep., 107)*. Add 21 to *C.F.*
- *+257/1. *MYRRHIS ODORATA* Scop. Waste ground, Broomfield Park, Southgate, 1950; *M. Scholey*. Add (21) to *C.F.*
- *+507/2. *LITHOSPERMUM PURPUREO-CAERULEUM* L. Abundantly naturalised in an orchard at Pinner, 1950; *T. G. Collett*. Add (21) to *C.F.*
- *543/9. *VERONICA CATENATA* Pennell. Shortwood Common, Staines; *B. Welch*. Det. *J. H. Burnett (Herb. Kent)*. Add 21 to *C.F.*
- *550/4. *OROBANCHE ELATIOR* Sutton. Harefield chalkpit, 1902; *C. B. Green (Herb. South Lond. Bot. Inst.)*. Add 21 to *C.F.*
- +553/2. *PINGUICULA VULGARIS* L. Bog, Hampstead Heath, 1855; *Orlando Jewitt (Herb. Hampst. Scient. Soc.)*. Planted, but now extinct.
- *+558/2. *MENTHA ALOPECUROIDES* Hull. Rubbish tip, Hounslow Heath, 1948; *B. Welch*, det. *R. A. Graham*. West Heath, Hampstead, 1949; *E. C. Wallace, F. Rose, R. A. Boniface* and *D. H. Kent*. Ken Wood, 1949; *H. C. Harris* and *D. H. Kent*. Ruislip, 1950; *D. P. Young*. Add to *C.F.*
- 667/2. *CEPHALANTHERA DAMASONIUM* (Mill.) Druce. Harefield, a single specimen, 1890, George Wall in litt. to *W. T. Thiselton-Dyer*, 26th June 1890. The letter is attached to a sheet bearing a Harefield specimen of *Gymnadenia conopsea* in Herb. Kew. The locality may have been in Hertfordshire, cf. *J. Benbow (1887, J. Bot., 25, 14)*. Add [21 ?] to *C.F.*
- *+685/1. *GALANTHUS NIVALIS* L. Highgate Archway; Herb. Mus. Brit. Add <21> to *C.F.*
- 876/7. *CHARA CONTRARIA* Kuetz. Long Water, Hampton Court, 1949; *D. H. Kent*, det. *G. O. Allen*.

SOURCES OF RECORDS.

Blackstone, J., 1746, *Specimen Botanicum quo Plantarum plurium rariorum Angliae indigenarum loci natales illustrantur*.

Specimens in the following herbaria are also cited:—*C. B. Green* (now in Herb. South London Botanical Institute); Hampstead Scientific Society; *D. H. Kent*; Royal Botanic Gardens, Kew; Linnean Society; *J. E. Lousley*; *J. C. Melvill* (now at the Butler Museum, Harrow School) and British Museum (Natural History).

THE VARIATIONS OF *SILENE NUTANS* L. IN GREAT BRITAIN

By F. N. HEPPER (Royal Botanic Gardens, Kew).

In the past there has been considerable confusion in Britain over the species *Silene nutans* L. The present paper seeks to present an analysis of the British forms of this species.

The trouble has been caused by the extreme variability of the species, which appears to set up a new form wherever it becomes sufficiently isolated to prevent free inter-breeding of populations. It is distributed patchily over Britain, as an aggregate species, but is commonest along the south coast of England, and in Jersey; it is also frequent in Derbyshire, but elsewhere it is local and rare.

Since Linnaeus' time many Continental European botanists have distinguished species and varieties from his type. In Britain, Smith (1800, 467) thought the Dover form was *S. paradoxa* L., thereby continuing a mistake of Miller. The plant Peete found in 1825 and described as *S. patens* (1832, No. 2748) was, in fact, *S. italica* Pers. and not a segregate of *S. nutans* L. at all. Nearly a century later, Salmon (1905, 127; 1918, 35) unfortunately misidentified a south coast and Channel Island form as *S. dubia* Herbich. This is a Bucovinian plant and, although Herbich's description might almost be applied to the British plants, the latter are certainly not the same as the Bucovinian specimen distributed as *S. dubia* by Woloszczak (Fl. polon. exsicc. 915, Herb. Mus. Brit.), for it has quite different indumentum and a rather different habit. Besides, in such a variable group as *S. nutans*, one would hardly expect a Bucovinian form to reappear in England.

Moss (1920, 79) realised that Salmon was in error and treated *S. dubia* Salm. non Herb. as var. *vulgaris* Moss. All the other forms in Britain he designated var. *Smithiana*. We shall deal with these varieties in detail later.

At the suggestion of the late Mr. A. J. Wilmott I tackled the morphological variations of *Silene nutans* without reference to previous work and literature on the species until I had reached my own conclusions. As will be seen later, these were similar to those reached by Moss. Even so, the position is very complicated, for it is not only a taxonomic problem but one of phytogeography as well.

First we need a typification of *S. nutans* L. Linnaeus (1753, 417) gives it a new definition: "*Silene petalis bifidis, floribus lateralibus secundis cernuis, caule recurvato.*" The *Hortus Cliffortianus* and Bauhin's *Pinax* definitions are cited as synonyms, and the habitat is given as "*in Europae borealis pratis aridis.*" The sheet in Herb. Linn. (Savage, 1945, No. 583/18) is written up as "*7 nutans*" and

one of the three specimens of this sheet must be made the lectotype. Whence did these specimens come? Wilmott (*in litt.*) wrote: "There is no information concerning their origin, but according to what Daydon Jackson once told me, it is possibly material gathered by Linnaeus himself, and probably near Upsala. In the *Flora Suecica* (1745, 133) to which Linnaeus refers in 1753, the plant is said to be frequent in the meadows of Upland (the old province which includes both Upsala and Stockholm). The three specimens in Herb. Linn. match other material from around Upsala and one may with reasonableness consider this to be the type area."

The specimens in Herb. Linn. are slender-stemmed (25 cm. high) with small linear-lanceolate stem leaves (1-4 cm. long). Hairs are very short, moderately dense. Leaves linear-lanceolate, small (4 cm.), hairs short on lamina, petioles slender rather longer than lamina. Pedicels and peduncles both short, less than 1 cm. each. Peduncles 1-3-flowered, calyx 10-striate, covered with short viscid hairs, calyx-teeth acute with scabrid margins. Flowers (white) small, petal segments linear. Although there are no capsules other Upsala specimens show that the plants there have *very* small capsules.

VARIATION WITHIN THE SPECIES AS A WHOLE.

Leaf-shape is a very variable characteristic; it ranges from narrow-linear to broad-spathulate. But leaf-size is a deceptive character as it appears sometimes to depend a good deal upon ecological factors.

Indumentum. Some glabrous forms are found in Eastern Europe in which the hairs may be reduced to minute pimples or scabrid spots on the leaves. Plants may be sparsely covered with short hairs, in which case a lens may be necessary to distinguish them, or they may be densely pubescent, with the hairs long and obvious.

Flower variations are frequently used as taxonomic features. Although *S. nutans* is typically white, forms with yellow, green or red flowers have been distinguished. In Britain red (*exsicc.* Payne 1931, and Edelston 1939, Herb. Mus. Brit.) and yellow (Salmon, 1905) occur. The degree of crowning of the petals (i.e. the length of the petal ligules) is used by some authors, but further fresh material needs to be examined before its taxonomic value can be assessed.

Capsule. The average size of the capsule of British specimens is about 1 cm., but the Continental forms are frequently rather less. Capsule size is an excellent taxonomic characteristic, but its shape is not so useful. It appears, however that the larger capsules are more inflated towards the base, resulting in a conical shape, whilst the smaller ones tend to be barrel-shaped. The carpophore seems to vary with capsule size. In this paper the term "capsule length" does not include the carpophore.

BRITISH VARIETIES.

The plants of *S. nutans* occurring in Britain may be divided into two clear-cut varieties with capsule size as the primary distinguishing factor. Along parts of the south coast, plants have a large mature capsule averaging between 11 and 14 mm. long, and their leaves are slender and sparsely covered with hairs. All the other plants possess capsules which are between 8 and 10 mm. long, their leaves are typically broad and pubescent. The southern variety has the following description.

***Silene nutans* var. *Salmoniana* Hepper var. nov.**

Planta var. *Smithiana* Moss gracilior. Folia radicalia in petiolum longum attenuata, acutiuscula (11 cm. longa), margine setulis brevissimis scabra. Flores flavescentes, secundi, nutantes. Capsula ovata, 11-14 mm. longa, carpophoro 3-4 mm. longo.

Synonyms. *S. dubia* Herbich sec. Salmon (1905, 127; 1918, 35), non Herbich.; *S. nutans* L. sec. Moss (1920, 79), non L. *in sensu stricto*; *S. nutans* var. *vulgaris* Moss (1920, 79).

The last name is untenable on two counts: Moss made this variety equivalent to the typical *S. nutans* of Linnaeus, which it is not (see p. 81); and, under the Rules agreed at Stockholm, 1950,* the typical form must now be expressed as *S. nutans* L. var. *nutans*.

Distribution of var. Salmoniana.

- V.-c. 10, Wight; Sandown Bay, Culver Cliff, St. Lawrence. Very rare.
 11, S. Hants.; Milford-on-Sea, Fort Cumberland (?), Portsea I., Stokes Bay, Browdown Ranges, Portsdown, near Fareham. Very rare.
 13, W. Sussex; Hassocks Sandpits (? native).
 14, E. Sussex; Hallingbury Hill, Downs near Bevendean, Moulscombe, near Stanmer. Very rare, may be locally abundant.
 15, E. Kent; Dungeness, Lydd, Hythe, Sandgate. Rare, fairly common on Dungeness shingle.
 17, Surrey; near Ham, Colley Hill near Reigate (now built over). Very rare.

Note.—The Jersey and N. French coast specimens are very similar to this variety.

Type of var. Salmoniana.

From Salmon's remarks (1905) it is clear that his paper started from investigation of plants sent from near Brighton by Hilton, and more particularly from his field study of the same form. He says (p. 128) that he "made a visit with him [Hilton] in June last [1904] and examined

*See H. C. D. de Wit, 1950, *Flora Malesiana Bull.*, no. 7, 209, Art. 28 bis.

the plants in a fresh state". The actual date of his visit with Hilton was, from the label of the specimens in his herbarium, 10th July 1904, the locality being given as "downs, Bevendean, East Sussex".

A specimen of this gathering in Herb. Salmon (Herb. Mus. Brit.) is therefore designated the holotype.

Icones. Moss (1920, t. 76); Ross-Craig (1951).

Discussion.

The Kentish plants referred to this variety are not typical of it, for they are extremely small in habit and their leaves are very reduced in size. This may be an adaptation to their habitat, for they grow in exposed, open shingle where there must be a great deal of insolation. Perhaps cultivation will show whether this adaptation is genetical or not. However, in all other respects than in habit this form matches var. *Salmoniana*.

The Ham plants fall into this variety although they are not typical of it. Their station† is curious and has the appearance of being unnatural (even so the plants seem to be thoroughly established and have been known from there for many years). Nevertheless, it may be that the excavations of sand and gravel have provided the species with a suitable habitat, from whence it has spread somewhat. The mature capsules are inclined to be rather smaller than those of the south coast plants, and in that way approach the Derbyshire form.

SILENE NUTANS L. var. *SMITHIANA* MOSS (1920, 79).

Cucubalus viscosus L. sec. Hudson (1762, 163), non L., excl. diagn. et syn.; *S. paradoxa* L. sec. Smith (1800, 467), non L., excl. syn. Jacquin et Zannoni; *S. nutans* L. sec. Salmon, loc. cit., *in sensu stricto*, non L.

A coarser, stouter, more viscid and hairier plant than var. *Salmoniana*. Leaves broader, less acute. Inflorescence less drooping. Calyx with less acute teeth. Petals white. Carpophore about 2.0-2.5 mm. long. Capsule with suberect teeth, 8-10 mm. long. Seeds with acute tubercles, greyish black, a little longer than broad, about 1 mm. long.

This description, with var. *Salmoniana* substituted for var. *vulgaris* of the original, has been taken from Moss (1920) and it covers all the forms of *S. nutans* in Britain except those already mentioned under var. *Salmoniana*. I regard the type locality for var. *Smithiana* as E. Kent, and Kingsdown in particular (exsicc. in Herb. Mus. Brit. ex Herb. Salmon: "chalk cliffs, Kingsdown, coll. H. E. Fox, 30.6.15", and distributed by the Watson B.E.C. as *S. italica* Pers.). It appears that Moss designated no type for his varieties for, though he quotes exsicc. Herb. Don, he does not state whether he intends this specimen (*non vidi*) from

†For a comment on this locality, see Lousley, J. E., 1950, *Wild Flowers of Chalk and Limestone*, 87.

Scotland to be taken as the type. His figure in *Cambr. Brit. Fl.* is from a specimen gathered in E. Kent.

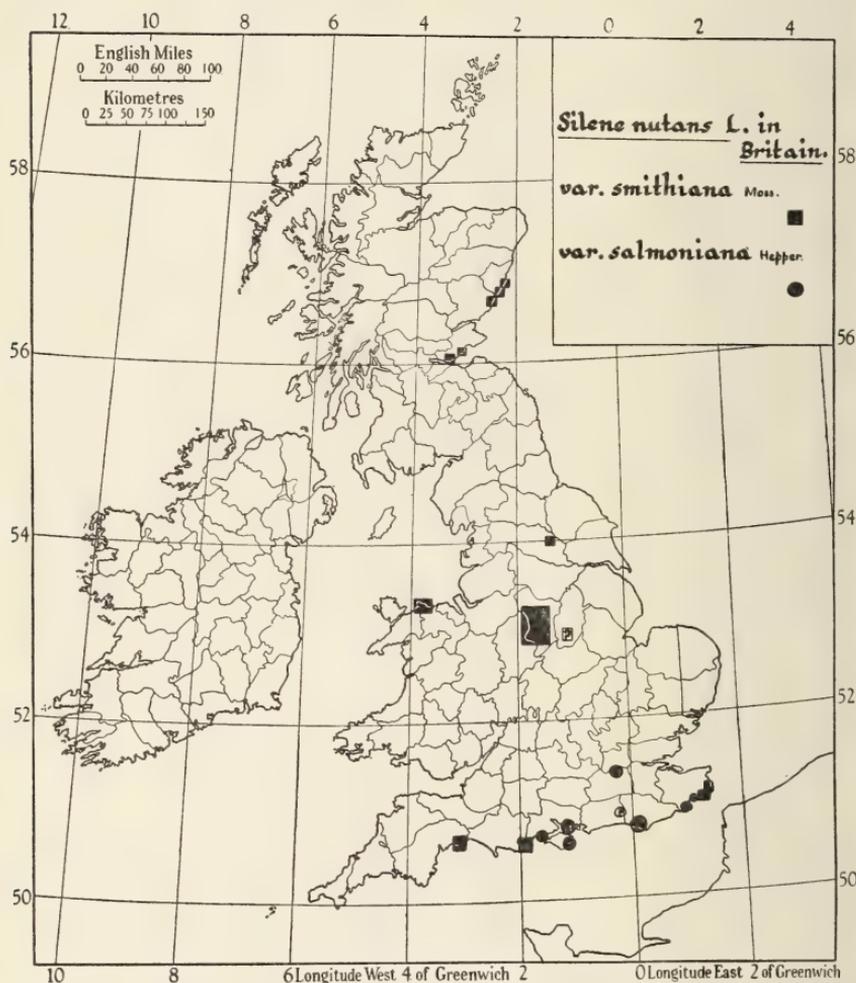
I was, at one time, very inclined to separate the Kent plants as a separate variety—for they contrast markedly with var. *Salmoniana*—but they are so similar to the Devon, and even to the Scottish, plants that it is impossible to draw a line of distinction between them. Once such a distinction were made for Kent, one would have to give the plants occurring in each station varietal rank—the British distribution of *S. nutans* being so discontinuous that isolated populations have been built up. Thus it is much more practical to state that var. *Smithiana* has six forms which may be distinguished from one another according to the tabulated characteristics given opposite. Form 1 is the typical var. *Smithiana*, whilst Form 6 is the least typical.

The latter form occurs in Derbyshire and Staffordshire and was placed under *S. dubia* by Salmon, and under var. *vulgaris* by Moss. It is clearly referable, however, to var. *Smithiana* on account of its small capsules which are typical of that variety, although in habit it approaches var. *Salmoniana*. Because of this, there was considerable discussion in the *Watson Exchange Club Reports* for the early 1930's. On the plants distributed from Stony Middleton, Derbyshire, however, Fraser (1931-2, 113) wrote: "I would call this *S. nutans* L. I have gathered it very similar to this from near Folkestone and 16½ ins. high . . . have gathered it on siliceous rocks by the sea, Kincardineshire". In the course of discussion, Pugsley (1932-3, 170) observes "that no real difference exists between the Dover and Nottingham catchfly and that Moss was right in merging them in one variety *Smithiana* of *S. nutans*". Again, Fraser (1933-4, 213) remarks on specimens from Colwyn Bay, Denbigh, "These fruiting specimens give an intimation of the shortness of the carpophore. The leaves of one strong specimen are the broadest I have ever seen in this species".

<i>Form 1</i> (E. Kent).	<i>Stem</i> 30 cm. more or less, stout; stem-leaves broadly lanceolate, sessile, lower ones broadly petiolate.	<i>Leaves</i> obovate, ratio length : breadth 1.5-2.0, apex usually obtuse, sometimes acute but not acuminate. Petiole equaling lamina. Leaf frequently tinged red. Lamina thick and equally pubescent on both sides.	<i>Indumentum.</i> Whole plant covered with long hairs, particularly long on the stems.	<i>Inflorescence</i> fairly close, very viscid to, or below, the lowest peduncle. Calyx viscid, teeth broad with scabrid margins.	<i>Capsules</i> small, 9-10 mm. (average 9.5).	<i>Carpophore</i> 2-3 mm. (average 2.4).	<i>Distribution</i> : 15, E. Kent; cliffs from Kingsdown Bay to Folkestone.
<i>Form 2</i> (Devon).	<i>Stem</i> similar.	<i>Leaves</i> broad lanceolate. Pubescence slightly less dense.	<i>Indumentum.</i> Rather similar.	<i>Inflorescence</i> very viscid and sturdy.	<i>Capsule</i> 9-10 mm.	<i>Carpophore</i> 2-2.5 mm.	<i>Distribution</i> : 3, Devon; Seaton, Beer Head, Dorset; Old Harry Cliffs (extinct ?).
<i>Form 3</i> (Scotland).	<i>Stems</i> sturdy, stem-leaves well developed, sessile.	<i>Leaves</i> obovate, l : b 2.5. Petiole equalling lamina.	<i>Indumentum.</i> Hairs fairly short and denser, longer on stem.	<i>Inflorescence</i> close.	<i>Capsules</i> 8-10 mm. (average 9.5).	<i>Carpophore</i> 2-3 mm. (average 2.9).	<i>Distribution</i> : 85, Fife; N. Queensferry, Dysart, 90, Forfar; Boddin Pt. near Montrose. Dumnald, Red Head, 91, Kincairdine; Bervie, St. Cyrus.
<i>Form 4</i> (N. Wales).	<i>Stem</i> thick, stem-leaves well developed, petiolate.	<i>Leaves</i> frequently very broad, almost spatulate, l : b 1.5-2.0.	<i>Indumentum.</i> Hairs dense all over the plant, but rather less dense on upper surface of leaves.	<i>Inflorescence</i> close.	<i>Capsules</i> 9-10 mm. (average 9.5).	<i>Carpophore</i> 2-3 mm. (average 2.8).	<i>Distribution</i> : 49, Caernarvon; Little and Great Orme's Head, Llandudno cliffs and Gloddaeth Hill. 50, Denbigh; Colwyn Bay.
<i>Form 5</i> (Yorks, Notts).	<i>Stem</i> rather less stout than preceding, stem-leaves well developed.	<i>Leaves</i> lanceolate, l : b 3.	<i>Indumentum</i> short and dense.	<i>Inflorescence</i> may be stout or more slender.	<i>Capsules</i> 8-10 mm. (average 9.2).	<i>Carpophore</i> average 3 mm.	<i>Distribution</i> : 56, Notts.; Nottingham Castle (extinct ?). 64, Mid W. York; Knaresborough cliffs, (extinct ? at Bramham and Ingleborough).
<i>Form 6</i> (Derbyshire).	<i>Stem</i> usually slender, stem-leaves may be small, but frequently well developed.	<i>Leaves</i> linear-lanceolate, l : b 3-4, acute.	<i>Indumentum</i> short and sparse on the leaves, longer on the stems.	<i>Inflorescence</i> slender, can be very viscid.	<i>Capsules</i> 8-10 mm. (average 9.1).	<i>Carpophore</i> average 2.3 mm.	<i>Distribution</i> : 57, Derby; in many of the Dales, 39, Stafford; continuation of some of the Derbyshire dates.

DISTRIBUTION OF *SILENE NUTANS* IN BRITAIN.

The figure shows the distribution of the species in Great Britain. As the plant has a very discontinuous distribution and is usually localised in any particular area, the stations have been represented by spots and blocks, rather than by the vice-county system. This method gives a much truer picture of the distribution of a rare species. The size of the spots and blocks is intended to give an approximate idea of the area occupied in each locality.



All the counties in which the species is indigenous are mentioned under the respective varieties and most of their individual localities have been noted.

Moss (1920, 79) gives a distribution map showing *S. nutans* to occur in many more counties than, in fact, it does. As the plant favours

open, dry situations it easily grows in sand pits and on ballast heaps if the seed is present; thus many of the county records are doubtful and the status of the species is dubious in such cases. The *Flora of Cornwall* (Davey, 1909) notes it as "a casual at Par, 1903," and, although I have seen specimens from other parts of Cornwall, they always appear to be casuals on tips, etc. Yet Moss blocked in the whole of that county on his map. Similarly, it cannot be said to be a native of Somerset as the records state that it occurred "on the top of a wall, Bath." Incidentally, I find the absence of the species from this county rather surprising as there are so many suitable habitats, particularly in the Mendips. The records for Norfolk are doubtful: it is said to occur on the "borders of fields." Also the Cumberland record is for a casual occurrence. Therefore, the species cannot be counted as a native for any of these counties. Some of the records quoted by Druce (1932, 47) are misidentifications—frequently with *S. dichotoma* or other aliens introduced with foreign seed.

The full list of vice-counties where *S. nutans* may be regarded as indigenous and a permanent element in the flora, is given below. V.-c. 3, S. Devon. 9, Dorset. 10, Wight. 11, S. Hants. [13, W. Sussex?] 14, E. Sussex. 15, E. Kent. 17, Surrey. 39, Staffs. 49, Caern. 50, Denb. [51, Flint?] 56, Notts. 57, Derby. 64, Mid W. York. 85, Fife. 90, Forfar. 91, Kincardine. S, Jersey.

SILENE NUTANS L. IN EUROPE.

The question will inevitably arise: "Do these varieties occur on the continent of Europe?" The most obvious place one would expect to find them, if they do occur, would be along the north French coast. Examination of material (kindly lent by Herb. Mus. Paris) from the Pas de Calais and Normandy shows that the plants are similar to var. *Salmoniana*. No specimen has been matched with var. *Smithiana* with its broad, pubescent leaves as found at Dover; this appears to be a well-marked British endemic. The plants of the Pas de Calais, just across the Channel, have a slender habit and possess capsules which are rather intermediate between our varieties; measurement of them shows that their length ranges from 9-11 mm., with an average about 10.5 mm.; they are quite barrel-shaped and have a rather small aperture. In fact, they are quite like our Surrey specimens. Plants from Jersey appear to be identical with the typical var. *Salmoniana*. I am not, however, prepared to say whether this variety occurs in France without examining further material.

Conversely, it is possible to say, from examination and comparison of specimens and descriptions, that none of the following species and varieties recorded from the Continent have been found in Britain. A chronological account of *S. nutans* agg. in Europe is given below, together with notes on *S. paradoxa* L. and *S. italica* Pers. with which *S. nutans* has been confused. The list gives a selection of names only and does not claim to be exhaustive.

- S. livida* Willd., 1809, *Enum., Hort. Berol.*, 474. Apparently different from *S. nutans* in having the exterior of the petals blue-green rather than white. A native of Carniola. No British plants have petals of this colour as far as I know, although many of var. *Salmoniana* have a green tinge.
- S. amblevana* Lejeune, 1811, *Fl. Spa*, 1, 199. Stem and leaves are perfectly glabrous. Found in the mountains bordering Amblève. Later (1812, *Fl. Spa*, 84) Lejeune admits it is synonymous with *S. infracta* W. et K.
- S. infracta* Waldst. & Kit., 1812, *Icones et desc. pl. rar. Hung.*, 237, t. 213. This is an entirely glabrous plant, unlike any British form.
- S. nutans* L. var. *infracta* (Waldst. & Kit.) Wahlenb., 1814, *Fl. Carp.*, 128.
- S. lagunensis* Chr. Sm. ex Link, in Buch, 1815, *Beschr. Canar. Ins.*, 154 (*non vidi*). This appears to be another glabrous form.
- S. nutans* L. var. *rubens* Vest, 1821, *Flora*, 150. This hardly seems to be a variety of *S. nutans* L. for its description is very different. It is said to have bifid petals without a corona, sometimes reddened, and red-coloured calyx, also a sessile capsule. There is no British form answering to this description, but red-flowered plants have been found in Hampshire and Kent; they correspond in no other details given. Plants raised from normal *S. nutans* seeds, obtained from Lausanne and Paris, both, however, produced a majority of pinkish flowers, which were not apparent on similarly grown Swedish or British plants.
- S. nutans* var. *livida* Otht, in De Candolle, 1824, *Prodromus*, 1, 378. This appears to be the same as *S. livida* Willd. (1809), and Moss (1920) states that his var. *Smithiana* "recalls *S. nutans* var. *livida* Otht." This seems to be a strange remark as the flowers of var. *Smithiana* are particularly white!
- S. pelidna* Reichb., 1825, *Pl. Crit.*, Cent. 3, 52. The author states that this species is often placed under *S. livida* Schl. as its petals are white and blue-green underneath, but it is less viscid and has shorter hairs than that species.
- S. nutans* β *subcanescens* Reichb., 1832, *Fl. Germ. excurs.*, 821: "indumento aucto, floribus majoribus". Described from Wallis in Switzerland.
- S. polyphylla* Baumg., 1846, *Enum. Transsilv.*, 1, 397. A common species around Talmats and Boiza in sandy and arid places. It is characterized by a glabrous calyx and scabrid, ciliate leaf margins.
- S. spatulaefolia* Jordan, 1848, *Cat. Jard. Dijon*, 31 [*non vidi*]. The original description was published in a rather obscure garden catalogue. For a discussion on the species see 1852 below.
- S. spergulifolia* Schur, 1850, *Sert. Fl. Transsilv., Verhandl. und Mittheil. Siebenb. Ver. Naturwiss.*, 12, No. 447. *Nomen nudum*.
- S. spathulaefolia* Jord., Willkomm, 1852, *Ic. et descr. pl. Hispan.*, 1, 64, t. 47. This give an excellent illustration and describes the plant sent to Willkomm by Jordan. Stem 40-50 cm. high, hairs short, leaves 5-12 cm. long by 1.5-2.5 cm. broad, rotundate or ovate-spathulate, apex obtuse, upper parts very viscid.
- The broadest-leaved British plants occur in N. Wales, although I have found a specimen with very broad leaves at St. Margaret's Bay in Kent. A specimen from the Great Orme's Head (in Herb. Mus. Brit. ex Herb. Linton) collected by Griffiths has very broad leaves and the sheet is noted "very marked var. *paradoxa* Sm. Bab. Man. ed. 9" and "cf. var. *spathulaefolia* Burnat et Jord. which seems much the same form". The first note is curious as Smith (1800) states in his description of *S. paradoxa*: "Folia longe angustiora, lineari-lanceolata glabra" (see reference to *S. paradoxa*).
- On comparing this specimen with *S. spathulaefolia* Jord. collected by Reverchon in the Basses-Alpes in 1885, which agrees well with Willkomm's figure, I concluded that the species does not occur in Britain. Mr. Wilmott endorsed my view.
- S. transsilvanica* Schur, 1858, *Oesterr. Bot. Zeit.*, 22 et 287, *nomen nudum; ibid.*, 1860, 181.
- S. dubia* Herbich, 1859, *Fl. Bucov.*, 388. This is the Bucovinian plant (whose description was repeated by Salmon, 1905, 127) with which Salmon confused the British var. *Salmoniana* (see pp. 80, 82).

- S. commutata* Schur, 1859, *Verh. Siebenburg. Ver.*, **10**, 66. Another green-flowered form. The author states that it has affinities with *S. nutans* L. rather than with *S. polyphylla* Baumg., but I feel sure that the status of most of these forms and species needs to be investigated to assess their taxonomic value.
- S. nutans* β *spathulataefolia* (Jord.) Burnat, 1892, *Fl. Alpes-Marit.*, **1**, 213.
- S. nutans* β *subverticillaris* Rouy et Fouc., 1896, *Fl. France*, **3**, 144. The synonyms under this name by no means agree and I have, therefore, been unable to typify the variety.

S. PARADOXA L. AND *S. ITALICA* PERS.

The name *Silene paradoxa* was given by Linnaeus (1764, 1673) to a plant said to live "in Italia" and to have the stature of *S. nutans* but to be four times larger. There are two sheets in his herbarium (Savage, 1945, No. 22 and 23) written up by Linnaeus as *S. paradoxa*. The plants are different from *S. nutans* and are more nearly allied to *S. italica* because of the long carpophore and calyx (20 cm.) and broad petal segments. Sheet 23 has a note "*Lychnis noctiflora dubiensis perennis*" (sic; ? *dubrensis*) written by Miller who thus identified it with a plant collected at Dover by "Mr. Newton" called "*Lychnis major noctiflora dubrensis perennis*" (in Ray, 1696, 20; 1698, 995, and Dillenius, 1724, 340).

This misidentification was continued by Smith (1800, 467) who ends his account: "Quanta apud auctores de hâc plantâ confusio!"—not realizing that he himself might be adding to the confusion. For the specimen in his own herbarium under the name of *S. paradoxa* is a quite glabrous plant allied to *S. infracta* W. et K. Unfortunately none of Newton's Dover specimens have been traced. Smith's description with "folia glabra" would seem to have been taken, at least in part, from his Hungarian specimen, as no British plant is glabrous, and especially not the Dover material.

In 1824, however, Smith (299), after visiting Dover and bringing back specimens which were cultivated by (T. F. ?) Forster (see Herb. E. F. Forster), realized that the Dover plant was not *S. paradoxa*. He also seems to have questioned Newton's view that it was less viscid than *S. nutans*. He says that "Miller mistook *S. paradoxa* for the Dover Catchfly and sent it as such to Linnaeus; but I cannot learn that it grows there" (Smith, 1824, 297).

In 1825 Peete found a plant at Dover which he described and figured as *S. patens* (1832, No. 2748). This plant was subsequently identified with *S. italica* Pers. Marshall (1899, 55) confused *S. nutans* with *S. italica*, but the latter has not been found at Dover since Peete collected it, though it still grows in N. Kent. I believe this might have been the species that Ray found, and the confusion arose because nobody knew what he had really found.

ACKNOWLEDGMENT.

In conclusion, my grateful thanks are due to the late Mr. A. J. Wilmott, who suggested the work, and to the Trustees of the British Museum (Natural History), who made it possible in initiating their Student Vacation Scheme. I also wish to thank Mr. H. K. Airy Shaw, of Kew, for giving valuable advice on the final lay-out of the paper.

SUMMARY.

1. The aggregate species *S. nutans* L. is very variable and a number of forms are found in Britain. Their occurrence may be partly related to the discontinuous distribution of the species.
2. The primary distinction of the British forms is the capsule size. On this basis there are two varieties in Britain.
3. *S. nutans* var. *Salmoniana* n. var. has a southern distribution and possesses capsules over 1 cm. long.
4. *S. nutans* var. *Smithiana* Moss includes six forms from various localities in Britain; all of them possess mature capsules under 1 cm. long.
5. Neither of these varieties matches published descriptions of Continental European forms.

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DISTRIBUTION OF THE BRITISH WATERCRESS SPECIES

By H. W. HOWARD and A. G. LYON, School of Agriculture, Cambridge.

Since the publication of our provisional lists relating to the vice-comital distribution of the British Watercresses (1950, *Watsonia*, 1, 230-3) we have had the opportunity of examining further material and have also received some records of determinations by others. The supplementary lists given below, comprise:—

- [a] Vice-county records not previously listed. These are marked with an asterisk (*).
- [b] Vice-county records of earlier date than those given in our previous lists, for which they should be substituted in each case.
- [c] A record to be deleted. This is marked §.

The key to the Herbaria housing the voucher specimens is as follows:—

- (D) University of Durham.
- (H) University College, Hull.
- (I) National Museum of Ireland (Dublin).
- (K) Royal Botanic Gardens, Kew.
- (M) University of Manchester.
- (N) King's College, Newcastle-on-Tyne.
- (NH) Hancock Museum, Newcastle-on-Tyne.
- (R) University of Birmingham.
- (Y) University College, Aberystwyth.

The number in brackets at the end of each record is of the total number of sheets seen for that vice-county.

NASTURTIUM OFFICINALE R.Br.

V.-C.

- 6, N. Som.; Cheddar, 1880, (Herb. J. Painter), (Y), (5).
- 30, Beds.; Woburn, 1878, *W. Hillhouse*, (R), (3).
- 43, Radnor; Waterwinch, 1873, *C. Bailey*, (M), (2).
- 59, S. Lancs.; Holcombe brook, 1854, (Herb. Dr. W. R. McNab), (I), (2).
- *65, N.W. York; Gunnerside to Reeth, 1948, *D. H. Valentine*, (D), (1).
- *67, S. Northumb.; Newcastle, ca. 1830, (*R.B.B.*), (N), (2).
- *70, Cumb.; nr. Armathwaite, 1817, (Herb. Robertson), (NH), (1).
- *74, Wigt.; nr. Luce, 1877, *s.n.*, (H), (1).
- *H.14, Leix; Rathdowney, 1930, *R. A. Phillips*, (I), (1).
- *H.20, Wicklow; Fassaroe, 1864, *R. M. Barrington*, (I), (4).
- *H.21, Dublin; Miltonsfields, 1839, (Herb. Dr. Steele), (I), (3).

NASTURTIUM MICROPHYLLUM Boenn. ex Rchb.

V.-C.

- 11, S. Hants.; Boarhunt, 1843, *W. L. Notcutt*, (M), (7).
- 16, W. Kent; Plumstead Marsh, 1845, (Herb. J. W. Rivington), (M), (2).
- 28, W. Norf.; Swaffenham, 1833, *Sir W. A. Trevelyan*, (NH), (6).
- 33, E. Glos.; delete record in previous list and substitute:—Cold Pool marsh, Badgeworth, and Sandy Lane, Pilley, 1944, *C. C. Townsend*, (K), (1).
- §37, Worcs.; delete record in previous list.

- *48, Mer.; Aberdovey, 1948, (B.E.C. Excursion), (K), (1).
- 55, Leics.; Swithland nr. Leicester, 1875, *F. T. Mott*, (M), (3).
- *56, Notts.; Wollaton Park, 1877, *E. F. Linton*, (M), (1).
- 57, Derby; Canal, Whatstandwell to Ambergate, 1884, *C. Bailey*, (M), (2).
- 58, Ches.; Hale Moss and Wilmslow, 1865, *C. Bailey*, (M), (9).
- 59, S. Lancs.; by R. Alt, 1875, *J. W. Lewis*, (M), (5).
- *62, N.E. York; Coatham Marsh, 1879, *C. Bailey*, (M), (2).
- 83, Edinb.; Hawthornden, 1832, *W.H.C. ?*, (I), (7).
- *H.20, Wicklow; nr. Newcastle, 1872, *R. M. Barrington*, (I), (1).
- *H.25, Rosc.; Kiltewan, 1897, *T. A. P. Mapother*, (I), (1).
- *H.28, Sligo; Sligo, 1882, *R. P. Vowell*, (I), (1).

NASTURTIIUM MICROPHYLLUM × *OFFICINALE*.

V.-C.

- *23, Oxon.; Headington Wick, 1885, *G. C. Druce*, (R), (1).
- 33, E. Glos.; Hilcot valley, Colesbourne, 1910, *C. Bailey*, (M), (2).
- 39, Staffs.; Arley, 1884, *s.n.*, (H), (2).
- 57, Derby; Millersdale to Buxton, 1875, *C. Bailey*, (M), (4).
- 58, Ches.; Prestbury 1869, *C. Bailey*, (M), (4).
- *59, S. Lancs.; Whitefield, 1842, *J. Just*, (M), (1).
- *64, M.W. York; nr. Harrogate, 1914, *A. C. Hardy*, (H), (2).
- 65, N.W. York; Richmond, 1865, *J. Ward*, (M), (2).
- *H.21, Dublin; Finglas, 1905, *N. McArdle*, (I), (1).
- *H.36, Tyrone; Omagh, 1896, *M. C. K(nowles)*, (I), (1).
- *H.38, Down; Castle Espie, 1879, *S. A. Stewart*, (I), (1).

Information regarding the distribution of the watercresses in Britain is still very incomplete and we would again welcome both material and records from areas which have not yet been covered and in particular from Ireland. The value of such records would be greatly enhanced by the inclusion of brief references to the geological nature of the terrain as an aid to the assessment of possible ecological preferences. We would especially welcome records from vice-counties not covered by this list or our previous one (1950, *Watsonia*, 1, 250-253).

Our thanks are again due to the Keepers of the Herbaria concerned for granting facilities for the examination of material and for assisting in the identification of localities. On this account we are particularly grateful to Mr. P. O'Connor for the help he has given us in connection with the Irish records.

GEORGE GRAVES, F.L.S. (1784-1839?)

By W. H. CURTIS.

George Graves was born at Newington Butts in the Parish of St. Mary Newington, Surrey, on May 23rd, 1784. To anyone who happens to have taken an interest in Graves the date of his birth may occasion some surprise, because it has usually been assumed that he flourished some years earlier. The date, however, is taken from the Registrar for London and Middlesex Quarterly Meeting 1720-1837 of the Society of Friends. In that most useful volume *A Biographical Index of Deceased British and Irish Botanists* by James Britten, F.L.S., and George S. Boulger, F.L.S., F.G.S., we find "George Graves fl: 1777-1834." The date 1777 was probably taken from Joseph Smith's *Catalogue of Friends Books*, 2 vols., 1867, in which George Graves is described as of Walworth, then of Peckham, and lastly of Edinburgh. He was further known to have left the Society of Friends, and eight of his works are listed between 1777 and 1834.

The eight works mentioned (Smith, *l.c.*, 1, 862) are as follows:

- Graves, George, of Walworth, after of Peckham, London, lastly of Edinburgh. (See Wm. Curtis) "*Flora Londinensis*," vol. 3, a new edition, enlarged by G. G. Vol. 4, 5 [a continuation by G. G.] Fol. 1777*, etc.
- , *British Ornithology*: being the history, with a coloured representation of every known species of British Birds. 3 vols. London: 8vo. 1811. Qt. Reprinted. 2nd Ed. 3 vols.: 1821.
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- , *Another* with a different title page.
- , *Monograph of the British Grasses*, with descriptions published every two months. Royal 8vo. 1822.
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- , *Hortus Medicus*: or figures and descriptions of the more important plants, used in medicine, or possessed of poisonous qualities; with their medical properties, chemical analysis, etc. The chemical and medical departments by J. D. Morries. Edinburgh: 4to. 1834.

*This was the date of the first volume of *Flora Londinensis*.

It was in March 1781 that William Curtis, F.L.S. (1746-1799), suffering from a severe attack of rheumatism which kept him indoors, by way of amusement set himself to design a beer jug and mug. This jug bears the designer's initials and the date 1781. The spout is so shaped as to form the upturned brim of a hat beneath which appears a cleverly moulded face believed for many years to be that of George Graves. As this jug and mug (they are now exhibited in the Curtis Museum, Alton, Hampshire) have never been out of the Curtis family it seems almost incredible that such a mistake should have been made, but once made it has continued to be accepted without question. The solution is that the face on the jug is of George's *father*, William Graves, "the constant and undeviating friend and assistant of Mr. Curtis," whom Samuel Curtis, F.L.S., writing in 1827 described as still working at the age of 73 when his colouring compared with any work extant. It may be remembered that coloured numbers of *Flora Londinensis* were sold at 5/- but some copies finished with extraordinary care cost 7/6. From long experience William Graves became a most competent colourist and was doubtless responsible for many of the plates for which a higher price was charged. What more natural than that Curtis should wish to associate his friend with this fine jug from which, no doubt, they drank many a good mug!

The writer has for long suspected some relationship between William and George Graves but the assumption that they belonged to the same generation seemed to eliminate the possibility of their being father and son. A miniature of William Graves and another of his wife, Mary, have been shown to me by the owner, Major J. S. Gemmell, D.S.O., M.C., of Woodbridge, Suffolk. They were painted in 1813 and 1814 by Stephen Poyntz Denning of Dulwich College. If Samuel Curtis's statement that William Graves was 73 years old in 1827 was correct, he must have been a young man of about 27 when the beer jug was made, and 59 or so when Denning painted his portrait. So far I have been unable to trace either the date or birth place of William Graves, or the maiden name of his wife, Mary. Mr. John Nickalls has been unable to find anything of the kind in the records of the Society of Friends which he has examined and the conclusions he has reached are either the marriage was in a record now lost, a most unlikely thing to happen seeing that so few are lost, or that William and his wife became Quakers after marriage.

Allowing for the differences in age, the face on the jug and the portrait by Denning are of the same man. There is the finely chiselled nose, the keen eyes, brown in the miniature, and almost the same wealth of hair.

According to the Register mentioned above, George was the eldest of several children of William and Mary Graves. The place of the monthly meeting is given throughout as Southwark but in the first entry William's occupation is omitted. With the birth of the second child, Joseph, born August 20, 1786, William is described as "colourer in Natural History". At the birth of the next child, Edward, in 1789 the

description of the father is merely "colourer", but at the birth of Samuel in 1793 the previous title is restored. A daughter Elizabeth is born in 1793 who is followed in 1795 by another son, Henry Swan, and in 1797 another daughter Frances. Now comes an interesting point. A daughter Mary is born on August 6, 1799, but William is no longer described as a "colourer" or "colourist" but as a "grocer" of Walworth Road.

In 1786 when the second child, Joseph, was born, the place of birth was given as Walworth Road, Parish of St. Mary Newington Butts, Co. Surrey, and probably George was born at the same house though the words "Walworth Road" were not inserted. In 1793, the address is Crown Row, Parish of St. Mary Newington.

It seems therefore that when his friend and employer William Curtis died on July 7th, 1799, William lost his job as a colourist and, in order to maintain a large family, was compelled to look around for some other means of earning a living. Why he entered the grocery business, for which he must have been totally unsuited, cannot be known for certain, but the Register contains what may be a hint on the same page, viz.: another Graves whose occupation is "grocer" and who may possibly have been a connection of some sort. William is still a grocer in July 1801 when another son, Bingham, appears, but with the birth of Rhoda in December 1803 William is again "a colourist" and his address is changed to Richmond Place, Walworth. As it has seemed necessary to introduce the names of William's children, it should perhaps be added that the youngest child, Thomas, was born at Crown Row in April 1806.

I have learnt nothing about George's early years, but from some notes in Minutes which Mr. John Nickalls, Librarian to the Society of Friends, has very kindly extracted for me, I find that George was for a time living in the house of Thomas Curtis, a younger brother of William, the botanist, whose works Thomas published. Thomas married Susannah Simmons. As a consequence of this George courted Thomas's daughter, Mary, and in 1806 they were married.

Entries in the Minutes of Southwark Monthly Meeting of the Society of Friends, dated 16.9.1806, 25.10.1806, and 13.1.1807-11.8.1807, tell the story how George and his young wife came to be disowned by the Society. It is enough to say that

"George Graves of St. George's Crescent (so called) in the Parish called St. George the Martyr, in the Borough, Southwark, Bookseller, son of William Graves of Newington Butts, Surrey, and Mary his wife, and Mary Curtis of St. George's Crescent (so called) aforesaid Daughter of Thos: Curtis of same place, deceased, and Susannah his wife now surviving, appeared together at this Meeting and declared their intention of taking each other in marriage . . .".

The formal disownment by the Society was made on 12.1.1808. A daughter whom they named Mary Ann was born on February 23, 1807, and their second child, William Curtis, on February 22nd, 1809. Both children were born at Garden Row, and George is described on both

occasions in the Register as a Bookseller, but the letters N.M. (signifying non-member) occur with the birth of the second child. Mr. Nickalls points out that the letters N.M. are included after the names of the later children by which they forfeited the birthright of membership through their parents, but he considers it probable that they continued to be worshippers because their children are in the Register.

In 1810 George Graves is described as a "colourer" and by 1815 as an "artist". In 1820 it may be added he was still living in London.

FLORA LONDINENSIS.

We come now to George's adventures in literature. On January 16, 1815, he became the owner—or more accurately part owner—of William Curtis's great, but unprofitable, work *Flora Londinensis*. As the agreement which is preserved in the Curtis Museum at Alton reveals a good deal in one way and another, it is worth while to consider it in some detail.

It is drawn up "between John Sims of Upper Guildford Street in the Parish of St. George, Bloomsbury, Doctor in Physick, and Thomas Fothergill now of Austin Friars in the City of London, gentleman, surviving executors named in the last Will and testament of William Curtis, late citizen and Apothecary of London deceased of the first part, Samuel Curtis late of Walworth in Surrey, florist, but now of — of the second part, and George Graves of Walworth in Surrey, gentleman of the third part Whereas the said John Sims and Thomas Fothergill together with Thomas Curtis, the other executor named in the Will, deceased did on or about the year 1802 contract and agree with the said Samuel Curtis for the sale to him of a certain work or publication called *Flora Londinensis* with the plates stock and materials and accounts belonging at the price of £600 and for securing the payment thereof the said Samuel Curtis did by his certain Bond or obligation bearing date the first day of March 1802 become bound to the said J.S., T.F. and T.C. in the penal sum of £1200 with condition to be void on payment of the said sum of £600 with interest for the same on March 1st, 1806."

"And whereas the said Samuel Curtis had possession given to him of the plates stock and materials belonging to the said work for the purpose of selling or continuing the publication thereof as he might think proper, but the said Samuel Curtis having neglected to pay and satisfy the said bond when the same became due " he proposed to the executors that he would give up to them the plates stock and materials then remaining to the said work or publication which the executors agreed to take back accordingly and whereas the said plates etc. were placed under the care of Susannah Curtis at Prospect Row and whereas the said George Graves hath agreed etc. with John Sims and Thomas Fothergill for the absolute purchase of the plates, stock etc. etc. with the copyright of *Flora Londinensis* and the sundry plates of plants, birds and insects and other subjects of Natural History . . . for the

sum of £390 . . . (and also for the consideration of 5/- to S. C.). The *Botanical Magazine* is specifically excepted.

The schedule above referred to consists of copper plates, copyright and materials of the *Materia Medica*. The copper plates of botanical subjects with the copyright and materials thereunto belonging. Two plates of insects with copyright and materials. Three ditto of birds with copyright and materials. All duly signed and sealed.

It will be seen from this that Samuel Curtis lost money on *Flora Londinensis*, and also that only two plates of insects and three of birds were handed to Graves. It is probable that William Curtis had many more which he hoped one day to use but never did and as Samuel is not known to have made use of them either, some were probably lost. The drawings of birds were no doubt by Sydenham Edwards and the insects by Moses Harris. A considerable number of the latter are, however, in the Museum at Alton.

In order to tell the full story it is necessary to give the gist of other agreements.

Assignment of interest in the *Flora Londinensis* etc. pursuant to an award.

Indenture 21st Oct. 1817 between John Harding of St. James Street, Mx. bookseller and G. Graves of Walworth, Surrey, gentleman. Whereas by mutual bonds dated July 25th last after reciting that they had been partners in the publication and sale of *F. L.* and some differences having arisen to dissolve partnership—they became mutually bound to each other in the personal sum of £3000 to stand to abide by, perform and fulfil etc. the order award etc. of Crosley George Lackington and Thomas Hurst.

That the said John Harding shall on or before Oct. 21st the next deliver to George Graves a good sufficient assignment of all his right title or interest in *F. L.* and a certain other work called *The Naturalist's Pocket Book*. Also that George Graves should pay to Harding £493 14 0 on or before 21st Oct. then next. copyright, stock etc. The signatures of John Harding and *George Graves* appear at the foot of this deed.

Indenture dated Oct. 23 1817 between George Graves and Anthony Sterry *Assignment of copyright by way of Mortgage to Anthony Sterry* George Graves of Walworth and Anthony Sterry of High Street, Borough of Southwark, citizen, in which G. G. has occasion for a loan of £500. Sterry agrees to lend the money at 5 p. cent. and G. G. gives as security all the stock and materials connected with *Flora Londinensis*.

Assignment of copyright by way of Mortgage is witnessed by Mary Sterry in the presence of Thomas Fothergill of Austin Friars.

Another agreement dated 28th March 1821 between George Graves now of Bath Place, Peckham, Surrey, gentleman, and Anthony Sterry, oilman of High Street, Southwark, William Sherwood, Samuel Dunbar Neely and Robert Jones all of Paternoster Row in the City of London, booksellers and co-partners; William Limbery Grosvenor the elder, Eliezer Chater, William Limbery Grosvenor the younger and Charles Rutt all of Cornhill in the said City, stationers and co-partners carrying on trade under the firm of Grosvenor, Chater and Company. Richard Taylor and Arthur Taylor both of Shoe Lane in the same City, printers and co-partners, and James Ramshaw of Fetter Lane in the same City, copper plate printer.

It appears that Graves had paid Sterry £300, but the sum of £210 including interest remained owing. But G. G. was also indebted to the above mentioned parties for the following amounts, viz.

Sherwood, Neely and Jones ...	£169	8	10
Grosvenor, Chater & Co. ...	64	10	0
James Ramshaw	51	17	2
R. & H. Taylor	104	9	0

For the payment of the sums owing Graves proposed to enter into an agreement by which, from time to time, he would deliver to Wm. Sherwood, Neely & Jones such coloured numbers of *F. L.* as they may require, being paid the sum of 3/- for the colouring of each number and that the said work be continued and published monthly or so often as the parties shall require, the materials nevertheless used in carrying out the same to be paid for by the said parties.

Anthony Sterry agrees to permit the use of copper plates (by virtue of mortgage on his property) upon his engaging to return them after use. Wm. Sherwood & Co. agree to sell the publications and stand possessed of the profits. Sterry to be paid interest on his mortgage. The remainder to be divided every three months between themselves and the other parties in proportion to their respective debts.

A. Sterry agrees to postpone repayment of the £200 now due for principal on the mortgage until the other parties are repaid. If at the expiration of two years the publication should not be sufficient to satisfy all debts, the same should be sold to the best advantage and the proceeds be applied first to pay A. Sterry by virtue of the mortgage, the residue to pay off the others. G. G. coming, of course, last of all.

To all this must be added the following notes.

- “Received from the within named Anthony Sterry by the hands of George Graves 432 plates belonging to the old press of the *F. L.* and 72 plates to the new press of the same work which I hereby engage to return to the said Anthony Sterry on demand. Signed April 10, 1821. James Ramshaw, 33 Fetter Lane.”
- “N. B. Sherwood sold his share to the other Trustees.”

“This agreement is cancelled by the partners having sold the *Flora* and equally dividing the proceeds at 3/6 in the £. A copy of which a/c is within—9th Mo. 1834.”

This seems to be as full an account of the *Flora Londinensis* transaction as is likely to be known, and shows clearly that every one concerned in it lost money.

George Graves was elected a Fellow of the Linnean Society on 17th March 1812, and Mr. Spencer Savage informs me that he withdrew from the Fellowship about the year 1834 owing the Society about £50 for annual contributions—a fact which will surprise no one who has read the foregoing account. The Linnean Society has but one letter of George Graves, dated 12th Feb. 1831, and this refers to his arrears of payment.

Points to be cleared up about George Graves are his reasons for departing to Edinburgh and the more important one of the date of his death.

It is possible that his removal to Edinburgh was brought about by one of his children having gone to reside there, and a scrap book bearing the name stamped in gilt lettering “Mary Ann Graves, Edinburgh”, seems to show that she went with her father. Samuel Curtis, who paid several visits to Scotland, had friends amongst gardeners and botanists in Edinburgh, and may perhaps have contributed to George’s leaving London.

A possible clue to the date of George’s death is contained in the account headed “George Graves to Sterry Sterry and Company” (no longer Anthony Sterry, oilman!). This concerns a policy for £1000 in the London Life Assurance. The first entry is dated June 2, 1839, and gives the amount of cash advanced at sundry times prior to this date. Then follows the amount of premiums paid by J. Sterry and subsequently by Graves’ executors from 1839 to 1862, viz., 23 years interest. In 1863 Sterrys receive £1000 from the London Life Assurance, but they estimate that they have lost £956 7s 0d on the transaction.

It would appear from this that Graves died on June 2, 1839.

Throughout his working life he was harassed by financial worries from which the proceeds of his publications never sufficed to free him. But in spite of this he and his wife brought up a family of eight children and so far as is known did well by them.

SHORT NOTE

H. F. PARSONS' HERBARIA

The note by A. H. G. Alston (1950, *Watsonia*, 1, 242) mentioning the herbaria of Dr H. F. Parsons prompts a further account of his herbarium at Croydon.

Henry Franklin Parsons was a medical officer by profession, an expert on public health and sanitation, and a keen naturalist. His most important botanical publication, viewed in retrospect, is his account of the flora of the Surrey commons (1912, *Proc. Croydon N.H.S.*, 7, 57).

The *Proceedings of the Croydon Natural History and Scientific Society* (1914, 7, clxxiv), at the end of his obituary notice, records that with the exception of his Somerset specimens, which were left to the Somerset Archaeological and Natural History Society, he left the whole of his collections to the Croydon society "for the Croydon Museum." The notice continues: "It is earnestly hoped that the local Authorities will accept them, and either place them in the Grange Wood Museum or provide a museum worthy of the town to receive them. They consist of a splendid geological collection containing some 10,000 specimens, chiefly fossils, all carefully named and mounted. A most complete British herbarium in good condition, and specially rich in Mosses, Lichens and Fungi. A considerable collection of land and freshwater shells, a number of microscope slides, and a large number of scientific works . . . etc."

Inspection of Parsons' will at Somerset House shows that he actually left all his collections to his executors for disposal as instructed by him, and these instructions were evidently as outlined above. The Somerset collection is the herbarium now at Taunton museum.

The only public museum in the borough of Croydon was a couple of rooms opened in the early years of the century in Grangewood recreation ground, S.E.25, and it was here that the Parsons herbarium was placed. Very shortly afterwards the museum was closed owing to the war, and was not reopened until 1920. I have so far not been able to find out whether the Parsons collections ever went back there; they were in the Society's own rooms at the outbreak of the second world war, when the Grangewood building was again closed and has remained so.

The geological collection appears to have lost its identity amongst the Society's collection, which is in need of renovation. A large number of the microscope slides, some of which are of botanical subjects, had perished at the outset, but a goodly collection still survives. The herbarium was arranged by Society members, probably under the leadership of Miss E. F. Klaasen, in 1914-16, and was cleaned some time in the 'thirties when it appears that some sheets attacked by insects were,

unfortunately, thrown away. I am at present cleaning it again; it is in surprisingly good condition considering that it had been neglected for over ten years.

The herbarium is at present in the Society's room at Eldon House, Croydon, and is in three cabinets: (i) A Surrey collection, of about 800 sheets ($11 \times 17''$), of phanerogams and ferns collected by Parsons, C. E. and E. S. Salmon, E. S. Marshall, E. Straker, G. W. Nicholson, H. T. Mennell, F. H. Ward, and others; (ii) a general British collection, on about 800 sheets ($10\frac{1}{2} \times 13''$, mainly folders), of phanerogams and ferns collected by Parsons, Salmon, F. A. Lees, W. R. Haywood, M. Patten, J. Pagan, J. C. Hutcheson, A. T. Teuton, and others; and (iii) a general collection of British bryophytes, fungi, and lichens, which is very comprehensive, as Parsons received specimens through exchange clubs and from W. Bellerby, W. H. Burrell, W. R. Sherrin, A. R. Horwood, J. Glover, J. C. Wilson, and others. The collections are mainly over the period 1870-1910.

D. P. YOUNG.

**CORRECTIONS TO BRITISH PLANT LIST
VIII**

Compiled by E. F. WARBURG.

- 6 RANUNCULUS.**
 10(2) *marginatus* Urv. See Plant Notes.
 [a. *marginatus*. Not British.]
 b. *trachycarpus* (Fisch. & Mey.) Aznavour.
- 96 SILENE.**
 10 *nutans*. See paper by Hepper, pp. 80-90.
 [a. *nutans*. Not British.]
 b. *Smithiana* Moss.
 c. *Salmoniana* Hepper.
- 98(2) MELANDRIUM.** See Abstracts, p. 113.
 1 *album* (Mill.) Garcke.
 c. *viscosum* (F. Aresch.) Ahlfr.
 2 *dioicum* (L.) Coss. & Germ.
 d. *glaberrimum* (Neilr.) Schinz & Thell. Vice 98/6
 Lychnis Preslii.
- 28(2) SAPINDACEAE Juss., 1811, *Ann. Mus.* [Paris], **18**, 476.
- 141(2) KOELREUTERIA** Laxmann, 1772, *Nov. Comment. Petrop.*, **16**, 561, t. 18.
 1 *paniculata* Laxmann. See Plant Notes.
- 155 TRIFOLIUM.**
 44(2) *Petrisavii* Clementi. See Plant Notes.
- 185 RUBUS.**
 26 *errabundus* W. Wats., 1946, *J. Ecol.*, **33**, 339. *R. Scheutzii* Lindeb. sec. Rogers, non Lindeb.
 37 *nemoralis* P. J. Muell., 1858. *R. Selmeri* Lindeb., 1884.
 See Watson, *l.c.*, 338.
 148 *aristisepalus* (Sudre) W. Wats., 1946, *l.c.*, 342.
 149(5) *tenuiarmatus* E. Lees. Vice 149 j. See Watson, *l.c.*, 342.
- 199 SAXIFRAGA.** See paper by Webb, *Watsonia*, **2**, 22-29.
 [Delete Nos. 3-9, 11, 12, 14, 16.]
 15(2) *Hartii* D. A. Webb. H1.
- 368 ANTHEMIS.**
 3(2) *hyalina* DC. See Plant Notes.
- 506 MYOSOTIS.**
 9 *hispida* Schlecht. *M. collina* auct., non (Ehrh.) Hoffm.
 See Plant Notes.

b. **Mittenii** (Baker) Airy Shaw.

c. **Lebelii** (Gren. & Godr.) Rouy.

- 10 **discolor** Pers. in Murray, 1797, *Syst. Veg.*, ed. 15, 190, in obs.; *M. versicolor* Sm., 1814, *Engl. Bot.*, sub. t. 2558.
—A. E. WADE.

543

VERONICA.

- 9 **catenata** Pennell. *V. aquatica* Bernh., 1834, non S. F. Gray, 1821. See paper by Burnett, *Watsonia*, **1**, 349-353.

558

MENTHA.

- 6 **piperita**. See paper by Graham, *Watsonia*, **2**, 30.
a. **piperita**. Vice a. *officinalis* Sole (see 1936, *Rep. Bot. Soc. & E. C.*, **11**, 37).
[c. **Druceana** Briq. Delete; =b. *vulgaris* Sole.]

569

NEPETA.

- 3x5 × **Faassenii** Bergmans ex Stearn. See Plant Notes.

618

RUMEX.

- 20(2) **cristatus** DC., 1813, *Cat. Hort. Monsp.* 39. Examination of the type of this species at Geneva by Dr. K. H. Rechinger has shown that this name should replace *R. graecus* Boiss. & Heldr., 1859, formerly used by Rechinger and by Lousley (1939, *Rep. Bot. Soc. & E.C.*, **12**, 55, 148).—J. E. LOUSLEY.
32 **fueginus** Phil., 1895, *Anal. Univ. Chile*, **9**, 492. See Abstracts, *Watsonia*, **1**, 384.—J. E. LOUSLEY.

650

SALIX.

8 **caprea**.

subsp. B. **sericea** (Anderss.) Flod. See Plant Notes.

669

ORCHIS.

- 7(2) **cruenta** Müll. H2. See paper by Heslop Harrison, *Watsonia*, **1**, 366-375.

726(2)

LYSICHITON.

- 1 **americanum** Hultén & St John. See Plant Notes.

745

ELEOCHARIS.

- 1 **palustris**. See Abstracts, *Watsonia*, **1**, 386-7.
subsp. A. **palustris** (*vulgaris* S. M. Walters).
subsp. B. **microcarpa** S. M. Walters.

775

MILIUM.

- 2 **scabrum**. Delete the brackets in *B.P.L.* See paper by Tutin, *Watsonia*, **1**, 345-8.

PLANT NOTES

6/10(2)b. **Ranunculus marginatus** Urv., 1822, *Enum.*, 62, var. **trachycarpus** (Fisch. & Mey.) Aznavour, 1902, *Magyar Bot. Lapok*, 1, 297; Hayek, 1924, *Prodr. Fl. Penins. Balcan.*, 1, 343. *R. trachycarpus* Fisch. & Mey., 1835, *Ind. 3, Hort. Petrop.*, 46; Boiss., 1867, *Fl. Orient.*, 1, 55; Hegi, 1912, *Ill. Fl. Mittel-Europa*, 3, 541.

34, W. Gloucester; rubbish-tip by Portway, Avon Gorge below Bristol, May 1950, C. I. and N. Y. SANDWITH.

Native of the Near and Middle East. Resembling *R. sardous* Cr., but immediately distinguished by the carpels being terminated at the apex by a conspicuous triangular or lanceolate beak at least 1 mm. long and sometimes slightly curved. Plant nearly glabrous. Smallest lowest leaves often entire and crenate, next lowest deeply and broadly 3-lobed. Sepals reflexed. Petals of medium size, two or three times as long as the sepals. Carpels with the disk filled with tubercles. Typical *R. marginatus* is a hairy plant with smooth carpels.—N. Y. SANDWITH.

45/7. **COCHLEARIA DANICA** L. The first inland record of this species in Britain appears to be in 1946 when D. E. Allen and E. C. Wallace both recorded it on railway ballast near Rugby (1949, *Report of the Rugby School Nat. Hist. Soc.*, 1948, 17, and 1948, *Rep. Bot. Soc. & E.U.*, 13, 284). In 1947 it was recorded by J. G. Dony in a similar habitat in Bedfordshire (1949, *Watsonia*, 1, 38).

The following year I met with the plant, also on railway ballast, at Hamstead, West Bromwich, Staffordshire, this find constituting the third new county record. How long it had been in that place I have no means of verifying, for I found it on my first visit to that particular area.

I have visited the area each year since and details of the plant's distribution at Hamstead can be summarised as follows:

1948. Abundant on ballast of railway track. Some plants on cinders beside track and a few on oily heaps of coal waste which supported no other vegetation.

1949. No plants on ballast of track. Extensive spraying with weed killer was the cause of this disappearance. The few remaining plants were on the oily heaps mentioned before and had colonised similar heaps a hundred yards or so to the north.

1950. Although the species had extended its range again to the north the plants were scarcer and more scattered than before. All but one of the plants were on similar habitats to the previous year, the exception being in a fissure of the rocks with which the lower part

of the railway cutting was lined. This one was the most northerly specimen seen and the habitat seemed to be eminently suitable.

1951. This year it was noticed with disappointment that most of the colonies on the heaps were absent and that the ballast was still free of the species. However, the estimation of a suitable habitat had evidently been correct, for the rocky face where we had seen one plant had many plants upon it. Similar rocky faces in the next hundred yards to the north were also well clothed with these plants and one can feel reasonably certain that *Cochlearia danica* will be found in Hamstead for many years to come.

It is interesting to note that these inland plants of *C. danica* seem to be associated with *Cerastium tetrandrum* Curt. for I have found them both at Hamstead and they have been recorded together from the Rugby district (see 1951, *Report of the Rugby School Nat. Hist. Soc.*, 1950, 28).—V. JACOBS.

64/3. *THLASPI ALPESTRE* L. On June 12th, 1949, during the B.S.B.I. Field Meeting in Breadalbane, an expedition, under the leadership of Miss M. S. Campbell and myself, re-discovered *Thlaspi alpestre* L. growing on limestone on Beinn a-Chuallaich at an altitude of approximately 2,000 feet above sea level—a colony of about 50 plants was found in a very small area.

On June 25th, 1949, my son and I, acting on rough instructions from the finders of the plant, ascended Beinn a-Chuallaich and without much difficulty found the colony before discovered, which contained upwards of 50 plants. There were still a few flower spikes visible and one or two with seed capsules containing unripe seed. Continuing uphill (in a northerly direction) we discovered a second colony, also consisting of upward of 50 plants, within a short distance of the first. Many of the plants in both colonies were growing on the turf and not on rock. The area occupied by both colonies is of very small extent, forming a narrow strip of perhaps 40 yards by 10 yards. Prolonged search failed to discover any trace of the plant outside this circumscribed locality.

On September 9th, 1949, I again visited the locality to show the plant to Mr. John Raven. We inspected both colonies and found one or two dead spikes, the capsules of which had discharged their seeds. Mr. Raven examined various likely looking places in the neighbourhood of the locality but failed to find any more plants.

On June 10th, 1950, I visited the locality by myself. On the limestone rock I found one very fine plant with 5 flower spikes about 2" to 2½" high, also a few smaller plants in flower. In the upper colony I found a large plant covered with flower heads at ground level that had not produced stalks. I was unable again to visit the locality and inspect this plant when it had attained its full stature. I feel sure that it would have proved the finest plant of the colony. It was not growing on rock but on bare soil.

The following species were associated with the *Thlaspi*:—*Viola Riviniana* Reichb., *Cerastium vulgatum* L., *Sagina procumbens* L., *Potentilla erecta* (L.) Raeusch., *Alchemilla glabra* Neygenf., *Saxifraga aizoides* L., *S. oppositifolia* L., *Bellis perennis* L., *Campanula rotundifolia* L., *Vaccinium Vitis-idaea* L., *Armeria maritima* L., *Thymus Drucei* Ronn., *Koeleria gracilis* Pers. (agg.), *Poa annua* L., *Festuca ovina* L., *Botrychium Lunaria* L., *Selaginella selaginoides* (L.) Link.

The presence of some of these (e.g. *Sagina* and *Poa*) was due to some of the plants of *Thlaspi* growing in the mouth of a rabbit hole.

A soil analysis gave pH=7.64 (determined from air-dried soil with a glass electrode) and CaCO₃ content 63.725%.—T. E. D. POORE.

141(2)/1. **Koelreuteria paniculata** Laxmann, 1772, *Nov. Comm. Acad. Petrop.*, **16**, 561. 35, Monmouth; waste ground opposite the Rectory, Tintern, 1947, E. M. FRANCIS. A deciduous tree from 30 to 60 feet high. Leaves alternate, pinnate or bipinnate, with 7 to 15 coarsely toothed leaflets; leaflets ovate, 1 to 4 inches long, glabrous above, pubescent beneath. Flowers yellow, about $\frac{1}{2}$ inch wide, in broad, loose terminal panicles; panicles up to 12 inches long; calyx deeply and unequally 5-lobed; petals four; stamens eight. Fruit an oblong-ovoid, inflated, three-valved capsule, $1\frac{1}{2}$ to 2 inches long; seeds dark brown, about the size of peas. Native of China, introduced into England in 1763.—A. E. WADE.

+155/44(2). **Trifolium Petrisavii** Clementi, 1855, *Sertulum Orientale*, **32**, pl. 7, fig. 2; Boissier, 1872, *Fl. Orient.*, **2**, 144; Aschers. et Graebn., 1907, *Syn. Mitteleurop. Fl.*, **6**, Abth. 2, 490; Hayek, 1926, *Prodr. Fl. Penins. Balcan.*, **1**, 853.

T. hygrophilum Boiss., 1856, *Diagn. Pl. Nov.*, *Ser.* **2**, 2, 18; *T. nigrescens* Viv. subsp. *Petrisavii* (Clem.) Holmboe, 1914, *Studies on vegetation of Cyprus*, 116.

34, W. Gloucester; rubbish-tip by Portway, Avon Gorge below Bristol, June 1950, C. I. and N. Y. SANDWICH. An annual, with decumbent growth and solid stems. Stipules loose, membraneous-scarious, with a broad and nearly truncate or triangular apex which is abruptly contracted into a long subulate point. Leaflets obovate, obovate-elliptic or obcordate, rounded, obtuse or truncate at the apex, cuneate to the base, strongly nerved, sharply toothed especially in the upper half, the teeth ending in fine cusps. Heads numerous, solitary from the leaf-axils, on peduncles exceeding the leaves, 1.5-2 cm. diam. Flowers more or less coloured with rose or mauve. Pedicels much shorter than the whole calyx, but equalling or somewhat exceeding its tube. Calyx-teeth unequal, the upper as long as or somewhat exceeding the tube. Corolla exceeding the calyx by one half. Native of the Near and Middle East.

Closely allied to *T. nigrescens* Viv., which is more widely distributed over the Mediterranean Region, and differing from it especially in the more dense-flowered heads of coloured (not white) corollas which are shorter in relation to the calyx (not twice as long), and in the 2 ovules

of the ovary (*T. nigrescens* normally has 4 ovules). The flowers of the British specimens were pale mauve-white. They bore no mature fruit but several dissected flowers showed 2 ovules, rarely 3 with the uppermost abortive. The fruit of *T. Petrisavii* is described as 2-seeded, whereas that of *T. nigrescens* is 4-seeded. *T. hybridum* and *T. elegans* are at once distinguished by their perennial habit, the shape of their stipules, and their more finely toothed leaflets. I am indebted to Mr. B. L. Burt for confirming my identification of this rather critical clover.—N. Y. SANDWICH.

+368/3(2). *Anthemis hyalina* DC., 1838, *Prodr.*, 6, 4; Boissier, 1875. *Fl. Orient.*, 3, 307.

34, W. Gloucester; rubbish-tip by Portway, Avon Gorge below Bristol, June 1950, C. I. and N. Y. SANDWICH.

Native of the Near and Middle East, from Asia Minor to Syria, Mesopotamia and Persia. An annual, more or less greyish-pubescent on stems and leaves, similar to *A. arvensis* in general facies, but immediately distinguished by the phyllaries, which are broad and very obtuse, very broadly and conspicuously hyaline-scarious and shining in the upper part, usually more or less tinted with brown, especially in the lower part. Leaf-segments acute or shortly awned. Heads about the size of those of *A. arvensis*. Ligules white, fertile. Scales of receptacle lanceolate, carinate.—N. Y. SANDWICH.

506/9. *MYOSOTIS COLLINA* (Ehrh.) Hoffm. G. F. Hoffmann (1791, *Deutschlands Flora oder Botanisches Taschenbuch*, 61) published *Myosotis collina*, citing Ehrhart, *Herb.*, 51, which was issued under the name *Myosotis scorpioides collina* without a description. Hoffmann's diagnosis "*Calyc. patulis, fol. caespitosis hirsutis, caule nudo,*" is too brief to enable one to identify the plant intended, but recourse to Ehrhart's exsiccata, No. 51, shows the latter to be the plant subsequently named *Myosotis versicolor* (Pers.) Sm. H. G. L. Reichenbach (in Sturm, 1822, *Deutschlands Flora*, Heft 42, No. 11) seems to have been the first author to interpret the name *M. collina* in the sense in which it has been generally used. Mertens and Koch (1826, *Deutschlands Flora*, 2, 47) adopted the name *M. hispida* Schlechtendal, citing as synonyms *M. collina* Reichb. and *M. scorpioides collina* Ehrh. They state that they give preference to *M. hispida* Schlecht. on the grounds that *M. collina* Hoffm. is somewhat ambiguous, since the example of Ehrhart's *Herb.* No. 51 which they had seen was *M. versicolor*, and suggest that Ehrhart may not have distinguished the two species, and that other examples of his exsiccata may prove to be *M. hispida*. Many continental authors have adopted this point of view and have considered *M. collina* Hoffm. to be a *nomen dubium*. It is unlikely that Ehrhart issued more than one species as *M. scorpioides collina*. I have seen three examples of Ehrhart's *Herb.* No. 51 from different herbaria and they all appear to form part of the same gathering.

Hoffmann (*loc. cit.*) gives under *M. arvensis* a var. *minor*. There is no description but he cites Bulliard, *Herbier de la France*, t. 355a. This figure is a good one and clearly represents the plant subsequently described by Schlechtendal as *M. hispida* Schlecht. (*M. collina* auct.). It is therefore evident that Hoffman distinguished between the two species.

From the foregoing *M. collina* (Ehrh.) Hoffm. is clearly synonymous with *M. versicolor* (Pers.) Sm. The correct name for the plant called *M. collina* by Reichenbach and many subsequent authors is *M. hispida* Schlechtendal sen., 1817, *Mag. Ges. Naturf. Freunde Berlin*, 8, 230.

Although the original application of the name is not in doubt, it is recommended that the name *Myosotis collina* be rejected as a *nomen ambiguum* under Article 62 of the International Rules, since it has been used with different meanings.

The varieties given in *B.P.L.* should stand as follows:—

b. *Mittenii* (Baker) Airy Shaw in Riddelsdell, Hedley & Price, 1948, *Fl. Glos.*, 343, 625.

c. *Lebelii* (Gren. & Godr.) Rouy, 1908, *Fl. France*, 10, 328. (*M. collina* β *Lebelii* (Gren. & Godr.) Corb., 1893, *Nouv. Fl. Norm.*, 407).—
A. E. WADE.

569/3 \times 5. ***Nepeta* \times *Faasenii*** Bergmans ex Stearn. A recent article by W. T. Stearn (1950, *J. Roy. Hort. Soc.*, 75, 403-406) draws attention to the fact that the plant commonly known to gardeners as *Nepeta Mussinii* is not the true plant. *N. Mussinii* Spreng., now rarely seen in cultivation, is a low prostrate plant with broadly ovate cordate leaves (up to 2.1 cm. broad, ratio length: breadth = 3:2) and a short inflorescence. The catmint so popular in gardens nowadays is bushier with ascending branches, lanceolate to narrow-ovate leaves (length: breadth = 3:1), and a long inflorescence. Bergmans (1939, *Vaste Planten*, ed. 2, 544) and Floto (1944, *Gartner-Tidende*, 60, 450) have independently shown it to be an infertile triploid ($2n=26$), and it appears to have arisen as a spontaneous garden hybrid between true *N. Mussinii* ($2n=18$) and *N. Nepetella* ($2n=34$). It receives the name *N. \times Faasenii* Bergmans (*loc. cit.*, e descr. lat) ex Stearn (*loc. cit.*).

It seemed probable that most of the British records for *N. Mussinii* as an adventive might actually refer to *N. \times Faasenii*, and this proved to be the case. The following herbarium specimens are *N. \times Faasenii*: —3, S. Devon; Sidbury, 1936, *J. W. Wyatt* (Hb. Kew). 6, N. Som.; Weston-super-Mare, 1922, *R. L. Smith* (Hb. Druce, Oxford). 69b, N. Lancs.; near Dalton-in-Furness, 1913, *D. Lumb* (*ibid.*).

The wild Siberian material of *N. Mussinii* at Kew shows quite a wide range of variation, but the following British specimens can be matched with forms of the true plant:—34, W. Glos.; Bristol, 1928, *G. C. Druce* (Herb. Oxford). "Scotland", 1926, Miss A. Grasseman (Hb. S. London Bot. Inst., as *N. nuda* L.).—D. P. YOUNG.

650/8B. ***SALIX CAPREA*** subsp. ***sericea*** (Andersson) Floderus, 1926, in Lindman, *Svensk Fan.-fl.*, ed. 2, 210. *S. caprea* [var.] *sericea* An-

dersson, 1867, *Monogr. Sal.*, 78. *S. caprea* var. *coactanea* Hartman, 1838, *Handb.*, ed. 3, 236. *S. coactanea* (Hartm.) Floderus, 1930, *Bot. Not.*, 1930, 331.

Rechinger (1949. *Watsonia*, 1, 154) suggests that this plant is probably British and includes it in his key. I am now able to confirm that it undoubtedly occurs in Britain. There are two specimens in Herb. Druce, Oxford University:—89, E. Perth; Glen Shee, 7th August 1883, *H. E. Fox*. 90, Forfar; Glen Phee, August 1916, *G. C. Druce*, which, though sterile, are certainly referable here. They agree well both with the description and with specimens I collected in Swedish Lapland last summer.

The subspecies is recognisable by its narrower buds without recurved tip, narrower obovate or obovate-elliptic cuneate-based leaves with persistent appressed silky hairs on the upper surface and by the absence of stipules. I am unable to see any marked difference in either the number or direction of the veins in either the Scottish or the Swedish specimens when compared with subsp. *caprea* and the tomentum of the twigs though more marked when young than in subsp. *caprea* is not persistent on the previous year's twigs in either set of specimens (though, as all were gathered in August, this does not necessarily mean that it does not persist through the winter). I have not been able to compare the floral characters.

I prefer to regard the plant as a subsp. of *S. caprea* rather than a distinct species as intermediates appear to occur. Thus many Scottish and southern Swedish plants of subsp. *caprea* have obovate leaves. It appears, however, to be a well-marked geographical race of *S. caprea* and deserving of subspecific rank. The possible identity of the plant with *S. sphacelata* Sm., 1804, *Fl. Brit.*, 1066, needs further study.—E. F. WARBURG.

†726(2)/1. **Lysichitum americanum** Hult. & St. John, 1931, *Svensk Bot. Tidskr.*, 25, 455. *L. camtschatcense* auct. amer. pro parte. Acaulescent robust herb with a thick peppery rhizome. Plant 3-15 dm. tall, leaves very large, erect or ascending, glabrous, oblong-lanceolate, acute, narrowed below to a sessile base or short petiole. Spathe 10-18 cm. long with a broad acute blade, yellowish. Spadix cylindrical, 3.5-11 cm. long, greenish-yellow, on a stout peduncle becoming 3-5 dm. long. Flowers foetid. Berries greenish, in a spike. A native of swampy scrub and woodland from Alaska and British Columbia southwards through Washington, Idaho, Oregon and Montana to California.

24, Bucks.; naturalized in a swamp at Black Park, west of Uxbridge, 1950. I have also seen the following British material in Herb. Mus. Brit. 17, Surrey; marshy ground near Haslemere, 1947, *C. E. Gascoyne*; Chobham, Woking, 1948, *Ethel Hackney*.—D. H. KENT.

787/1. **AMMOPHILA ARENARIA** (L.) Link. The useful property of this grass in retaining the encroachment of sand has been so well known for four or five centuries and its use so often recommended for the purpose

that it is probably difficult to say where, if anywhere, it is native in these islands. It grows abundantly over the 2000 acres of sand dune at Perranporth and looks quite native but a letter preserved in the Archives of Exeter Cathedral shows that it was originally planted there. The letter was written in 1704 by the Rev. John Hosken, Vicar of Perranzabuloe, to counter a petition by the Churchwardens and a number of parishioners asking permission to change the site of the church on account of the encroachment of sand, and states that "the thick grass planted in the sand" was checking the encroachment. The late Edgar Thurston once told me, on what authority I do not know, that Cornish marram grass was originally imported from Holland.—
F. RILSTONE.

872/2. *NITELLA TENUISSIMA* Kütz. This inconspicuous charophyte has only been found in three limited areas in England and two in Ireland, viz., W. Norfolk (Lopham Great Fen), Cambridgeshire (various localities near Wicken), Anglesey (two localities) and in Ireland, Westmeath (two localities) and Galway, N.E. So far as I know the last record for it was twenty years ago.

From his diary I find that on 23rd September 1897 Canon Bullock-Webster found some small pieces in the extreme south-east corner of Lopham Great Fen though he did not realize this till on getting home he found it adhering to the roots of a clump of *C. aspera* Willd. Four days later he visited the spot again specially for it and after nearly three hours search secured some good specimens, but on 9th June 1898, accompanied by Groves, he only succeeded in finding one small piece, adhering as before to the roots of *C. aspera*. Entries of visits on 5th July 1899 and 25th June 1901 made no mention of it.

From 1895 to 1904 Bullock-Webster found this species, sometimes in great quantity, in the Wicken area. Two entries in July 1922 recorded his still finding it in Wicken Lode but in very small quantities.

Anglesey records are for 1882 and 1884 and the Irish ones for 1892 and 1904.

A new Norfolk locality for this rare plant is therefore of special interest. Dr. C. West kindly sent me some fresh material that his friend, Mr. G. H. Rocke, had found on Foulden Common near Stoke Ferry, W. Norfolk, on 27th August 1950, and also some more that they had collected on 10th September. The oogonia were not at that time fully developed, but on the plant being kept growing ripe oospores with their characteristic beaded reticulation of the membrane appeared in due course.

Dr. West told me there were a number of pools, more or less overgrown with *Cladium*, on the Common, but the *Nitella* was only found in one small pond, though in quantity there. It was growing on soft black peaty mud at a depth of about eighteen inches in association with *Chara desmacantha* Gr. & B.-W. and *C. delicatula* Ag. The plant is a particularly small form, resembling that recorded from Anglesey.—G. O. ALLEN.

876/5. *CHARA HISPIDA* L. L. W. Wilson and I found this growing freely at Worth Minnis near Sandwich, E. Kent. A local farmer told us that it was known there as "iron weed". He also mentioned that there was a ditch cleaner who had to give up when he came across this plant as it made his lips swell up.—G. O. ALLEN.

ABSTRACTS FROM LITERATURE

Compiled by A. H. G. ALSTON.

Thanks are due to D. E. Allen, E. B. Bangerter, J. G. Dony, K. J. Hodges, D. H. Kent, N. Y. Sandwith, N. D. Simpson, A. E. Wade and D. P. Young for their help.

SYSTEMATIC, ETC.

32/10×12. *FUMARIA ALBERTI* Rouy & Foucaud f. *Bergerebae* Bouchard. Bouchard, J., 1949, Observations sur un Fumeterre de nature hybride voisin du ×F. Alberti Rouy & Foucaud, *Bull. Soc. France. Exch. Plant. Pl. Vasc.*, **3**, 17. A putative hybrid between *F. Vaillantii* var. *Chavini* Reut. and *F. officinalis* f. *Wirtgeni* Hausskn. was found at Bourberain (Côte d'Or).—[A.H.G.A.]

35/1(2). *NASTURTIUM MICROPHYLLUM* Boenn. ex Rehb. Hylander, N., 1950, Rorippa microphylla i Sverige och Danmark, *Bot. Notiser*, **1950**, 1-13. The author states that all the Danish material belongs to *R. microphylla* (Boenn.) Hyl. except a single specimen from Varde in Jutland, while in Sweden *R. Nasturtium-aquaticum* (L.) Hayek is the more common species. The hybrid has been found in Gotland, where it is thought to be introduced.—[A.H.G.A.]

54/14. *BRASSICA KABER* (DC.) Wheeler. Shinnars, A. H., 1950, Brassica Kaber var. *stricta*, *Rhodora*, **52**, 127-128. *B. Kaber* var. *stricta* (Čelak.) Shinnars is based on *Sinapis arvensis* var. *stricta* Čelak. The variety has adpressed pods as in *B. nigra*, but with a long tetragonally subulate beak and 3-ribbed valves.—[A.H.G.A.]

96. *SILENE*. Haslip, M. B., 1951, Some cytoecological aspects in the evolution of certain species of the plant genus *Silene*, *Ohio Journ. Sci.*, **51**, 62-70. *S. latifolia* and *S. maritima* were cultivated and found to be reciprocally cross-fertile, the resulting F1 hybrids being fertile. These two diploids, however, will not form fertile hybrids with American polyploid species.—[D.E.A.]

96. *SILENE*. Marsden-Jones, E. M., & Turrill, W. B., 1950. Researches on *Silene maritima* and *S. vulgaris*, *Kew Bull.*, **32**, 35-123; **33**, 123-127. In the first paper are described the results of genetical studies on material of *S. glareosa* and *S. alpina* from the French Alps. Stock plants and the results of selfings and intrataxic crossings are described. Crosses were also made between both of these taxa and British *S. maritima* and *S. vulgaris* and Norwegian *S. vulgaris*. In the second paper seedlings representative of a number of the families (selfings and crossings) that have been considered in the series were subjected to comparative study. Two main cotyledon types are distinguishable. Generally speaking the narrow type with more gradual constriction below is characteristic of *S. maritima* and of some stocks of *S. glareosa*.

The broader type with abrupt constriction below is characteristic of *S. vulgaris* and *S. alpina*.—[K.J.H.]

98. MELANDRIUM. Sandwith, N. Y., 1948-49, The Glabrous White Campion, *The Naturalist*, 1948, April-June, 45-46; 1949, April-June, 47. A glabrous variety of *M. album* has been collected on waste ground near London and in Northants. The specimens are completely glabrous in all parts, which are shining as if varnished, and coloured with deep purple anthocyanin, especially on stems, bracts and calyces, which are also sticky owing to the presence of minute white papillae. The colour of the petals is the normal white. In the first article the author gives this plant the name *M. album* var. *glabrum* (De Vries) comb. nov., based on *Lychnis vespertina* var. *glabra* De Vries, a plant which occurred in Holland. In the second article he points out, on the evidence of information received from Dr. N. Hylander, that the earliest name for the British glabrous White Campion is *M. album* (Mill.) Gareke var. *viscosum* (F. Aresch.) Ahlfr., which described a plant found only once at Lund, Sweden. It is suggested, in the first of the two articles, that the correct name for the glabrous Red Campion (*Lychnis Prestlii* Sekera of the *British Plant List*) is *Melandrium dioicum* (L.) Coss. et Germ. var. *glaberrimum* (Neilr.) Schinz et Thell.—[N.Y.S.]

100. CERASTIUM. Brett, O. E., 1950, Chromosome numbers of Cerastium species, *Nature*, 166, 446-447. The following counts are made on root-tips of young seedlings (previously reported figures on continental material are given in parentheses): *C. vulgatum* (Sussex) $2n=136$ (144, 126), *C. alpinum* (Auchlean, Inverness) $2n=72$ (72, 108), *C. "alpinum lanatum"* (cult.) $2n=72$ (108), *C. arvense* (Austria) $2n=38$ (72), *C. pertoliatum* (cult.) $2n=38$. The occasional presence of individuals with $2n=108$ in *C. alpinum* is ascribed to chromosome doubling from $2n=72$. Probably the basic number for this section of the genus is 19, in addition to the previously-known figure of 9.—[D.P.Y.]

100/11. CERASTIUM CERASTOIDES (L.) Britton. Favarger, C., & Söllner, R., 1949, Nombres chromosomiques et Structure du Noyau de quelques Cerastium des Alpes, *Ber. Schweiz. Bot. Ges.*, 59, 87-90. The number $2n=38$ was found in material from two different localities in the Alps. Mention is made of the fact that T. W. Böcher with difficulty found $2n=40$ in Greenland material, and it is suggested that northern material be recounted.—[D.E.A.]

101. STELLARIA. Morton, J. K., 1951, Notes on Some Chickweeds from the North-east, *Vasculum*, 36, 6-7. *S. apetala* Ucria in Northern England is characteristic of fixed dunes on the coast where rabbits are plentiful. It seems to need soil with a fairly high nitrogen content and stable ground where competition is low. Most herbarium material named "*S. Boracana* Jord." turns out to be merely a small form of *S. media* with reduced flowers, quite distinct from the true *S. apetala* of coastal regions which retains its essential characters when grown from seed. *S. neglecta* Weihe appears to be uncommon in the North-east; it only has half as many chromosomes as *S. media*. Variants of the latter

occur, identical with *S. neglecta* in appearance and only separable from it by having 5 stamens instead of 10 and possibly also by differences in the seed.—[D.E.A.]

103/3. *SAGINA INTERMEDIA* Fenzl. Gams, H., 1951, *Bull. Soc. Bot. France*, **98**, 77; 99; 101. This minute species, hitherto only known from northern Europe, was found in August 1950 in three localities in the Western Alps between 2540 and 3041 metres. The Alpine plant is identical with specimens received from Lapland.—[D.E.A.]

150/1. *SAROTHAMNUS SCOPARIUS* (L.) Wimm. ex Koch. Castro, D., 1949, *Novos Números de Cromosomas para o Género Cytisus L.*, *Agron. Lusit.*, **11**, 85-89. The chromosome number of both the type and its var. *Andreanus* was found to be $2n=48$.—[D.E.A.]

153/3. *MEDICAGO SATIVA* L. Bolton, J. L., and Greenshields, J. E. R., 1950. A diploid form of *Medicago sativa* L., *Science*, **112**, 275-277. A sample of *M. sativa* seed from the Botanical Gardens at Erevan, Armenia (U.S.S.R.), and sown at Saskatoon (Canada) in 1949, gave plants with purple flowers and glabrescent pods with 3-4 coils, but in general size and appearance resembling *M. falcata*. Root-tip smears showed $2n = 16$; normal *M. sativa* has $2n = 32$, and is considered to be an autotetraploid, so that the present plant is a diploid. It was highly self-sterile and highly cross-sterile when crossed to 32-chromosome forms of *M. sativa* and *falcata*, but showed normal fertility when intercrossed with 16-chromosome forms of *M. falcata*.—[D.P.Y.]

178/6. *LATHYRUS PRATENSIS* L. Crane, M. B. (Ed.), 1951, *Cytology, Report John Innes Hort. Inst.*, **1950**, 12. All species of *Lathyrus* have hitherto been thought to be diploid ($x = 7$) except *L. venosus* ($4x$) and *L. palustris* ($6x$). It has now been found that the British forms of *L. pratensis* are all autotetraploid, though botanic garden material has always been found to be diploid.—[D.E.A.]

185. *RUBUS*. Christen, H. R., 1950, *Untersuchungen über die Embryologie pseudogamer und sexueller Rubusarten*, *Ber. Schweiz. Bot. Ges.*, **60**, 153-198.

185. *RUBUS*. Beijerinck, W., and ter Pelkwijk, A. J. (1950). De voornaamste Bramen in het Drense district, *De Levende Natuur*, **53**, 191-196, 211-216. The author gives a useful key to the *Rubus* species of his area.—[A.H.G.A.]

185. *RUBUS*. Rilstone, F., 1950, Some Cornish Rubi, *J. Linn. Soc. (Bot.)*, **53**, 354, 413-421. Twelve brambles which occur west of Dartmoor and which appear to be distinct species are described and named. Nine of these have been under continuous observation, and the natural occurrence of seedlings true to type has been confirmed.—[K.J.H.]

[A paper by Mr. Rilstone on these and other Cornish Rubi will appear in *Watsonia* in the near future.—Ed.]

189. *POTENTILLA*. Rutishauser, A., 1949, *Untersuchungen über Pseudogamie und Sexualität einiger Potentillen*, *Ber. Schweiz. Bot. Ges.*, **59**, 409-419.

194. ROSA. Darlington, C. D. (Ed.), 1951, *Rose Species, Report John Innes Hort. Inst.*, 1950, 19-20. Formerly nearly all species and varieties of this genus were supposed to have multiples of 7 chromosomes, but amongst native British races several plants have been found with the unbalanced numbers of 34, 37 and 39, instead of 35. According to Wolley-Dod's revision, there are five native species which are supposed to have arisen as hybrids between *Caninae* (Section *Villosae*) and the tetraploid *R. spinosissima*. The *Caninae* are mostly pentaploids which produce tetraploid eggs and haploid pollen grains. In reciprocal crosses the results of their hybridization are therefore quite different. *R. Wilsoni* has now been found to have arisen from a cross between a pentaploid member of the *Caninae* complex and an unrelated tetraploid as female and male parents respectively.—[D.E.A.]

194. ROSA. Flora, W. S., 1950, Pollen condition in some species and hybrids of *Rosa* with a consideration of associated phylogenetic factors, *Virginia Journ. Sci.*, 1, 11-59. 95 species and about 55 variants of roses were analysed for percentage of normal pollen during a five-year period. This percentage decreased with the increase in chromosome number in the diploid, tetraploid, pentaploid and hexaploid groups. The single octoploid species investigated was high in percentage of normal pollen, the triploid forms very low. Broad differences in the percentage of normal pollen according to the geographical origin of the various species was noted. The author thinks that the polyploid species have originated from forms with lower chromosome numbers, contrary to Hurst's theory of the evolution of *Rosa* species by descent from an extinct hypothetical decaploid species by the loss of chromosome sets. The centre of origin of the genus is postulated as Eastern Asia, and the possible distribution and evolution of the genus are outlined.—[D.E.A.]

194. ROSA. Fagerlind, F., 1948, Compatibility, Eu- and pseudo-incompatibility in the genus *Rosa*, *Acta Hort. Berg.*, 15, 1-38. The author analyses the seed-production frequency of the species of *Rosa*, in inter-specific combinations. He is able to arrange the results in tables. It is remarkable that *R. arvensis* (diploid) produced no seeds when pollinated by *R. gallica* (tetraploid).—[A.H.G.A.]

195. MALUS. Lamb, J. G. D., 1951, The Apple in Ireland: its History and Varieties, *Econ. Proc. R. Dublin Soc.*, 4, 1-64.

195(2). SORBUS. Hedlund, T., 1948, Om uppkomsten av nya livstyper inom släktet *Sorbus* (Concerning the rise of new Biotypes within the genus *Sorbus*), *Bot. Not.*, 1948, 381-392. Two different kinds of biotypes exist in respect of seed formation, apomicts and those producing seed normally. In the case of the apomictic biotype pollen deposited on the stigma produces no fertilization, but is in varying degrees conducive to seed formation. In *S. intermedia* (Ehrh.) Pers. no seed may be formed unless pollen is supplied, for example, from *S. aucuparia* L., when the germination of the pollen grains on the stigma stimulates the formation of seed (stimulative parthenocarpy). In the

second kind of biotype seeds are formed as a result of fertilization, e.g. *S. aucuparia* L., *S. aria* (L.) Crantz, *S. torminalis* (L.) Crantz, and closely related species. Sexual formation in the type is evident from the fact that they can form hybrids with other species. The process of hybridization is in some degree dependent upon which of the two kinds of biotypes provides the pollen. If the pollen is derived from a species producing seed after normal fertilisation, and neither of the parents are hybrids, the hybrids produced are identical with one another, and their offspring segregate in the normal mendelian manner.

If the flowers of a biotype with sexual seed-formation are pollinated with pollen from an apomictic biotype, the resulting hybrids resemble each other to greater or lesser degree; this is especially observable in the crossing of *S. aucuparia* L. with pollen from *S. intermedia* (Ehrh.) Pers. An apomictic biotype is, genetically considered, a hybrid. It has been produced, furthermore, by a similar crossing and forms pollen grains which are genotypically unlike each other with respect to the qualities which were unlike in their parents. Their pollen grains also convey a dominant inheritance factor for apomictic seed-formation, for which reason the hybrids produced are themselves newly formed apomictic biotypes. When such biotypes arise in nature it is the environment and especially the character of the soil which determines their survival and spread. It is thus that biotypes with sexual seed-formation have in the genus *Sorbus* rendered possible a large number of new formations of biotypes showing apomixis.—[A.E.W.]

UMBELLIFERAE. Gardé, A. & N. M., 1949, Contribuição para o Estudo Cariológico da Família Umbelliferae. I, *Agron. Lusit.*, **11**, 91-140. All the chromosome numbers so far published for this family are listed, together with a few new counts. The results in the case of *Eryngium campestre* ($n=14$) and *Seseli Libanotis* ($n=9$) do not agree with those of previous workers. The possibility of the initial basic number of the family being $n = 4$ is discussed. As a result of the new counts now made the possibility of $n = 11$ being the actual basic number in the sub-family *Apiodeae* is reinforced.—[D.E.A.]

277. HERACLEUM. "ED." 1950. Cow Parsnip, *The Field*, **1950**, 262. A plant growing at Newton Reigny, near Penrith, is referred to as *Heracleum sphondylium*. It was 11 ft. 10 in. tall, the umbel had a diameter of 14 in., and the base of the stem was 10 in. in circumference. The plant has persisted over a number of years. Photo.

An editorial note states that there is a variety of the plant (*H. giganteum*) normally attaining 12 ft. in height.—[N.D.S.]

[Presumably *H. persicum*.—A.H.G.A.]

282/1. DAUCUS CAROTA L. Whitaker, T. W., 1949, A Note on the Cytology and Systematic Relationships of the Carrot, *Proc. Amer. Soc. Hort. Sci.*, **53**, 305-308. The chromosome number of 17 wild and cultivated forms was found to be $2n = 18$. Cytological observations suggest that neither polyploidy nor gross structural rearrangement of the chro-

mosomes is associated with the differentiation of the varieties and forms of *D. Carota*.—[D.E.A.]

296/4. GALIUM SAXATILE L. Fernald, M. L., 1950, *Galium hircynium*: a problem in interpreting the International Rules, *Rhodora*, **52**, 222. The spelling should be "hircynium" not "hercynium". The author does not think that Weigel made a typographic error.—[A.H.G.A.]

365. ACHILLEA. Clausen, J., Keck, D. D., and Hiesey, W. H., 1948, Experimental Studies on the Nature of Species. III. Environmental Responses of Climatic Races of Achillea, *Carnegie Inst. Wash. Publ.*, **581**. (Reviewed, 1950, *New Phytol.*, **491**, 424-5). Plants from eighty-one populations were sampled: of these fifteen American and two European were studied intensively. It was concluded that "the climatic race, like other kinds of ecotype, is the basic (but usually neglected) ecological unit."—[K.J.H.]

422. LEONTODON AUTUMNALIS L. Pfell, H. H., 1950, Herfstleewentand met ingesneden stengel-bladen: *Leontodon autumnalis* L var. *crepidifolius* nov. var., *Ned. Kruidk. Arch.*, **57**, 277-279. The new variety has a long pinnatifid, dentate or sinuate leaf at the base of the lowest stem branch, similar to the radical leaves. In typical plants the leaf at the base of the stem branch is entire or wanting. The variety persisted in cultivation and was reproduced from seed.—[A.H.G.A.]

423/29. TARAXACUM NORDSTEDTII Dahlst. van Soest, J. L., 1948, Sur quelques Taraxaca et Hieracia du Portugal, *Agron. Lusit.*, **10**, 6-23. This group of apomictic biotypes is common in western Europe from Sweden to North Portugal, but whilst it is characteristic of marshy plains in northern Europe, it seems to prefer more hilly regions further south. In Holland it belongs to the *Molinion-caeruleae* association and is generally accompanied by species of *Carex* and *Juncus*. It is suggested that the true *T. Nordstedtii* and other closely related forms (including *T. udum* Jordan) form a sub-group of the *Spectabilia* with a distinct range which is less northern than that of the *eu-Spectabilia*.—[D.E.A.]

428. TRAGOPOGON. Ownbey, M., 1950, Natural Hybridization and Amphiploidy in the Genus *Tragopogon*, *Amer. J. Bot.*, **37**, 487-499. *T. dubius* Scop. (*T. major* Jacq.), *T. porrifolius* L. and *T. pratensis* L. are widespread weeds in North America, and hybrids occur wherever any two of these species grow together. These hybrids are not found except in patches including both of their parents, and in most features they are not intermediate but exhibit a recombination of the parents' characters. All the hybrids are extremely sterile, and are often taller, more branched, and more floriferous than the parents. Four small amphiploid populations were discovered, representing apparently recent, independent instances of the doubling of the chromosome sets. They are moderately fertile, but are morphologically like the diploid hybrids except for conspicuous "gigas" features.—[D.E.A.]

440/1. ARBUTUS UNEDO L. Sealy, J. R., 1951, *Arbutus Unedo*, *J. Ecol.*, **37**, 365-388.

478. **CENTAURIUM.** Jonker, F. P., 1950, Revisie van de Nederlandse Gentianaceae. I. Centaurium Hill, *Ned. Kruidk. Arch.*, **57**, 169-198. *Centaurium minus* de Gars. is adopted for *C. umbellatum* Gilib. There is a key to the species and forms.—[A.H.G.A.]

480. **GENTIANA.** Favarger, C., 1949, Contribution à l'étude caryologique et biologique des Gentianacées, *Ber. Schweiz. Bot. Ges.*, **59**, 62-86. The chromosomes of twelve species from the Alps and Jura have been counted, including *G. nivalis* ($2n=14$), *G. verna* ($2n=23$) and *G. campestris* subsp. *campestris* ($2n=36$). *G. nivalis* is one of two diploids found in the genus, each of which is a therophyte and has a vast range in the North and in the mountains of Eurasia. In *G. verna* the floral buds develop in autumn, and meiosis takes place at the beginning of spring, at a time when the plants are often still covered with snow.—[D.E.A.]

489/1. **POLEMONIUM CAERULEUM** L. Davidson, J. F., 1950, The Genus Polemonium (Tournefort) L., *Univ. Calif. Pub. Bot.*, **23**, 209-282. A British plant is allocated to subsp. *vulgare* (Ledeb.) Brand, distinguished from other subspecies by stamens slightly exceeding the corolla, corolla lobes glabrous, obtuse at the apex, style slightly exceeding the stamens.—[K.J.H.]

511. **CALYSTEGIA.** Hylander, N., 1949, Calystegia silvestris, en förbisedd Kulturflyktning i Sveriges och Danmarks flora, *Botaniska Notiser*, **1949**, pp. 148-156. The author considers that the cultivated pink variety of *C. sepium*, which has been called var. *colorata*, is identical with var. *americana* (Sims) Kitag., other plants so named are the pink-flowered garden form of *C. silvestris* (Willd.) R. & S., which is now found as an escape in Sweden.—[A.H.G.A.]

515. **CUSCUTA.** Gaertner, E. E., 1950, Studies of Seed Germination, Seed Identification, and Host Relationship in Dodders, Cuscuta spp., *Cornell Univ. Agr. Exp. Sta., Mem.*, **294**, 1-56. *C. Epilinum*, *C. suaveolens*, *C. Epithimum* and *C. europaea* have so far been recorded growing on 8, 19, 147 and 237 different species respectively. Experiments were made to try to induce them to grow on various other species. *C. europaea* failed to grow on 37 species; it lacks the ability to germinate immediately after the harvest. *C. Epithimum* will grow on a large number of aquatics and can thrive even though submerged in water. There are indications that different races of the same species may vary in their susceptibility to certain Dodder species.—[D.E.A.]

515/2. **CUSCUTA EUROPAEA** L. Böcher, T. W., 1949, Nælde-Silkens Naturhistorie, *Naturens Verden*, **33**, 156-161.

532. **LINARIA.** Dillemann, G., 1949, Remarques sur l'hybridation spontanée de *Linaria vulgaris* Mill. et de *L. striata* DC. dans la nature. *Bull. Soc. Bot. France*, **96**, 48-49. In some regions of France, though both parents may be equally abundant, the hybrid between *L. vulgaris* and *L. striata* (*L. repens*) is rare, while in other regions hybrid swarms can be found. The frequency of the hybrid is explained as the result of the isolation of one or other species, both of which are self-incompatible

and may receive pollen from plants of the other species when their own species is under-represented. The pollen of the one species is quite capable of fertilising the flowers of the other, but is apparently not as effective as the latter's own pollen.—[D.E.A.]

532. LINARIA. Dillemann, G., 1950, Hérité du principe cyanhydrique dans les croisements interspécifiques expérimentaux de *Linaria*, *Comptes Rendus Soc. Biol.*, **144**, 50-51.

532. LINARIA. Dillemann, G., 1949, Hybrides réciproques des *Linaria vulgaris* Mill. et *L. striata* DC. et identification expérimentale de l'hybride $\times L.$ *intermedia* Babey, *Bull. Soc. Bot. France*, **96**, 171-172. Natural hybrids between *L. vulgaris* and *L. striata* fall into two main types, $L. \times intermedia$ Babey with a fairly large corolla and orange palate and close to *L. vulgaris*, and $L. \times ochroleuca$ Bréb. with a yellowish smaller corolla and recalling *L. striata*. Plants called $L. \times intermedia$ are the product of reciprocal crosses between both parents, but $L. \times ochroleuca$ probably represents either backcrosses or plants of the second generation in which recessive characters appear, although attempts to produce this type experimentally have so far failed.—[D.E.A.]

537/1. MIMULUS GUTTATUS DC. Campbell, G. R., 1950, *Mimulus guttatus* and Related Species, *El Aliso*, **2**, 319-335. Six varieties of this species are described from western North America, the plant naturalised in Britain being the type. The chromosome number is given as $n=14$.—[D.E.A.]

561. THYMUS. Hegnauer, R., 1948, Beitrag zur chemischen und morphologischen Kenntnis der schweizerischen Thymus-formen, *Berichte Schweiz. Bot. Ges.*, **58**, 391-461. The writer reviews the systematic and chemical literature. The oil of *T. pulegioides* has a high phenol content but there is a form which is poor in phenol named forma *biochimica citroligena*. The subspecies of *T. euserpyllum* are mostly poor in phenol.—[A.H.G.A.]

588/5. PLANTAGO MARITIMA L. Gregor, J. W., & Lang, J. M. S., 1950, Intra-colonial variation in plant size and habit in sea plantains, *New Phytol.*, **49**, 135-141. Such taxonomically "difficult" characters as plant size and habit are highly variable and this variation is ecotypically distributed along an environmental gradient. It is often useful to know how much internal variation different habitat communities retain under the action of ecotype selection. Within the British region samples from specially isolated local breeding communities (gamodemes) of *Plantago maritima* were little if any less variable than those from gamodemes in relatively close contact with their neighbours. There seems to be less intra-gamodeme variability as conditions improve, but even at the limit of plantain survival only a moderate degree of adaptive fitness is achieved. Variation within the gamodeme does, however, reflect the lack of uniformity of what are in general the most uniform and exacting phytosocial conditions.—[K.J.H.]

593/1. HERNIARIA GLABRA L. Kent, D. H., 1950, *Herniaria glabra* L. in Middlesex, *Lon. Nat.*, **29**, 6-7. Records the occurrence in Middle-

sex, gives all the known records for the London Area and the British v.-c. distribution.—[D.H.K.]

611/4. *SALICORNIA EUROPAEA* L. Ludwig, W., 1950, Der Queller (*Salicornia europaea*) in der Wetterau, *Natur und Volk*, 80, 176-180. There is an inland saline flora in Germany in the region north of Frankfurt, including *Lepidium latifolium*, *Aster Tripolium*, *Cochlearia officinalis*, *Plantago maritima*, *Triglochin maritimum*, *Glaux maritima* and *Juncus Gerardi*. *Salicornia europaea* has also been found there, and its chromosome number is given as $2n=18$, "as in all other inland forms so far examined". On the North Sea coast forms with $2n=36$ are said to predominate.—[D.E.A.]

618. *RUMEX*. Lousley, J. E., 1951, Docks and Sorrels of Essex, *Essex Nat.*, 28, 265-271. Records for 15 species and 6 hybrids in Essex are given and the main taxonomic criteria for separating the species discussed. The British species of the subgenus *Acetosella* are separated by the following key:—

- Valves fused to the nut *R. angiocarpus* Murb.
 - Valves not fused to the nut:
 - Stems procumbent with erect flowering branches. Leaves all narrow linear up to ten times as long as broad, their edges often revolute. Mature nut 0.9-1.3 mm. \times 0.6-0.8 mm. *R. tenuifolius* (Wallr.) Löve.
 - Stems erect. Leaves lanceolate or linear-lanceolate, broader than in the previous species, plane. Mature nut 1.3-1.5 mm. long *R. Acetosella* L. em. Löve.
- [D.E.A.]

631/1. *BUXUS SEMPERVIRENS* L. Stoeber, 1949, Sur quelques stations remarquables de *Buxus sempervirens* dans le Haut-Rhin, *Monde des Plantes*, 258, 20-22; 259, 26-27. Localities have been found in the Rhine-Moselle area of Germany, far from the main Mediterranean area of this species and possessing different ecological features.—[D.E.A.]

633. *ULMUS*. Ciferri, R., 1949, Qualche dato per una revisione degli olmi italiani, *Atti Ist. Bot. Univ. Pavia*, Ser. 5, 6, 89-94. The classification of Italian elms is at present in a state of chaos. The author sets out the basic diagnostic characters as well as Bancroft's key to the English species and hybrids. The main species in Italy seems to be *U. carpiniifolia*, *U. glabra* is also frequent, while *U. minor* is the rarest of the three.—[D.E.A.]

628. *EUPHORBIA*. Kloos, A. W., 1951, Aanwinsten van de Nederlandse Flora in 1948 en 1949, *Ned. Kruidk. Arch.*, 58, 60-93. Most of the new records are aliens, but *Euphorbia lucida* Waldst. & Kit. is recorded from the dunes near the German frontier. It was previously known from E. and S.E. Germany, Austria and the western Balkans. *E. lucida* is near *E. Esula* from which it differs as follows:—

- Leaves broadest above the middle, linear-lanceolate to orbicular-ovate, narrower towards the base, margin slightly sinuate *E. Esula*.
- Leaves broadest below the middle, linear, lanceolate or ovate, narrowed towards the apex; margin not sinuate:
 - Leaves shining, lanceolate to ovate, cordate or rounded at base; lateral nerves making an angle of 60° or more with the costa *E. lucida*.

Leaves not shining, linear-lanceolate, abruptly narrowed into a short stalk at base; lateral nerves making a much smaller angle with the costa
E. virgata.

—[A.H.G.A.]

AMENTIFERAE. Hjelmquist, H., 1948, Studies on the Floral Morphology of the Amentiferae, *Bot. Notiser Suppl.*, **2**, pt. 1: 5-171. The author concludes that the *Amentiferae* constitute one of the most primitive types of Angiosperms, with the genus *Rhoiptelea* showing some transition to the *Urticales*. There seems also to be some relationship with the *Proteales*.—[A.H.G.A.]

642. BETULA. Johnsson, M., 1949, Studies on Birch species hybrids, *Hereditas*, **35**, 115-135. The writer finds *B. verrucosa* ($2n=28$) and *B. pubescens* ($2n=56$) intersterile. *B. pubescens* is thought to be an allopolyploid. *B. tortuosa* Ledeb. is contained in the variation sphere of *B. pubescens*.—[A.H.G.A.]

642/1. BETULA PENDULA Roth. Jentys-Szaferowa, 1950, Analysis of the Collective Species *Betula alba* L. on the Basis of Leaf Measurements. I. Aim and Method of the Work on the Example of *Betula verrucosa* Ehrh., *Bull. Acad. Polon. Sci. Lett.*, Ser. B., **1**, 175-214. Samples of *B. verrucosa* (*B. pendula*) from various parts of Europe have been subjected to biometrical analysis, attention being confined to the leaves of the vegetative short shoots, which are the least variable of the four separate leaf types to be found in birches. The species was found to display characteristic local variability of leaf shape, but the cause of this was not discovered. The leaf shape of *B. verrucosa* is further compared in detail with that of *B. pubescens*. The author considers that Lindquist's division of the whole *B. verrucosa* population into a southern and a northern variety is premature and insufficiently substantiated. Local population differences must be subjected to biometrical study.—[D.E.A.]

663/1. LISTERA OVATA (L.) R. Br. Downie, D. G., 1950, The Germination of *Listera ovata* (L.) R. Br., *Trans. Bot. Soc. Edinb.*, **35**, 126-130. The seed of this species will not germinate in water nor in nutrient salt solution in the absence of a symbiotic fungus. Two species of endophytic fungus form mycorrhizal associations with the roots of adult plants.—[D.E.A.]

669. ORCHIS. Heslop Harrison, J., 1949, Field Studies in Orchis L. I. The Structure of Dactylorchid Populations on certain Islands of the Inner and Outer Hebrides, *Trans. Bot. Soc. Edinb.*, **35**, 26-66. The distribution of Dactylorchid populations on various Hebridean islands shows that a close correlation exists between edaphic factors and the form occurring. Biometrical analysis of certain taxonomic features has been extensively utilised in studying such populations, and one result is the revelation that there is a slight divergence between the populations of *O. Fuchsii* var. *hebridensis* (Wilm.) H.-Harr. of the Inner Hebrides and those of the Outer Isles. No such race divergence is apparent in *O. ericetorum* or in the *O. latifolia* forms

within the area so far investigated. An anomalous form of the *O. maculata* complex was first noticed on Rhum in 1937 and is now described as *O. Fuchsii* subsp. *rhoumensis*. Its chromosome number ($2n=40$) is the same as in *O. Fuchsii*, but it exhibits many morphological and physiological characters intermediate between that species and *O. ericetorum*. It is undecided whether the plant is the stabilised product of ancient hybridity between isolated strains of these two species, or whether it is of an earlier origin than either. The significance of the excessive variability of many foliar and floral characters in the Dactylorchids is discussed, and a basis for the interpretation of the range of labellum patterning occurring in the *O. maculata* complex is proposed. In view of the extreme interfertility existing between Dactylorchid forms, and the degree to which the maintenance of their taxonomic independence depends on ecological isolation, the author suggests that the subgenus should be regarded as a single coenospecies, its component "species" as different ecospecies, and certain of the subspecific units as morphologically marked ecotypes.—[D.E.A.]

669. ORCHIS. Heslop Harrison, J. W. & J., 1950, A Contribution to our Knowledge of the Flora of the Isles of Lewis, Harris, Killegray and Ensay, *Trans. Bot. Soc. Edinb.*, **35**, 149. *O. Fuchsii* var. *hebridensis* is locally abundant in the Outer Isles in Lewis and Harris, but very strange gaps exist in its distribution. Its extraordinary tendency to develop highly fertile hybrid swarms with *O. purpurella* seems remarkable in view of the fact that the two have chromosome numbers of 40 and 80 respectively. Some form of double fertilization is believed responsible for this. On the other hand, var. *hebridensis* only crosses with *O. latifolia* ($2n=40$) with extreme difficulty, even when the two grow intermingled in enormous quantities. *O. ericetorum* ($2n=80$) likewise produces hybrid swarms with *O. purpurella* with great facility and to a limited extent also with *O. latifolia*, despite the disparity in chromosome numbers in the latter case.—[D.E.A.]

672. OPHRYS L. Kullenberg, B., 1950, Investigations on the pollination of Ophrys species, *Oikos*, **2**, 1-19, (in English); 1950, Bidrag till kännedomen om Ophrys-arternas blombiologi, *Svensk Bot. Tidskr.*, **44**, 446-464; 1950, Pollinationsbiologien hos några orkideer, *Medlemsbl. för Biologilärarnas Fören.*, **1**, 19-35, (in Swedish). These three papers are substantially the same. Statistics are given for insect visitors to flowers of *Ophrys insectifera* L. in Sweden, *O. apifera* Huds. and three non-British spp. in Lebanon, and five non-British spp. in Morocco. These are fertilized by attracting the males of various Hymenoptera (mainly Apidae), which alight on the labellum and execute characteristic movements thereon. Previous observers have assumed that this behaviour is sexual activity, the labellum acting as a dummy female, but the movements are actually often not like those leading to copulation. The attraction of the flowers for insects is possibly fourfold: (1) scent, which may resemble that of the female insect; (2) "Täuschobdach", the illusion of shelter being available in the dark stigmatic cavity; (3) the false pro-

mise of food given by light-coloured sepals, e.g. in *O. tenthredinifera* Willd.; (4) the form and dull metallic colourings of the labellum, which do simulate a female insect. The activities of the insect on the labellum after landing are stimulated by the hairs on its surface. The same behaviour can be induced by means of an artificial flower consisting of a piece of velvet over a source of *Ophrys* perfume. The origin of the insect's behaviour is discussed; it appears to be instinctive and at least connected with sexual impulses. It has no discernable advantage for the insect. How this relationship, whereby insects are induced to visit the flowers and transfer the pollinia without any gain on their part, has evolved is questionable.—[D.P.Y.]

674/1. GYMNADENIA CONOPSEA (L.) R.Br. Bean, R. C., Knowlton, C. H., & Hill, A. F., 1951, Tenth Report of the Committee on Plant Distribution, *Rhodora*, **53**, 79-89. There is a specimen of this species collected about 1930 at Littlecut, Connecticut, in the herbarium of the Torrey Botanical Club. No one has ever been able to refine the station, which is the only one known in North America.—[D.E.A.]

678/1. CROCUS NUDIFLORUS Sm. Crump, W. B., & Sledge, W. A., 1950, History and Distribution of the Autumn Crocus in England, *The Naturalist*, No. 835, 133-141. It is suggested that the origin of *C. nudiflorus* in its English localities is due to its being grown as a substitute for the Saffron Crocus (*C. sativus* L.). Details of all the recorded localities which the authors have been able to trace are given. The British v.-c. distribution is given as 13, 37-40, 54, 56-60, 63, 69, 72. G. A. Nelson, Saffron of commerce and *Crocus nudiflorus* Sm., *ibid.*, 141-142. The author shows that the product from the stigmas of *C. nudiflorus* does not materially differ from that obtained from the genuine Saffron.—[A.E.W. & D.H.K.]

684. NARCISSUS. Janaki-Ammal, E. K., & Wylie, A., 1949, Chromosome Numbers of Cultivated Narcissi, *The Daffodil and Tulip Year Book*, **15**, 33-40. The chromosome numbers are given of 210 cultivated varieties, of which 22 are diploid, 33 triploid and the rest tetraploid.—[D.E.A.]

691/2. POLYGONATUM MULTIFLORUM (L.) All. Eigsti, O. J., 1950, Chromosomes of triploid Polygonatum multiflorum, *Amer. J. Bot.*, **37**, 661-662. The low percentage of pollen germination among triploid forms of this species proves that they are hybrids between diploid and tetraploid forms and not auto-triploid in origin.—[D.E.A.]

713/1. COLCHICUM AUTUMNALE L. Takenaka, Y., 1950, Notes on Cytological Observations in Colchicum, with Reference to Autotoxicosis and Sterility, *Cytologia*, **16**, 95-99. This species is known as a sterile plant in middle and southern Japan. The author concludes that the influence of the colchicine contained in the plant itself has produced abnormal meiotic divisions which are the cause of this sterility. The chromosome number was found to be $2n=38$, as in counts by previous workers.—[D.E.A.]

718. *JUNCUS*. Richards, P. W., 1949, Rushes in East Anglia, *New Nat.*, **6**, 41-44. Fifteen species occurring in East Anglia are discussed in turn. The habit among rushes of flowering in 'pulses' and the complete dependence of some species on light for germination are mentioned.—[D.E.A.]

718/17. *JUNCUS BUFONIUS* L. Böcher, T. W., 1950, Contributions to the Flora and Plant Geography of West Greenland, II, *Medd. om Grönl.*, **147**, 4-39. This species is, if anything, cosmopolitan and follows man. Its behaviour in Greenland, however, is very strange, for it occurs in three or four localities far from any dwelling, where it seems indigenous. Although common in Iceland, it has not been recorded from the Canadian Eastern Arctic. It is suggested that, along with other southern species, it survived the last glaciation in Greenland more or less *in situ*.—[D.E.A.]

719. *LUZULA*. Böcher, T. W., 1950, Contributions to the Flora and Plant Geography of West Greenland, II, *Medd. om Grönl.*, **147**, 4-39. Culture experiments and chromosome counts were made, mostly on Greenland material, and the conclusion reached that the somatic numbers 12, 24, 36 and 48 present in the *L. multiflora* complex represent different species. *L. pallescens* ($2n=12$) has medium, shortly rod-shaped chromosomes and very short seeds, while *L. multiflora* ($2n=36$) and its arctic subspecies *frigida* (Buch.) Krecz. have rather small, rod-shaped chromosomes and larger seeds. The subspecies is not very well marked off from *L. multiflora*, but it has a different range and ecological preferences; it is widely distributed in the Scandinavian mountains and also occurs in Newfoundland, though unrecorded from Iceland. The two are separated as follows:—

Perianth longer than fruit; heads brown, rarely blackish brown; seeds big, 1.4-1.7 mm; leaves rather broad *L. multiflora*.

Perianth mostly the same length as fruit; heads blackish brown; seeds 1.1-1.4 mm. (very rarely 1.0 or 1.5 mm.); leaves somewhat narrower

subsp. *frigida*.

(Var. *contracta* Samuelss. differs from the several-headed typical subsp. *frigida* in having one big sessile head, sometimes also one or very few smaller, short-stalked heads).

—[D.E.A.]

719. *LUZULA*. Nordenskiöld, H., 1949, The Somatic Chromosomes of some *Luzula* species, *Bot. Notiser*, **1949**, 81-92. The nos. given for British species are *L. multiflora* ($2n=36$), *L. campestris* ($2n=12$), *L. pallescens* ($2n=48$), *L. silvatica*, *luzuloides* and *nivea* (all $2n=12$), *L. Forsteri* ($2n=24$), and *L. pilosa* ($2n=72$). Their chromosomes form a polyploid series with three as the basic number.—[A.H.G.A.]

729/1. *ALISMA PLANTAGO-AQUATICA* L. Wulff, H. D., 1950, Chromosomenstudien an der schleswig-holsteinischen Angiospermen-Flora, V, *Ber. Deutschen Bot. Ges.*, **62**, 64-70. The occurrence in this species of both hyperdiploid ($n=8$) and tetraploid ($n=14$) plants is recorded.—[D.E.A.]

730. *BALDELLIA RANUNCULOIDES* (L.) Parl. Kern, J., & Reichgelt, T., 1950, Over eenige kritische planten van onze Flora, *Ned. Kruidk. Arch.*,

57, 244-261. The plant which has been known as *Echinodorus ranunculoides* var. *repens* is raised to specific rank and the following characters are given:

E. ranunculoides (L.) Engelm.

Plant up to \pm 5 dm. high, almost always erect, rarely with prostrate inflorescence (and then very rarely rooting) with usually robust stems, up to 3 mm. thick.

Flowers small (\pm 15 mm. in diameter, rarely up to 18 mm.).

Whorls of inflorescence many flowered (15-20-flowered).

Fruit peduncles erect or arcuately ascending.

Fruiting heads large, up to 8 mm. in diameter.

Number of fruits per head up to 45.

Fruit $2\frac{1}{2}$ mm. long without papillae.

E. repens (Lam.) Kern & Reichg.

Plant weak (but not always), creeping, rooting at the nodes of the inflorescence, with leaf-rosettes, up to 2 dm. high, with thin stems up to 1 mm. thick.

Flowers much larger (up to 22 mm. in diameter).

Whorls of inflorescence few (up to 5)-flowered.

Fruit peduncles straight, arising at angle with the apex deflexed.

Fruiting heads smaller, about 5 mm. in diameter.

Number of fruits per head up to 15 (-20).

Fruit 2 mm. long with numerous papillae.

[This variety has been recorded from N. Wales and Ireland. The Scottish plant from Beaully R., E. Inverness, which has been called var. *zosterifolius* Fries is similar.]—[A.H.G.A.]

737. POTAMOGETON. Heslop Harrison, J. W., 1949, Potamogetons in the Scottish Western Isles, with Some Remarks on the General Natural History of the Species, *Trans. Bot. Soc. Edinb.*, 35, 1-25. The machair lochs of the Outer Isles are prolific both in species and in individuals, but the moorland lochs, with rocky beds and more acid conditions, have a much poorer flora. *P. polygonifolius* is much the most abundant species, being found in every island; it seems to prefer moorland slacks and hollows. The variety *cancellatus* Fryer, hitherto only known from the Shetlands, was found in Rhum. Protracted field studies suggest that some of the wide variation in this species is genetically controlled. Detailed notes are given on various other species and their hybrids together with remarks on their distribution, ecology and seed germination. *P. × Heslop-Harrisonii* W. A. Clark is a hybrid between *P. gramineus* or *P. alpinus* and *P. Millardii* (*P. Berchtoldii*). The North American *P. epihydrus* Raf. var. *Nuttallii* (Cham. & Schlecht.) has been detected in two lochs in South Uist.—[D.E.A.]

737. POTAMOGETON. Harrison, J. W. Heslop, 1950, A Pondweed new to the European Flora, from the Scottish Western Isles, with some remarks on the phytogeography of the island group, *Phyton*, 2, 104. The author discusses the presence of *Potamogeton epihydrus* Raf. in South Uist.—[A.H.G.A.]

741/2. NAJAS FLEXILIS (Willd.) Rostk. & Schmidt. Backman, 1948, *Najas flexilis* in Europa während der Quartärzeit, *Acta Bot. Fenn.*, 43, 1-44. The author maps the distribution (p. 6) and gives British records (p. 4). Postglacial finds are reported from Tregaron, Cardigan, and localities in Ireland.—[A.H.G.A.]

743. *ERIOCAULON SEPTANGULARE* With. Hare, C. L., 1950, The structure and development of *Eriocaulon septangulare* With, *J. Linn. Soc. (Bot.)*, **53**, 422-448. with figures and one plate. This species belongs to the small group of less than a dozen plants that together constitute the North American element in the British flora. In order to examine afresh the problems raised by the peculiar geographical distribution of the species, and more especially to arrive at a clearer understanding of its restricted range within the British Isles, field studies have been carried on over a number of years, in Ireland and in the Hebrides. At the same time the plant has been grown in culture on a considerable scale and the life history has been worked out, with details of the plant's climatic and edaphic preferences. A second paper is to follow which will include a re-examination of the geographical distribution of the species in the light of the facts which have emerged as the work proceeded.—[K.J.H.]

753/70(2). *CAREX CAPITATA* L. Böcher, T. W., 1950, Contributions to the Flora and Plant Geography of West Greenland, II, *Medd. om Grönl.*, **147**, 4-39. This species is a subcontinental meadow plant exclusive to lime with a subalpine-boreal distribution in Scandinavia, where it is associated with the conifer and subalpine zones, extremely rarely going above the birch limit. In Greenland it is almost replaced by the more Arctic *C. arctogena* Sm., but the author thinks that it may have survived the last glacialian more or less *in situ* there.—[D.E.A.]

GRAMINEAE. Litardière, R. de, 1950, Nombres chromosomiques de diverses graminées, *Bol. Soc. Brot.*, Ser. 2, **24**, 79-87. *Desmazeria loliacea* (Huds.) Nym. (2n=14), *Vulpia membranacea* (L.) Link (2n=14), *Festuca ovina* L. ssp. *laevis* Hack. (2n=14), *F. rubra* L. ssp. *heterophylla* (Lam.) Hack. (2n=28), *Bromus commutatus* Schrad. (2n=28).—[A.H.G.A.]

758/3. *SPARTINA TOWNSENDII* H. & J. Groves. Higgs, C., 1950, A Farmer's Ruminations. *The Countryman*, **41**, 390-394. This plant prefers a clay sub-soil and likes to be submerged by the tide each day. In Northumberland newly-planted seedlings were frozen into the ice in the severe winter of 1929-30, and later floated away. Plants that did survive did not spread, until in 1939, an exceptionally warm summer, small plants began to sprout over a considerable area, since when it has spread widely. The plant seems to require an abnormally warm summer for setting good seed in higher latitudes.—[D.E.A.]

777/3. *PHLEUM PHLEOIDES* (L.) Simonk. Böcher, T. W., 1950, Chromosome behaviour and syncyte formation in *Phleum phleoides* (L.) Karst., *Bot. Notiser*, **1950**, 353-368. 14 types referable to the species were studied; of these 7 had 2n=14, 2 had 2n=28, and in 6 (1 tetraploid and 5 diploids) there were different numbers of B. chromosomes. None of the material examined was British; the tetraploid was from Armenia and should perhaps be regarded as a species (*P. montanum* C. Koch).—[A.H.G.A.]

791. *DESCHAMPSIA*. Nygren, A., 1950, Studies on vivipary in the genus *Deschampsia*, *Hereditas*, **35**, 27-32. The influence of short day treatment was investigated in relation to certain viviparous grasses and vivipary was induced in *D. caespitosa* from Lapland. In species with an already fixed vivipary it was not affected by the treatment.—[A.H.G.A.]

792/1. *HOLCUS MOLLIS* L. Fenton, E. Wyllie, 1948, Some Notes on *Holcus mollis* L., *Ann. Appl. Biol.*, **35**, 290-292. The natural woodland habitat of this species and its ability to survive after the removal of the tree cover are discussed, together with its occurrence as a weed and the effect on it of grazing and cultivation.—[D.E.A.]

824. *POA*. Nygren, A., 1950, Cytological and embryological studies in Arctic *Poa*e, *Symbolae Bot. Upsal.*, **10**, 4. *Poa laxa* ssp. *flexuosa* (Sm.) Hyl., which is recorded from Scotland, has a chromosome number $2n=42$ in Scandinavia. *Poa jemtlandica* (Almq.) Richt is regarded as a hybrid (*P. alpina* var. *vivipara* L. \times *P. laxa* Hke. ssp. *flexuosa* (Sm.) Hyl.) and no mention is made of the British plant which has been given this name.—[A.H.G.A.]

826. *FESTUCA*. Markgraf-Dannenberg, I., 1950, Die Gattung *Festuca* in der Bayerischen Alpen, *Ber. Bayer. Bot. Ges.*, **28**, 195-211. The writer gives a key to the species and varieties.—[A.H.G.A.]

830. *AGROPYRON*. Simpson, F. W., 1949, Plants of 1949, *Trans. Suffolk Nat. Soc.*, **7**, 23-24. A series of hybrids between *A. junceum* and *A. pungens* was found at Bawdsey in Suffolk. Many of the described varieties of these two species are considered to be obvious hybrids; the two cross freely and produce plants which might easily be mistaken for varieties if not growing near both parents.—[D.E.A.]

841/1. *PINUS SYLVESTRIS* L. Hustich, I., 1948, The Scotch Pine in Northernmost Finland and its dependence on the climate in the last decades, *Acta Bot. Fenn.*, **42**, 1-71. The author considers that changes in climate are particularly noticeable at the timber-line. The climate has improved in recent decades and trees are more fruitful. Years in which many cones ripen are to some extent correlated with the annual rings. If it is a favourable year, then the year $n+1$ is richer in female flowers than normal years and $n+2$ produces cones which consume some reserve nourishment and hence a narrow annual ring is produced. $N+3$ is the seed year, but the annual ring is wider than $n+2$.—[A.H.G.A.]

PTERIDOPHYTA. Parrot, A. G., 1949, Liste des Fougères du Pays basque français, *Bull. Soc. bot. France*, **96**, 208-211. 52 species of ferns growing in the Basque country are listed, together with their floristic types and ecological preferences.—[D.E.A.]

847/1. *PTERIDIUM AQUILINUM* (L.) Kuhn. Poel, L. W., 1951, Soil aeration in relation to *Pteridium aquilinum* (L.) Kuhn, *J. Ecol.*, **39**, 182-191.

847/1. *PTERIDIUM AQUILINUM* (L.) Kuhn. Watt, A. S., 1950, Contribution to the ecology of Bracken (*Pteridium aquilinum*) V. Bracken and frost, *New Phytol.*, **49**, 308-327. The susceptibility of bracken to

frost is shown to be correlated with the severity of spring frosts. Winter frosts have less general importance.

854/4. *POLYSTICUM LONCHITIS* (L.) Roth. Quézel, P., & Rioux, J. A., 1949, Un curieux mode de survivance d'*Aspidium Lonchitis* (L.) Sw. sur les Cauves des Cévennes, *Bull. Soc. Bot. France*, **96**, 175-177. Many Atlantic species have gradually been disappearing from the Massif Central of France. *P. Lonchitis* has, however, been rediscovered growing in a narrow crevice more than two metres below the surface along with other ferns, including the Atlantic *Phyllitis Scolopendrium*. Here it appears to find a microclimate to its liking, the surface conditions being too arid for its successful development.—[D.E.A.]

856/1(2). *DRYOPTERIS BORRERI* Newm. Döpp, W., 1950, Zur Problematik von *Dryopteris paleacea* (Sw.) C. Chr. und ihres Formen und Verwandtschaftskreises, *Ber. Deutschen Bot. Ges.*, **62**, 61-68.

872/6. *NITELLA MUCRONATA* Miq. Olsen, S., 1949, Illegitimate Names in *Nitella mucronata* (Braun) Miquel, *Bot. Notiser*, **1949**, 269-276. The varietal names *leipyrena*, *pachygyra*, *robustior* and *tenuis*, which were adopted by R. D. Wood in 1948, are considered illegitimate.—[A.H.G.A.]

TOPOGRAPHICAL

8, S. WILTS. Barton, A. O., 1950. A new plant colony on barren greensand; *Wilts. Arch. & N.H. Mag.*, **53**, 363-366. An account of the re-colonisation of a site on the main Salisbury Road at West Lavington which was cleared in 1948 by mechanical excavator. The whole area was cut away, leaving the bare greensand exposed. 54 species are enumerated.—[A.E.W.]

17, SURREY. Bangerter, E. B., and Castell, C. P., 1949, Notes on the Vegetation of Gun-pits and Trenches on Eastern Plain, Bookham Common, *Lond. Nat.*, **28**, 52-56.—[D.H.K.]

18-19, ESSEX. Ward, Bernard T., 1950, The Man Orchis in Essex, *Essex Nat.*, **28**, 193-194. Records the rediscovery of *Aceras anthropophorum* (L.) R. Br. in v.-c. 18, and gives all known records for the county.—[D.H.K.]

21, MIDDLESEX. Ager, J. A. M., 1949, Flora of St. Thomas's Hospital and Bombed Sites, *St. Thomas's Hospital Gazette*, **47**, no. 1. Gives short accounts of the localities, which are areas within the grounds of St. Thomas's and bombed sites within half a mile range of the hospital, followed by a systematic list of the vascular plants.—[E.B.B.]

21, MIDDLESEX. Wrighton, F. E., 1949 and 1950, Plant Ecology at Cripplegate, *Lond. Nat.*, **28**, 39-44; **29**, 85-88.

21, MIDDLESEX. Kent, D. H., Tothill Fields, Westminster: A Lost Botanical Area, *Lond. Nat.*, **29**, 3-6. Gives a brief history of the district and the species formerly found there.—[D.H.K.]

24, BUCKS, etc. Weevers, I., 1950, Some woodland plant associations of the Chiltern Hills, *Ned. Kruidk. Ark.*, **57**, 417-420.

25, 26, SUFFOLK. Simpson, F. W., 1950, Our Changing Suffolk Countryside and its Endemic Flora, *Trans. Suffolk Nat. Soc.*, **7**, 49-57. The author deprecates the destruction of the native vegetation by urbanization, agricultural expansion, vandalism, water pollution and misguided local authorities, and stresses the urgent need of Nature Reserves.

25, E. SUFFOLK. Batchelor, S. J., 1949, Wild Plants growing on Waste Ground in Ipswich, *Trans. Suffolk Nat. Soc.*, **7**, 9-10

27, E. NORFOLK. Jennings, J. N., & Lambert, J. M., 1951, Alluvial stratigraphy and vegetational succession in the region of the Bure Valley Broads, *J. Ecol.*, **39**, 106-170.

29, CAMBS. Kassas, M., 1951, Studies in the Ecology of Chippenham Fen, *J. Ecol.*, **39**, 1-32.

33, E. GLOS. Sprague, T. A., 1950, The Wild Flora of Cheltenham, *Proc. Cotteswold N.F.C.*, **30**, 20-28. An account of the flowering plants, ferns and fern allies found growing spontaneously within the Borough of Cheltenham. A list of well over 200 species is enumerated in an appendix.—[A.E.W.]

59, S. LANCS. Allen, D. E., 1951, The Flora of the Liverpool Bombed Sites, *Report Merseyside Nat. Assoc.*, **1**, 25-27; Hardy, E., The Pre-War Flora of Inner Liverpool, *ibid.*, 28-29. The flora of bombed sites in general is discussed with special reference to Liverpool. *Sisymbrium orientale* is relatively more plentiful than in other bombed English cities and *Senecio viscosus* is also common. *Senecio squalidus* and *Erigeron canadensis* appear to be absent. The fact is stressed that several characteristic marsh plants are becoming increasingly common on dry waste ground, and it is suggested that freedom from competition in such a habitat outweighs edaphic preferences. The Liverpool sites are considered to be poorer both in number (60) and abundance of species than most cities further south, probably chiefly due to topographical differences. The second author compares the post-War flora with that found on waste ground in the city in 1939. The two show several similarities, but *Pteridium aquilinum* was then much rarer and *Senecio squalidus* has not reappeared.—[D.E.A.]

102-104, 110, INNER & OUTER HEBRIDES. Heslop Harrison, J., 1948, Recent Researches on the Flora and Fauna of the Western Isles of Scotland and their Biogeographical Significance, *Proc. Belfast N.H. & Phil. Soc.*, Ser. 2, **3**, 87-96. A comprehensive summary is given of the results of work on the biogeography of the Hebrides. The climate is of the extreme oceanic type and the islands receive the full force of the Atlantic gales, which prohibit the growth of continuous tree cover. Miniature woodlands, however, do occur in sheltered gorges and on cliff faces facing east and north; in such habitats well-grown hollies, aspens, birches, willows, roses, and even oaks can be found, but the associated woodland flora often flourishes in the absence of any tree-cover. The character of the flora of Rhum is discussed and mention made of the remarkable number of arctic-alpine species, including *Thlaspi calam-*

inare, *Arenaria norvegica*, *Saxifraga nivalis* and *Ajuga pyramidalis*, to be found on the island's mountain system, which is the most extensive in the Western Isles outside of Skye. The Outer Isles are a great deal less varied in geological structure than the Inner, and in general the higher ground in their case tends to be in the east, where the land descends precipitously to the sea; the western shores are composed of great linked series of shell sand beaches, backed by machair. Between the machair and the eastern hills lies the area of lochs and moorland, favoured by *Najas flexilis*, *Nymphaea occidentalis* and many unusual species and hybrids of *Potamogeton*. Most of the Western Isles are covered with barren and monotonous blanket bog, and the interesting plant communities are almost all confined to somewhat specialised habitats, e.g. calcareous dune sand of the machair zone and mountain scree, cliffs and gorges protected from the wind. The habitats act as refuges for species that must be regarded as relicts.

The extinction of the Hebridean woodlands must be attributed to the climatic deterioration of the Sub-Atlantic period, beginning c. 700 B.C., as a result of which many woodland species have sought refuge on cliffs and in gorges. Geological evidence shows that the Hebrides were islands in pre-glacial times, and during the Ice Age the ice-sheets passed over all parts of the islands. Total extermination of the biota within the limits of the ice-sheet holds true in general, but the distribution of three groups of species in the Hebrides cannot be reconciled with the thesis of a post-glacial continental origin *via* Britain. These groups coincide with similar anomalous ones recognised among Irish biota, namely, the arctic-alpine, the Lusitanian, and the American elements. In the case of the arctic-alpine element, it is interesting to note that certain species, such as *Silene acaulis* and *Polygonum viviparum*, occur at sea-level in the Outer Isles, a phenomenon well-known in Ireland. The opinion of Scandinavian botanists is supported in supposing that some of these species survived one or more glaciations on ice-free "nunataks". Survival of a remnant of the flora from the last interglacial period, or even the Aurignacian interstadial, is envisaged as a definite possibility. The American element is represented in the Hebrides by several species, one of them the orchid *Spiranthes stricta*, which grows on Coll and Colonsay, though it has disappeared for the moment on the latter island. An American species of sponge and *Najas flexilis*, on the other hand, have quite a wide range. Theories of random dispersal from North America are untenable, and the author stresses the fact that orchid species would have to be capable of finding their associated symbiotic fungi in any new ground that they colonized. The recent discovery of *Eriocaulon septangulare* in inter-glacial beds in the West of Ireland supports the view that this American element must have survived from the Tertiary Period in Western Europe. The Lusitanian-Hibernian element includes *Trifolium Bocconi* on Coll, *Rubus iricus* in the Outer Isles and the Macaronesian moss *Myurium hebridarum* in Rhum, Coll, Tiree and nearly all the Outer Isles (it fails to fruit and so

cannot be dispersed at random over long distances). Endemic races of bees, moths and field-mice also occur.

This last element, together with the American species, must represent the descendants of very ancient survivals; but they are hardly organisms which might be expected to have persisted on "nunataks" within the ice-sheet, subject to a rigorous frost climate, although *Myurium* often accompanies the groups of arctic-alpine relicts [and *Eriocaulon* flourishes after being frozen in winter in a solid block of ice.—D.E.A.]. Many of the land areas also, such as Coll, now occupied by these relict species, must have been submerged by post-glacial rises in sea-level. It is therefore suggested that the relict biota survived on low ice-free land, since submerged, to the west of Ireland and the Hebrides. The climate of such marginal zones bordering on the Atlantic may, even during the height of glaciation, have been a great deal milder than is commonly supposed. Organisms surviving in this hypothetical western strip of land would be isolated genetically from the main European stocks, and, indeed, evidence of racial divergence is coming to light in a great many species. Many plants, like the mountain form of *Epilobium angustifolium* and the Irish *Juncus tenuis*, appear to differ ecotypically from the more widespread, biotypically-rich, "plastic" races of the same species. Cytogenetical evidence for such racial differentiation will doubtless be analysed in the near future, and further work on pollen analysis in the Hebrides promises good results in clarifying the complex history of this region.—[D.E.A.]

110. OUTER HEBRIDES. Heslop Harrison, J. W. & J., 1950, A Contribution to our Knowledge of the Flora of the Isles of Lewis, Harris, Killegray and Ensay. *Trans. Bot. Soc. Edinb.*, **35**, 132-156. A large number of new locality records made in 1948 and 1949 are given for the rarer plants. Though *Nasturtium officinale* was common. *N. microphyllum* was not encountered. The name *Rosa dumalis* Bechst. is employed instead of *R. Afzeliana* Fr., which it is said to antedate. *R. mollis* is exceedingly rare in the Outer Isles, being replaced by *R. Sherardi*. *Antennaria hyperborea* is common in one area in South Harris, even down to sea-level. *Erica Tetralix* is very variable in Harris and forms occur which are reminiscent of Donegal forms suspected of ancient hybridity with *E. Mackaiana*. *Betula tortuosa* Ledeb. occurs in Harris and South Uist. *Salix nigricans* var. *hebridensis* Wilmott is rejected as a form of *S. phyllicifolia*, and is said to be mainly planted in the Outer Isles. A new form of *Orchis latifolia*, bearing some relationship with *O. majalis*, was found on coastal flats in Lewis and is being subjected to statistical analysis. Huge forms of *O. purpurella* also occur in Lewis in great numbers, nearer *O. majalis* than the Durham plant.—[D.E.A.]

H.39. ANTRIM. Chase, C. D., The Natural History of Campbell College and Cabin Hill, Belfast, 1941, reprinted from *The Campbellian* and *The Junior Campbellian*, 1943-48. The work deals with the 130 acres which comprise the grounds of Campbell College. 570 species, animals and plants are recorded.—[A.H.G.A.]

MISCELLANEOUS

ALLEN, D. E., 1951, A Survey of Recent Work on the British Flora (Flowering Plants), *Bull. Liverpool Bot. Soc.*, no. 3.

BAKER, H. J., 1951, A palynological treasure-house, *Nature*, **167**, 457-460. Attention is drawn to an unpublished volume, now at the British Museum (Natural History), of paintings by F. Bauer of leaf-hairs and epidermes and, more particularly, pollen-grains. Contrary to Wodehouse (1935, *Pollen grains: their structure, etc.*, London), many of these paintings are dated and were made between 1798 and 1836 and the majority in 1820-36. They are of considerable interest as accurately depicting details, the significance of which has not been realised until much later, e.g. the growth of pollen-tubes and abortive pollen in hybrids.—[D.P.Y.]

BÖCHER, T. W., and LARSEN, K., 1950, Chromosome numbers of some arctic and boreal flowering plants, *Medd. om Grönland*, **147**, no. 6, 1-32. *Roegneria Doniana* (White) Melderis var. *virescens* (Lge.) Melderis $2n=28$ (*Agropyron* of British authors). *Elymus arenarius* L. $2n=56$, *E. mollis* Trin. $2n=28$, *Arenaria norvegica* Gunn. $2n=80$.—[A.H.G.A.]

CAIN, S. A., 1950, Life-forms and Phytoclimate, *Bot. Rev.*, **16**, 1-32. The author considers that when life-forms are selected and handled statistically without a *a priori* assumption of their adaptive value, they can reflect both general and micro-climatic conditions; also that life-forms are important in vegetation study. Pre-Linnean taxonomy had a large element of life-form description for its basis. After Linnaeus, vegetative structures were relegated to a minor rôle, but in modern times, notably in the flowering plant classification of Hutchinson, form appears to be regaining some of its former importance.—[K.J.H.]

CAMP, W. A., 1950, Francis Bacon Lunches with the Torrey Botanical Club, *Bull. Torrey Bot. Club*, **77**, 146-150. Taxonomic methods are examined in the light of the writings of Bacon, who would approve modern experimentation, and is apparently on the side of the "splitters".—(K.J.H.)

EDWIN, G., 1951, A Quicker More Satisfactory Method for Soaking and Re-pressing Dried Plant Specimens, *Rhodora*, **53**, 113-114. Poorly-pressed plant specimens may be saved for mounting on herbarium sheets by an extension of the method of Fassett. The specimens to be soaked are placed separately between metal corrugates, as used in drying fresh plants, and completely submerged for 20-35 minutes (depending on succulence) in a very dilute solution—about 1 tablespoon per gallon of water—of any household detergent. The stack of material should be weighted down to prevent the floating of particles or the intermingling of different specimens. After soaking the specimens are removed from the solution, excess water being allowed to drain away, and are placed in dry collection sheets, blotting paper, etc., and dried in the usual manner.—[D.E.A.].

EMEIS, W., 1950, Über die Bedeutung des Atlantischen Klimakeils für das Verbreitungsbild unserer Flora und Fauna, *Schriften des naturw. Ver. Schleswig-Holstein*, **24**, 1-7. The effect of an Atlantic climate on plant distribution in a region such as Schleswig-Holstein is discussed.—[D.E.A.]

HASKELL, G., 1951, Plant chromosome-races and their ecology in Great Britain, *Nature*, **167**, 628-629. The reported ecological and geographical differences between members of polyploid and aneuploid series in the following groups is reviewed: *Galium palustre*, *Erophila verna*, *Cardamine pratensis*, *Aphanes*, *Ranunculus Ficaria*, *Valeriana officinalis*, *Nasturtium*, *Arum*, *Glyceria*, and *Polypodium vulgare*. Generally, forms with lower chromosome multiples prefer drier habitats, and there is a progressive trend through intermediates to the highest polyploids, which prefer moist habitats. The reason for this is not known.—[D.P.Y.]

HULTÉN, E., 1949, On the races in the Scandinavian Flora, *Svensk Bot. Tidskr.*, **43**, 383. Deals with the following:—*Lycopodium annotinum* and its montane representative var. *alpestre* Hartm. (*L. pungens* La Pylaie). *L. clavatum* and its montane representative var. *lagopus* (*monostachya* Grev. & Hook.). *L. complanatum* and its lowland representative ssp. *chamaecyparissus* (R.Br.) Asch. & Graebn. *Picea Abies* (L.) Karst., its northern representative var. *obovata* (Ledeb.) Hultén. The tetraploid, northern representative of *Phleum alpinum*, which is ssp. *commutatum* (Gaud.) Hultén. *Caltha palustris* and its radicate form from N. Scandinavia. *Ranunculus sceleratus* and var. *reptabundus* (Rupr.) Hult. with long-beaked achenes. *R. peltatus* and var. *septentrionalis* with thicker stem and more dissected leaves. Races of *Sedum Rosea*, *Parnassia palustris*, *Prunus Padus* and var. *borealis* Schüb. with pubescent leaves and erect racemes. *Sorbus aucuparia* and *S. glabrata* Hedl. *Dryas octopetala* and ssp. *punctata* (Juz.) Hult. *Astragalus alpinus* and ssp. *arcticus* (Bunge) Hult. with darker flowers. *Oxytropis campestris* and ssp. *sordida* (Willd.) Pers. *Pyrola rotundifolia* and *P. norvegica* Knaben. The author considers the latter a southern form of *P. grandiflora*, which is distinguished from *P. rotundifolia* by smaller leaves with petiole longer than the blade, blunt denticulate calyx-lobes, and fleshy collar at base of calyx. *Vaccinium uliginosum* and its small-leaved northern race. *Veronica serpyllifolia* and var. *humifusa* (Dicks.) Vahl. *Pedicularis palustris* and ssp. *borealis* with simple stem, fewer and smaller flowers with galea exceeding lip.—[A.H.G.A.]

JALAS, I., 1950, Zur Kausalanalyse der Verbreitung einiger nordischen Os- und Sandpflanzen, *Ann. Bot. Soc. Zool.-Bot. Fenn. 'Vanamo'*, **24**, No. 1, 1-362. The article contains descriptions of a large number of arenicolous varieties. The treatment of the varieties of *Anthyllis Vulneraria* L. (pp. 27-46), *Lotus corniculatus* L. (pp. 46-54) are of special interest to British botanists. *Oxytropis campestris* (L.) DC. ssp. *scotica* Jalas (p. 59) from Glen Fee is new.—[A.H.G.A.]

JANCHEN, E., 1950, Beiträge zur Benennung, Verbreitung und Anordnung der Farn- und Blütenpflanzen Österreich II, *Phyton*, **2**, 302. *Armoracia lapathifolia* **Usteri** not Gilib. *Barbarea iberica* (Willd.) DC. for *B. arcuata* (Opiz) Reichenb.—[A.H.G.A.]

KLOOS, A. W., 1950, Aanwinsten van de Nederlandse Flora in 1945, 1946 en 1947, *Ned. Kruidk. Arch.*, **57**, 199-243. The local species of *Claytonia* are put under *Limnia* as *L. sibirica* (L.) Haw., *L. alsinoides* (L.) Haw., and *L. perfoliata* (L.) Haw.; the two former are distinguished as follows:

Leaves rather fleshy, strongly 3-5 ribbed; petals rose ... *L. sibirica*.

Leaves thin, faintly nerved; petals white *L. alsinoides*.
Alisma × *rhincocarpum* Schotsm. is adopted for *A. lanceolatum* × *Plantago-aquatica*. Several other plants are recorded from the Netherlands, mainly aliens and varieties.—[A.H.G.A.]

LÖVE, A. & D., 1949, The Geobotanical Significance of Polyploidy. I. Polyploidy and Latitude, *Portugal. Acta Biol.*, Ser. A., 273-352. The frequency of polyploids in various floras is found to increase relative to the higher latitude or to the severity of the Pleistocene and post-glacial climate, thus confirming Hagerup's hypothesis that polyploid frequency increases with an increase in climatic rigour. The percentage of polyploids found in the British Isles is given as 56.7, compared with 53.5 in Denmark, 57.6 in Norway, 61.3 in the Faeröes and 63.8 in Iceland. Polyploid frequency is significantly higher in monocotyledons than in dicotyledons. In northern regions some connection between polyploidy and the perennial habit seems to exist, though this is not apparent in more temperate regions. Hardiness increases in probably the majority of hardy and subhardy genera with an increase in chromosome number, though it decreases in a few cases of strict autopolyploidy. The increased adaptability of polyploids to extreme conditions can be explained only on the base of genetical interpretations. The differences between autopolyploids and allopolyploids are discussed, and the authors propose dividing them into pan- and hemiautopolyploids and pan- and hemiallopolyploids on the basis of differences in their cytogenetical behaviour. The panautopolyploid state implies considerably less advanced evolutionary status than the other subgroups. The species reacts to an extreme condition by forming new ecotypes, not by production of polyploids, which are only formed haphazardly, but which, if advantageous, will survive and be able to invade areas or ecological conditions closed to their diploid parental types.—[D.E.A.]

OSVALD, H., 1949, Notes on the Vegetation of British and Irish Mosses, *Acta Phytog. Suecica*, **26**. The paper describes and classifies some of the peat lands of the British Isles. It is based on field observations made between 1921 and 1937. A map on p. 16 shows the places mentioned.—[A.H.G.A.]

PICHON, M., 1949, Au sujet des "nomina specifica conservanda," *Bull. Soc. Bot. France*, **96**, 216-218; 229-230. The various problems connected with the conservation of specific names are discussed. The

writer fears even worse abuses than in the case of conserved generic names, if such a system is adopted, unless special care is taken in observing the rules with the greatest strictness. Only the names of species which are distributed over a very wide area would be fit for conservation. Three categories of names which might be conserved are distinguished and lists added of specific names which the author proposes should be proscribed. Most of the *nomina rejicienda* in these lists are now in general use in Britain.—[D.E.A.]

SCHEUERMANN, R. H., 1948, Zur Einteilung der Adventiv- und Ruderalflora, *Berichte Schweiz. Bot. Ges.*, **58**, 268-276. The writer classifies the adventive and weed flora as follows:—

A. Escapes.

- a. Ephemeral imported species (Vorübergehend eingeschleppte Arten).
 1. Corn weeds.
 2. Wool plants.
 3. Oil plants.
 4. Bird seed plants.
 5. Plants brought in with southern fruits.
 6. Plants, whose seeds come in with other commodities, or escapes an unknown way.
- b. Denizens (Eingebürgerte Arten).

B. Non-imported species.

- a. Cultivated plants.
- b. Native crop and garden plants.
 - b1. Weeds of all kinds in large towns.
 - b2. Weeds of agricultural land and garden ground.
- c. Native waste ground plants.

[A.H.G.A.]

SHIELDS, L. M., 1950, Leaf Xeromorphy as Related to Physiological and Structural Influences, *Bot. Rev.*, **16**, 399-447. It is concluded that no direct correlation exists between drought resistance and water requirements of plants, xeromorphic leaves commonly showing high transpiration rates. Resistance to desiccation is explained on the basis of changes within the cells such as increase in osmotic pressure, decrease in cell permeability and modifications in the protoplasm which increase its waterholding capacity.—[K.J.H.]

SKALINSKA, M., 1950, Studies in chromosome numbers of Polish Angiosperms, *Acta Bot. Polon.*, **20**, 45-. Strains of *Cardamine pratensis* L. were found with $2n=30, 32, 44, 50, 76$ & 78 . These seem to be connected to some extent with their habitat. Two numbers, $2n=42$ and $2n=35$, are given for *Potentilla argentea*. *Valeriana officinalis* L. diploid ($2n=14$), tetraploid ($2n=28$) and *sambucifolia* Mik. ($2n=56$) are well defined morphologically in Poland and lack the intergrading forms found in Britain. The diploid is the most widely distributed; the tetraploid from only one locality. *V. sambucifolia* is a montane species com-

mon in southern Poland. Several other numbers relating to British species are listed.—[A.H.G.A.]

STEARNS, W. T., 1949, The use of the term "clone", *J. Roy. Hort. Soc.*, **74**, 41-46. Several equivalent definitions of "clone", e.g. the vegetatively produced progeny of a single individual, are cited. The spelling "clon", which is the original and more literal rendering of the Greek κλών, is preferable for the formal designation of plants, but for general usage the spelling "clone" is adopted to preserve the correct pronunciation. The term is a genetical rather than a taxonomic one, and has no nomenclatural standing under the International rules; thus a clone, although actually equivalent to an *individuum*, may be given any higher nomenclatural category. *Salix caerulea* and *Populus serotina* are both single clones; *Elodea canadensis* is also represented over a very large area by one clone. Large clones may not be absolutely homogeneous, but where a vegetative mutation (bud-sport) occurs in a ramet of a clone and gives rise to a diverging race, although that race is by rigid definition part of the original clone it is more logically regarded as the starting-point of a fresh one. A race of plants propagated by apomixis forms a special kind of clone. The longevity of single clones is discussed; the only impediment to an indefinite life appears to be infection by virus disease, and whereas certain hortical clones have died out completely from this cause, some apomicts (e.g. of *Alchemilla*) may date back to before the last glaciation.—[D.P.Y.]

TAYLOR, GEOFFREY, 1951, *Some Nineteenth Century Gardeners* (Skeffington & Sons). Informative accounts of the work, character and influence of three famous gardeners, J. C. Loudon, William Robinson and Reginald Farrer, of interest to gardeners and botanists.—[E.B.B.]

ZENARIA, S., 1948, Piante critiche delle alpi Venete, *Nuovo Giorn. Bot. Ital.*, **55**, 68-81; 1949, *op. cit.*, **56**, 198-222. The writer deals mainly with varieties and gives, among others, definitions of 5 varieties of *Cardamine amara* L. and a large number of varieties and forms of *Lotus corniculatus* L.—[A.H.G.A.]

OBITUARIES

Compiled by J. E. LOUSLEY.

MERRITT LYNDON FERNALD (1873-1950) was born on 5th October 1873 at Orono, Maine, where his father was head of the Department of Mathematics and Physics at the Maine State College and later president of that institution, which is now the University of Maine. The absorption in botany which filled all his adult life to the exclusion of practically every other interest must have begun while he was still a boy, for we find him writing in February 1891 to Sereno Watson: "I think the one thing I was made for was a botanist, as from early childhood my inclinations have been in that line." His first paper, published only four days after his 17th birthday, was, appropriately enough, a note on the local occurrence of two species of *Carex*, a genus of which he later became one of the leading American students. His second, published six months later, was a fairly lengthy list of noteworthy plants he had found in the vicinity of Orono, including many that were first records for the state; he mentions about 20 species and varieties of *Carex*, and says that 60 others occur there. In it he speaks of having been able to spend the year of 1890, especially the time from May to August (evidently his summer vacation), collecting around Orono, and acknowledges assistance in identification from Sereno Watson, George Vasey, D. C. Eaton, and L. H. Bailey—the last of whom, happily, is still with us. As a consequence of this contact with Watson and of some further correspondence, Fernald was brought down to Cambridge, Massachusetts, in March 1891, by his father, and installed as an assistant at the Gray Herbarium of Harvard University, a connection which was to continue unbroken for the rest of his life, only a few months short of sixty years. In the autumn of that year he entered the Lawrence Scientific School of Harvard, graduating S. B. *magna cum laude* in 1897. He served as an assistant at the Gray Herbarium from 1891 to 1902 (first under Sereno Watson, then under the late B. L. Robinson), then as instructor and assistant professor, and from 1915-1947 as Fisher Professor of Natural History, then as Fisher Professor Emeritus. From 1935-1937 he was Curator, and from 1937-1947 Director of the Gray Herbarium.

Fernald's publications amount to over 750 titles, nearly all in the fields of floristics, phytogeography, and taxonomy of vascular plants. With the exception of a few papers on Mexican and Central American plants, published mostly during his early years at the Gray Herbarium (the last in 1907), they relate almost wholly to the flora of the Gray's *Manual* range, that is, the north-eastern quarter of the United States and the associated provinces of eastern Canada. The bulk of these studies was published in *Rhodora*, the journal of the New England Botanical Club, an organization of which Fernald was one of the founders and definitely the most active member. Of the 621 numbers

of that monthly periodical that appeared from 1899 on in his lifetime (during all of which time he was on the editorial board, and from 1929 on, editor-in-chief) there are comparatively few that do not contain an article, a note, or at least a review from his pen; his trenchant and frequently caustic reviews were through the years one of the outstanding features of this journal. Many of these items, of course, were of only transient significance, but many more are documents of permanent value, such as the very readable reports on his expeditions and the revisions of genera or parts of genera as they were represented in the region with which he concerned himself.

The results of most of his investigations were absorbed into his *magnum opus*, the 8th edition of Gray's *Manual*, but some of his publications not directly contributory to that work are likely to remain, like it, standard in their fields for a long time to come. Among such are his "Soil preferences of certain alpine and subalpine plants" (1907, *Rhodora*, 9, *Contr. Gray Herb.*, 35), a work of much ecological significance; "Notes on the plants of Wineland the Good" (1910, *Rhodora*, 12), an evaluation of the botanical evidence in the old Icelandic sagas which led him to identify the landing place of the Norsemen as probably Labrador rather than New England or Nova Scotia; "Persistence of plants in unglaciated areas of boreal America" (1925, *Mem. Gray Herb.*, 2), a paper which has stimulated further investigation as much in Pleistocene geology as in botany; and his only separately published book (except two editions of Gray's *Manual*), *Edible wild plants of Eastern North America* (1943), written in collaboration with Prof. A. C. Kinsey, into which he poured the results of over half a century's experimentation with more or less edible wild plants and note-taking among late and early writers on the same subject. Among his outstanding systematic papers were: "A synopsis of the Mexican and Central species of *Salvia*" (1900); "The north-eastern *Carices* of the section *Hyparrhenae*" (1902); "The linear-leaved North American species of *Potamogeton*, section *Axillares*" (1932).

His field work was as extensive and as fruitful as his work in the herbarium. Gifted with a keen eye and a prodigious capacity for work, with a marvellously trained memory for plant ranges and diagnostic characters and the ability to select profitable regions for exploration, he unquestionably accomplished more toward the elucidation of plant distribution in the Gray's *Manual* area than any other individual—one might almost say, than all others put together. His collecting trips, beginning as a boy around his home at Orono, gradually led him farther and farther afield. He botanized extensively in Quebec, Newfoundland (of which he planned to write a flora, but never did), Nova Scotia, Cape Cod, Michigan, and, during his last years of active field work (1933-1946), in Virginia.

Among botanists at large, both amateur and professional, Fernald is best known as co-author of the 7th edition of Gray's *Manual of Botany* (with B. L. Robinson, 1908), and as sole author of the 8th edition, issued

in 1950 only a couple of months before his death*. It is the most critically elaborated flora that has been published for any part of America, and will take high rank among the regional floras of the world. I can think of no other botanist in history who has devoted so many years of such intensive and productive field and herbarium work to the continuous study of a comparable area.

Fernald made two visits to Europe; in 1903, when he studied the Michaux herbarium in Paris, so important for American plants, and in 1930, when he attended the Fifth International Botanical Congress in Cambridge, England.

Among European scientific organizations, he was an honorary member of the Botanical Society of the British Isles from 1908 and a foreign member of the Linnean Society of London from 1936.

For much of the information in this notice I am indebted to the February 1951 *Rhodora*, a memorial number containing a sketch of Fernald's life and other papers discussing his work as a teacher, as a reviser of Gray's *Manual*, as a botanist, and as a field-man.

S. F. BLAKE.

RUTH MARY TRISTRAM (née CARDEW) (1886-1950). Miss R. M. Cardew was born on April 25th, 1886, and became interested in botany at a very early age. The discovery of *Holosteum umbellatum*, previously known in this country only from Suffolk and Norfolk, in Surrey in 1905 by this "young and enthusiastic botanist" brought her to the notice of well-known workers of the day (1905, *J. Bot.*, **43**, 189). A little later she turned her attention to a study of *Plantago* in collaboration with the late E. G. Baker and with a view to an account of the genus for Moss's *Cambridge British Flora*. This resulted in the joint publication of *P. coronopus* var. *Sabrinae* [*P. Sabrinae* (Baker & Cardew) Druce] in 1911, *Rep. Bot. Soc. & E.C.*, **3**, 28-29, and Notes on *Plantago*, 1912, *J. Bot.*, **50**, 55-58.

Meanwhile Miss Cardew had been elected a Fellow of the Linnean Society on December 7th, 1911 (the same meeting at which our late member, Mr. A. J. Wilmott, was elected). As only six years had passed since the Linnean had first admitted women, and as she was only 25 at the time of election, the honour was a very considerable one of which she remained proud until the end of her days.

She was an early member of the Wild Flower Society but did not join the B.E.C. until 1934, resigning under the stress of war in 1940. She married Major G. H. Tristram, R.A., in 1919, and had four children. Mrs. Tristram died on October 22nd, 1950, and her husband and two children survive her.

J. W. CARDEW and J. E. LOUSLEY.

*See Review, p. 140.

REVIEWS

Gray's Manual of Botany, Eighth (Centennial) Edition—Illustrated.

A handbook of the flowering plants and ferns of the Central and North-eastern United States and adjacent Canada. Largely rewritten and expanded by MERRITT LYNDON FERNALD, with assistance of specialists in some groups. Pp. lxiv+1632, ff. 1806, pl. iii. New York: American Book Company, 1950; U.S. \$9.50.

The title of this book conceals its greatness and its importance for botanists in all North Temperate regions. Far from being merely a new edition of an old and honoured book, it is, in fact, a new flora and almost the perfect flora of the taxonomist's dream. This is because it is the work of the one man who was supremely competent to undertake it. Prof. Fernald, who died just after the book appeared, had been for many years the leading botanist in Eastern North America and combined, with tireless energy and equal distinction, the three rôles of herbarium systematist, field collector and plant geographer. This is a rare combination, and when its author enthusiastically devotes his time to assembling such vast knowledge in one great descriptive flora, the result is not merely a happy one, it is a unique masterpiece of its kind and a benefaction to the scientific world.

The area treated in the first edition of Asa Gray's *Manual* was altered from time to time by Gray and his successors until, in the seventh edition prepared in 1908 by Prof. Fernald himself in collaboration with Prof. B. L. Robinson, it extended from Prince Edward Island and northern New Brunswick to south-western Ontario in Canada, and covered the north-eastern States from New England to Virginia and Kentucky, the western limit following the western boundary of Minnesota and Iowa and thence southward along the 96th meridian so as to take in easternmost Nebraska and Kansas. For this centennial edition Prof. Fernald added Eastern Quebec Province and Newfoundland, because of their extraordinary phytogeographic interest and the many remarkable discoveries of relict species he had made there. It seems unfortunate that no map defining this area is to be found anywhere in the book.

That omission, however, is perhaps characteristic. True to its title, this book is unashamedly devoted to pure systematics, and, after 11 pages of preface, plunges straight into the synopsis of the orders and families of the vascular plants, without any phytogeographic survey or essays on geology and climate. The "new taxonomist", then, will not expect to find indications of life-forms or chromosome numbers of species, but he will get his "alpha taxonomy" in unsurpassed quality. The synopsis is followed by an artificial key to the families and a statistical summary of them, and then comes the descriptive flora in the order of Engler and Prantl's system. The book ends with a glossary and indices to Latin and colloquial names.

The exceptional merits of Prof. Fernald's work are to be found in his descriptions and keys, with their numerous italicised and contrast-

ing characters and the constant use of measurements. Surely there have never been, in any previous flora, such carefully considered descriptions and keys: they bear the marks of the finest monographic studies and could have been prepared only by a taxonomist of the highest order and the longest experience of such methods. In many instances keys are also given for infraspecific groups. There is nothing vague about these keys, and they will be just as helpful to students and amateurs as to professional botanists.

Other features of the work are the very numerous small text-figures, especially useful in the critical genera, the explanations of the meanings or sources of the generic names, the English equivalents of the Latin epithets, the accentuation of names as an aid to pronunciation, and the concise definitions of habitat, distribution and flowering period. Prof. Fernald's varieties occupy a somewhat segregated geographic area, while his forms correspond more nearly to the varieties of most British botanists. He also recognises certain geographic subspecies. No less than 8340 "taxa" are treated in the work, the total of the species being 5523. The six largest families are the *Compositae* (with 703 species), *Rosaceae* (551), *Gramineae* (487), *Cyperaceae* (473), *Leguminosae* (237) and *Scrophulariaceae* (152). Among the larger genera are *Carex* (with 267 species), *Rubus* (205), *Crataegus* (103), *Panicum* (76), *Solidago* (75), *Aster* (68), *Juncus* (56), *Salix* (54), *Viola* (51), *Polygonum* (46), *Eleocharis* and *Cyperus* (40 each), *Potamogeton* (37), *Ranunculus* (36) and *Antennaria* (32). In a few instances, e.g. *Crataegus*, the accounts were contributed by specialists. Prof. Fernald himself took a broad view of generic limits, while he has taken a firm line here with species in some large critical genera such as *Rosa*, *Rubus*, *Taraxacum* and *Hieracium*.

The Manual is important for British botanists and plant geographers, not only because so many of our species and critical allies of them occur as natives in the area covered by it, but also because nearly 1100 of the species described have been introduced into this area from Europe. We now have the advantage of seeing how the names and characters of many of our species and varieties have been reconsidered and weighed by this master mind across the Atlantic, and distilled into keys which we have not seen equalled in European books. Quite often Prof. Fernald's decisions run counter to the treatments to which we are accustomed here, and the rest of this notice may aptly be devoted to some examples of these and of other unusual statements with a bearing on British botany.

In the Ferns, the name *Dryopteris disjuncta* (Ledeb.) Morton is accepted for the Oak Fern. In the Grasses, the genus *Helictotrichon* is not recognised (for *Avena pubescens*), and Dr. Philipson's paper on *Agrostis* has not been used. *Carex lepidocarpa* Tausch is strangely described as glaucous: is it, then, identical in North America with our plant? Of *C. microglochis* the author says, "A very primitive and ancient species, transitional to the subantarctic genus *Uncinia*." *Juncus conglomeratus* is treated as a variety of *J. effusus*, with the

remark, "With us the differential characters not so clear." *Betula alba* L. is adopted in the sense of *B. pubescens* Ehrh. *Polygonum lapathifolium* L. is given only pink or purplish spikes and its typical form is made to include *P. nodosum* Pers., while *P. dubium* Steen is used for our *P. mite* which is said not to be the plant of Persoon. The author's complete rejection of Aellen's work on *Chenopodium* will surprise European botanists, and he wrongly uses the name *C. graveolens* Lag. et Rodr. in the sense of *C. incisum* Poir. *Atriplex hastata* and *littoralis* are kept as varieties of *A. patula*, while *Salsola pestifera* returns to varietal status as *S. Kali* var. *tenuifolia* Tausch. In *Caryophyllaceae*, *Spergularia marina* (L.) Griseb. is used instead of *S. salina*, and *S. media* (L.) C. Presl instead of *S. marginata*; more interesting is the reduction, with an excellent description, of *Arenaria leptoclados* to varietal rank (as var. *tenuior* M. et K.) under *A. serpyllifolia*. In *Cruciferae*, *Brassica Rapa* and *B. Napus* are used in opposite senses to those current here; one wonders whether the author's application of the name var. *microphyllum* (Boenn.) Thell. of *Nasturtium officinale* is the same as ours, since he does not mention the seed character. *Potentilla anglica* Laicharding, an old name not yet listed in the *Index Kewensis*, antedates our *P. procumbens* Sibth. The nomenclature of some of the species of *Alchemilla* will be criticised here, as may the use of the name *Rosa Eglanteria* for *R. rubiginosa* and of *Dipsacus Fullonum* L. for the Fuller's Teazle. In *Leguminosae*, there is a good account of *Vicia* in which *V. villosa* and *V. dasycarpa* are kept distinct but *V. tenuifolia* is treated as a variety of *V. Cracca*; while, in *Medicago*, var. *glandulosa* Neir. is adopted for the glandular form of *M. lupulina* instead of the familiar var. *Willdenowiana* Koch. The treatment of *Oxalis* must be examined here, since a polymorphic species *O. europaea* Jord. is admitted as well as the related *O. corniculata* and *O. stricta*. It is disappointing, if not surprising, to find *Euphorbia virgata* included without comment in *E. Esula*!

Rhamnus Frangula is "recently and very rapidly spreading; likely to become obnoxious." *Oenothera Lamarckiana* is included in *Oe. grandiflora* Ait. The tuberous-thickened rhizome is used to distinguish *Circaea alpina* from *C. canadensis* but will not, I suspect, prove a very reliable character. *Myriophyllum alterniflorum* var. *americanum* Pugsley is described as "the clones with smallest leaves." E. H. L. Krause, not Druce (as on p. 1157), was the first author of the combination *Centaurium pulchellum*. The varieties of *Calystegia sepium* are distinguished mainly by characters taken from the leaves. *Stachys palustris* is divided into two geographic (but unnamed) subspecies, each with several varieties; yet *Calamintha Nepeta* and *C. nepetoides*, which have a long European tradition as good species, are reduced to varieties of *Satureja Calamintha*. In *Veronica* somewhat heterodox sepal characters, which we must test, are used for distinguishing *V. agrestis* and *V. polita*; while others, equally unfamiliar to us, are seen in the key to *Rhinanthus*. It is strange to find that the common name for

Valeriana officinalis is "Garden Heliotrope." In the *Compositae*, *Carduus acanthoides* L. and *C. crispus* L. are carefully distinguished, and the varieties of *Cirsium arvense* are excellently described under their correct names, but Prof. Fernald's *Arctium nemorosum* Lej. et Court. is "a mixed series" covering *A. vulgare* Evans and probably including *A. pubens* Bab., and he has surely misinterpreted *Hieracium brunneocroceum* Pugsl. when he merges it in *H. aurantiacum* L. as "colonies with broadest [*sic!*] leaves, quite inseparable with us."

These examples will be enough, I think, to whet the appetite of British botanists and persuade them to purchase or at least borrow this wonderful book, which will broaden their outlook on their own flora by its revelation of parallel developments in the North Temperate regions of the American continent.

N. Y. SANDWICH.

Le Valois: Phytosociologie et Phytogéographie. Paul Jovet. 8vo, pp. 389, with 66 figures, 79 tables, 28 maps and 20 photographs. Paris: Société d'Édition d'Enseignement Supérieur, 1949; francs 1,500.

British field botanists have so long been familiar with accounts of their local floras based on the traditional systematic treatment that there is a danger that they may overlook alternative methods of presentation. The works of Crampton, 1911, *The Vegetation of Caithness . . .*, and Moss, 1913, *The Vegetation of the Peak District*, were valuable in introducing the ecological approach, but they made no attempt to include material of the kind associated with our conventional local floras—and there has been no attempt to combine the two methods in this country since. To a considerable extent this has been achieved by M. Jovet for the part of France selected for his book. While his approach is ecological, he has incorporated a history of botanical research in his area, and he shows that he is well acquainted with past records, distribution and taxonomy. It cannot be claimed that the result supersedes our own method for all purposes, but it does merit close examination by workers producing local floras in this country and it affords an excellent opportunity of comparing our own flora with that of an area just across the English Channel.

Le Valois is an ancient jurisdiction of France, well known as having given its name to a line of French kings, and now divided between the *départements* of Oise and Aisne. As defined by M. Jovet for the purposes of his book, it is bounded approximately by the R. Oise and its tributaries and by tributaries of the R. Marne. Although only 34 km. N.E. of Paris at its nearest point, it is little known to English tourists. Including a wide range of habitats on acid and basic soils, it presents fascinating opportunities for comparative studies, of which the author has taken full advantage.

The classification of the vegetation is based on the Braun-Blanquet system but with considerable modification. Whereas the use of this system in several continental countries has been far too rigid to reflect the facts observed in the field, M. Jovet's classification is more closely

based on nature. As a result he recognises various small well-defined communities which will be familiar to field botanists in this country but which I do not remember seeing mentioned in other works on ecology. An example of this is the account of his *Caricetum strigosae* (pp. 158-164) which so strongly recalls the flora of parts of Kentish and Surrey woods below the North Downs. Other communities will be of particular interest to botanists familiar with Breckland, which offers interesting comparisons with the siliceous-calcareous areas of Le Valois.

Features of the ecological treatment are the excellent transects, which include drawings of the underground systems of the plants, and the tables showing the range of *pH* tolerance for a large number of species. The latter show surprisingly low limits for some species regarded as calcicoles in this country—for example, *Potentilla verna*, *Veronica spicata* and *Euphorbia Cyparissias* as all given (on p. 123) with about *pH* 5.5 as a lower limit.

The classification of vegetation is carried to its logical conclusion with a long chapter on "*Vegetation anthropique*" and here there is much to interest English workers. The weeds of flax fields (p. 239), the flora of railways (p. 246), and the plants of walls (p. 246 *seq.*), are examples of the thoroughness with which the flora has been accounted for. Elsewhere in the book the associates of *Euphorbia Cyparissias* may help to throw light on its status in Britain, while our alien *Festuca heterophylla* is characteristic of one type of Beech-Hornbeam-Oakwood (p. 196), *Senecio viscosus*, as with us, spreads along railways (p. 337), *Juncus tenuis* is associated with *Cicendia filiformis* and *Radiola linoides* (p. 92)—the pages are crowded with similar ecological observations.

Over a quarter of the book is devoted to a study of the present distribution of the flora, and an attempt to explain it by comparison with adjacent areas and from geological and recent history. The occurrences of about 120 species are plotted on maps. There is an interesting discussion of the causes which lead to plants becoming extinct or reduced in quantity—collectors are blamed for the reduction of *Ranunculus Questieri* which is known only from Le Valois. The records of earlier workers, and especially those in the 118 notebooks of the Abbé Questier, compiled from 1843 to 1877, are cited to indicate increases and decreases in frequencies. Contrary to our experience in Britain, *Cynoglossum montanum* is now more frequent than it was about a century ago (p. 337). *Erigeron canadensis* was recorded in 1655, and *Elodea canadensis* in 1868, while *Matricaria matricarioides* tends to replace other *Matricarias*, as with us (p. 339) [the names quoted are those in current use in Britain]. The map showing the distribution of *Coronilla varia* (p. 338) indicates that this, with some other species, is confined to the vicinity of railways.

The book concludes with an excellent bibliography and detailed lists of illustrations and contents, and it is to be regretted that there is no index. *Le Valois* may be strongly recommended to English botanists as a volume packed with information and ideas; one cannot help wishing that we had accounts of a few British areas on similar lines.

J. E. LOUSLEY.

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Edited by
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THE BRITISH FORMS OF VALERIANA OFFICINALIS

By T. A. SPRAGUE.

The publication in *Watsonia*, 1 (6), 379-380 (1950), of an abstract from E. Walther's paper on the medicinal Valerians of Middle Europe (1949, *Mittel. Thüring. Bot. Ges., Beiheft 1*) may lead to uncritical acceptance, by workers on the British flora, of all her conclusions, and especially of her determinations of plants from the British Isles, and it is therefore felt that the following commentary may be useful. Walther had unfortunately seen neither Skalińska's paper on Polyploidy in *Valeriana officinalis* (1947, *Journ. Linn. Soc. Lond., Bot.*, 53, 159-186) nor my own on Field Studies on *Valeriana officinalis* in the Cotswold Hills (1943, *Proc. Linn. Soc. Lond.*, Session 155, 93-104), in which we reached conclusions somewhat different from hers, and her acquaintance with the British and Irish forms was based on the study of only 33 herbarium specimens, six of which she identified as hybrids.

Walther recognized five species of *Valeriana*, Section "*Officinalis*" from Middle Europe, namely, two octoploids ($2n=56$), *V. sambucifolia* Mikan (1810) and *V. procurrens* Wallr. (1840); one tetraploid ($2n=28$), *V. collina* Wallr. (1840); and one diploid ($2n=14$), *V. exaltata* Mikan (1810); the chromosome number of the fifth species, *V. pratensis* Dierb. (1825), being unknown. From examination of herbarium material she recorded three of these species, namely, the octoploid *V. procurrens*, the tetraploid *V. collina*, and the diploid *V. exaltata* from the British Isles.

Skalińska recorded only octoploids and tetraploids from Britain, and the record of a diploid species, *V. exaltata*, from England is therefore extremely interesting if it can be confirmed by cytological examination. Only a single herbarium specimen was cited from England by Walther, from a marsh near Slade's Bottom in the Woodstock district of Oxfordshire. The nearest localities cited by her for *V. exaltata* appear to be in Northern Germany, between the rivers Weser and Elbe, e.g. Schnakenburg (near Wittenberge) and Magdeburg on the Elbe, and Nordhausen am Harz. The species was unrecorded by her from Denmark, Western Germany, Holland, Belgium and France (except for Savoy).

The British octoploids were, on the whole, identified by Walther as *V. procurrens*, and most of the tetraploids as *V. collina*. A Mercombe Wood specimen of mine, however, which was cited by her as *procurrens*, was from a tetraploid population and should presumably be referred to *collina*, whilst the North Staffordshire plants from Biddulph, Knypersley, and on limestone in the Manifold Valley, which were assigned by her to *collina*, fall outside the known tetraploid area, and may have to be referred to *V. procurrens*. Skalińska gave a photograph (pl. 6, fig. 2, right) of a short octoploid from Mayfield, Staffs., which might have been taken for a tetraploid, had it not been examined cytologically.

Apart from the fact that the British forms of the *officinalis* group are not quite identical with the Continental ones, it may be pointed out that certain criteria used by Walther in her clavis to the Middle European species are inapplicable to the British plants assigned by her to these species. She distinguishes *V. procurrens* from *V. collina* by the presence of *above-ground* runners, and by the runners (whether above- or below-ground) bearing leaves in the first year, whereas the British octoploid, which she identified as *V. procurrens*, does not, as far as is known, produce above-ground runners, and both the octoploid and the tetraploid in Britain frequently bear leaves on their runners in the first year. The distinction between *V. procurrens* as "late-flowering" and *V. collina* as "early-flowering" also does not hold good for the British octoploid and the tetraploid: out of thirty-four strains of each examined by Skalińska, the octoploid set included 8 early-, 17 intermediate- and 9 late-flowering strains, whilst the tetraploid had 13 early-, 16 intermediate- and 5 late-flowering strains: the amount of overlapping is here so great as to render the period of flowering useless for diagnostic purposes.

Skalińska came to the conclusion that in most cases purely morphological criteria are inadequate for a correct delimitation of the two polyploid types in Britain, there being a great diversity within each cytological group, and a strong overlapping of the characters analysed. It remains to be seen whether the following anatomical characters, given by Walther, will serve to distinguish the two British polyploids.

V. procurrens: epidermal cells on the upper surface of the leaflets with strongly undulate walls; only one layer of palisade cells, seldom two; stomata on the middle leaflets of the middle cauline leaves 43-140 per μ^2 .

V. collina: epidermal cells on the upper surface of the leaflets with slightly undulate walls; two layers of palisade cells; stomata on the middle leaflets of the middle cauline leaves 108-340 per μ^2 .

Perhaps the least satisfactory feature of Walther's paper is her facile assumption (pp. 31, 61-63, 67) that plants which appear to be intermediate between two of the species recognized by her are hybrids between them. Under the heading *Valeriana collina* \times *procurrens* she cites from England four herbarium specimens which, judging from locality and habitat, are probably tetraploids, and two which are probably octoploids. Skalińska found that the British octoploid and the British tetraploid were inter-sterile. Walther (p. 89) stated that in 1946 she crossed a plant of *V. procurrens* with 5 pairs of leaflets with one of *V. collina* which had 11-12 pairs of leaflets on the middle cauline leaves. The resulting plant had the early flowering and the habit of *V. collina*, but somewhat larger flowers and fruits. It does not appear to have been examined cytologically. Elsewhere (p. 91) she stated that a hybrid, *V. collina* \times *procurrens*, artificially produced by her, had $2n=28$ chromosomes, whereas a hybrid between the tetraploid *collina* and the octoploid *procurrens* should presumably have been a hexaploid, $2n=42$.

To sum up, the following questions remain to be answered:—

1. Can the British forms of *Valeriana officinalis* L. sensu lato be divided into two or more species recognizable by exomorphic characters?

2. Does the British octoploid correspond essentially to *V. procurrens* as defined by Walther, and does the British tetraploid correspond essentially to her *collina*?

3. Can they be separated by the anatomical characters given by Walther?

4. Is there any evidence of hybridization between the British octoploid and the British tetraploid?

5. Assuming that *V. procurrens* and *V. collina* are accepted as distinct British species, what name should each bear? *V. officinalis* L. was rejected, as a *nomen ambiguum*, by Walther. Is it impossible to typify it satisfactorily? *V. procurrens* seems indicated as the type. In any case examination of types might conceivably prove that *V. repens* Host was an earlier name for *V. procurrens*, and that *V. angustifolia* Tausch was an earlier name for *V. collina*.

In conclusion, it should be mentioned that, in the diagnoses of Series *Sambucifoliae* and *Collinae* as given in the abstract, the sentences relating to the leaflets should read: "Leaflets little decurrent down the rhachis" and "Leaflets strongly decurrent down the rhachis" respectively: the amount of decurrence is independent of the angle formed by the leaflet as a whole with the rhachis.

POSTSCRIPT. Walther's record of *V. exaltata* from Britain should now be deleted. I have since visited the marsh at Slade's Bottom near Woodstock in company with Dr. W. B. Turrill, and find that the supposed diploid from that locality is indistinguishable externally from the octoploid found at Sapperton, Glos. Skalińska (1951, *Bull. Acad. Pol. Sci. Lettres*, Sér. B, Sci. Nat. (1), 1950, 160) states that cytological studies of living plants from the Woodstock district proved that these plants were octoploids. Putative tetraploids also occur, however, in the Woodstock district, in a relatively dry and open habitat at the edge of a strip of wood about $\frac{1}{4}$ mile away from Slade's Bottom, to which I was taken by Dr. Turrill.

Skalińska (*l.c.*, 167) re-iterates the view that "in Great Britain it seems impossible to subdivide the collective species *V. officinalis* sensu lato into smaller distinct and well separated units owing to the great morphological diversity within the species and the occurrence of a range of intergrading forms which connect the extremes; the various characters of these forms are not regularly correlated."

A HYBRID CAREX FROM WALES

By E. NELMES.

During the Field Meeting of the Botanical Society of the British Isles at Dolgelly, Merionethshire, June 26th to July 4th, 1948, my colleague, Mr. E. Milne-Redhead, discovered a sedge which he correctly determined as a hybrid between *Carex distans* L. and *C. extensa* Gooden. It is completely sterile, the achenes being quite undeveloped, and is about mid-way in character between the parents. The plant was growing in a typical salt marsh, with *Juncus maritimus* L. conspicuous amongst other plants, and the two parent species. A description of the principal characters of the hybrid follows.

CAREX DISTANS L. × C. EXTENSA Gooden.

Densely tufted. *Stems* 38-60 cm. tall, 0.7-1 mm. thick below, smooth except that the angles are slightly rough towards the apex, leafy in the lower 8-12 cm., which part is hidden by the leaf-sheaths. *Leaves* long, the longest extending up to the lower spikes, somewhat incurved-canaliculate in life, becoming flatter when pressed-dried, 1.75-3.25 mm. wide, lower reduced to acuminate, often blackish-red, nearly bladeless sheaths; *sheaths* pale, sometimes reddish-tinged, becoming dark brown, persistent. *Spikes* usually 4, sometimes 3, terminal male, cylindrical but tapering to each end, 2.5-3 cm. long, about 2 mm. thick at or just below the middle, lateral spikes female, sometimes one or more with a few male flowers at the apex, more or less cylindrical, sub-erect, rarely patulous to subpatent, 1-2 cm. long, 4-5 mm. thick, lower internodes 3-5.5 cm., upper 1.9-2.5 cm., long, but lower spikes more longly peduncled so that they are about equidistant from one another, lower 2 with peduncles wholly included in bract-sheaths, uppermost sessile or very shortly included-peduncled, forming an inflorescence 6.8-10.5 cm. long. *Bracts* of the two lower spikes foliaceous, much exceeding the whole inflorescence, uppermost bract much reduced, sub-setaceous, often curved or flexuose, about as long as its spike, all usually erect but sometimes patently or more extremely reflexed; *sheath* of the lowest spike 2-2.5 (-3.5) cm. long, that of the middle one 7-10 mm. long, uppermost bract not or very shortly sheathing, *sheaths* tight except at the mouth where they are often dilated and sometimes split, the peduncles being too short to carry the spikes out of the sheaths *Female glumes* elliptic or ovate-elliptic, apex usually rounded and ciliate, sometimes very obtuse, 2.4-2.75 mm. long, 1.7-1.9 mm. wide, flecked, spotted and splashed reddish-brown above, whitish or pale in the lower third, the narrowly to rather widely pale margins becoming erose on the edges, nerveless except for a wide, strongly 3-nerved, yellowish-green, central stripe, the nerves coalescing above and excurrent

in a wide, slightly tapering, hispidulous-margined awn, 0.4-0.75 mm. long. *Utricles* broadly elliptic, flat or flattish (due to sterility), (3-)3.25-3.5(-3.75) mm. long, 1.5-1.9 mm. broad, very narrowly marginate, slenderly and obscurely about 6-nerved on each face, whitish below, yellowish-green becoming yellowish or yellowish-brown above, densely glandular-punctate, subabruptly contracted above into a smooth, bidentate beak, 0.75-1 mm. long; *teeth* straight or straightish, smooth outside, sparsely hispidulous inside. *Nut* abortive. *Style* bent.

WALES: Merioneth, Llanenddwyn, Mochras, on salt marsh with *Juncus maritimus* L. and both parents, 1 July 1948, E. Milne-Redhead 6036 (Herb. Kew.)!

Differs from *C. distans* L. in the longer, slightly narrower, subincurved-canalicate leaves with persistent basal sheaths, rather shorter and more slender terminal spike, rather shorter, less distinctly spaced and much more slender lateral spikes, the peduncles of the lower ones not exerted, the lower bracts much exceeding the terminal spike, with rather shorter sheaths, which are dilated at the mouth, much smaller and paler female glumes, and much shorter, less distinctly nerved sterile utricles, the beak with teeth not diverging.

Differs from *C. extensa* Gooden. in the somewhat longer stems slightly rough above, less incurved-canalicate leaves, rather fewer and more distantly spaced spikes, a longer and more slender terminal spike, much more slender, more or less cylindrical and more longly peduncled lateral spikes, forming a much longer inflorescence, bracts with usually longer sheaths, elliptic, or ovate-elliptic, whitish-hyaline margined glumes, and always elliptic, membranaceous, paler, sterile utricles, the beak with teeth not converging.

This is the only convincing hybrid between these species which I have seen, but I have not seen that recorded from Sicily by Chiovenda (1927), to which he gave the name *Carex* × *Tornabonii*.

Mr. J. P. M. Brenan and Mr. N. D. Simpson (1945) collected what they considered to be *C. distans* × *C. extensa* on the south side of Poole Harbour, Dorset, in 1939, and in their account of it they recorded also as a hybrid between these two species specimens gathered by Dr. G. C. Druce on the shore of East Kent in 1902. These had been determined by Druce as *C. extensa*. Then, in 1946, Mr. J. E. Lousley (1947) brought away from Berrow salt marsh, Somerset, sedges to which he, too, attributed the same parentage.

The Dorset plant of Brenan and Simpson, as represented at Kew, is in my opinion well within the bounds of *C. extensa* itself. Its principal characters—stems, leaves, spikes, bracts, glumes, utricles, and achenes—are all typical of the species, except that the leaves are yellowish-green and the utricles rather smaller (3-3.5 mm. long) than the average (3.5 mm. long). It would seem that this leaf colour is no evidence of hybridity between *C. distans* and *C. extensa*, the leaves of each being described by Kükenthal (1909) as “cinereo-viridia.” Neither would the small fruits appear to be evidence, as the length of

the utricles of *C. distans* ranges from 4 to 5 mm. Finally, and perhaps most important, the achenes of the Dorset plant, to quote its collectors, "were found to be filled with endosperm, suggesting that they are viable." It seems clear, therefore, that this supposed hybrid is really *C. extensa* Gooden.

Druce's Kent plant is also, I feel, to be included in *C. extensa*. It is typical of the species except in its spikes and achenes. The spikes are less crowded (more spaced) and more cylindrical than is usual, in these characters resembling the Mediterranean form *Balbisii* (Spreng.) Reichb. The achene is not much below average size but contains little or no endosperm and is somewhat shrunken. This condition of the achene is frequent in *Carex* and in itself does not indicate hybridity. It contrasts strikingly with the achene of Milne-Redhead's plants which is flat and completely undeveloped.

The specimens collected at Berrow, Somerset, were considered by Mr. Lousley to represent two forms of the hybrid and he designated them "Ref. A" and "Ref. B".

Of Ref. A he says: "The spikes were congested as in *extensa*, but the fruits did not form regularly and many of the female spikelets terminated in a few male flowers. The leaves were slightly glaucous but less so than in *extensa*". Two specimens represent Ref. A on Mr. Lousley's herbarium sheet, one, in which the spikes are congested, is *C. extensa*, and the other, in which some of the fruits are poorly developed and the female spikes often terminate in male flowers, is, for me, *C. distans*. Mr. Lousley says of his Ref. B, which is at Kew as well as in his own herbarium: "Most of the spikelets were spaced down the stem as in *distans* but very much stouter and formation of fruit was irregular. The leaves were yellowish-green but broader than those of *distans*." I am quite certain that these are robust plants of *C. distans*, with wider leaves and stouter spikes than is usual, and with some poorly developed fruits.

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RUBI FROM DARTMOOR TO THE LAND'S END

By F. RILSTONE, A.L.S.

The county of Cornwall and the western fringes of Devonshire form a single floral region so far as brambles are concerned. Study of these plants in the field in nearly every Cornish parish and in portions of the Devon border over a period of more than thirty years has given a fairly comprehensive knowledge of their distribution and revealed some marked differences from the *Rubus* floras of other western counties. It is scarcely a matter of surprise that the *Rubus* experts of fifty years ago, when dealing with unfamiliar forms sent to them from Cornwall, should have given them the names of well-known English brambles to which they seemed nearest. In Davey, 1909, *Flora of Cornwall*, however, it had the unfortunate effect of masking the distinctive character of the south-western *Rubus* flora, about forty per cent of the names being incorrectly applied. Thus *Rubus vestitus* Weihe & Nees, which is almost certainly absent from Cornwall, is given a long list of stations, under the name *R. leucostachys*, while the common *R. cornubiensis* (Rog. & Ridd.) Rilst. is freely recorded as *R. rhamnifolius* Weihe & Nees and *R. pulcherrimus* Neum. My own paper (1927) records determinations by the Rev. H. J. Riddelsdell and is to some extent open to the same criticism.

A good many of the *Rubus* forms vary little from one part of the region to another but some species have a clearly defined range of variation due to habitat. Some species occasionally produce bushes with uncharacteristic leaves and it is perhaps significant that the abnormality is much the same in all, namely the production of nettle-like leaves with long points and coarse, often lobate, toothings. This has been noted particularly in *R. Daveyi*, *R. lamburnensis*, *R. dumnoniensis*, *R. ulmifolius*, *R. adscitus*, and *R. Rilstonei*. A peculiarity of *R. lamburnensis* is that young plants usually produce only such leaves.

The sequence followed in this list is that of Davey's *Flora of Cornwall*, but mention is made only of plants which seem to call for comment.

RUBUS SCISSUS W. Wats. Seen in one locality only, Margate Wood near Bodmin, and there only a few barren stems.

R. PLICATUS Weihe & Nees. Rather sparingly distributed. A peculiar small form with leaflets tending to be narrowly elliptical which grows in boggy ground is quoted in the *Flora of Cornwall* as "var. *hemistemon* (Genev. ?)." It seems a distinct local form. I have seen it in bogs about Helmen Tor.

R. SUBOPACUS Sudre (*R. opacus* f. *minor* Focke). This Devon plant with its small felted leaves, the terminal leaflet elliptic, and narrow subracemose panicle with felted pedicels, is very distinct. I have not seen it in Cornwall but it may occur. Plants found from the Lynher valley to the neighbourhood of St. Austell have been recorded (Rilstone, 1927) under the name but they seem to go off towards allied species.

R. BRIGGSIANUS (Rogers) W. Watson. Locally common on heathy ground and rocky hillsides throughout most of Cornwall. Rogers' (1900) description seems to imply that the panicles are all "remarkably large and composite" and to that extent is misleading. Only a proportion of the panicles are highly composite even on strong bushes and small weak growth may show nothing but subracemose panicles. Gatherings from weak growth have been recorded as *R. opacus* f. *minor*, as at Carnkief Pond, Perranzabuloe. Davey notes (1909, 144) that *R. nitidus* was sent to Professor Areschoug by Mr Briggs from "Cornwall as well as Devon" and that Briggs' specimens were gathered probably near Probus. It seems probable that the specimens sent were of *R. Briggsianus* with composite panicles.

R. ALTIARCUATUS Bart. & Ridd. Davey's specimen of *R. cariensis* from Ponsanooth seems an abnormal growth but true *R. altiarcuatus* occurs at Goonhavern, Perranzabuloe. Mr. W. C. Barton agrees to the naming.

?*R. CONFERTIFLORUS* Watson. A plant from Goonhavern, Perranzabuloe, has been recorded (Rilstone, 1927) as *R. holerythros* Focke (det. H. J. Riddelsdell as a form with sulcate stems, leaves with a few hairs beneath, short-flowered pedicels and rather short stamens). I have collected it also at Silverwell five miles away. It is a plant of luxuriant growth much resembling *R. confertiflorus* but the fully-developed panicle is much more composite and it is probably distinct.

R. STANNEUS Bart. & Ridd. (*R. latifolius* of the *Flora*). A well-marked species frequent over a great part of Cornwall and subject to little variation.

[*R. IMBRICATUS* Hort. I have not seen this from Cornwall.]

[*R. CARPINIFOLIUS* Weihe & Nees. Not seen in Cornwall. The plant so named for Ralfs from Sancreed near Penzance by Lees and Baker may have been *R. polyanthemus* Lindeb.]

R. INCURVATUS Bab. Apparently very rare. Vigurs' specimen from Quintrell Downs seems hardly to differ from typical *incurvatus* except in the more cylindrical panicle.

R. CRYPTADENES Sudre (*R. argenteus* Wh. & N. of the *Flora*). An abundant and widespread plant with showy lilac-pink flowers, stems which in full sun tend to become blackish purple, and often with a proportion of lax panicles with long slender peduncles and pedicels.

R. DAVEYI Rilst., 1950. This plant, widely spread in Cornwall, is near to *R. silurum* (Ley) W. Watson, but has a very different terminal leaflet (oblong-ovate or oblong-elliptic, cordate, cuspidate instead of subrotund or broadly elliptic) and differs also in the scanty armature of the panicle, the usually convex leaflets, the large violet-pink flowers and the rather strongly reflexed sepals.

R. CORNUBIENSIS (Rog. & Ridd.) Rilst., 1950. A frequent plant from the Lvnher valley westwards. It is known by its bluntly angled nearly glabrous stem, leaflets often small and strongly plicate, heavily white-felted beneath in dry spots and larger, smoothly convex

and losing felt in damper spots, the obovate cordate terminal leaflet, often almost quadrangle and abruptly cuspidate, and the showy cup-shaped pink flowers with white stamens and reflexed sepals. The records of *R. rhamnifolius* in the *Flora of Cornwall* concern this plant. *R. cardiophyllus*, indeed, seems to be absent from the county. *R. bifrons*, with which *R. cornubiensis* has been identified, is a Discolorean which *R. cornubiensis* certainly is not.

R. TRESIDDERI Rilst., 1950. A local plant frequent in Perranzabuloe, allied to *R. Daveyi* and *R. thyrsoides* var. *viridescens*, known by its robust brownish-purple furrowed stem with very few appressed hairs and with rather short and weak declining or slightly curved prickles, its leaflets broad and plicate with some hair and felt beneath, the terminal leaflet cordate, roundish or broadly elliptic, shortly pointed, its pyramidal panicle with a very wavy rhachis, its reflexed sepals and the large purplish pink petals and purple based stamens.

R. DUMNONIENSIS Bab. Varying very little from east to west. The long patent stem prickles and the large white flowers are notable characteristics. The panicle when well developed is strikingly pyramidal. The Cornish plant differs from the description in that the terminal leaflet is often distinctly pentagonal with the point almost triangular.

R. CHRYSOXYLON Rogers. A plant from the Looe and Polperro valleys recorded (Rilstone, 1927) as "a hairy form of *R. chrysoxylon*," det. Riddelsdell, has a very hairy stem with scattered unequal prickles, coarsely serrate leaves, a lax broadly pyramidal panicle, and a shaggy flexuose rhachis. It would seem more at home among Rogers' *Vestiti* and is probably an undescribed species.

R. VILICAULIS Koehl. agg. Most of the Cornish plants recorded as *R. villicaulis* Koehl. belong to a form with showy bright pink flowers, sharply toothed leaves which are green beneath, and long slender prickles on both stem and panicle. It is abundant over the granite uplands of the St. Austell area and the Bodmin Moors and occurs also on Dartmoor. It is something like a plant from Bethesda which Rogers called *R. insularis* Aresch. but I am told by Mr. W. C. Barton that the name *insularis* is quite wrongly applied to British plants. This south-western bramble is probably an unnamed species.

R. GRATUS Focke. F. H. Davey's gathering from Tresamble Lane is a robust plant with patent sepals and seems to be true *R. gratus*, but another plant recorded under the name (Rilstone, 1927) is widespread in East Cornwall in wooded areas. It is less stout, has stem leaves with cordate terminal leaflets, and has reflexed sepals and hairy anthers. It can scarcely be *R. sciaphilus* Lange as that has patent sepals. It seems, however, almost inseparable from J. W. White's *R. hirtifolius* from Nailsea, Somerset, July and August 1929. A Cornish gathering from Bodmin Road, July 1929, is neither so stout nor so hairy and lacks acicles on the sepals, but otherwise is very similar to the Nailsea plant, which also has reflexed sepals. I use the name *sciaphilus* because Mr. Watson equates *R. sciocharis* Sudre with *R.*

hirtifolius of Rogers (1900) and that is not *R. sciaphilus*, which as shown by the specimen collected by Lange (Fredericia, Jylland, 1867) might easily be mistaken for *R. gratus*.

R. LEUCANDRUS Focke. Watson (1948) deals with British plants which have been named *R. leucandrus*, but I cannot see that the common East Cornwall plant recorded under the name is covered by any of the accounts. It appears to differ considerably from *R. danicus* Focke in the stem becoming almost glabrous, the irregularly branched panicle usually leafy to the top and with wavy rhachis and in the dead white of the flowers. *R. purbeckensis* Bart. & Ridd. (*R. leucanthemus* of Rogers' *Handbook*) with which also *R. danicus* is equated has a panicle with regular branching and is more hairy than the Cornish plant which seems to be an unnamed species.

R. LAMBURNENSIS Rilst., 1950. A local plant of Perranzabuloe known by its Discolorean character, the stem with pronounced shallow furrows and prominent rounded ridges along the angles, with a good deal of stellate pubescence and much adpressed or spreading white hair, and prickles mostly straight or declining with long slender points; the mature leaves with broad plicate terminal leaflet white or greenish felted beneath, roundish ovate or roundish obovate, cordate, cuspidate acuminate and petioles distinctly furrowed; the usually cylindrical panicle with rather long rigidly patent peduncles above, the sepals broad and concave, apiculate, patent at fall of petal, often soon subpatent, and petals creamy white and crumpled.

R. THYRSOIDEUS Wimm. var. *VIRIDESCENS* Rog. & Ridd., 1925. This is locally frequent in many parts of Cornwall and seems to be a distinct species. It was described as a variety of *R. thyrsoides* and cited from v.-cs. 1, 4, and 45. The mature stem leaves are quite green and without felt beneath. There are two growth forms, possibly due to varying amounts of nourishment taken in by the plants. One is robust with larger broader leaflets and a stout dense-headed panicle with long stoutish prickles. The other has rather small and narrower leaflets and a lax panicle with weaker prickles and longer more slender branches, the lowest branch usually long and patent or divergent. The two might easily be taken for distinct varieties but I have occasionally found both kinds of panicle on the same bush, the stouter panicle on the stouter stem. The plant has apparently been identified with *R. neomalacus* Sudre, but Genevier's gatherings of that plant from Vendée, determined by Sudre, show an almost unarmed panicle and stem leaflets all strongly white-felted beneath.

R. CARNKIEFFENSIS Rilst., 1950. A Discolorean allied to *R. Winteri* but with almost glabrous shining purplish stem, large convex somewhat rugose overlapping leaflets recalling those of *R. ramosus* Briggs and a lax broad and leafy panicle with the fruiting sepals patent.

[*R. WINTERI* Focke. British plants formerly referred to *R. robustus* P. J. Muell. apparently belong to *R. Winteri* but I know of no Cornish

plant which could properly be assigned to it. So far as I have seen the *R. robustus* of Davey's *Flora* is *R. Riddelsdellii*, and so is some of his *R. Godronii*. Otherwise plants which have been named *R. Godronii* appear to be solitary bushes of hybrid origin. Other than such solitary bushes I know of no Cornish member of the "*Godronii*" group except a showy white-flowered bramble which is frequent about Callington. *R. clivicola* Ley is recorded from the Penzance area from two old gatherings, one by Ralfs and the other by Curnow, and a specimen of the latter is said to be preserved in Herb. R. P. Murray. It will probably prove to be *R. pydarensis*.]

R. RIDDELSDELLII Rilst., 1950. Besides being abundant in Cornwall and occurring in Devon this species may possibly extend its range considerably further for the bramble from Tidenham Chase, West Gloucestershire, distributed in 1910 by Augustine Ley as *R. iricus* Rogers looks much like *R. Riddelsdellii* though Riddelsdell (1948) considers it a hybrid of *R. vestitus* and *R. rusticanus*. Rogers approved of the original naming and it is significant that Ley's late-gathered plant (Aug. 31st) has the bronze purple leaf coloration characteristic of *R. Riddelsdellii* at the end of the season and that among Cornish plants its resemblance is closest to the Polgoda plant which Rogers thought was the most characteristic Cornish gathering he had seen of *R. iricus*. *R. Riddelsdellii* is a hairy Discolorean with somewhat felted stem and with numerous patent prickles, 5-nate digitate leaves, the terminal leaflet elliptic or sometimes obovate and the panicle often congested at the top and often with longly-attenuate-cuspidate simple leaves in the upper part.

R. PYDARENSIS Rilst., 1940A. By the kindness of Dr. Warburg I have been able to examine an example of *R. herefordensis* Sudre from the Set of British Rubi in the Oxford University Herbarium. *R. pydarensis*, which has been identified with *R. herefordensis*, is I find quite distinct in its much smaller size, stronger stem prickles, much smaller leaves with fine or moderate tothing as against the coarse tothing of *R. herefordensis*, and the terminal leaflet elliptic or obovate instead of ovate. The panicle is narrow in *R. herefordensis* as it usually is in *R. pydarensis* (though in the latter it can on occasion be pyramidal) but the latter differs in the mostly patent 1-2-flowered peduncles as against the strongly ascending many-flowered peduncles of *R. herefordensis*. The rhachis of *R. herefordensis* appears to be furrowed below and strongly angled throughout while that of *R. pydarensis* is bluntly angled below and terete above. While quite two-thirds of the *R. pydarensis* panicle is ultra-axillary, that of *R. herefordensis* is leafy to the top. The drupelets in *R. herefordensis* appear to be normal in number as against an average of eighteen per fruit in *R. pydarensis*.

R. ULMIFOLIUS Schott. The name covers a very varied assortment of plants which yet are easily assignable to the aggregate species. Forms with a broad obovate-cuspidate terminal leaflet are not uncommon. The result of any attempt to arrange Cornish forms according to Sudre's arrangement would appear to be highly artificial.

R. HEREFORDENSIS Sudre (det. W. C. Barton). A common plant up and down the eastern borders of Cornwall, especially about Callington, and occurring also in the neighbouring parts of Devon. I have a gathering (leg. Rev. H. H. Harvey) from Clawton.

[*R. PUBESCENS* Weihe. Some of the Cornish records for this species are for shade forms of *R. Riddelsdellii* but it seems probable that Rogers' plant from Bridgerule was *R. herefordensis*.]

R. SILVATICUS Weihe & Nees. Apparently rare. Vigurs' gathering from the Goss Moors is of exactly the same form as that collected by Rogers on Dartmoor and evidently belongs to *R. silvaticus*, but that from Ponsanooth is a form of *R. Riddelsdellii*.

[*R. HESPERIUS* Rogers (det. Riddelsdell). A striking plant from the Fowey valley at Lostwithiel was recorded under this name (Rilstone, 1927). It has broad leaflets, the terminal leaflet cordate-orbicular and cuspidate, and a broad pyramidal panicle, shaggy rhachis, and reflexed sepals. It is considerably like the Welsh plant recorded as *R. hesperius* but seems nearer to Cornish plants which have been recorded as *R. mollissimus* Rog.]

[*R. LENTIGINOSUS* Lees. Davey records this only for Ponsanooth but his specimen is, I feel sure, only abnormal *R. cryptadenes*.]

[*R. MACROPHYLLUS* Weihe & Nees. Cornish gatherings so labelled which I have seen seem to be coarsely grown *R. Riddelsdellii*.]

[*R. MACROPHYLLOIDES* Genev. F. H. Davey's specimens so named are a form of *R. Riddelsdellii*. Gatherings of *R. adscitus* have also been given this name in the past.]

[*R. CRUDELIS* W. Wats. The only Cornish locality recorded (under *R. Colemanni* Blox.) (Rilstone, 1927) is Silverwell, West Cornwall, where I could never find it again, so the record may be doubtful. In Riddelsdell's company I have seen it in the Plym Valley, South Devon.]

R. SPRENGELII Weihe. Davey (1909, 153) gives under this name Briggs' record "In bushy spots in the vicinity of Rouse farm-house near Pillaton." But the record in the *Flora of Plymouth* makes it plain that the plant recorded is "a. *Borreri*" which is *R. vectensis* W. Watson. I have, however, found *R. Sprengelii* on the downs near the Men-an-Tol, Penzance. Presumably the plant collected by Riley from Valency Valley and recorded as var. *hirsutissima* (Davey, 1909) was an unusually hairy form. Rogers, I learn from Mr. W. C. Barton, entered *R. Sprengelii* for Valency in his record book.

R. GRISEOVIRIDIS Bart. & Ridd. One of the commonest of Cornish brambles. I do not know *R. prolongatus* Boul. & Letendre except from Sudre's account and figure but Mr. W. C. Barton tells me he has looked into the application of this name to *R. griseoviridis* and sees no reason to displace the latter.

R. ADSCITUS Genev. Common in Devon and East Cornwall but scarce in West Cornwall. The plant recorded in the *Flora of Cornwall* from Kea Playing Place Wood as *R. macrophyllus* Weihe & Nees var. *Schlechtendalii* (Weihe) is shown by Davey's specimen to be *R. adscitus*.

[*R. HIRTIFOLIUS* Muell. & Wirtg. Recorded for Cornwall only from Polperro. The plant may be a small form of *R. mollissimus* as determined by Mr. Watson. But see under that species.]

[*R. MOLLISSIMUS* Rogers. As mentioned above the common plant recorded under this name (Rilstone, 1927) from East Cornwall is a form of *R. herefordensis* Sudre. Otherwise Cornish gatherings of reputed *R. mollissimus* are puzzling. I have such gatherings from half a dozen widely separated stations but they are all different plants and so far as I have been able to find none of them exists in any quantity. Thus the one so named from Crumplehorn, Polperro, is restricted to two clumps only a few feet apart. That at Langreek, Polperro, quoted under *R. hirtifolius*, is restricted to a few square yards. Plants at St. Columb Major and at St. Keverne were, so far as I could find, only isolated bushes. It seems doubtful if any of them represents the true species. Davey's gathering so named from Carn Marth is *R. griseo-viridis* Bart. & Ridd.]

[*R. IRICUS* Rogers. This has been recorded for West Cornwall but I believe all the records to be incorrect; the plants were *R. Riddels-dellii*.]

R. ORBUS W. Watson (*R. iricus* var. *minor* Rog. & Ridd.). Common in the east of Cornwall from Roche eastward and also on the western and northern slopes and foothills of Dartmoor in Devon. The flowers open a bright red and are then very showy.

R. THURSTONII Rilst., 1950. Locally frequent in Cornwall along the borders of the hills, but apparently not near the sea. I have collected it also between Haverfordwest and Milford Haven in Pembrokeshire. The plant is known by the densely hairy stem, small and neat finely toothed leaves 5-nate and of yellowish-green colour with terminal leaflet usually obovate entire-based; cylindrical or pyramidal panicle with shortly stalked primordial flower, the rhachis and its branches clothed with dense yellowish hair and felt, and the pink flowers and conspicuously patent sepals. It is subfertile in dry spots.

[*R. PYRAMIDALIS* Kalt. I have not seen this from Cornwall.]

[*R. VESTITUS* Wh. & N. (*R. leucostachys* of the *Flora of Cornwall*). Almost certainly absent from Cornwall.]

R. CRINIGER Linton. A handsome plant found from St. Cleer to Callington has been recorded (Rilstone, 1927) under this name but the resemblance is not to true *R. criniger* Linton but to *R. Wolley-Dodii* Sudre. Davey's note in the *Flora* on a bush with handsome dark rose-colour flowers, Perranarworthal, 1908, which Rev. Augustin Ley placed under *R. criniger* as "a very robust form with stem more glabrous than usual", is very suggestive of *R. peninsulæ*.

[*R. MUCRONIFER* Sudre (*R. mucronatus* Blox.). The true species of Bloxam—the northern plant—is apparently not found in Cornwall. Plants which resemble it are at one extreme of a complex series at the other extreme of which are the forms which have been assigned to *R.*

oigocladus M. & L. and *R. cenomanensis* Sudre. Mr. W. C. Barton is investigating the group.]

R. GELERTII Frider. The Cornish plants which have been given this name by Rev. H. J. Riddelsdell (Rilstone, 1927) belong to other species but a plant with large leaves and strongly developed panicle growing near Launce's Church may perhaps belong to it.

R. ANGLOSAXONICUS Gelert. The only Cornish station known is Rogers' locality near Stratton where I have collected it. Sudre wrongly used the name *R. apiculatus* for the British plant; Weihe's own specimen sent to Koehler and now in Herb. Focke is quite a different plant with terminal leaflet rhombic with strongly cuneate base, but our plant is certainly identical with Gelert's *R. anglosaxonicus*.

R. COOMBENSIS Rilst., 1950. A plant from East Cornwall and Devon allied to *R. curvidens* A. Ley, differing in its low growth, 3-nate leaves, smaller simpler panicle with the panicle leaves green beneath, its patent sepals and long narrow petals. The terminal leaflet is often almost completely oblong.

[*R. INFESTUS* Weihe. The only record calling for consideration is the doubtful one of Rogers' from Mullion, but *R. Vigursii* was recorded under the name (Rilstone, 1927). Weihe's own specimen of *R. infestus* in Herb. Focke shows that it is not a Hystrican but apparently nearest among our British plants to *R. Daltrii* Edees & Rilst., which seems to justify Focke's treatment in putting it into a special subclass of the *Suberecti*.]

R. TUMULORUM Rilst., 1940B. Rather frequent about Looe and Polperro and for some miles inland. It has been referred to *R. melanoderms* Focke, a naming I do not at all understand. Rogers' Branksome plant, which may be taken as characteristic—Focke mentions having seen it there in Rogers' company—does resemble *R. tumulorum* in stem armature but the leaves are different, the terminal leaflet of the Branksome plant being rounded below to the cordate base while that of the Cornish plant is subcuneate emarginate or even entire. The panicle of *R. melanoderms* is very narrow above with very short uppermost branches. That of *R. tumulorum* is from the beginning wide and lax with long slender patent branches above. The panicle clothing is very different in the two plants. *R. melanoderms* has felted pedicels, very short glands and very few acicular setae, while *R. tumulorum* lacks the felt, has abundant setae and abundant stalked glands some very long. The sepals of the Branksome plant are shorter and far less shaggy, glandular and acuminate than those of the Cornish bramble and the stamens are long in the latter. The prevailing stem colour of *R. tumulorum* when growing is a tawny or yellowish-brown with prickles of the same colour or tinged with purple, and there is on the stem an understaining of purple which becomes more pronounced in dried specimens.

R. DENTATIFOLIUS (Briggs) W. Watson. This common plant of the Dartmoor borders is strangely rare on the Cornish side of the Tamar.

The only dependable record is "near Launceston, Briggs teste W. M. Rogers." The records for the west of the county (Penryn to Halfway House) are very doubtful. Abnormal forms of *R. Rilstonei* have been mistaken for *R. dentatifolius*.

[*R. DREJERI* G. Jensen. The single Cornish record for this species (Rilstone, 1927) from near Bodmin is a very doubtful one.]

[*R. RADULA* Weihe. This species is very doubtfully Cornish. Some of the specimens so named belong to *R. Newbouldianus* Rilst.; others appear to be hybrid forms.]

?*R. RADULA* Weihe var. *MICROPHYLLUS* Lindb. In parts of West Cornwall, as in Perranzabuloe, a well-marked plant occurs which has been recorded (Rilstone, 1927) as *R. Powellii* Rogers. Mr. E. S. Eedes has sent me exactly the same plant from Staffordshire; it is not true *R. Powellii*, but I gather it is near the Oxfordshire plant which Mr. Watson now refers to *R. radula* var. *microphyllus*. It seems, however, more Rosacean than Radulan.

R. LEIGHTONII Ed. Lees (*R. ericetorum* Lefv.; *R. radula* var. *anglicanus* of the *Flora*). Distributed somewhat sparingly throughout Cornwall. A narrow-leaved form which was recorded in the *Flora* as *R. scaber* f. *angustifolia* occurs in Kenwyn and Perranzabuloe.

R. ECHINATUS Lindl. I have not seen this from Cornwall. *R. echinatus* is certainly the same as *R. discerptus* P. J. Muell., but I refrain from using that name because Rev. H. J. Riddelsdell claimed to have seen a properly named specimen of the plant in Herb. Lindley and if that is so the name *R. echinatus* has priority.

R. OIGOCLADUS Muell. & Lefv. (*R. cenomanensis* Sudre). These names have been used for a complex series of Cornish plants the most variable forms of which occur in the east of the county. (See also under *R. mucronifer*).

[*R. BLOXAMIANUS* Colem. The Cornish record for this (det. H. J. Riddelsdell in White, 1920) was a mistake; the plant was the *R. rosaceus* of the *Flora of Cornwall*.]

R. NEWBOULDIANUS Rilst., 1950. A Radulan plant with more or less prostrate stems, generally yellowish green foliage, terminal leaflet varying from rhomboidal to narrowly elliptical, and the well-developed panicles strikingly pyramidal. It is found throughout Cornwall.

[*R. REGILLUS* A. Ley. This has been recorded (Rilstone, 1927) for the Looe valley, det. H. J. Riddelsdell, but the plant appears to have been *R. coombensis*.]

R. PENINSULAE Rilst., 1950. A striking woodland plant with usually dark purple stems, small prickles, leaves mostly 3-nate with the terminal leaflet obovate-cuspidate with cuneate base, and usually deep rose-pink flowers.

R. CINEROSIFORMIS Rilst., 1940B. Widely but sparingly distributed in Cornwall and occurring also in South Devon. Mr. W. Watson assigns the plant to *R. podophyllus* P. J. Muell., as indeed Rogers did Davey's gatherings. But specimens in Herb. Mueller collected in the Vosges by

Mueller himself and named *podophyllus* or passed as such by Sudre are somewhat similar in stem, though pricklets and intermediate prickles are numerous, but considerably different in foliage and panicle. The stem leaves are 5-nate with very shallow mostly patent toothing and the terminal leaflets tend to be broadly ovate or obovate, sometimes sub-orbicular, instead of elliptic. On the panicles the terminal leaflets of 3-nate leaves have the base usually strongly cuneate, quite unlike those of *R. cinerosiformis*. The panicle branches are patent rather than ascending and the sepals are shorter, broader and shortly pointed instead of attenuate. Sudre's drawing of *R. podophyllus* in *Rubi Europae* t. 106 differs considerably from Mueller's plants.

[*R. GRIFFITHIANUS* Rogers. It is very doubtful if this species really occurs in Cornwall. Strong bushes with unequal bright red prickles and considerable glandular development combined with white-felted leaves occur here and there, but so far as I have seen, only as isolated bushes. They are probably hybrids of *R. ulmifolius* with a glandular species.]

[*R. MELANODERMIS* Focke. Plants from south-east Cornwall to which this name has been applied (Rilstone, 1927) may belong to the difficult "*mucronifer-cenomanensis*" group previously mentioned.]

R. PENHALLOWENSIS Rilst., 1950. A local glandular plant from **Peranzabuloe** with deep purple stem, large dark green mature leaves, plicate and rugose above and paler green beneath, the terminal leaflet ovate-cordate shortly stalked; panicle laxly pyramidal, leafy, sepals reflexed in fruit, and petals pink, smoothly concave, of moderate size.

R. FUSCOVIRIDIS Rilst., 1940B, 166. I am satisfied that this plant is distinct from *R. hyposericeus* Sudre with which it has been identified. An example of that plant from the Set of British Rubi no. 126, in the Oxford University Herbarium, shows a much weaker growth with much weaker slenderer prickles and much less shaggy clothing of stem and rhachis while the leaves are pale, silky and soft beneath, very different from the green, thinly hairy under surface of the leaf, both on stem and panicle, in *R. fuscoviridis*. The terminal leaflet, too, in the latter is much broader and more cuspidate with stronger and more curved prickles on petiole and petiolules.

R. PALLIDUS Weihe & Nees. I have not seen F. H. Davey's gathering so named. The record from East Cornwall is of a solitary clump in shade, which, though very like *R. pallidus*, may not be the true plant.

[*R. SCABER* Weihe & Nees. I know of no true *R. scaber* from Cornwall. That recorded from Mithian (Rilstone, 1927) is a well-marked plant allied to *R. cenomanensis* Sudre which is of widespread occurrence in the county. The Polperro plant with broad 3-nate leaves is known only from a small area. The f. *angustifolia* of the *Flora* is a narrow-leaved form of *R. Leightonii*.]

[*R. FOLIOSUS* Weihe & Nees. Not seen from Cornwall.]

R. ROSACEUS Weihe & Nees. The well-marked plant recorded under this name in the *Flora of Cornwall* is found throughout the county and is locally common. There seems to me no reason why it should not bear the name. It seems to agree with the specimen of *R. rosaceus* which Weihe sent to Koehler (now in Herb. Focke) except for the somewhat hairy upper leaf surface, slightly more hairy stem, the usually more or less abruptly pointed terminal leaflet and somewhat less unequal glandular clothing on the panicle, characters which appear to me to make it only a slight variety. The stem armature is very like that of *R. rosaceus* with more or less patent slender-pointed prickles, there is the same coarse irregular nearly simple leaf-toothing, the same lax panicle leafy nearly to the top and with one of the upper simple leaves tending to be lobate and with slender straight or slightly curved prickles, and the same irregularity of sepal behaviour, patent or reflexed on the same panicle.

R. HYSTRIX Weihe & Nees. In south-east Cornwall there is a frequent large-panicled plant which has been recorded (Rilstone, 1927) under this name but which is in all probability a distinct species. Otherwise there seems to be in the county no one widespread and constant form to which the name can be given in an aggregate sense but rather a series of isolated clumps or bushes differing one from another and often difficult to understand. One such, at Lambriggan, Perranzabuloe, seems to be a hybrid of *R. Rilstonei* with *R. rosaceus*.

[*R. RUFESCENS* Lef. & Muell. (*R. rosaceus* subsp. *infecundus* (Rogers) Rogers). Davey's (1909) single record is a mistake; his specimen is *R. peninsulæ* Rilst. The only specimen labelled *R. rufescens* in Herb. Mueller (coll. Wirtgen, Eifel, 1860, and evidently named so by Sudre) has subpatent or loosely reflexed sepals and an obovate terminal leaflet and plainly is not the same thing as *infecundus*. But a specimen in Herb. Lenormand at Caen (coll. Questier as *R. scaber*) is evidently *infecundus* and was labelled *R. rufescens* by Mueller in 1859. Sudre's drawing (t. 178) seems to be a composite picture, having in the main the characters of the Eifel plant but with certain characters of true *R. rufescens* incorporated.]

R. VIGURSI Rilst., 1950. The Cornish representative of *R. Koehleri* Wh. & N. A small and low-growing plant with bright crimson stems almost or quite prostrate and sharply-angled, leaves small and neat, 3-5-pedate on long petioles, panicle small usually cylindrical, sepals patent in fruit and petals narrow and white.

[*R. DASYPHYLLUS* Rogers. This is recorded in the *Flora of Cornwall* for "Truro-Penryn," presumably as a roadside plant. I know the Truro-Penryn road well but have never seen this species there nor anywhere in the county. But half a century ago unfamiliar Cornish forms could be very puzzling to *Rubus* students and I have a gathering of strong but undoubted *R. Newbouldianus* collected by Vigurs in 1908 at Colan which bears a note in Rogers' handwriting "Looks like a very weakly armed and untypical *R. dasphyllus* but must remain unnamed for the present.—W.M.R. '08."]

R. RILSTONEI Bart. & Ridd. It may be as well to put on record that this plant is common on the high ground along the northern side of the watershed but scarce in the wooded valleys to the south of it.

R. SEMIGLABER (Rog.) W. Watson. F. H. Davey's gathering so named by Rogers from Ponsanooth is a striking plant with considerable resemblance to continental specimens labelled *R. pilocarpus* Gremli with which Focke identifies *R. semiglaber*. It is probably, however, a distinct species.

R. HIERNII Ridd. (*R. hirtus* var. *rotundifolius* of the *Flora of Cornwall*). This, which occurs in Cornwall only in the extreme east and there infrequently though it is plentiful in Devon, is apparently the only plant of the group of *R. hirtus* to occur in the county. Both Rogers and Briggs were evidently of this opinion. (See *Flora of Cornwall*, p. 163.)

R. DUMETORUM Weihe & Nees, agg. Of the plants belonging to this aggregate *R. MYRIACANTHUS* Focke appears to be widespread in the extreme east of the county. I have not, however, come across it. But two well-marked forms occur in the south-east of Cornwall, one a strongly-armed, dark-foliaged plant, the other paler and more weakly armed. The former has been recorded (Rilstone, 1927) as var. *raduliformis* Ley and probably accounts for the record from Fowey in Davey's *Flora* of var. *ferox* Weihe, but it appears to be distinct from both. In the west of Cornwall forms of *R. dumetorum* seem to be rare.

"*R. CORYLIFOLIUS* Sm." of the *Flora of Cornwall*. *R. SUBLUSTRIS* Ed. Lees and *R. CONJUNGENS* (Bab.) W. Watson both occur in Cornwall but there are widespread forms of the aggregate which belong to neither segregate.

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A CONTRIBUTION TO THE FLORA OF WEST SUTHERLAND

By MARY McCALLUM WEBSTER and PETER MARLER.

The region in the far north-west of Sutherlandshire known as the Parphe is a desolate, unproductive area. A few crofters live along the northern bank of Loch Inchard between Rhiconich and Sheigra, and Kinlochbervie has a small fishing industry and a hotel. These places lie along the southern edge of the Parphe. To the east the boundary is the road from Rhiconich to Durness, and to the north and east, the Atlantic Ocean.

During 1948 opportunities occurred for the authors to make collections of plants on the Parphe and in a few areas outside it, one of us (M.McC.W.) staying during the summer in Kinlochbervie and the other camping on the west coast, near Sandwood Loch, during July.

The area has been heavily glaciated and the rock outcrops frequently through the peat. Great blanket bogs cover the hills, coming down in places almost to the edge of the sea cliffs. Many are dominated by *Scirpus*, in a community made up of only a very small number of species. The valley bogs are more productive and some interesting *Carices* were found including *C. lasiocarpa*, *C. pallescens*, *C. limosa*, *C. curta*, and *C. pauciflora*. *Tofieldia* was found in such a bog near Durness.

The hills of the Parphe are of no great altitude. The highest, Ffarmeall (1709') was not explored but the next, Creag Riabhach (1592'), was climbed and provided *Salix herbacea* and *Cornus suecica*. On An Grianan (1527') *Juncus trifidus* was found and it is interesting that these and the more common arctic-alpines should occur on hills of such low altitude. Foinaven (2980'), east of the Parphe, was examined superficially and A. Gardener has kindly provided us with some notes. *Empetrum hermaphroditum* grows there, as well as *Arabis petraea*, *Subularia*, *Arenaria Sedoides*, *Epilobium alpinum*, and *Gnaphalium supinum*.

The blanket bog is studded with great numbers of dubh lochans and some lochs of which Sandwood Loch is the largest, and these show in places interesting successions of vegetation. There is no woodland on the Parphe apart from small plantations at Kinlochbervie and Durness. But two woods outside the area, a birch-hazel wood on the Ardmore peninsula and a birch wood on the northern slopes of Ben Stack, were explored and the records have been included. Occasional trees occur throughout the area in the river gorges and along the shores of some of the larger lochs. In such peat-free areas, other interesting plants were found, such as *Osmunda*, by Sandwood Loch and at Ardmore, and *Vicia Orobus* near Kinlochbervie.

It was along the coast, particularly on the consolidated dune swards or "machair", that the greatest richness of vegetation was found, and these were studied in detail. Machair occurs all along the south coast of the Parphe, on the west coast at Sandwood Bay and to the north-east

at Durness. They yielded among many other species, *Gentiana septentrionalis*, at Sandwood Bay, *Viola orcalensis* at Oldshore More, *Ophioglossum* between Oldshore and Polin and at Sandwood, *Bromus lepidus* at Durness, and *Leuchorchis albida* at Kinlochbervie and Sheigra. The sea cliffs were also interesting, with *Dryas* on the cliff tops from Sandwood Bay to Cape Wrath, and at Durness with *Primula scotica*. *Cochlearia scotica* and *Arctostaphylos alpinus* were also found on the west coast cliffs. As is often the case in the north-west, arctic alpinines were as common on the coast as on the hill tops. *Saxifraga oppositifolia* and *Silene acaulis* are locally common, *Thalictrum alpinum* and *Salix herbacea* were both found on the west coast and *Oxyria* at Cape Wrath.

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LIST OF LOCALITIES.

- Kinlochbervie: Lewisian Gneiss, with sea cliffs, sea loch, meadows and cultivated land.
- Oldshore More: Lewisian Gneiss and Torridon Sandstone, with sea cliffs, dunes, machair, and wet meadows.
- Polin: Gneiss with sea cliffs, dunes, machair and rich meadows and patches of limestone.
- Sheigra: Gneiss and Sandstone with sea cliffs and blown sand and meadows.
- Sandwood Bay: south shore and upper half of the north shore, Sandstone, seaward half of the north shore, Gneiss, with blown sand and extensive dunes, loch, machair and a large valley bog. Inland are An Grianan and Creag Riabhach, of Torridon Sandstone.
- Achlyness: Gneiss, with meadows, cultivated land and a small marsh.
- Ardmore: Gneiss, with a birch wood, sea and freshwater lochs, and some cultivated land.
- Foinaven: Ceann Garbh is Gneiss, capped by Cambrian Quartzite, which thickens eastwards. Plat Reidh and Creag Dionard are entirely composed of it.
- Ben Stack: Gneiss, capped by Quartzite, with on the north side, a birchwood and on the south, some grassland.

2/2(3). *Thalictrum montanum* Wallr. Sand dunes at Oldshore More, Polin, and Sandwood Bay. Det. A.J.W.

2/3. *Thalictrum marinum* Druce. Sand dunes at Oldshore More, Polin, and Sandwood Bay. Det. A.J.W. (as *T. arenarium* Butcher).

2/5. *Thalictrum alpinum* L. At sea level on grassy cliff tops at Polin, Sheigra and on Foinaven, and Ben Stack.

6/2. *Ranunculus repens* L. Cultivated ground at Achlyness, Kinlochbervie, Oldshore More, Polin and Sheigra.

6/3. *Ranunculus acris* L. Common on machair in all districts.

6/5. *Ranunculus bulbosus* L. Pastures and grassy places at Kinlochbervie, Oldshore More, Polin, Sheigra and on Ben Stack.

6/7. *Ranunculus Flammula* L. Edges of lochans, small burns and ditches. Kinlochbervie, Oldshore More, Polin, Sheigra, Sandwood Bay, Strath Chaillich, Achlyness, Durness, etc.

6/7h. *Ranunculus Flammula* L. var. *petiolaris* Lange. Lochan between Rhiconich and Durness. Lochan near Scourie. Det. A.J.W.

6/23. *Ranunculus Drouetii* F. Schultz ex Godr. Mouth of burn at Balnakell by Durness. Det. A.J.W.

6/33. *Ranunculus Ficaria* L. Wet grassy banks, Kinlochbervie, Oldshore More, Polin, Sheigra, Sandwood Bay, Achlyness, and at 1,500 ft. on Ben Stack.

7/1. *Caltha palustris* L. Bogs, marshy fields at Kinlochbervie, Oldshore More, Polin, Sheigra, Sandwood Bay, Achlyness, Ardmore, Ben Stack.

8/1. *Trollius europaeus* L. Grassy meadows near sea at Oldshore More, Polin, Drymen. Locally plentiful.

20/1. *Nymphaea alba* L. var. *occidentalis* Ostenf. Lochan east of Ardmore, slow running burn between Laxford Bridge and Scourie, lochan near Ben Stack. Det. A.J.W.

32/1. *Fumaria capreolata* L. Cultivated field by the Garbet Hotel, Kinlochbervie, cultivated field at Polin. Det. A.J.W.

32/10. *Fumaria officinalis* L. var.? Cultivated ground, Kinlochbervie, Oldshore More, Polin, Sheigra. Det. A.J.W.

35/. *Nasturtium officinale* R.Br. agg. Stream at Balnakeil near Durness, immature specimen.

37/1. *Arabis hirsuta* (L.) Scop. Grassy bank at Polin, and shell sand dunes at Durness, rare.

37/5. *Arabis petraea* (L.) Lam. Rocky ledge on Foinaven, 2,800 ft., rare.

39/1. *Cardamine pratensis* L. Damp meadows, burn sides, Kinlochbervie, Oldshore More, Polin, Sheigra, Sandwood Bay, Ben Stack, Achlyness, Ardmore, Strath Dionard, Durness.

39/4. *Cardamine flexuosa* With. Ditch at Polin.

39/5. *Cardamine hirsuta* L. Dry stony places, damp ditches and as a weed of cultivation. Kinlochbervie, Oldshore More, Polin, Sheigra, Achlyness, Ben Stack.

44/1. *Erophila verna* (L.) Chwall. Dry gravel banks at Kinlochbervie, Polin, Oldshore More, Durness.

45/2. *Cochlearia officinalis* L. Coastal cliffs, shingle, margins of sea lochs, Kinlochbervie, Oldshore More, Polin, Sheigra, Sandwood Bay, Durness. Det. A.J.W.

45/6. *Cochlearia scotica* Druce. Sea cliff top at Sheigra. Det. A.J.W.

53/1. *Subularia aquatica* L. Near sea level in Loch Innes, Kinlochbervie, Coire Dual, Foinaven, at 2,300 ft., and in Loch a Phuill Buide below Creag Riabhach.

54/14. *Brassica Kaber* (DC.) L. C. Wheeler. Cultivated ground at Kinlochbervie, Oldshore More, Polin, Sheigra, Achlyness, Ardmore and Durness.

59/1. *Capsella Bursa-pastoris* (L.) Medic. Weed of cultivation at Kinlochbervie, Oldshore More, Polin, Sheigra, Durness.

77/1. *Cakile maritima* Scop. On the drift line of the sea shore at Oldshore More, Polin and Sheigra, more plentiful at Sandwood Bay.

- 88/4. *Viola Riviniana* Reichb. Behind the Garbet Hotel, Kinlochbervie, and at Oldshore More, Achlyness. Det. A.J.W.
- 88/6. *Viola canina* L. Grassy banks at Oldshore More, Kinlochbervie, Sandwood Bay, sand dunes at Durness. Det. A.J.W.
- 88/11. *Viola palustris* L. Common in bogs at Kinlochbervie, Oldshore More, Polin, Sandwood Bay. Det. A.J.W.
- 88/. *Viola tricolor* L. Cultivated ground between Kinlochbervie and Sheigra. Det. R.D.M.
- 88/21. *Viola orcadensis* Drabble. In the machair and meadows at Oldshore More, with entire stipules at Kinlochbervie. Det. A.J.W.
- 88/34. *Viola Curtisii* E. Forst. Sand dunes at Durness, very plentiful. Det. A.J.W.
- 89/1. *Polygala serpyllifolia* Hose. On the summit of Creag Riabhach. Det. A.J.W. What is probably this species is common in bogs and on rock outcrops.
- 89/4. *Polygala oxyptera* Reichb. In a cultivated meadow at Sheigra. Det. A.J.W.
- 96/1. *Silene maritima* With. Cliffs at Kinlochbervie, Oldshore More, Polin, Sheigra, Sandwood Bay, and plentiful on cliffs northwards to Cape Wrath.
- 96/8. *Silene acaulis* (L.) Jacq. Sea cliffs at Sheigra and northwards to Cape Wrath. Its absence is notable on cliffs between Kinlochbervie and Sheigra. Foinaven, 2,000 ft.
- 98/1. *Lychnis Flos-cuculi* L. Abundant in valley bogs at Kinlochbervie and all districts.
- 98/3. *Lychnis alba* Mill. Not common; found as a weed of cultivation at Kinlochbervie and Polin.
- 98/4. *Lychnis dioica* L. Grassy Banks at Kinlochbervie, Polin, Oldshore More, Sandwood Bay, Ardmore, Durness.
- 100/5. *Cerastium vulgatum* L. Garden of Garbet Hotel, Kinlochbervie, dunes and waste places at Oldshore More, Polin, Sheigra, Sandwood Bay, Durness. On Foinaven at 1,500 ft. Ardmore. Det. A.J.W.
- 100/6. *Cerastium viscosum* L. Sea cliffs on Rhohan Island off Kinlochbervie. Det. A.J.W.
- 100/9. *Cerastium tetrandrum* Curt. Dunes and blown sand at Kinlochbervie, Oldshore More, Polin, Sheigra, Sandwood Bay. Det. A.J.W.
- 101/3. *Stellaria media* (L.) Vill. Garden weed at the Garbet Hotel, Kinlochbervie, cultivated at Oldshore More, Polin, Sheigra, Achlyness and Durness.
- 101/7. *Stellaria graminea* L. In a meadow at Kinlochbervie.
- 101/8. *Stellaria Alsine* Grimm. Plentiful on stream margins at Kinlochbervie, Oldshore More, Polin, Sheigra, Sandwood Bay, Achlyness, Foinaven (1,800 ft.), Durness.
- 102/5. *Arenaria serpyllifolia* L. Common on dunes and blown sand at Kinlochbervie, Oldshore More, Polin, Sheigra, Sandwood Bay, Achlyness, Durness. Det. A.J.W.
- 102/7. *Arenaria peploides* L. On shingle and sand at Kinlochbervie, Oldshore More, Polin, Sheigra, Sandwood Bay.
- 102/12. *Arenaria Sedoides* (L.) F. J. Hanb. North corrie on Foinaven, 1,500 ft.
- 103/1. *Sagina nodosa* (L.) Fenzl. Machair near the sea at Oldshore More, rare, more plentiful at Durness. Det. A.J.W.
- 103/2. *Sagina subulata* (Sw.) C. Presl. On a gravelly road behind Loch Innes Kinlochbervie, and on rocks north of Sandwood Bay. Det. A.J.W.
- 103/11. *Sagina procumbens* L. Common on roads, gravel, etc., at Kinlochbervie, Oldshore More, Polin, Sheigra, Sandwood Bay, Achlyness and Durness. Det. A.J.W.
- 104/1. *Spergularia arvensis* L. In cultivated fields near Kinlochbervie, Oldshore More, Polin, Sheigra, Sandwood Bay, Achlyness.
- 105/5. *Spergularia rubra* (L.) J. & C. Presl. On the drift line of Loch Bervie (Safety Loch), and on the Kyle of Durness.
- 109/1. *Montia fontana* L. ssp. *fontana*. Common in streams and flushes in all areas. Det. S.M.W.

112/9. *Hypericum pulchrum* L. Rock outcrops and stream banks at Kinlochbervie, Oldshore More, Polin, Sheigra, Sandwood Bay, Achlyness, wood at Ardmore, west slope of Creag Riabhach, slopes of Ben Stack and Foinaven.

125/3. *Linum catharticum* L. Coastal cliffs at Kinlochbervie, Oldshore More, Polin, Sheigra, Sandwood Bay, bank at Achlyness, Ardmore, Durness.

127/4. *Geranium pratense* L. Edge of field adjacent to the Garbet Hotel, Kinlochbervie.

127/9. *Geranium dissectum* L. Cultivated meadow at Kinlochbervie.

127/10. *Geranium molle* L. Edge of field at Kinlochbervie, dry dunes at Oldshore More, Polin, Sheigra, in rabbit scrapes, etc., at Sandwood Bay.

127/14. *Geranium Robertianum* L. On rocky floor of a birch wood at the foot of Ben Stack.

132/1. *Oxalis Acetosella* L. Rock outcrops and stream banks at Kinlochbervie, Oldshore More, Polin, Sheigra, Sandwood Bay, Foinaven, Ben Stack, wood at Ardmore.

136/1. *Ilex Aquifolium* L. One tree at Dionard bridge near Durness.

142/1. *Acer Pseudo-platanus* L. Planted in garden at the Garbet Hotel, Kinlochbervie, Durness.

149/1. *Ulex europaeus* L. Field at Kinlochbervie, and at Ardmore, Sandwood Bay.

153/7. *Medicago lupulina* L. Cultivated meadow at Polin.

155/1. *Trifolium medium* L. Grassy bank at Kinlochbervie.

155/2. *Trifolium pratense* L. Meadows at Kinlochbervie, Oldshore More, Polin, Sheigra, Ardmore and Achlyness.

155/15. *Trifolium hybridum* L. Cultivated meadows at Kinlochbervie, Oldshore More, Polin, Sheigra and Durness.

155/16. *Trifolium repens* L. Common at Kinlochbervie, Oldshore More, Polin, Sheigra, Sandwood Bay and Durness.

155/21. *Trifolium dubium* Sibth. Banks at Kinlochbervie, in the machair at Oldshore More, Polin, Sheigra. Dry sandy ground at Sandwood Bay. Ardmore, Achlyness, Durness.

156/1. *Anthyllis Vulneraria* L. Coastal dunes at Oldshore More, Polin, north dunes at Sandwood Bay, Ardmore, Durness.

160/5. *Lotus corniculatus* L. Cliff tops and meadows at Kinlochbervie, dunes at Oldshore More, Polin, Sheigra, Sandwood Bay, machair at Durness, common.

176/3. *Vicia Cracca* L. Cultivated meadows at Kinlochbervie, machair at Oldshore More, Polin. Dunes at Sheigra, Sandwood Bay. In Ardmore wood. Durness.

176/4. *Vicia Orobus* DC. Rock outcrop near the sea, Kinlochbervie, only about six plants. Det. A.J.W.

176/8. *Vicia septum* L. Pasture at Kinlochbervie, machair at Oldshore More, Polin, Sheigra dunes at Sandwood Bay. Ardmore, Achlyness and Durness.

178/6. *Lathyrus pratensis* L. Meadows at Kinlochbervie, Oldshore More, Polin, Sheigra, Ardmore, Achlyness and Durness.

178/25. *Lathyrus montanus* Bernh. Rock outcrops at Kinlochbervie, Oldshore More, Polin, Sheigra, Sandwood Bay, birch wood ground flora at Ardmore, pasture at Ardmore, pasture at Achlyness. Durness, Ben Stack.

184/11. *Filipendula Utmaria* (L.) Maxim. Stream margins and damp rocks at Kinlochbervie, Oldshore More, Sheigra, round Sandwood Loch, Polin, Ardmore Wood, Achlyness, Durness.

185/1. *Rubus idaeus* L. Rocky ground by Loch More at the foot of Ben Stack.

185/. *Rubus fruticosus* L. agg. Rough ground at Kinlochbervie, by the river at Laxford bridge.

185/154. *Rubus saxatilis* L. Cliff at the Smoo Cave, Durness.

185/155. *Rubus Chamaemorus* L. At 2,000 ft. on Foinaven.

186/1. *Dryas octopetala* L. Cliff tops at Sandwood Bay and northwards to Cape Wrath. Limestone pastures at Durness. On a small islet off Oldshore More.

187/1. *Geum urbanum* L. Between the Garbet Hotel and the Post Office at Kinlochbervie, not common.

187/2. *Geum rivale* L. Marsh at Achlyness, by a burn on the south side of Ben Stack. Det. A.J.W.

188/1. *Fragaria vesca* L. Dry bank at Dionard bridge, near Durness and rocky ground by Loch Laxford. Not common.

189/3. *Potentilla Anserina* L. Coastal shingle at Kinlochbervie, Oldshore More, Polin, Sheigra, Sandwood Bay, Ardmore, Achlyness, Durness. Also common on cultivated ground, etc.

189/9. *Potentilla erecta* (L.) Raeusch. In *Scirpus* bogs, etc., at Kinlochbervie, Oldshore More, Polin, Sheigra, Sandwood Bay, Ardmore, Achlyness, Foinaven, Ben Stack, and Durness. Very common.

189/25. *Potentilla palustris* (L.) Scop. Marsh at Sheigra, south shore of Sandwood Loch and plentiful in the valley bog, east of the Loch.

190/1. *Alchemilla vulgaris* L. agg. Several plants by the road near the shepherd's cottage between Durness and the Gualin Lodge.

190/19. *Alchemilla alpina* L. Slopes of Foinaven, Ben Stack. Summit of Creag Riabhach and in Strath Dionard. Det. S.M.W.

190/20. *Alchemilla arvensis* (L.) Scop., agg. One location between the Garbet Hotel and the Post Office at Kinlochbervie.

194/12b. *Rosa Azétiiana* Fr. var. *Reuteri* (God.) W. Dód. Rocks on the south shore of Sandwood Loch. Det. R.M.

194/19c. *Rosa Sherardi* Davies f. *resinosoides* (Crép.) W. Dod. At Balnakiel, near Durness. Det. R.M.

194/23. *Rosa spinosissima* L. Sea cliffs at Kinlochbervie, Oldshore More and Polin. Det. A.J.W. Near the road between Kinlochbervie and Sheigra. Det. R.M. (as var. *typica* W. Dod.).

195/5. *Sorbus aucuparia* L. Plentiful in all localities wherever rock outcrops occur.

†196/2. *Crataegus oxyacanthoides* Thuill. Planted at Kinlochbervie and at Durness.

199/1. *Saxifraga aizoides* L. Coastal cliffs at the Smoo Cave, Durness, damp limestone by the roadside near Durness, on Foinaven and Ben Stack.

192/2. *Saxifraga oppositifolia* L. Damp sea cliffs at Sheigra and northwards to Cape Wrath, Sandwood Bay, Foinaven. Not noted between Sheigra and Kinlochbervie, as with *Silene acaulis*.

199/23. *Saxifraga stellaris* L. Foinaven, Ben Stack, Creag Raibhach, Strath Doinnard.

203/2. *Chrysoplenium oppositifolium* L. Flush streams at Sandwood Bay, Foinaven, Ben Stack and Achlyness.

205/1. *Parnassia palustris* L. Coastal blanket bog, south of Sandwood Loch, Durness.

211/6. *Sedum acre* L. Blown sand at Oldshore More, machair at Polin, cliffs north of Sandwood Bay

211/11. *Sedum anglicum* Huds. Common on banks and rocks by the sea at Kinlochbervie, Oldshore More, Polin, Sheigra, Achlyness, and Ardmore.

211/22. *Sedum Rosea* (L.) Scop. Common on sea cliffs at Kinlochbervie, Oldshore More, Polin, Sheigra, Sandwood Bay, and north to Cape Wrath. Creag Riabhach at 2,000 ft.

213/1. *Drosera anglica* Huds. Very common in valley bogs at Kinlochbervie, Oldshore More, Polin, Sheigra, Sandwood Bay, Achlyness, Ardmore, Foinaven, Ben Stack.

213/3. *Drosera rotundifolia* L. Common in bogs at Kinlochbervie, Oldshore More, Polin, Sheigra, Sandwood Bay, Achlyness, Ardmore, Foinaven and Ben Stack.

214/1. *Hippuris vulgaris* L. Only seen in the "General's Loch", Achriesgill, near Kinlochbervie.

216/2. *Myriophyllum alterniflorum* DC. In Loch Innes, Kinlochbervie "General's Loch", south shore, Sandwood Loch, lochan by Creag Riabhach. Det. A.J.W.

217/1. *Callitriche stagnalis* Scop. Streams and ditches at Kinlochbervie, Oldshore More, Polin, Sheigra, Sandwood Bay, Achlyness, Ardmore and Durness.

220/1. *Epilobium angustifolium* L. On the Torridonian sandstone sea cliff to the south of Sandwood Bay.

220/5. *Epilobium tetragonum* L. A weed of cultivation in the garden of the Garbet Hotel, Kinlochbervie. Det. A.J.W.

220/10. *Epilobium montanum* L. In a dry ditch at Kinlochbervie, walls at Oldshore More, banks at Polin, Sheigra, south rocks at Sandwood Bay, below the wood at Ardmore. Det. A.J.W.

220/13. *Epilobium alpinum* L. Flushes on Foinaven at 2,500 ft. on the south side. Det. A.J.W.

237/1. *Hydrocotyle vulgaris* L. Valley bogs at Kinlochbervie, Oldshore More, Polin, Sheigra, Sandwood Bay, Achlyness and Ardmore.

254/1. *Aegopodium Podagraria* L. Garden weed at Kinlochbervie, and at Durness.

256/1. *Conopodium majus* (Gouan) Loret. Stream banks at Kinlochbervie, Oldshore More, Polin, Sheigra, Sandwood Bay, Ben Stack at 2,000 ft., Achlyness, Ardmore and Durness.

261/1. *Anthriscus sylvestris* (L.) Hoffm. Among ruins of a cottage at Kinlochbervie.

271/1. *Ligusticum scoticum* L. Sea cliffs at Kinlochbervie, Oldshore More, Sandwood Bay, Polin, Sheigra, Durness, and on Creag Riabhach at 1,500 ft.

274/1. *Angelica sylvestris* L. In a marshy field near the Garbet Hotel, Kinlochbervie, ditches at Oldshore More, Polin, Sheigra, sea cliffs south of Sandwood Bay, north crags of Creag Riabhach, Achlyness, Ardmore, on Foinaven at 2,000 ft. on Ben Stack and at Durness.

277/2. *Heracleum Sphondylium* L. Field at Kinlochbervie, cultivated ground at Oldshore More, Polin, and Sheigra, South rocks at Sandwood Bay, Achlyness, Ardmore and Durness.

282/1. *Daucus Carota* L. Field at Kinlochbervie, sand dunes and machair, very squat form, at Oldshore More, Polin, Sheigra, dunes at Sandwood Bay, Ardmore, and Durness.

284/1. *Hedera Helix* L. Cliffs near the road at Kinlochbervie, rocks at Oldshore More. Cliffs at Sandwood Bay, Durness.

284/1b. *Hedera Helix* L. var. *borealis* Druce. Rocks near road three miles north of Scourie. Det. A.J.W.

285/1. *Cornus suecica* L. South slopes of Foinaven at 1,800 ft. Creag Riabhach on the north crags.

287/2. *Sambucus nigra* L. Near cottages at Oldshore More, Durness.

291/2. *Lonicera Periclymenum* L. Rocks by the shore of Loch Innes, Kinlochbervie, Oldshore More, rocks south of Sandwood Loch. Ardmore and near Laxford Bridge.

296/1. *Galium boreale* L. On a wet grassy bank on the sea cliffs at Oldshore More, rare.

296/7. *Galium palustre* L. Wet stream banks and flushes at Kinlochbervie, Oldshore More, Polin, Sheigra, Sandwood Bay, Durness and Ardmore.

296/9. *Galium verum* L. Cliff tops at Kinlochbervie, machair at Oldshore More, Polin, Sheigra, Sandwood Bay, by the roadside at Achlyness. Ardmore, and Durness.

296/11. *Galium Aparine* L. Shingle on the shore line at Kinlochbervie, Oldshore More, Polin, Sheigra, Sandwood Bay, and Durness.

296/4. *Galium saxatile* L. By the roadside at Kinlochbervie, bogs and dry heath at Oldshore More, Polin, Sheigra, Sandwood Bay, Achlyness, Ardmore, slopes of Foinaven, Ben Stack, Creag Riabhach and at Durness.

301/1. *Valeriana officinalis* L. Below the birch wood at sea level, Ardmore. Det. A.J.W.

304/1. *Valerianella Locusta* (L.) Bœtke. In cultivated fields at Oldshore More and Polin. Det. A.J.W.

308/4. *Scabiosa Succisa* L. Very common over the Parphe in blanket and valley bogs and on rock outcrops.

306/5. *Scabiosa arvensis* L. In a meadow near the Keoldale Hotel, Durness.

312/1. *Solidago Virgaurea* L. Rock outcrops at Kinlochbervie, sea cliffs at Oldshore More, Polin, very dwarf type on the cliffs at Sheigra. Sandwood Bay, north crags of Creag Riabhach, Foinaven, Ben Stack, Ardmore, Achlyness.

314/1. *Betula perennis* L. Pastures at Kinlochbervie, Oldshore More, Polin, Sheigra, dunes at Sandwood Bay (absent from the fixed dunes). Achlyness, Ardmore, Durness.

318/19. *Aster Tripotium* L. Margin of sea loch at Ardmore.

326/1. *Antennaria dioica* (L.) Gaertn. Rock outcrops at Kinlochbervie, Polin, Sheigra, Sandwood Bay, summit of Foinaven at 2,900 ft. Ben Stack and Creag Riabhach.

328/3. *Gnaphalium sylvaticum* L. Grassy bank near the Post Office at Kinlochbervie.

328/5. *Gnaphalium supinum* L. On the summit of Foinaven.

365/1. *Achillea Millefolium* L. Dry grassland at Kinlochbervie, Oldshore More, Polin, Sheigra, Sandwood Bay, Achlyness, Ardmore, Durness.

365/2. *Achillea Ptarmica* L. Damp pasture at Kinlochbervie, meadows at Oldshore More, Polin, Sheigra, Sandwood Bay, Achlyness, Ardmore and Durness.

370/1. *Chrysanthemum segetum* L. Weed of cultivation at Kinlochbervie, Oldshore More, Polin, Sheigra, Achlyness, Ardmore and Durness.

370/4. *Chrysanthemum Leucanthemum* L. Meadows at Kinlochbervie, Oldshore More, Polin, Achlyness and Durness.

371/1. *Matricaria maritima* L. Sea cliffs at Kinlochbervie, Oldshore More, Polin, Sheigra, Sandwood Bay, Ardmore and Durness. Det. A.J.W.

371/3. *Matricaria matricarioides* (Less.) Porter ex Britton. Garden weed at Kinlochbervie, cultivated fields at Polin, Sheigra, Achlyness and Durness.

†372/. *Cotula dioica* Hook. f. Well established in short grass behind the Garbet Hotel and about 400 yards down the road towards Oldshore More. Det. A.J.W.

378/3. *Artemisia vulgaris* L. Edges of cultivated fields at Kinlochbervie, Oldshore More, Polin, Sheigra, Achlyness, Ardmore and Durness.

379/1. *Tussilago Farfara* L. Banks of the burn near the old graveyard at Oldshore More.

383/3. *Senecio aquaticus* Hill. Marshes at Kinlochbervie, Oldshore More, Polin, Sandwood Bay, Achlyness and Durness.

383/5. *Senecio Jacobaea* L. Rough fields and dunes at Oldshore More, Polin and Sandwood Bay.

383/9. *Senecio sylvaticus* L. Dry stoney bank at Durness.

383/10. *Senecio vulgaris* L. Weed of cultivation at Kinlochbervie, Oldshore More, Polin, Sheigra, Achlyness, Ardmore and Durness.

393/1. *Arctium Lappa* L. Waste ground at Kinlochbervie, dunes at Oldshore More, Polin, Sandwood Bay, Ardmore and Durness.

396/3. *Cirsium heterophyllum* (L.) Hill. By the burn at Oldshore More, Polin, rocks to the north-west of Sandwood Loch, south slopes of Ben Stack.

396/8. *Cirsium arvense* (L.) Scop. Garden at Kinlochbervie, cultivated ground and dunes at Oldshore More, Polin, Sheigra, Sandwood Bay, Achlyness, Ardmore and Durness.

396/2. *Cirsium vulgare* (Savi) Ten. Waste ground and machair at Kinlochbervie, Oldshore More, Polin, Sheigra, Sandwood Bay, Achlyness, Ardmore and Durness.

396/9. *Cirsium palustre* (L.) Scop. Common in marshes at Kinlochbervie, Oldshore More, Polin, Sheigra, Sandwood Bay, Achlyness, Ardmore, Durness, Foinaven, Ben Stack.

405/8. *Centaurea nigra* L., agg. Rough fields at Kinlochbervie, Oldshore More, Polin, Sheigra, Achlyness, Sandwood Bay and Durness.

- 405/13. *Centaurea Scabiosa* L. Meadow at Oldshore More, on the machair at Polin, Durness.
- 411/1. *Lapsana communis* L. Edges of cultivated fields at Kinlochbervie, Ardmore and Durness.
- 416/5. *Crepis capillaris* (L.) Wallr. Dry banks and rocks at Kinlochbervie, Oldshore More, Polin, Sheigra, Sandwood Bay, Achlyness, Ardmore, Durness. Det. A.J.W.
- 419/. *Hieracium* sp. Smoo Cave, sp. Foinaven, sp. Kinlochbervie, sp. Oldshore More, sp. Ardmore. Not yet determined.
- 419/1. *Hieracium Pilosella* L. Rock outcrops and banks at Kinlochbervie, Oldshore More, Polin, Sheigra, Sandwood Bay, Achlyness, Ardmore, Durness. On Foinaven and Ben Stack. Det. A.J.W.
- 421/2. *Hypochoeris radicata* L. Path margins and roadsides at Kinlochbervie, Oldshore More, Polin, Sheigra, Sandwood Bay, Achlyness, Ardmore and Durness.
- 422/2. *Leontodon autumnale* L. Meadows at Kinlochbervie, Oldshore More, Polin, Sheigra, rough ground at Sandwood Bay, Achlyness, Ardmore, Durness.
- 423/1. *Taraxacum* sp. Fields at Kinlochbervie, cultivated ground at Oldshore More, Polin, Sheigra, dunes at Sandwood Bay, rocks at Achlyness, Ardmore and Durness, very variable.
- 427/2. *Sonchus arvensis* L. On the shingle at Kinlochbervie, Oldshore More, Polin, Sheigra and Durness.
- 427/3. *Sonchus asper* (L.) Hill. Rocks on the shore of Sandwood Bay. Det. A.J.W.
- 427/4. *Sonchus oleraceus* L. Garden weed at Kinlochbervie, cultivated ground at Oldshore More, Polin, Sheigra, Ardmore, dunes at Sandwood Bay.
- 428/2. *Tragopogon pratensis* L. agg. In the machair at Polin.
- 431/1. *Lobelia Dortmanna* L. In Loch Innes, Kinlochbervie, lochans at Oldshore More, Polin, Sandwood Bay, Achlyness, Ardmore, Foinaven, Durness.
- 435/5. *Campanula rotundifolia* L. Machair at Oldshore More, very large flowered type at Polin, in the machair, Sheigra, Sandwood Bay, banks at Ardmore, Durness.
- 438/2. *Vaccinium Myrtillus* L. Very sparse on rock outcrops at Kinlochbervie, Oldshore More, Achlyness, Ardmore, Foinaven and Creag Riabhach.
- 438/3. *Vaccinium Vitis-idaea* L. Dry rocks on The Rhu, and at Kinlochbervie, Sandwood Bay and Foinaven.
- 441/1. *Arctostaphylos Uva-ursi* (L.) Sprengel. Cliff tops at Kinlochbervie, Sandwood Bay, Sheigra, and on Foinaven.
- 441/2. *Arctostaphylos alpinus* (L.) Sprengel. One plant only on cliff top between Sheigra and Sandwood Bay.
- 445/1. *Calluna vulgaris* (L.) Hull. Generally distributed over the Parphe.
- 446/1. *Erica cinerea* L. Sparsely distributed over the Parphe in drier places.
- 446/2. *Erica Tetralix* L. Generally distributed over the Parphe in blanket and valley bogs.
- 458/2. *Armeria maritima* Willd. On sea cliffs and on the summits of Foinaven and Ben Stack.
- 460/2. *Primula vulgaris* Huds. Rock outcrops and sea cliffs at Kinlochbervie, Oldshore More, Polin, Sheigra, Sandwood Bay, Achlyness, Ardmore, Durness, Ben Stack.
- 460/5. *Primula scotica* Hook. Cliffs at Balnakeil Bay, Durness.
- 463/5. *Lysimachia nemorum* L. Rock outcrops above Loch Innes, Kinlochbervie, birch woods at Achlyness, and Ardmore.
- 466/1. *Glaux maritima* L. Muddy margin of Loch Bervie, Kinlochbervie, Polin, Kyle of Durness and Ardmore.
- 471/1. *Fraxinus excelsior* L. Planted in gardens at Durness.
- 480/5. *Gentiana septentrionalis* (Druce) Druce. North dunes at Sandwood Bay. Det. A.J.W.

- 480/9. *Gentiana campestris* L. White flowered type on cliffs and in fields at Kinlochbervie, Oldshore More, Polin, Sheigra, Sandwood Bay, Achlyness, Ardmore, Durness. Det. A.J.W.
- 481/1. *Menyanthes trifoliata* L. Valley bogs at Kinlochbervie, Sandwood Bay, Achlyness, Ardmore, Durness.
- †500/1. *Anchusa sempervirens* L. Shore near the Keoldale Hotel, Durness.
- 501/1. *Lycopsis arvensis* L. Garden weed at Kinlochbervie, cultivated fields at Oldshore More, Polin, Sheigra.
- 506/3. *Myosotis secunda* A. Murray. In ditches and wet places at Ardmore, Oldshore Beg and on the margin of Sandwood Loch. Det. A.E.W.
- 506/4. *Myosotis caespitosa* K. F. Schultz. Stream margins at Oldshore More, Polin, Durness. Very variable. Det. A.E.W.
- 506/8. *Myosotis arvensis* (L.) Hill. Dry fields at Kinlochbervie, Oldshore More, Polin, Sheigra and Durness.
- 506/10. *Myosotis discolor* Pers. Cultivated fields at Kinlochbervie, Oldshore More, Polin, Sheigra, rocky ground at Sandwood Bay, Achlyness and Durness.
- 511/1. *Calystegia sepium* (L.) R.Br. A garden weed at the Garbet Hotel and in a field nearby, at Kinlochbervie.
- 535/4. *Scrophularia nodosa* L. On a bank below Ardmore Wood near the sea.
- †537/1. *Mimulus guttatus* DC. In a stream below the store at Badcall near Kinlochbervie. In a damp field at Polin. Durness.
- 541/1. *Digitalis purpurea* L. Rocky banks at Kinlochbervie, Oldshore More, Polin, Sandwood Bay, Achlyness, roadside near Ben Stack, Ardmore and Durness.
- 542/4. *Veronica Chamaedrys* L. Dry banks at Kinlochbervie, Polin, Achlyness, in wood at Ardmore.
- 542/7. *Veronica Beccabunga* L. Streams at Oldshore More, Polin, Balnakeil by Durness.
- 542/8. *Veronica Anagallis-aquatica* L. Stream at Balnakeil near Durness. Det. A.J.W.
- 542/12. *Veronica humifusa* Dickson. Flushes on Foinaven and Ben Stack.
- 542/15. *Veronica arvensis* L. Weed at Kinlochbervie, Oldshore More, Polin, Sheigra, Achlyness, Ardmore and Durness, dunes at Sandwood Bay.
- 542/18. *Veronica persica* Poir. Garden weed at Kinlochbervie, fields at Sheigra.
- 542/21. *Veronica hederifolia* L. Garden weed at Kinlochbervie.
- 545/1. *Euphrasia officinalis* L. agg. Common on rocky banks and in pastures and cultivated land.
- 545/3. *Euphrasia brevipila* Burnat & Greml. Meadow between Kinlochbervie and Sheigra. Det. E.F.W.
- 545/13. *Euphrasia foulaensis* Towns. Rocky slope at Ardmore. Det. E.F.W.
- 546/5. *Odontites verna* (Bell.) Dumort. ssp. *verna*. A damp pasture at Balnakeil, near Durness, and generally distributed in cultivated areas. Det. E.F.W.
- 547/1. *Pedicularis palustris* L. In bogs at Kinlochbervie, Oldshore More, Polin, Sheigra, Sandwood Bay, Achlyness, Ardmore and Durness.
- 547/2. *Pedicularis sylvatica* L. Valley bogs at Kinlochbervie and generally distributed over the Parphe.
- 548/1. *Rhinanthus stenophyllus* (Schur) Dr. In a meadow between Kinlochbervie and Sheigra, and at Ardmore. Probably the same species common in pasture and cultivated land in all areas. Det. A.J.W. and E.F.W.
- 549/3. *Melampyrum pratense* L. Birch wood ground flora at Ardmore and in *Scirpus* bog at Sandwood Bay, Foinaven.
- 552/3. *Utricularia vulgaris* L. Drains and pools near Sandwood Bay, flowering.
- 553/2. *Pinguicula vulgaris* L. In bogs and on peat banks. Generally distributed over the Parphe.
- 553/4. *Pinguicula lusitanica* L. Bogs, usually on eroded peat, at Kinlochbervie, Oldshore More, Sandwood Bay and Achlyness.

- 558/4. *Mentha spicata* L. Ditches at Oldshore More and Achlyness, not common.
- 561/4. *Thymus Serpyllum* L. agg. On rock outcrops in all areas and on the mountain summits.
- 572/1. *Scutellaria galericulata* L. Stony drift line by Loch Inchard, Kinlochbervie at the mouth of a dried up stream.
- 573/1. *Prunella vulgaris* L. Waste ground, roadsides and stream margins at Kinlochbervie, Oldshore More, Polin, Sheigra, Sandwood Bay, Achlyness, Ardmore and Durness.
- 577/4. *Stachys* × *ambigua* Sm. Dry stony fields at Kinlochbervie.
- 577/5. *Stachys palustris* L. Ditches at Kinlochbervie, Oldshore More, Polin and Sheigra.
- 577/6. *Stachys arvensis* (L.) L. Only found in one cornfield at Kinlochbervie.
- 578/1. *Galeopsis speciosa* Mill. Garden weed at the Garbet Hotel, Kinlochbervie.
- 578/2. *Galeopsis Tetrahit* L. Garden weed at Kinlochbervie, cultivated fields at Oldshore More, Polin, Sheigra, Achlyness, Ardmore and Durness. Det. A.J.W.
- 581/3. *Lamium purpureum* L. Garden weed at Kinlochbervie, pasture at Oldshore More, Polin, Sheigra, Sandwood Bay, Achlyness, Ardmore and Durness.
- 581/6. *Lamium amplexicaule* L. Garden weed at Kinlochbervie, cultivated ground at Oldshore More, Polin, Sheigra, Achlyness, Ardmore and Durness.
- 586/1. *Teucrium Scorodonia* L. Rock outcrops and stream banks at Kinlochbervie, Oldshore More, Sandwood Bay, Achlyness, Ardmore and in Strath Dionard.
- 583/3. *Plantago Coronopus* L. Meadows near the sea at Kinlochbervie, and generally distributed along the coast.
- 588/5. *Plantago maritima* L. Sea cliffs at Kinlochbervie, Oldshore More, Polin, Sheigra, Durness, summits of Creag Riabhach and Foinaven.
- 588/8. *Plantago lanceolata* L. Generally distributed over the Parphe on dunes and pastures.
- 588/10. *Plantago major* L. Roads and waste ground at Kinlochbervie, Oldshore More, Polin, Sheigra, Achlyness and Durness.
- 589/1. *Littorella uniflora* (L.) Aschers. Loch Innes, Kinlochbervie.
- 600/8. *Chenopodium album* L. Garden weed at Kinlochbervie, fields at Oldshore More, Polin, Sheigra.
- 613/1. *Salsola Kali* L. Drift line on the sandy beaches of Oldshore More, Polin, Sheigra and Sandwood Bay.
- 606/3. *Atriplex patula* L. Drift line on the sea shore at Kinlochbervie, Oldshore More, Polin, Sheigra, Sandwood Bay, Ardmore, Durness.
- 606/7. *Atriplex glabriuscula* Edmondston. Cultivated ground at Oldshore More and Polin. Det. A.J.W.
- 615/2. *Polygonum Convolvulus* L. Cultivated ground at Kinlochbervie, Oldshore More, Polin, Sheigra, Achlyness, Ardmore and Durness.
- 615/4. *Polygonum viviparum* L. Sea cliff tops at Polin and Durness and on Foinaven.
- 615/5. *Polygonum amphibium* L. Marshy ground by Loch Borrallie near Durness.
- 615/6. *Polygonum lapathifolium* L. Cultivated fields at Kinlochbervie, Oldshore More, Polin, Sheigra and Durness. Det. A.J.W.
- 615/9. *Polygonum Hydropter* L. Ditches at Kinlochbervie and Oldshore More. Det. A.J.W.
- 615/14. *Polygonum aviculare* L. agg. Cultivated fields and meadows at Kinlochbervie, Oldshore More, Polin, Sheigra, Sandwood Bay, Achlyness, Ardmore and Durness.
- 617/1. *Oxyria digyna* (L.) Hill. Cliffs at Cape Wrath and on Foinaven.
- 618/2×3. *Rumex crispus* L. × *R. longifolius* DC. On a sea cliff near Oldshore. Det. J.E.L.
- 618/3. *Rumex crispus* L. Generally distributed along the coast, on shingle and cliffs.

- 618/6. *Rumex obtusifolius* L. Waste places at Kinlochberrie, Oldshore More, Polin, Ardmore and Durness.
- 618/14. *Rumex Acetosella* L. Cultivated ground at Kinlochberrie, Oldshore More, Polin and Durness. Sea cliffs at Sheigra, Sandwood Bay, Achlyness. In the wood at Ardmore. On Foinaven.
- 618/16. *Rumex Acetosella* L. Generally distributed over the Parphe in machair, pasture, etc.
- 628/7. *Euphorbia helioscopia* L. Cultivated fields at Kinlochberrie, Oldshore More, Polin, Sheigra and Durness.
- 628/14. *Euphorbia Peplus* L. Seen in one locality only, on waste ground by the sand dunes at Oldshore More.
- 637/1. *Urtica dioica* L. Pasture and waste ground at Kinlochberrie, Oldshore More, Polin, Sheigra, Sandwood Bay, Achlyness, Ardmore and Durness.
- 641/1. *Myrica Gale* L. Generally distributed over the Parphe in valley and blanket bogs.
- 642/2. *Betula pubescens* Ehrh. Occasional trees in river courses, etc., at Kinlochberrie, Sandwood Bay, Achlyness, Durness, woods at Ardmore and Ben Stack. Det. A.J.W.
- 643/1. *Alnus glutinosa* (L.) Gaertn. Isolated trees in Strath Dionard.
- 645/1. *Corylus Avellana* L. Occasional trees in river courses, etc., at Kinlochberrie, Sandwood Bay, Achlyness, Durness, Ben Stack, and in the birch wood at Ardmore.
- 646/1. *Quercus Robur* L. A plantation near Durness.
- 649/1. *Fagus sylvatica* L. Planted in a small plantation at the Garbet Hotel, Kinlochberrie, and Durness.
- 650/1. *Salix pentandra* L. On the river bank in Strath Chaillach and on the margins of the wood at Ardmore.
- 650/6. *Salix viminalis* L. Occasional trees at Kinlochberrie, Oldshore More, Polin, Sheigra, Sandwood Bay, Achlyness, Ardmore and Durness. Det. A.J.W.
- 650/8×10×12. *Salix atrocinnerea* Brot. × *Caprea* L. × (?) *S. nigricans* Sm. On the margin of the wood at Ardmore. Det. R.M.
- 650/9. *Salix aurita* L. Isolated trees by Sandwood Loch and in river gorges. Det. R.M.
- 650/10. *Salix atrocinnerea* Brot. Isolated trees by a stream at Oldshore. Det. R.M.
- 650/10×9. *Salix atrocinnerea* Brot. × *S. aurita* L. A tree on the south bank of Sandwood Loch. Det. R.M.
- 650/11. *Salix arenaria* L. × *S. repens* L. Common on the machair and cliff tops in all coastal areas.
- 650/12. *Salix nigricans* Sm. By a derelict croft at Strachallach. Det. R.M.
- 650/18. *Salix herbacea* L. Near sea level on the cliff tops at Sheigra, and the summit of Foinaven, Ben Stack and Creag Riabhach. Det. A.J.W.
- 650/13. *Salix phyticifolia* L. Isolated trees by the River Polla near Loch Erribol.
- 651/2. *Populus tremula* L. Common on cliffs and rock outcrops at Kinlochberrie, Oldshore More, Polin, Sandwood Bay, Achlyness, Ardmore and Durness.
- 652/1. *Empetrum nigrum* L. Generally distributed over the Parphe, inland and on the cliff tops.
- 652/2. *Empetrum hermaphroditum* (Lange) Hagerup. On Foinaven.
- 663/1. *Listera ovata* (L.) Br. On cliff tops at Kinlochberrie, Oldshore More, Polin, Sheigra, Sandwood Bay, meadows at Achlyness. Ardmore and Durness.
- 668/5. *Epipactis atrorubens* (Hoffm.) Schult. Grassy bank by Loch Borrallie and cliff by a runnel near Keoldale Hotel, Durness.
- 669/6f. *Orchis latifolia* L. var. *coccinea* Pugsf. Coastal meadows at Kinlochberrie, Oldshore More, Polin and Durness, varying from pale pink to salmon and maroon flowers. Det. V.S.S.
- 669/9. *Orchis purpurella* T. & T. A. Steph. Meadows at Kinlochberrie and Sheigra. Det. V.S.S.
- 669/9(2). *Orchis occidentalis* (Pugsf.) Wilmott. Pasture at Polin. Det. V.S.S.

669/10. *Orchis ericetorum* (E. F. Linton) E. S. Marshall. Pastures at Kinlochberrie, Oldshore More, Polin, and generally distributed over the Parphe. Det. A.J.W.

669/11. *Orchis Fuchsii* Druce. Pasture near the pier at Kinlochberrie. Det. V.S.S.

669/11(2). *Orchis hebridensis* Wilmott. Pasture at Oldshore More and Sheigra. Det. A.J.W.

669/14. *Orchis mascula* (L.) L. Sea cliff tops at Kinlochberrie, Oldshore More, Polin, Sheigra, Sandwood Bay, Durness (a double winged variety from the Smoo Cave. Det. V.S.S.

674(1)/1. *Gymnadenia conopsea* (L.) R.Br. Damp meadows and on the machair at Kinlochberrie, Oldshore More, Folin, Sheigra. Achlyness and Durness.

674(2)/1. *Leucorchis albida* (L.) E. Mey. ex Schur. Not common, dry banks near the sea at Kinlochberrie, and Sheigra.

674(3)/1. *Coeloglossum viride* (L.) Hartm. Grass bank at Kinlochberrie, machair at Oldshore More, Polin, Sheigra, Sandwood Bay, Durness, Ardmore. An interesting hybrid between this species and possibly *Gymnadenia conopsea* sent to Herb. Kew.

674(5)/2. *Platanthera bifolia* (L.) L. C. Rich. Very common in meadows at Kinlochberrie, Oldshore More, Polin, Sheigra, Sandwood Bay, Achlyness, Ardmore and Durness. Det. V.S.S.

676/1. *Iris Pseudacorus* L. Marshes at Kinlochberrie, Polin, Oldshore More, Sheigra, Achlyness, Ardmore and Durness.

706/1. *Scilla verna* Huds. On the cliff tops, at Kinlochberrie, Oldshore More, and Polin.

706/3. *Scilla non-scripta* (L.) Hoffm. & Link. Pastures at Kinlochberrie, damp cliffs at Oldshore More, Polin, Sheigra and Sandwood Bay.

714/1. *Narthecium ossifragum* (L.) Huds. Valley and blanket bogs at Kinlochberrie and generally distributed over the Parphe.

715/1. *Tofieldia pusilla* (Michx.) Pers. In a bog at the edge of Loch Caladail near Durness.

718/3. *Juncus conglomeratus* L. A stream margin on the north bank of Sandwood Loch. Det. A.J.W.

718/4. *Juncus effusus* L. Stream margins at Kinlochberrie and Sandwood Bay. Det. A.J.W.

718/6. *Juncus balticus* Willd. In a bog at Kinlochberrie, and on the Kyle of Durness. Det. A.J.W.

718/10. *Juncus articulatus* L. Common in ditches and bogs over the Parphe. Det. A.J.W.

718/12. *Juncus bulbosus* L. Streams and lochans at Kinlochberrie, Sandwood Bay, Foinaven and Creag Riabhach. Det. A.J.W.

718/13. *Juncus squarrosus* L. Generally distributed over the Parphe in eroded bogs on the hill slopes. Det. A.J.W.

718/15. *Juncus Gerardi* Lois. Shores at Kinlochberrie, Oldshore More, Polin, Sheigra, Sandwood Bay, Ardmore, and Kyle of Durness. Det. A.J.W.

718/17. *Juncus bufonius* L. Damp gravel paths, etc., and stream margins over the Parphe.

718/23. *Juncus trifidus* L. On Foinaven and Creag Riabhach, and on the summit of An Grianan.

719/1. *Luzula sylvatica* (Huds.) Gaud. Damp rock cliffs and stream gorges at Kinlochberrie, Oldshore More, Polin, Sandwood Bay, Ardmore, Foinaven and Ben Stack, not plentiful although fairly widely distributed.

719/4. *Luzula multiflora* (Retz.) Lej. Late dunes at Sandwood Bay, north crags of Creag Riabhach, in Ardmore Wood, and at Durness. Det. A.J.W.

719/6. *Luzula campestris* (L.) DC. Generally distributed over the Parphe, in drier places. Det. A.J.W.

719/8. *Luzula spicata* (L.) DC. Near the summit of Foinaven, Strath Dionard. Det. A.J.W.

722/4. *Sparganium angustifolium* Michx. Lochans near Kinlochbervie, Sheigra, Sandwood Bay, Ardmorc, Foinaven. Det. A.J.W.

722/5. *Sparganium minimum* (Haitn.) Fries. In a bog between Scourie and Rhiconich. Det. A.J.W.

735/1. *Triglochin maritimum* L. Margin of the Safety Loch, Kinlochbervie, cliff tops at Oldshore More, Polin, Sheigra, Sandwood Bay, Ardmorc and Durness. Det. A.J.W. A very luxuriant specimen collected by Keith Piercey, from Bulgach Island.

735/2. *Triglochin palustris* L. Wet meadows near the sea at Kinlochbervie, Oldshore More, Polin and Sandwood Bay. Det. A.J.W.

737/1. *Potamogeton natans* L. Lochans and ditches at Kinlochbervie, Oldshore More, Polin, Sandwood Bay, Achlyness, Ardmorc and Durness. Det. J.E.D. and G.T.

737/9. *Potamogeton gramineus* L. Sandwood Loch and Loch Caldail, Durness. Det. J.E.D. & G.T.

737/2. *Potamogeton polygonifolius* Pourr. Bogs at Oldshore More, Sandwood Bay and Strath Dionard. Det. J.E.D. & G.T.

737/16. *Potamogeton perfoliatus* L. Loch Aisir Mor, near Kinlochbervie. Det. J.E.D. & G.T.

745/1. *Eleocharis palustris* (L.) Roem. & Schult. Lochans at Kinlochbervie, Oldshore More, Sandwood Bay, Ardmorc. Det. A.J.W.

745/3. *Eleocharis multicaulis* (Sm.) Sm. North banks of Sandwood Loch. Det. A.J.W.

746/7. *Scirpus cespitosus* L. Generally distributed over the Parphe in blanket bogs. Det. A.J.W.

746/8. *Scirpus pauciflorus* Lightf. Shores of Loch Inchard and Sandwood Loch. Det. A.J.W.

746/13. *Scirpus fluitans* L. Marsh at the east end of Sandwood Loch, and in a lochan near Ardmorc.

746/11. *Scirpus setaceus* L. South shore of Safety Loch, Kinlochbervie, rare.

746/15. *Scirpus rufus* (Huds.) Schrad. Shores of sea lochs at Kinlochbervie, Ardmorc, Kyle of Durness.

747/2. *Eriophorum angustifolium* Honck. Common in bogs over the Parphe.

747/4. *Eriophorum vaginatum* L. Scattered at Kinlochbervie, Oldshore More, Polin, Foinaven, but nowhere abundant.

748/2. *Rhynchospora alba* (L.) Vahl. Valley bogs south of Sandwood Bay, and at Achlyness, Ardmorc and Foinaven.

749/1. *Schoenus nigricans* L. Flushes in the sea cliffs, west of Kinlochbervie and at Oldshore More, Polin, Sheigra, Sandwood Bay and Ardmorc. Det. A.J.W.

753/7. *Carex rostrata* Stokes. In Sandwood Loch and Strath Chaillaich. Det. E.N.

753/8. *Carex lasiocarpa* Ehrh. Valley bog to the east of Sandwood Loch. Det. E.N.

753/14. *Carex capillaris* L. Cliff tops near Kinlochbervie, Oldshore More, Polin, Sheigra and Sandwood Bay. Det. A.J.W.

753/15. *Carex binervis* Sm. Generally distributed over the Parphe on hill summits and sea cliffs. Det. E.N.

753/17. *Carex distans* L. Shore of sea loch at Durness. Det. E.N.

753/20(2). *Carex demissa* Hornem. Damp flushes around Sandwood Loch and Kinlochbervie and generally distributed over the Parphe. Det. E.N.

753/28. *Carex caryophyllea* Latourr. Sea cliffs to the west of Kinlochbervie. Det. A.J.W.

753/32. *Carex pilutifera* L. Dry heath at Kinlochbervie, on the summit of Creag Riabhach, and generally distributed over the Parphe. Det. E.N.

753/33. *Carex flacca* Schreb. Meadows at Sheigra, Polin, cliffs, dunes and path margins at Sandwood Bay, and Durness. Det. E.N.

753/34. *Carex patescens* L. Dry heath at Kinlochbervie, Achlyness and Ardmorc. Det. E.N.

753/39. *Carex panicea* L. Generally distributed over the Parphe, particularly on eroded peat and on hill summits. Det. E.N.

753/38. *Carex limosa* L. Valley bog to the south-east of Sandwood Loch. Det. E.N.

753/49. *Carex nigra* (L.) Reichard. Generally distributed over the Parphe by lochans and streams, etc. Det. E.N.

753/51. *Carex Bigelowii* Torr. ex Schwein. Sandy margins of lochs at Kinlochbervie (very variable). Det. A.J.W.

753/53. *Carex ovalis* Gooden. Generally distributed over the Parphe in meadows and on rock outcrops. Det. E.N.

753/56. *Carex echinata* Murr. Generally distributed over the Parphe in bogs and marshes. Det. E.N.

753/58. *Carex curta* Gooden. A bog at Achlyness. Det. E.N.

753/60. *Carex spicata* Huds. In a bog east of Sandwood Loch. Det. A.J.W.

753/66. *Carex disticha* Huds. Marsh at Durness. Det. A.J.W.

753/67. *Carex arenaria* L. Sand dunes and machair at Oldshore More, Polin, Sheigra, Sandwood Bay, Ardmore and Durness. Det. E.N.

753/72. *Carex pauciflora* Lightf. In a bog between Sandwood Bay and Kinlochbervie. Det. A.J.W.

753/74. *Carex pulicaris* L. Grass banks and sea cliffs, generally distributed over the Parphe. Det. E.N.

753/75. *Carex dioica* L. Generally distributed in bogs over the Parphe. Det. E.N.

765/11. *Phalaris arundinacea* L. Stream sides at Kinlochbervie, Oldshore More, Polin, Sheigra Sandwood Bay, Achlyness, Ardmore.

766/1. *Anthoxanthum odoratum* L. Generally distributed in dry grassland over the Parphe.

770/5. *Alopecurus geniculatus* L. Ditch at Kinlochbervie, stream margins at Oldshore More, Polin, Sheigra, Sandwood Bay, Achlyness, Ardmore and Durness. Det. A.J.W.

780/2. *Agrostis stolonifera* L. Sand dunes at Sandwood Bay. Det. A.J.W.

780/6. *Agrostis canina* L. Banks at Kinlochbervie and generally distributed over the Parphe on river banks and in dry heaths. Det. A.J.W.

787/1. *Ammophila arenaria* (L.) Link. Sand dunes at Oldshore More. Polin, Sheigra, Sandwood Bay and Durness.

789/1. *Aira caryophyllea* L. Dry banks at Kinlochbervie, Sandwood Bay, Achlyness, Ardmore, Foinaven and Ben Stack.

789/2. *Aira praecox* L. Generally distributed in dry places over the Parphe.

791/1. *Deschampsia cespitosa* (L.) Beauv. Generally distributed over the Parphe on all the wetter rock outcrops.

791/4. *Deschampsia flexuosa* (L.) Beauv. Dry heaths, generally distributed over the Parphe.

792/2. *Holcus lanatus* L. Meadows and river banks at Kinlochbervie, Ardmore, Sandwood Bay, and in Strath Dionard.

795/1. *Arrhenatherum elatius* (L.) Beauv. ex J. & C. Presl. Margins of meadows at Kinlochbervie, Oldshore More, Polin, Sheigra, and on rocks at Sandwood Bay. Det. A.J.W.

802/1. *Phragmites communis* Trin. Streams and lochs at Kinlochbervie, Oldshore More, Polin, Sheigra, Sandwood Bay, Achlyness, Ardmore.

800/1. *Sieglingia decumbens* (L.) Bernh. Generally distributed over the Parphe in the drier grassland.

808/2. *Cynosurus cristatus* L. Coastal pastures at Kinlochbervie, Oldshore More, Polin, Sheigra, Sandwood Bay, Achlyness, Ardmore, Durness.

809/1. *Koeleria gracilis* Pers. Coastal pastures at Kinlochbervie, Oldshore More, Polin, Sheigra, Sandwood Bay and Durness.

813/1. *Molinta caerulea* (L.) Moench. Generally distributed on hill slopes and flushed areas over the Parphe.

819/1. *Dactylis glomerata* L. Common in pastures at Kinlochbervie, Oldshore More, Polin, Sheigra, Sandwood Bay, Achlyness, Ardmore, Durness.

- 824/2. *Poa pratensis* L. On Foinaven.
- 824/3. *Poa subcaerulea* Sm. Sand dunes at Sheigra and Sandwood Bay. Det. C.E.H.
- 824/4. *Poa irrigata* Lindm. Sand dunes at Polin where the burn enters the sea. Det. C.E.H.
- 824/6. *Poa trivialis* L. At Kinlochbervie and Ardmore.
- 824/7. *Poa nemoralis* L. In a small wood near Durness.
- 824/14. *Poa annua* L. Generally distributed over the Parphe on paths and in pastures. A specimen about 18 in. high collected by Keith Piercey on Bulgeach Island.
- 825/2. *Glyceria fluitans* (L.) R.Br. In streams at Kinlochbervie, Polin, Sheigra and Sandwood Bay.
- 826/7. *Festuca rubra* L. Probably this species on banks and meadows at Kinlochbervie and generally distributed over the Parphe.
- 826/7e(2). *Festuca rubra* L. var. *glaucescens* (Heg. & Heer) Richt. High dunes at Sandwood Bay. Det. C.E.H.
- 826/7f. *Festuca rubra* L. var. *arenaria* Fries. Dunes at Sandwood Bay. Det. C.E.H.
- 826/12. *Festuca tenuifolia* Sibth. Dunes at Sandwood Bay. Det. C.E.H.
- 827/19. *Bromus mollis* L. Meadows at Kinlochbervie, Oldshore More, Polin, Sheigra and Durness. Det. A.J.W.
- 827/19(2). *Bromus lepidus* O. R. Holmb. Meadow at Durness. Det. A.J.W.
- 828/1. *Brachypodium sylvaticum* (Huds.) Beauv. Sea cliff at Sandwood Bay and in a wood near Scourie.
- 829/1. *Lolium perenne* L. On cultivated land over all the area.
- 830/1. *Agropyron junceum* (L.) Beauv. Sand dunes at Polin, Sheigra and Sandwood Bay. Det. A.J.W.
- 830/4. *Agropyron repens* (L.) Beauv. Cultivated ground at Kinlochbervie, Oldshore More, Polin, Achlyness and Durness.
- 834/1. *Nardus stricta* L. Generally distributed over the Parphe on the drier hill slopes.
- 839/2. *Juniperus sibirica* Burgsd. Sea cliffs at Oldshore More, Polin, Sheigra, Sandwood Bay and on Creag Riabhach and Foinaven. Det. E.M.-R.
- 841/1. *Pinus sylvestris* L. Planted at Kinlochbervie and near Scourie.
- 844/5. *Equisetum limosum* L. In Sandwood Loch and at Durness. Det. A.J.W.
- 844/2. *Equisetum arvense* L. In a field at Kinlochbervie. Det. A.J.W.
- 844/6. *Equisetum palustre* L. Bogs at Oldshore More. Polin, Sheigra and Sandwood Loch.
- 844/3. *Equisetum sylvaticum* L. Ditches at Sheigra and Sandwood Bay. Det. A.J.W.
- 847/1. *Pteridium aquilinum* (L.) Kuhn. Sparsely distributed over the Parphe, on dry banks.
- 849/1. *Blechnum Spicant* (L.) Roth. Rock outcrops at Kinlochbervie, Sandwood Bay, Achlyness, Ardmore, and on Foinaven.
- 850/1. *Phyllitis Scolopendrium* (L.) Newm. In the Smoo Cave at Durness.
- 851/1. *Asplenium marinum* L. Sea cliffs at Oldshore More, Polin, Sheigra and Sandwood Bay. Det. A.J.W.
- 851/2. *Asplenium Trichomanes* L. Rock outcrops at Kinlochbervie, Oldshore More, Polin, Sheigra and Sandwood Bay.
- 851/3. *Asplenium viride* Huds. Sea cliffs at Sandwood Bay.
- 851/5. *Asplenium Adiantum-nigrum* L. Rock outcrops at Oldshore More, Sheigra and Sandwood Bay.
- 851/7. *Asplenium Ruta-muraria* L. Wall at Kinlochbervie.
- 853/1. *Athyrium Filix-femina* (L.) Roth. Woods at Kinlochbervie and Ardmore.
- 856/1. *Dryopteris Filix-mas* (L.) Schott agg. In a birch wood at the foot of Ben Stack.
- 856/3. *Dryopteris spinulosa* (Müll.) Watt. Birch wood at the foot of Ben Stack.

- 856/7. *Dryopteris oreopteris* (Ehrh.) Maxon. On Foinaven and Ben Stack.
- 858/1. *Polypodium vulgare* L. Walls, rock outcrops, etc., at Kinlochbervie, Polin, Sheigra, Ardmore, Ben Stack.
- 863/2. *Hymenophyllum peltatum* (Poir.) Desv. Within moss tufts on rocks at Kinlochbervie and Sandwood Bay.
- 864/1. *Osmunda regalis* L. Rocky margin of Sandwood Loch and by a small lochan near Ardmore.
- 865/1. *Botrychium Lunaria* (L.) Sw. Stony machair at Kinlochbervie, Oldshore More, Polin and Sandwood Bay.
- 866/1. *Ophioglossum vulgatum* L. Machair on the cliff top between Oldshore More and Polin, and on the cliff top north of Sandwood Bay.
- 870/1. *Lycopodium alpinum* L. On Foinaven, Ben Stack and Creag Riabhach.
- 870/7. *Lycopodium Selago* L. Generally distributed over the Parphe on the hills and on rock outcrops at low altitudes.
- 871/1. *Selaginella Selaginoides* (L.) Link. Coastal pastures at Kinlochbervie, mountain slopes on Foinaven and distributed locally over the Parphe.

ROEGNERIA DONIANA (F. B. WHITE) MELD. IN BRITAIN

By J. E. RAVEN.

Roegneria Doniana, although it has been known in Britain for almost a century and a half, seems to have been seen in the field by relatively few living botanists. The recent publication of a paper by Melderis (1950, 'The short-awned species of the genus *Roegneria* of Scotland, Iceland and Greenland, *Svensk Bot. Tidsk.*, **44**, 1), in which the Scottish plant is shown to be the type subspecies, endemic to Britain, of an Arctic species distributed in North America, Greenland and Iceland, provided the necessary stimulus to investigate the occurrence and distribution of the plant in Scotland; and as the last published record is now nearly forty years old, this is perhaps an opportune time for a brief summary of the plant's history.

First discovered in 1810 by George Don on Ben Lawers, it shared with several others of his discoveries the fate of being so long lost that it was widely discredited. In 1878, however, it was rediscovered by J. C. Melvill on the Stuic rocks, a little to the north of the summit of Ben Lawers itself. There it was apparently known for some years and seen by a number of botanists; it is from roots gathered from this locality and grown in their gardens by F. J. Hanbury and F. B. White that the majority of British herbarium specimens seem to have originated. Again, however, so far as I can reconstruct the story, the plant was lost to sight, until, in the words of Druce (1915, *Rep. Bot. Soc. & E.C.*, **4**, 78), "our member, Dr. F. Laidlaw, found in 1914 this very rare species, hitherto only known from one locality, in some quantity on another mountain of the Breadalbane group." Finally, in 1933—though it was not until lately that the specimen was authoritatively determined by Dr. Melderis, and in consequence the fact was not published—it was again collected, this time by Mr. E. C. Wallace, on yet another of the Breadalbane hills.*

Such were the facts known to me when, in July 1951, I spent six days in the Lawers neighbourhood; and since by then a party consisting of Prof. T. G. Tutin, Dr. S. M. Walters, Miss Elizabeth Davies and myself had already arranged to spend four days early in September at Killin with the special object of finding the *Roegneria*, I took the opportunity of making a preliminary survey of a number of suitable localities, including the Stuic rocks themselves whence came Hanbury's and White's roots. On my last evening in the district, when, with Prof.

*[In 1933 *Roegneria Doniana* was collected by Mr. Wallace on two Perthshire hills. A specimen gathered by R. Mackechnie in his company on Creag na Chaillich near Killin on July 30, 1933, as *Agropyron repens*, has been confirmed, since Mr. Raven's paper was written, as *R. Doniana* by Dr. Melderis, who subsequently also confirmed a specimen of the same gathering in Mr. Wallace's herbarium.—J. E. LOUSLEY.]

PLATE 3.



Roegneria Doniana near Inchnadampu.



Bealach Amadal, Skye, a typical locality for *Koenigia islandica*.

A. R. Clapham and Miss M. S. Campbell, I was examining a stretch of cliff which I had not before searched, I was surprised to come upon a considerable colony of *Roegneria Doniana*, some of it already flowering. Time, however, did not permit of any detailed investigation on this occasion, and the observations which I shall later be recording were made almost exclusively on my second visit in September.

Meanwhile, on my return to Cambridge late in July, the specimen which I had collected for the University herbarium prompted Dr. Walters and myself to further investigation. Attempts to trace Dr. Laidlaw, whose locality for the *Roegneria*, it seemed, might well have been the same as my own, had just proved fruitless when, by the merest accident, he happened to write to me on quite another subject. Enquiries were therefore made both of him and of Mr. Wallace, from which it emerged that their localities for the *Roegneria*, so far as they could be precisely defined, were respectively three and a half miles and about half a mile distant from my own. Further, and far more surprisingly, a cursory glance through the *Agropyron* folder in the herbarium of the late E. S. Marshall (now in the Cambridge University Herbarium, but still kept separate) revealed that under *A. caninum*, though with a pencilled comment at the bottom running "Root fibrous; awns very short," there was a specimen of *R. Doniana* labelled "12th September 1887, near Inchnadamph, W. Sutherland." Finally, Marshall's habit of publishing in the *Journal of Botany* an account of his previous season's activities enabled us to give the vague phrase "near Inchnadamph" a much more precise connotation. Though there was no reference in his account to any *Agropyron*, he did mention two plants, *Salix myrsinites* and a hybrid *Epilobium*, which he had collected while he was staying at Inchnadamph; and further recourse to his herbarium not only showed that these two plants had also, like the *Roegneria*, been collected on September 12th, but gave us two precise points on the map, separated by some two miles of interesting ground, between which Marshall must have walked on the day in question. We were thus in possession, by the time we gathered at Killin, of a set of directions for, apparently, no fewer than four separate localities for this little-known species.

Accordingly on September 4th we visited my own locality. The plant proved to be scattered over a stretch of cliff about a hundred and fifty yards long and to grow always, and in some places abundantly, in the immediate neighbourhood of streamlets or trickles of water. In Dr. Laidlaw's locality, on the other hand, which we searched very thoroughly on September 6th, it appeared to be exceedingly scarce: either we failed to find the precise spot or else the grass would seem to have greatly diminished in that area since 1914. Finally, on September 7th, Dr. Walters alone went to explore Mr. Wallace's locality, our directions for which were not very precise and which might possibly indeed, as we already realised, be identical with my own. This time not only was the search unsuccessful, but moreover Dr. Walters, after

a detailed inspection of the mountainside indicated, concluded that there were few other areas of any size in the neighbourhood, apart from my own locality, that satisfied all the plant's requirements. It seems in fact virtually certain that Mr. Wallace was the first finder of *Roegneria Doniana* in the station where it has since proved to be so abundant.

On September 8th the party dispersed; owing to difficulties of transport I, alone of the four, was able to go northwards to Sutherland. That evening, on arrival at the Inchnadamph Hotel, I enquired of the proprietor for the Visitors' Book covering the year 1887. It proved to be lost. There can, however, be little doubt that Marshall stayed at the hotel; and in any case when, the following morning, I set off to follow in his footsteps, I had walked less than a hundred yards from the front door of the hotel when I came upon a magnificent plant of *Roegneria Doniana*, with no less than twenty-two culms in perfect condition, growing on the bank of the Traligill Burn. From that moment onwards for the rest of the day I found the plant, often in profusion, wherever I went. It grows, in patches, all along both banks of the Traligill from 250 feet above sea level near the hotel to 600 feet near the cave where the burn disappears underground for a distance. In the lower stages it abounds, with *Roegneria canina*, on rocks under trees in the burn's ravine, while in the upper stages it favours ledges and crevices of the rather bare north-facing cliff which overhangs the dry bed of the burn. In this latter station, incidentally, it is accompanied by *Salix myrsinites*, one of the two plants discovered by Marshall on September 12th, 1887, and recorded in the *Journal of Botany*; it seems at least highly probable that it was from this cliff that Marshall's original specimen of *R. Doniana* came. It grows also, as I discovered later in the day, on rocks near waterfalls up both the Allt Poll an Droighinn and the Allt nan Glaiice Moire; and it is scattered, in places profusely, along at least a mile of the cliff—well known as a station for *Carex rupestris* and *Epipactis atrorubens*—that runs southwards from immediately behind the hotel. The only question, in fact, that arises from the day's observations—and the same question arises also in the Lawers neighbourhood—is how so conspicuous a plant growing so abundantly in so well worked an area could for so long have remained unnoticed.

The answer would seem to be twofold. In the first place the taxonomic difficulties surrounding the plant, only very lately cleared up by Dr. Meldreis' paper, have probably deterred botanists from the search for so supposedly rare and critical a species; and in the second place it is, in both areas where it is to be found, very effectively camouflaged by an abundance of other grasses that bear at least a superficial resemblance to it. All over the rocks of the Lawers range *Helictotrichon pratense* abounds, while near Inchnadamph great quantities of both *Roegneria canina* and *Brachypodium sylvaticum* serve to make *Roegneria Doniana* very much less conspicuous than it might otherwise be.

Indeed, though the two species are easily distinguished even from a distance of several yards, it was no doubt this abundance of *R. canina*, growing in similar situations and often in the closest proximity to *R. Doniana*, that misled even Marshall himself into hastily labelling his specimen of the latter with the former's name; and it is by no means impossible that several specimens of the rarer species are even now lying unrecognised in other herbaria.

During the remaining four days of my stay at Inchnadamph I did my best to demarcate the precise area in which the grass is to be found. The results once again were surprising. Though I had been led to expect, by my first day's experiences, that it would be found wherever else in the district there were suitable limestone cliffs and river banks, it proved, so far as I could discover, to be almost confined to the area drained by the Traligill. At all events I failed to detect it either on the Knockain rocks or, more surprisingly, on the rocky banks and cliffs above either the Allt nan Uamh or the Allt a' Chalda Mòr. In fact the only locality that I succeeded in adding to the first day's list (where, however, it was again abundant) was a second row of cliffs (see Plate 3) some distance above and behind the cliff already mentioned which overhangs the dry bed of the Traligill Burn.

When the stations for *Roegneria Doniana* in the Lawers neighbourhood are compared with those near Inchnadamph, two main differences are immediately obvious. Whereas near Ben Lawers it grows at an elevation of between 2,200 and 3,000 feet, near Inchnadamph it seems to range from 250 only up to about 700 feet; and again, whereas in the Breadalbanes it favours exclusively stretches of cliff that are at once light and damp, the majority of its stations near Inchnadamph (though by no means all) are either on cliffs, which, facing north to north-east, get hardly any sunlight at all, or else under a fairly dense cover of trees. In the small area in Sutherland where it has so far been found its requirements seem indeed considerably less rigid than in Perthshire. The following detailed descriptions of four localities, the two near Lawers compiled by Dr. Walters and the two near Inchnadamph by myself, may serve to show at once the similarities and the differences between typical stations in each district. Site 1 lies on a spur of Meall nan Tarmachan, site 2 on the massif of Ben Lawers itself; site 3 is on the cliff above the Traligill Burn, and site 4 on the south-facing but densely shaded bank lower down the same burn.

1. In this locality the plant proved (4th September 1951) to be locally frequent, on open rock-ledges facing south, south-east or east at an approximate height of 2,200 to 2,400 feet. The following is a description of a typical stand:—

Wet, more or less vertical gully, facing S.S.E., between two bare, vertical rock-faces; water seeping through and over a rich vegetation. *Roegneria Doniana* was here frequent, with the following associated species:—

<i>Ranunculus acris</i> L. o.	<i>Plantago lanceolata</i> L. r.
<i>Viola Riviniana</i> Reichb. o.	<i>Rumex Acetosa</i> L. r.
<i>Cerastium alpinum</i> L. r.	<i>Salix nigricans</i> Sm. (one large bush).
<i>Linum catharticum</i> L. r.	<i>Luzula sylvatica</i> (Huds.) Gaud. (few large clumps).
<i>Filipendula Ulmaria</i> (L.) Maxim. r.	<i>Agrostis tenuis</i> Sibth. o.
<i>Alchemilla glabra</i> Neygenf. o.	<i>Holcus lanatus</i> L. o.
<i>Alchemilla alpina</i> L. o.	<i>Dactylis glomerata</i> L. o.
<i>Saxifraga aizoides</i> L. f.	<i>Poa nemoralis</i> L. r.
<i>Angelica sylvestris</i> L. o.	<i>Festuca tenuifolia</i> Sibth. f.
<i>Hieracium prenanthoides</i> Vill. f.	<i>Festuca rubra</i> L. o.
<i>Euphrasia</i> sp. r.	
<i>Rhinanthus stenophyllus</i> (Schur) Druce. r.	

On the bare, somewhat drier rock were also:—

<i>Draba incana</i> L.	<i>Thymus Drucei</i> Ronn. emend. Jalas.
<i>Silene acaulis</i> (L.) L.	<i>Poa pratensis</i> L.
<i>Pinguicula vulgaris</i> L.	

The following bryophytes were also present:—

<i>Fissidens adianthoides</i> Hedw.	<i>Bryum alpinum</i> With.
<i>Distichum capillaceum</i> (Hedw.) B. & S.	<i>Campyllum stellatum</i> (Hedw.) Lange & Jens.
<i>Dichodontium pellucidum</i> (Hedw.) Schimp.	<i>Acrocladum cuspidatum</i> (Hedw.) Lindb.
<i>Anomobryum filiforme</i> (Dicks.) Husn.	<i>Brachythecium rivulare</i> (Bruch) B. & S.
<i>Bryum pseudotriquetrum</i> (Hedw.) Schwaegr.	<i>Conocephalum conicum</i> (L.) Dumort.

2. Here the plant is rare: in all, five spikes were counted, belonging to three separate plants, and a possible fourth plant was seen in an inaccessible position. A stand containing one plant bearing two good spikes was a mass of vegetation overhanging and not in direct contact with a vertical rock-face, through which water was seeping. It faced nearly south and was in full light. Here the luxuriant vegetation consisted of:—

<i>Silene acaulis</i> (L.) L.	<i>Succisa pratensis</i> Moench.
<i>Geranium sylvaticum</i> L.	<i>Hieracium anglicum</i> Fries.
<i>Anthyllis vulneraria</i> L.	<i>Vaccinium Vitis-idaea</i> L.
<i>Lotus corniculatus</i> L.	<i>Myosotis alpestris</i> Schmidt.
<i>Filipendula Ulmaria</i> (L.) Maxim.	<i>Mercurialis perennis</i> L.
<i>Geum rivale</i> L.	<i>Luzula sylvatica</i> (Huds.) Gaud.
<i>Alchemilla glabra</i> Neygenf.	<i>Deschampsia cespitosa</i> (L.) Beauv.
<i>Saxifraga oppositifolia</i> L.	<i>Helictotrichon pratense</i> (L.) Pilger.
<i>Sedum rosea</i> (L.) Scop.	<i>Festuca ovina</i> L.

3. Here the plant is locally frequent, on moist ledges and in gullies of a more or less vertical cliff facing north to north-east. The following is a description of one of the many stands:—

Rather dry, vertical crevice with thin layer of stony soil overlying limestone. Elevation c. 575 feet. Vegetation sparse, but *Roegneria Doniana* frequent. The following species were here associated with it:—

<i>Hypericum pulchrum</i> L.	<i>Taraxacum</i> sp. (immature).
<i>Dryas octopetala</i> L.	<i>Pinguicula vulgaris</i> L.
<i>Galium pumilum</i> Murr.	<i>Plantago maritima</i> L.
<i>Solidago virgaurea</i> L.	<i>Salix myrsinites</i> L.
<i>Hieracium</i> sp. (too immature to determine).	<i>Asplenium Trichomanes</i> L.
	<i>Asplenium Ruta-muraria</i> L.

4. In this locality also the plant was (9th September 1951) frequent, on steep, rocky banks, often heavily shaded, above the Traligill Burn. One stand, in a steep rock-crevice only two feet long, on the south-facing bank but shaded by *Ulmus* and *Betula*, was associated with the following species only:—

<i>Viola Riviniana</i> Reichb.	<i>Primula vulgaris</i> L.
<i>Rubus saxatilis</i> L.	<i>Roegneria canina</i> (L.) Nevski.

NOTE ON THE NOMENCLATURE OF ROEGNERIA DONIANA
(F. B. WHITE) MELD.

By T. G. TUTIN.

There is little that need be said about the specific epithet of *Roegneria Doniana*, as the matter has been fully dealt with in a recent paper by Melderis (1950). The question of the generic name does, however, call for some discussion and I may say at once that I am greatly indebted to Dr. Melderis for much of the information in the following short account.

A number of workers, particularly in the last fifteen years, have studied the tribe *Hordeae* and have come to the conclusion that the usually accepted genera do not differ from one another to any greater extent than do many groups of species included within them. Two alternatives are available for improving on this unsatisfactory state of affairs: either all or nearly all the genera can be united into one enormous genus with a great range of variation, or the existing genera can be subdivided into small and homogeneous groups. The former alternative has been adopted by Gould (1947), who places all N. American species, except those of *Hordeum*, in *Elymus*, and was earlier carried to its logical conclusion by Krause (1903), who placed the whole tribe in the genus *Fruentum*. Nevski (1936) and some Scandinavian taxonomists have adopted the second course and are using smaller and more homogeneous genera; this seems on the whole to be more convenient and also gives a greater likelihood of natural groupings.

The divisions adopted seem to provide a satisfactory arrangement of the British species, though much work remains to be done before all the plants included in the *Hordeae*, and particularly in the genera *Agropyron* and *Elymus*, can be satisfactorily classified.

If we adopt this course we have to recognise the genus *Hordelymus* (Jessen) Harz (1885) for *H. europaeus* (L.) Harz, which has been placed in *Elymus* and *Hordeum* but does not really fit in either, and divide our species of *Agropyron* between two genera, *Roegneria* C. Koch (1848) and *Elytrigia* Desvaux (1810).

Roegneria includes our species of *Agropyron* (*sensu lato*) which lack rhizomes (i.e. *R. canina* (L.) Nevski and *R. Doniana* (F. B. White) Meld.) while the remaining rhizomatous species are placed in *Elytrigia* (*E. repens* (L.) Nevski, 1933, *Act. Inst. Bot. Acad. Sci. U.R.S.S.*, ser. 1, fasc. 1, 14, *E. junceiformis* A. & D. Löve and *E. pungens* (Pers.) Tutin, comb. nov., based on *Triticum pungens* Pers., *Syn.*, 1, 109 = *Agropyron pungens* (Pers.) Roem. & Schult., *Syst.*, 2, 753). It may be noted in passing that *Triticum junceum* L. is not the western European species which has passed under that name for many years and for which the specific epithet *junceiformis* has been provided by A. & D. Löve (1948).

The characters of the two genera are summarised by Dr. Melderis as follows:

Roegneria.

Plants caespitose; Glumes usually scabrous, lacking a transverse furrow at the base and remaining on the rhachis at maturity; Anthers up to 3 mm. long; Caryopsis with a shallow furrow.

Elytrigia.

Plants rhizomatous; Glumes glabrous, with a transverse furrow at the base; spikelets falling off together with the glumes at maturity; Anthers 4.5-6 mm. long; Caryopsis with a deep furrow.

It is interesting to note that hybrids between species of *Roegneria* and *Elytrigia* appear to be quite unknown, though the species of both genera hybridise among themselves not uncommonly.

Druce (1928) records, in addition, four alien species of *Agropyron*: *A. prostratum* (Pall.) Beauv., *A. cristatum* (L.) Gaertn., *A. orientale* (L.) Roem. & Schult. and *A. patulum* Trin. Of these only *A. cristatum* belongs to the restricted genus *Agropyron*, and, according to Dr. Melderis, the adventive plants in Scandinavia and Britain agree closely with the description of *A. pectiniforme* Roem. & Schult. from S.E. Europe, S. Russia, Crimea, Caucasus, Kurdistan, Asia Minor, Persia and western Siberia, which in turn seems to be no more than a glabrous form of *A. cristatum*.

The remaining species belong to the genus *Eremopyrum* (Ledeb.) Jaub. & Spach, which contains annual plants with a fragile rhachis and glumes connate at the base. The three species recorded are *Eremopyrum triticeum* (Gaertn.) Nevski (= *Agropyron prostratum*), from the Balkans, S. Russia, Crimea, Caucasus, Kurdistan, C. Asia and western Siberia, *E. orientale* (L.) Jaub. & Spach, with a similar distribution but more widespread in the Mediterranean region, and *E. Buonapartis* (Spreng.) Nevski (= *A. patulum*), from the Balkans, eastern Mediterranean, Caucasus, Asia Minor, Persia and C. Asia.

I wish to express my thanks to Mr. C. E. Hubbard for advice on several points, particularly the nomenclature of *Elytrigia*.

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KOENIGIA ISLANDICA L. IN SCOTLAND

By J. E. RAVEN.

The discovery of *Koenigia islandica* in Britain was first reported in a short paper by Burt (1950, *Kew Bull.*, 1950, 266). It had been collected by Mr. H. M. Montford, as long ago as August 31st, 1934, near the summit of the Storr in the Isle of Skye; but, having been casually labelled *Peplis*, it had for some years remained undetected amongst the material of that genus at Kew.

Mr. Burt ended his article with a description of the plant, which he has very kindly allowed me to reproduce:—" *Koenigia islandica* is a small annual plant usually about 2-6 cm. high, though growing up to 15 cm. in some parts of its range. The lowest leaves are subopposite, the intermediate ones alternate, the uppermost subopposite or clustered below the flowers. The lamina is obovate-oblongate, about 5 mm. long and 3 mm. broad, sessile or with a very short petiole; the stipular sheath (ocrea) is short. The flowers are small, fasciculate among the upper leaves, and shortly pedicellate. The perianth is deeply 3-lobed, the stamens 3 in number and the angled ovary develops to a typically polygonaceous trigonous nutlet."

As for the distribution of the plant, Mr. Burt quotes from Hultén (1937, *Flora of the Aleutian Islands*, 154):—" Europe: from Jan Mayen, Spitzbergen and Novaya Zemlya southwards to Iceland, Faeroe Islands, central Scandinavia and arctic Russia. Asia: along the Arctic Coast to Chukch Penins. and southwards to Jakutsk distr., the northern Kuriles (Onekotan) and Commander Is. Also in the central Asiatic mts. southwards to Tibet, Kashmir and Szech'uan. N. Amer.: N. Alaska (Kotzebue Sd.) to Baffin Land and Labrador southwards to the Pribilof Is., the eastern Aleutians, S.E. Alaska and Alberta (Smoky R. acc. to Macoun), E. and W. Greenland. S. Amer.: Tierra del Fuego."

"Clearly," as Mr. Burt says, "the station in Skye can be regarded as a not improbable outlier of that part of the range which includes Iceland, the Faeroes and central Scandinavia."

On August 26th, 1951—almost exactly the same date as that on which, in 1934, the *Koenigia* had been first collected in Britain—I myself visited the Storr. The route followed was up the north-east shoulder, at the top of the great east-facing cliff, to the summit itself and thence, around the top of the lesser cliff that faces north, along the rocky ridge to Carn Liath. *Koenigia islandica* proved to be so abundant and widespread on the mountain, down to an elevation of about 1750', that I formed the opinion that it would most probably be found on other hills in the same region of the island.

Accordingly the following day I walked from the village of Uig, by way of Glen Uig and the Lòn Airidh-ùige, to the summit of Beinn Edra; thence along the top of the cliff southwards to the summit of

Groba nan Each; and finally back to Uig by way of Beinn an Laoigh, Beinn Fhuar and Creag Chragach. Once again the *Koenigia* proved to be abundant. On Beinn Edra itself, though there is plenty of apparently suitable ground, I failed to detect it; but from the summit of the next hill to the south onwards to the lowest point of the col just to the east of Beinn an Laoigh I met with five separate colonies of the plant, one at least of which—that in the Bealach Amadal (see Plate 3)—I should estimate to have contained many thousands of plants, growing, in places, so abundantly that between thirty and forty plants were counted on an area of one square foot. Thus, though my knowledge of the plant is limited to the observations of two days in the field, I am in a position to add something at least to the account already published.

Within the limited area where it has so far been encountered (and I would by no means exclude the possibility of its being found elsewhere in Scotland) the requirements of *Koenigia islandica* would seem to be surprisingly elastic. Indeed, the only obvious characteristic common to all its sites is an absence of competition from other and more vigorous species. Though, in 1951 at least, it was always very small, the largest plants being barely an inch in height or diameter, it seems to grow with equal abundance in localities of three distinct types.

First, there are the damp stony patches on the summits, from which it was first collected by Mr. Montford, where it not infrequently grows in shallow standing water, and where it is accompanied by such species as *Juncus squarrosus* L., *J. triglumis* L. (not, so far as I could see, *J. biglumis* L. as reported in the *Kew Bulletin*), *Carex dioica* L., *C. pulicaris* L. and *C. demissa* Hornem.

Next, it favours also stony patches of quite another type, patches which, in the summer at least, are apparently quite dry, and which, if the *Koenigia* is accompanied by any other flowering plants at all, carry such species as *Galium hercynicum* Weig. and *Thymus Drucei* Ronn. emend. Jalas. One such patch to the north of the Bealach Amadal, which measured some 6 yards by 2, supported a very sparse vegetation consisting of the following species:—

<i>Viola Riviniana</i> Reichb.	<i>Euphrasia</i> sp.
<i>Cerastium vulgatum</i> L.	<i>Thymus Drucei</i> Ronn. emend. Jalas.
<i>Cherleria Sedoides</i> L.	<i>Koenigia islandica</i> L.
<i>Sagina saginoides</i> (L.) Karst.	<i>Agrostis canina</i> L.
<i>Galium hercynicum</i> Weig.	<i>Festuca ovina</i> L.
<i>Gnaphalium supinum</i> L.	

On another much larger and slightly damper patch a little lower down the same shoulder there were present also:—

<i>Ranunculus acris</i> L.	<i>Plantago maritima</i> L.
<i>Potentilla erecta</i> (L.) Räusch.	<i>Polygonum viviparum</i> L.
<i>Sibbaldia procumbens</i> L.	<i>Salix herbacea</i> L.
<i>Saxifraga stellaris</i> L.	<i>Carex demissa</i> Hornem.
<i>Sedum Rosea</i> (L.) Scop.	

But a third patch, on the very edge of the cliff in the Bealach Amadal, bore no vegetation at all except an astonishing abundance of both *Koenigia islandica* and the moss *Oligotrichum hercynicum*, Hedw.) DC.

Finally, the *Koenigia* favours also localities of, superficially at least, a very different nature—long, steep shoots, chiefly at the foot of cliffs, composed of loose, red, somewhat stony soil. Here the vegetation is again exceedingly sparse, though it includes, on the Storr itself, such interesting species as *Arabis petraea* (L.) Lam., *Saxifraga nivalis* L. and *Poa alpina* L. In such sites, as also in the localities of the other two types, the *Koenigia* is by no means ubiquitous; but in the places where it chooses to grow, it grows—or at any rate grew in 1951—in considerable plenty.

The two areas where I myself saw the *Koenigia* are separated by exactly five miles, and its localities range from just under 1500' near Beinn an Laoigh to 2360' on the very summit of the Storr. It seems not unlikely that in sites such as I have described, and at any altitude over 1500', the plant will prove to be locally abundant at least along the whole range of hills from Beinn a' Chearcaill in the south to Sgùrr Mòr in the north; and it is, to my mind, by no means impossible that it will be found to occur also both in the Red Cuillins and on the hills of Rhum. I am doubtful, owing to the difference of the rock, whether it will be found on the mainland of Scotland, but the most promising areas to search would seem to be the hills around Loch Torridon, a few, such as Quinag, in West Sutherland, and perhaps, to judge from its appearance from a distance, Ben Sgriol on the north shore of Loch Hourn.

PLANT RECORDS

Compiled by E. C. WALLACE.

Records are for the year 1950 when no date is given.

The following signs are used:--

- § before the *B.P.L.* number: to indicate that the paragraph contains information necessitating a correction in the annotated copy of the *Comital Flora*.
- † before the *B.P.L.* number: to indicate that the plant is not a native species in the British Isles.
- † before the record: to indicate a native species which is not native in the locality recorded.
- * before the record: to indicate new vice-county records, not previously published.
- ‡ before the record: to indicate records additional to an annotated copy of *Comital Flora*, previously published elsewhere.
- [] enclosing a record: to indicate doubt as to the validity of the record, either of identification or locality.

It will be useful if, in future, National Grid Co-ordinates, made as accurate as is thought advisable, are added to all records.

1/1d. *CLEMATIS VITALBA* L. var. *TIMBALII* Drabble. 17, Surrey; near Buckland, Miss B. M. C. MORGAN, det. J. E. LOUSLEY.

2/5. *THALICTRUM ALPINUM* L. 108, W. Suth.; flushes at 2000 ft. on Quinag above Loch Assynt: flushed turf at 1800 ft. on Suilven, 1950, C. D. PIGOTT.

6/6. *RANUNCULUS LINGUA* L. 17, Surrey; by a small pond on Headley Heath, two plants in 1950, R. W. DAVID; also, independently, 1951, R. A. BONIFACE; I saw this there in 1947 when it had the appearance of having been recently thrown into the pond, E. F. WARBURG.

6/24c. *RANUNCULUS HETEROPHYLLUS* Weber var. *SUBMERSUS* Bab. 33, E. Glos.; (2b) in a small pond, Benhall Farm, St. Mark's, Cheltenham, 1947; Coombe Hill Canal, near Cheltenham, 1949, C. C. TOWNSEND, det. R. W. BUTCHER.

6/33e. *RANUNCULUS FICARIA* L. var. *BULBIFERA* Marsden-Jones. 59, S. Lancs.; weed in borders, Hesketh Park, Southport, 1949, D. E. ALLEN.

+21/1. *PAPAVER SOMNIFERUM* L. 59, S. Lancs.; bank of R. Tame on Coal measures, Lower Houghton, an obvious garden escape, which has spread about 10 miles, T. R. LAYCOCK.

+31/4. *CORYDALIS LUTEA* (L.) DC. 22, Berks.; (3) far from houses in a dense wood on chalk south of Streatley, J. OUNSTED.

§32/4. *FUMARIA PURPUREA* Pugsl. *95, Elgin; in a turnip field, with *F. officinalis*, at Kinloss Abbey Farm, near Forres, M. McC. WEBSTER, det. J. E. LOUSLEY.

32/5. *FUMARIA BORAEI* Jord. 34, W. Glos.; (4) two plants of a large-flowered, small spring form in a field near Beachley, 1949; late ramping form frequent along track from Wigpool Common to Mitcheldean Road station, 1949, C. C. TOWNSEND, det. N. Y. SANDWITH.

§35/1. *NASTURTIUM OFFICINALE* R.Br. *4, N. Devon; ditch by the roadside between Braunton and Saunton: *35, Mon.; ditch by the roadside, Tintern, 1949, C. C. TOWNSEND, confirmed by H. K. AIRY SHAW.

35/1(2)×1. *NASTURTIUM MICROPHYLLUM* (Boenn.) Reichb. × *OFFICINALE* R.Br. 4, N. Devon; River Heddon between Hunter's Inn and Heddon's Mouth, 1950, C. C. TOWNSEND, confirmed by H. K. AIRY SHAW: 70, Cumb.; roadside ditch near Brampton Junction, in the direction of Talkin Tarn, C. W. MUIRHEAD, comm. CARLISLE MUSEUM.

35/1(2). *NASTURTIUM MICROPHYLLUM* (Boenn.) Reichb. 59, S. Lancs.; Freshfield, Formby, D. P. YOUNG, confirmed by H. K. AIRY SHAW.

§35/2. *RORIPPA SYLVESTRIS* (L.) Besser. *50, Denb.; bank of R. Dee about 1 mile above Overton bridge, 1948, W. D. GRADDON, det. E. MILNE-REDHEAD. 88, Mid Perth; gravelly paths at Gask House, Auchterarder, near Perth, M. McC. WEBSTER, det. J. E. LOUSLEY.

37/5. *ARABIS PETRAEA* (L.) Lam. 105, W. Ross; plentiful on the cliffs and screes (on both Torridonian felspathic-sandstone and Cambrian quartzite) of Mullach an Rathain and Spidean a' Chroire Léith, Liathach, C. D. PIGOTT.

37/6. *ARABIS GLABRA* (L.) Bernh. 12, N. Hants.; abundant in a hedgebank near Eversley Church, J. OUNSTED.

§43/4. *DRABA MURALIS* L. *70, Cumb.; on a wall in Penrith, Miss N. M. STALKER, comm. CARLISLE MUSEUM.

49/1. *SISYMBRIUM SOPHIA* L. †95, Elgin; waste places and dunes round Findhorn village, M. McC. WEBSTER.

49/6b. *SISYMBRIUM OFFICINALE* (L.) Scop. var. *LEIOCARPUM* DC. 36, Heref.; one plant by the Wye at Symonds Yat, C. C. TOWNSEND.

+54/7. *BRASSICA TOURNEFORTII* Gouan. 33, E. Glos.; (2a) one large plant, Flour Mills, Tewkesbury, C. W. BANNISTER, det. N. Y. SANDWITH.

54/14b. *BRASSICA KABER* (DC.) L. C. Wheeler var. *ORIENTALIS* (L.) Wilmott. 33, E. Glos.; (2a) plentiful in many parts of Ashchurch and adjacent districts; Deerhurst; as common as the type, C. W. BANNISTER.

55/2. *DILOTAXIS MURALIS* (L.) DC. var. *CAULESCENS* Kittel. 33, E. Glos.; (2a) the common form at Northway, with the type, but more plentiful, C. W. BANNISTER.

†56/2. *ERUCA SATIVA* Mill. 16, W. Kent; Lullingstone Castle, H. W. PAYTON, det. & comm. D. H. KENT.

†76/3. *RAPISTRUM RUGOSUM* (L.) All. 17, Surrey; (7) Banstead Downs, 1909, H. F. PARSONS, det. at Kew 1950, comm. D. P. YOUNG.

†76/3c. *RAPISTRUM RUGOSUM* (L.) All. var. *VENOSUM* (Pers.) DC. 33, E. Glos.; (2a) Borough Flour Mills tip, Tewkesbury, C. C. TOWNSEND, confirmed by N. Y. SANDWITH.

†78/1. *ENARTHROCARPUS LYRATUS* (Forsk.) DC. 33, E. Glos.; (2b) Gloucester Docks, C. W. BANNISTER.

88/34. *VIOLA CURTISII* E. Forst. 59, S. Lancs.; plentiful with purple flowers on the coastal sand-dunes, but the yellow-flowered form appears to be extinct, W. G. TRAVIS, comm. D. E. ALLEN: a century ago yellow flowers were plentiful, and T. B. Hall (1838, *A Flora of Liverpool*, 14) mentions the "endless variety in the colours of their corolla." Similar particoloured swarms have been recorded on the Lancashire dunes by H. C. Watson (1847, *Cybele Britannica*, 1, 180) and J. Cosmo Melville (1918, *Lancs. & Ches. Nat.*, 11, 21-24) and in the *B.E.C. Reports for 1877-78 and 1887*; such swarms of particoloured and yellow-flowered plants have not been seen for about 50 years, D. E. ALLEN.

89/7. *POLYGALA AUSTRIACA* Crantz. 16, W. Kent; old chalkpit near Trottscliffe, 1950, 1951, D. P. YOUNG.

96/5. *SILENE ANGLICA* L. 90, Forfar; waste ground near Nine-wells, Dundee, U. K. DUNCAN and C. M. ROB, det. J. E. LOUSLEY.

†96/21. *SILENE BEHEN* L. 33, E. Glos.; (2a) Flour Mills, Tewkesbury, one plant, C. W. BANNISTER, det. at Kew.

†96/22. *SILENE RUBELLA* L. 90, Forfar; waste ground near Nine-wells, Dundee, 1950, U. K. DUNCAN and C. M. ROB, det. J. P. M. BRENNAN.

100/4. *CERASTIUM EDMONDSTONII* (Wats.) Murb. & Ostenf. 105, W. Ross; ledges on the cliffs (Torridonian felspathic-sandstone) above Loch a' Ghlas-tuill on Liathach, C. D. PIGOTT.

100/7. *CERASTIUM PUMILUM* Curt. 33, E. Gos.; (7a) old quarry above Guiting Power, 1949, C. C. TOWNSEND, det. E. MILNE-REDHEAD.

§100/9. *CERASTIUM TETRANDRUM* Curt. *†38, Warw.; railway track near Brandon, Rugby, with *Cochlearia danica*, D. E. ALLEN.

§101/4. *STELLARIA NEGLECTA* Weihe. *97, [Argyll]; near Mingary Castle, Ardnamurchan, R. MACKECHNIE.

101/5e. *STELLARIA HOLOSTEA* L. var. *APETALA* Aschers. & Graebn. 24, Bucks.; roadside near Rush Green, D. H. KENT.

§102/12. *ARENARIA SEDOIDES* (L.) F. J. Haub. *96, Easternness; on ledges on cliffs of mica schist at 3000 ft. above Glen Feshie, C. D. PIGOTT.

§103/2. *SAGINA SUBULATA* (Sw.) C. Presl. 97, [Argyll]; bare rocky limestone ridge, Swordle, Ardnamurchan, R. MACKECHNIE and E. C. WALLACE. *107, E. Suth.; in fine turf on rocky hillside near Rogart, Mrs DYSON PERRINS, det. B. M. C. MORGAN.

§103/7. *SAGINA CILIATA* Fr. †70, Cumb.; Silloth, 1949 (see *Year Book*, 1951, 48).

103/7(2). *SAGINA FILICAULIS* Jord. 23, Oxon.; platform of Kingham station, D. P. YOUNG.

§105/2. *SPERGULARIA MARGINATA* (DC.) Kittel. *95, Elgin; salt marshes round the Findhorn Estuary, Findhorn, M. McC. WEBSTER, det. J. E. LOUSLEY. 97, [Argyll]; shore of Loch Sunart at Glenmore, Ardnamurchan, E. C. WALLACE.

§†108/1. *CLAYTONIA ALSINOIDES* Sims. *38, Warw.; naturalised in plantation, Bilton Grange, near Rugby, D. E. ALLEN.

†108/2. *CLAYTONIA PERFOLIATA* Donn ex Willd. 17, Surrey; (7) Great Burgh, Epsom Downs, on new flower-beds, possibly introduced with shrubs, D. P. YOUNG.

§111/2. *ELATINE HEXANDRA* (Lapierre) DC. *43, Rad.; Llyn Hilyn, Miss A. NOCK, comm. NAT. MUS. WALES.

117/2c. *MALVA SYLVESTRIS* L. var. *LASIOCARPA* Druce. 33, E. Gos.; (2a) several plants at Corporation tip, Folly Lane, Cheltenham, C. C. TOWNSEND.

123/3. *TILIA CORDATA* Mill. 38, Warw.; plentiful and regenerating in many parts of Ryton Wood, where it looks undoubtedly native, D. E. ALLEN.

124/1. *RADIOLA LINOIDES* Roth. 95, Elgin; sandy pathways on the Culbin Sands, near Forres, M. McC. WEBSTER, 1950.

†127/5. *GERANIUM PHAEUM* L. 14, E. Sussex; Castle Lane, Hurstmonceaux, A. J. MAUDSLEY.

†127/19. *GERANIUM NODOSUM* L. 44, Carm.; near the Maerdy, near Llandilo, 1950, Mrs. MARY BARNES, comm. NAT. MUS. WALES.

†128/10. *ERODIUM ACAULE* (L.) Becherer & Thell. 17, Surrey; several plants on bare sandy soil by roadside, Sondes Place Drive, Dorking, A. H. G. ALSTON.

‡133/2. *IMPATIENS CAPENSIS* Meerb. *38, Warw.; canal banks from Hillmorton to Cathiron, near Rugby, spreading fast since arrival in 1937, P. FALK and D. E. ALLEN, comm. D. E. ALLEN.

‡133/3. *IMPATIENS PARVIFLORA* DC. *91, Kincardine; banks of the river North Esk, near Edzell, very common down to Marykirk, 1942, K. N. G. MACLEAY.

‡133/4c. *IMPATIENS GLANDULIFERA* Royle var. *CANDIDA* (Lindl.) Britt. *59, S. Lancs.; side of R. Tame, Strines, T. R. LAYCOCK and D. W. JOWETT.

†144/1. *THERMOPSIS MONTANA* Nutt. ex Torr. & Gray. 32, Northants.; gravel pits, Oundle, 1948, 1950, I. HEPBURN.

†145/4. *LUPINUS ANGUSTIFOLIUS* L. E. Glos.; (2a) two or three plants by the railway sidings, between Arle Road and Tewkesbury Road, Cheltenham, 1948, C. C. TOWNSEND, det. at BRITISH MUSEUM.

151/2b. *ONONIS REPENS* L. var. *HORRIDA* Lange. 33, E. Glos.; (7a) in a cornfield above Aggs Hill, The Hewletts, Cheltenham, C. C. TOWNSEND.

‡152/1. *TRIGONELLA ORNITHOPODIOIDES* (L.) DC. ‡71, Man; sandy ground north of Ramsey, J. A. Wheldon (1918, Further Notes on the Manx Flora, *Lancs. and Ches. Nat.*, 127-130), comm. D. E. ALLEN.

†153/1b. *MEDICAGO FALCATA* L. var. *TENUIFOLIOLATA* Vuyck. 34, W. Glos.; (2b) Sharpness Docks, C. W. BANNISTER.

153/2. *MEDICAGO* × *SILVESTRIS* Fries. †34, W. Glos.; (2b) Sharpness Docks, C. W. BANNISTER.

153/7e. *MEDICAGO LUPULINA* L. var. *WILLDENOWIANA* Koch. 36, Heref.; abundant in the sidings, Mitcheldean Road railway station, greatly outnumbering the typical plant, C. C. TOWNSEND.

156/1. *ANTHYLLIS VULNERARIA* L. 97, [Argyll]; on a dyke, Ben Resipol; basic rocks at Maclean's Nose, Ben Hiant, Ardnamurchan, R. MACKECHNIE and E. C. WALLACE.

160/6. *LOTUS TENUIS* Willd. 14, E. Sussex; north side of Newmarket Hill, D. McCLINTOCK. 33, E. Glos.; in great profusion in the sand pits, Sandy Lane, Leckhampton, Cheltenham, C. C. TOWNSEND.

†170/1. *CORONILLA VARIA* L. 38, Warw.; roadside at Knightlow Hill, Dunchurch-Coventry Road, 1947-50, H. J. M. BOWEN and D. E. ALLEN.

†176/6. *VICIA DASYCARPA* Tenore. 17, Surrey; (8) Chelsham, abundant and setting good fruit in a field of oats, although confined to the outer margin, with *V. pannonica* and *sativa*, D. P. YOUNG. 33, E. Glos.; (2a) one plant on a waste along the W. branch of the Ring Road, Gloucester, 1948, C. C. TOWNSEND, det. A. H. G. ALSTON.

†176/26. *VICIA PANNONICA* Crantz. 17, Surrey; (8) Chelsham, one plant only in an oat field (see under *V. dasycarpa*), D. P. YOUNG.

178/3. *LATHYRUS TUBEROSUS* L. †37, Worcs.; old brick pit near Evesham, A. J. HARTMAN, comm. F. M. DAY.

†184/10. *SPIRAEA SALICIFOLIA* L. 37, Worcs.; waste ground at Fernhill Heath, F. M. DAY.

185/88(3). *RUBUS DENTATIFOLIUS* (Briggs) W. Wats. 35, Mon.; Chepstow Park Wood, 1896, W. A. SHOOLBRED (as *R. Leyanus* Rog.), det. W. WATSON, comm. NAT. MUS. WALES.

185/129(2). *RUBUS ADENOLOBUS* W. Wats. 35, Mon.; Pant-y-Cossin, Shirenewton, 1891 (as *R. Koehleri* Weihe var. *pallidus* Bab.) and below Chepstow Park, 1894 (as *R. fuscus* W. & N.), W. A. SHOOLBRED, det. W. C. R. WATSON, comm. NAT. MUS. WALES.

185/143. *RUBUS ACUTIFRONS* Ley. 35, Mon.; Chepstow Park Wood, 1896, W. A. SHOOLBRED (as *R. Lintoni* Focke ex Bab.), det. W. WATSON, comm. NAT. MUS. WALES.

186/1. *DRYAS OCTOPETALA* L. 96, Easternness; steep sloping ledge on cliffs of mica schist above Glen Feshie, C. D. PIGOTT.

§189/5. *POTENTILLA CRANTZII* (Crantz) Beck. *96, Easternness; a few plants on a ledge on cliffs of mica schist above Glen Feshie, C. D. PIGOTT.

†189/11. *POTENTILLA NORVEGICA* L. 90, Forfar; waste ground near Ninewells, Dundee, U. K. DUNCAN and C. M. ROB, det. E. C. WALLACE.

†189/18. *POTENTILLA CANESCENS* Besser. 17, Surrey; sandpit near Buckland, Miss E. ISHERWOOD, comm. Miss B. M. C. MORGAN.

§190(2)/1. *APHANES ARVENSIS* L. *33, E. Glos.; (6) Bull Banks, Miserden, 1950; (7a) bare paths, Hinchwick Warren, 1950; cornfield, Cleeve Hill, Cheltenham, 1946, C. C. TOWNSEND, confirmed by S. M. WALTERS. *50, Denb.; limestone rocks above Loggerheads, D. E. ALLEN, det. S. M. WALTERS.

§190(2)/2. *APHANES MICROCARPA* (Boiss. & Reut.) Rothm. *4, N. Devon; pathway between Hunters Inn and Heddons' Mouth, C. C. TOWNSEND. 17, Surrey; (8) Coombe Wood, Croydon, amongst turf and flower-beds on sandy soil, D. P. YOUNG. *33, E. Glos.; (2a) Brockeridge Common, abundant, C. W. BANNISTER. *34, W. Glos.; (4) heathy ground near Newnham; heathy ground near Foxes Bridge, Ruspidge, C. C. TOWNSEND; Yate Common, 1916, I. M. ROPER, specimen in Herb. Roper in Leeds University; on Millstone Grit on Clifton Down, 1949, N. Y. SANDWITH (1949, *Proc. Brit. Nat. Soc.*, 28, 18). *38, Warw.; Brandon, D. E. ALLEN. 59, S. Lancs.; weed in lawn, Birkdale, D. E. ALLEN. †70, Cumb.; Silloth, 1949, Miss E. J. Gibbons (see *Year Book*, 1951, 48). All determined or confirmed by S. M. WALTERS.

194/6a. *RUBRA CANINA* L. var. *LUTETIANA* (Léman) Baker. 33, E. Glos.; (7b) Charlton Kings railway station, Cheltenham, 1947, C. C. TOWNSEND, det. N. Y. SANDWITH.

194/6h. *ROSA CANINA* L. var. *SENTICOSA* (Ach.) Baker. 33, E. Glos.; (2a) Shuthonger Common, near Tewkesbury, 1947, C. C. TOWNSEND, det. N. Y. SANDWITH.

194/11. *ROSA DUMETORUM* Thuill. var. *DESEGLISEI* (Bor.) Chr. 33, E. Glos.; (2a) Brockeridge Common, near Tewkesbury, 1947, C. C. TOWNSEND, det. N. Y. SANDWITH.

199/10. *SAXIFRAGA HYPNOIDES* L. 97, [Argyll]; basic rock outcrops on Sgurr na h-Eanchainne, Ardgour, E. C. WALLACE.

§214/1. *HIPPURIS VULGARIS* L. *98, Argyll; common in lochans in Argyll and Lorne near Loch Awe, K. N. G. MACLEAY; margin of Loch Balnagowan, Lismore, 1949, E. C. WALLACE.

220/1. *EPILOBIUM ANGUSTIFOLIUM* L. 91, Kincardine; form with pale pink corolla, about fifteen plants growing with type, Arbuthnott, Fordoun, 1950, THE VISCOUNTESS OF ARBUTHNOTT, det. G. M. ASH, comm. U. K. DUNCAN.

‡220/7(2). *EPILOBIUM ADENOCALON* Hausskn. *3, S. Devon; Kenton, in felled woods of Oxtton House, 200 ft., E. MILNE-REDHEAD, det. G. M. ASH. 33, E. Glos.; (2a) waste ground on the Ring Road, Gloucester,

1948, C. C. TOWNSEND, det. A. J. WILMOTT; Staverton Wood, 1950, C. C. TOWNSEND, det. G. M. ASH: 36, Heref.; by the west bank of the Wye at Symonds Yat, roadside just beyond Wye Rapids Hotel, with *E. obscurum* Schreb., 1949, C. C. TOWNSEND, det. G. M. ASH.

220/9. *EPILOBIUM LANCEOLATUM* Seb. & Maur. 34, W. Glos.; (2b) Sharpness Docks, C. W. BANNISTER.

+220/17. *EPILOBIUM PEDUNCULARE* A. Cunn. 1, W. Cornw.; a few plants on a wall, Camborne, 1945, C. C. TOWNSEND, det. G. M. ASH. 33, E. Glos.; (6) in moss round a beech stump in a wood between Fostons Ash and Bull's Cross, Painswick, C. C. TOWNSEND, det. G. M. ASH. 95, Elgin; well established among the stones on the river Findhorn, at Banchory, M. McC. WEBSTER, det. J. E. LOUSLEY. H1, S. Kerry; damp base of cliff. Knockavulloge, at about 800 ft., J. and I. OUNSTED, confirmed by G. M. ASH.

*+223/5. *OENOTHERA AMMOPHILA* Focke. 34, W. Glos.; (2b) many plants along rail-tracks. Sharpness Docks, C. W. BANNISTER, det. E. B. BANGERTER.

225/2. *CIRCAEA INTERMEDIA* Ehrh. 97, [Argyll]; ravine of Resipol burn, Sunart: calcareous rocks, Swordle, Ardnamurchan, R. MACKECHNIE and E. C. WALLACE.

§225/3. *CIRCAEA ALPINA* L. *41, Glam.; near a waterfall, west cliffs of the Rhondda Valley. 1890, A. LEY (Herb. Ley, Birmingham University), comm. NAT. MUS. WALES.

+252/1. *FALCARIA VULGARIS* Bernh. 33, E. Glos.; (7b) quarry 2½ miles from Cirencester, L. ABELL.

257/1. *MYRRHIS ODORATA* (L.) Scop. †36, Heref.; roadside near a cottage, The Hollybush, Eastnor, F. M. DAY.

+258/1. *CHAEROPHYLLUM AUREUM* L. 85, Fife; as a casual plant on the cliff beside the castle, St Andrews, 1938, K. N. G. MACLEAY.

§261/2. *ANTHRISCUS CAUCALIS* M. Bieb. *45, Pemb.; Freshwater West, Miss DAPHNE BARNES, comm. NAT. MUS. WALES. 95, Elgin; sparingly in waste places and banks round houses in Findhorn village, M. McC. WEBSTER.

+287/3. *SAMBUCUS EBULUS* L. 97, [Argyll]; by ruins of Mingary Castle, Ardnamurchan, E. C. WALLACE.

296/5. *GALIUM PUMILUM* Murr. 98, Argyll; Creag Bhan, Glencoe, E. C. WALLACE.

§296/8. *GALIUM DEBILE* Desv. †66, Durham; Seaton Sluice, J. W. H. HARRISON (1950, *Vasc. Subst.*, **35**, 23).

304/5. *VALERIANELLA RIMOSA* Bast. 20, Herts.; in considerable quantity in cultivated fields on either side of the road from Old Sarratt to the river Chess, R. A. GRAHAM.

†308/2. *SCABIOSA MARITIMA* L. 14, E. Sussex; well naturalised on chalk, Kemp Town station yard, Brighton, D. McCLINTOCK.

†318/4. *ASTER NOVI-BELGII* L. 34, W. Gos.; by the Wye at Symonds Yat, 1949, C. C. TOWNSEND, det. at BRITISH MUSEUM.

318/19. *ASTER TRIPOLIUM* L. 21, Middx.; marshy field near Yeading, 1949, R. A. Boniface (1950, *Lond. Nat.*, **29**, 13).

§†320/3. *ERIGERON CANADENSIS* L. †36, Heref.; in gutters and on the roadside, Hereford, 1947, Miss F. M. B. Marsh (1950, *Trans. Woolhope N.F.C.*, **33**, 91): *70, Cumb.; railway bank near Scotby, Carlisle, R. MARTINDALE, comm. CARLISLE MUSEUM.

§†327/1. *ANAPHALIS MARGARITACEA* (L.) Benth. *96, Easternness; Beaulieu, 1944: *106, E. Ross; Muir of Ord, locally common, 1944. K. N. G. MACLEAY.

333/4. *INULA CONYZA* DC. 59, S. Lancs.; two patches, Ainsdale and Freshfield dunes, D. E. ALLEN.

†338/1. *IVA XANTHIIFOLIA* Nutt. 33, E. Gos.; (7a) one plant in a flax field, Harp Hill, near Cheltenham, 1948, C. C. TOWNSEND, det. A. H. G. ALSTON.

†347/12. *HELIANTHUS TUBEROSUS* L. 33, E. Gos.; (2a) waste ground by the Ring Road, Gloucester, common, 1948; one plant, Lower Lock sewage farm, Tewkesbury, 1949, C. C. TOWNSEND.

†353/6. *BIDENS FRONDOSA* L. 33, E. Gos.; (2a) waste ground by the Gloucester by-pass, 1947, C. C. TOWNSEND, confirmed by N. Y. SANDWITH.

†354/1. *GALINSOGA PARVIFLORA* Cav. 59, S. Lancs.; weed in Hesketh Park, Southport, known for 15 years, D. E. ALLEN.

§†371/3. *MATRICARIA MATRICARIOIDES* (Less.) Porter. *97, [Argyll]; several places in Ardnamurchan as at Mingary, Swordle, Salen, R. MACKECHNIE.

†380/3. *PETASITES FRAGRANS* (Vill.) C. Presl. 36, Heref.; Pencombe, Miss ANNESLEY, comm. F. M. DAY.

§+383/7. *SENECIO SQUALIDUS* L. 13, W. Sussex; Kingston Lighthouse; one plant in Brighton goods yard: *14, E. Sussex; two plants in Kemp Town station yard, Brighton, D. McCLINTOCK.

383/7×8. *SENECIO* × *LONDINENSIS* Lousley. 17, Surrey; waste ground at Gomshall Station. 1950, R. A. GRAHAM. 21, Middx.; on bomb rubble in Queens Gate, S.W.7, 1949, R. A. GRAHAM; Vincent Square, Westminster, W. T. Stearn (1950, *J. Roy. Hort. Soc.*, **75**, civ).

†383/7×10. *SENECIO* × *BAXTERI* Druce. 33, E. Glos.; (2a) Northway, one plant in 1949 and one in 1950, both large, bushy, solitary plants, C. W. BANNISTER.

383/10e. *SENECIO VULGARIS* L. var. *RADIATUS* Koch. 14, E. Sussex; abundant, and the only form, Kemp Town station yard, Brighton, D. McCLINTOCK.

391/1: *CARLINA VULGARIS* L. 70, Cumb.; (2) sandhills at Eskmeals, J. D. HINDE, comm. CARLISLE MUSEUM.

†395/1c. *CARDUS NUTANS* L. var. *MACROCEPHALUS* (Desf.) Druce. 33, E. Glos.; (2a) several fine plants on the tip, Tewkesbury Flour Mills, 1949, C. C. TOWNSEND, det. A. H. G. ALSTON.

415/2. *PICRIS HIERACIOIDES* L. 59, S. Lancs.; delete † before record in 1951, *Watsonia*, **2**, 46.

425/1. *LACTUCA VIROSA* L. †70, Cumb.; railway bank near Carlisle, R. MARTINDALE, comm. CARLISLE MUSEUM.

§425/2. *LACTUCA SERRIOLA* L. *†32, Northants.; waste places in Peterborough (1947, *Journ. Northants. N.H.S.*, **31**, 131-34).

425/5. *LACTUCA SERRIOLA* L. var. *DUBIA* (Jord.) Rouy. †33, E. Glos.; (2a) is increasing prodigiously around Gloucester and promises to be very common there in a few years' time, C. C. TOWNSEND, det. J. E. LOUSLEY; Northway, becoming common in 1950, C. W. BANNISTER.

†425/8. *LACTUCA MACROPHYLLA* (Willd.) A. Gray. 70, Cumb.; garden weed, Etterby St., Carlisle, Miss M. WATSON, comm. CARLISLE MUSEUM.

432/1. *JASIONE MONTANA* L. 97, [Argyll]; roadside banks, Ardour, opposite Corran, R. MACKECHNIE and E. C. WALLACE.

438/2×3. *VACCINIUM* × *INTERMEDIUM* Ruthe. 57, Derby; near Tansley, with both parents, 1945, 1950, D. P. YOUNG.

441/2. *ARCTOSTAPHYLOS ALPINUS* (L.) Spreng. 105, W. Ross; bare, windswept, rock slope at 1800 ft. on Liathach; exposed heath at 1900 ft. on Beinn Damh; 108, West Suth.; abundant on Meallan Liath Mòr at 1600 ft., east of Canisp, C. D. PIGOTT.

†443/1. *GAULTHERIA SHALLON* Pursh. 58, Ches.; Storeton Hill, Wirral, naturalised in some quantity, E. P. A. JONES and D. P. YOUNG.

§453/1. *PYROLA ROTUNDIFOLIA* L. *18, S. Essex; chalk pit near Grays, 1948, B. T. WARD.

454/1. *MONESSES UNIFLORA* (L.) A. Gray. 95, Elgin; in young pine plantations, Culbin Sands and district, M. HUNTER and M. McC. WEBSTER.

457/1. *LIMONIUM VULGARE* Mill. 69b, N. Lancs.; on the saltings beside the old railway line from Barrow to Rampside, GEOFFREY WILSON, comm. BARROW NATURALISTS' FIELD CLUB. 70, Cumb.; salt marsh near Eskmeals, with the more abundant *L. humile* Mill., J. D. HINDE, comm. CARLISLE MUSEUM.

§459/1. *HOTTONIA PALUSTRIS* L. †95, Elgin; common in pools in sand dunes at edge of fir wood, Culbin Sands, 1941, K. N. G. MACLEAY; the entry of 96 in *C.F.* should be corrected to read 95; Dr. Patton informs me that he found the plant (in 1923) in v.-c. 95 and not v.-c. 96 as stated in *B.E.C. 1923 Rep.*, 7, 198 and 253 (1924); the Culbin Sands lie in both v.-c. 95 and 96—E.C.W.

467/2d. *ANAGALLIS ARVENSIS* L. var. *LILACINA* Alefeld. 34, W. Glos.; (3) arable field, Payford Bridge, D. M. FROUDE, comm. W. R. PRICE.

467/2f. *ANAGALLIS ARVENSIS* L. var. *AZUREA* Wilmott. 17, Surrey; (8) Coulsdon, a single small plant as a garden weed, A. F. MILLIDGE, det. and comm. D. P. YOUNG.

467/2×3. *ANAGALLIS ARVENSIS* L. × *A. FOEMINA* Mill. 38, Warw.; two plants found with both parents on margin of cultivated land between Wilmcote and Billesley; Mr. Marsden-Jones writes: "This is the first time I have seen a natural hybrid," R. C. READETT, det. E. M. MARSDEN-JONES (as *A. arvensis* ssp. *phoenicea* (Scop.) Schinz & Keller × ssp. *foemina* (Mill.) Schinz & Thell.).

648/1. *CENTUNCULUS MINIMUS* L. 95, Elgin; sandy pathways with *Radiola* on the Culbin Sands, near Forres, very tall plants, M. McC. WEBSTER.

§473/2. *VINCA MINOR* L. *†96, Easternness; Beauly, 1940, K. N. G. MACLEAY.

476/1. *CICENDIA FILIFORMIS* (L.) Delarb. 13, W. Sussex; refound by a small pond, St. Leonards, near Horsham, by Mrs. C. ESPLAN in 1948; seen in 1950 by several members—first notice in Sussex for some 80 years—E.C.W.

480/9b. *GENTIANA CAMPESTRIS* L. var. *BALTICA* (Murb.) Druce. H16, W. Galway; plentiful at Dogs Bay, 1950, with some white-flowered specimens, J. OUNSTED, confirmed by J. P. M. BRENNAN.

†490/2. *OMPHALODES VERNA* Moench. 34, W. Glos.; (3) Four Oaks Halt between Newent and Dymock, a patch 27 yards square in a damp wood away from habitation above the station, E. H. FRENCH, comm. W. R. PRICE.

§497/2. *SYMPHYTUM TUBEROSUM* L. *96, Easternness; common beside burn above village, Beauly, and in Strath Glass, 1940, K. N. G. MACLEAY.

§4500/1. *ANCHUSA SEMPERVIRENS* L. *106, E. Ross; by East Fearn near Ardgary, M. S. CAMPBELL.

†500/7. *ANCHUSA AZUREA* Mill. 33, E. Glos.; (7a) on roadside at Nether Westcote turn between Burford and Stow, C. W. BANNISTER.

§509/2. *ECHIMUM PLANTAGINEUM* L. *†8. S. Wilts.; Sleight Wood, 1948. C. RICE, det. J. E. LOUSLEY (1949, *Wilts. Arch. & N.H. Mag.*, 53, 91).

†511/2. *CALYSTEGIA SYLVESTRIS* (Willd.) Roem. & Schult. 4, N. Devon; by the right-hand side of the main road between Lynton and the Valley of Rocks, 1950, C. C. TOWNSEND. 32, Northants.; climbing over *Phragmites* beside Daventry reservoir, 1949, D. E. ALLEN. 33, E. Glos.; (7a) Aggs Hill, Cheltenham; (7b) sandpits, Sandy Lane, Leckhampton, C. C. TOWNSEND. 34, W. Glos.; (2b) Sharpness, the pink-flowered form, C. W. BANNISTER. 38, Warw.; weed in gardens, Rugby, D. E. ALLEN. 59, S. Lancs.; commoner than *C. sepium*, except round Clitheroe and a few areas on the Mosslands, D. E. ALLEN, Miss V. GORDON, W. G. TRAVIS and H. E. GREEN, comm. D. E. ALLEN. 60, W. Lancs.; sand dunes, Fleetwood, D. E. ALLEN. 63, S.W. York; Sherburn in Elmet, side of brick pond near railway, 1947, C. M. ROB. 103, Mid Ebudes; Salen, Isle of Mull, Miss V. GORDON, comm. D. E. ALLEN.

†515/7. *CUSCUTA SUAVEOLENS* Ser. 32, Northants.; parasitic on *Polygonum aviculare* in clover field, Ashton near Oundle, 1944, I. HEPBURN, det. J. E. DANDY.

†517/2d. *SOLANUM NIGRUM* L. var. *ATRIPLICIFOLIUM* (Desf.) Dunal. 33, E. Glos.; (2a) Folly Lane tip, Cheltenham, C. C. TOWNSEND. 34, W. Glos.; (5) Cole's boneyard tip, St. Philip's Marsh, Bristol, a variety with incised leaf edges, N. Y. SANDWICH and C. C. TOWNSEND.

521/1. *ATROPA BELLA-DONNA* L. †95, Elgin; among the ruins of Kinloss Abbey, near Forres, first noted 20 years ago and diminishing, M. McC. WEBSTER.

†522/1. *DATURA STRAMONIUM* L. 1, W. Cornw.; bulb-field, between Higher Town and Middle Town, St. Agnes, Isles of Scilly, 1948, B. W. RIBBONS and P. J. WANSTALL, and in much greater quantity, 1950, B. W. RIBBONS.

†537/1. *MIMULUS GUTTATUS* DC. 100, Arran; sea shore, around and above high-water mark, Blackwater Foot, J. N. MILLS.

543/9. *VERONICA CATENATA* Pennell. 33, E. Glos.; (2a) Carrant Brook near Tewkesbury; ponds, Northway and Natton, common—the common species about here, C. W. BANNISTER. 70, Cumb.; Silloth, 1873, Dr. J. LEITCH; Benwray, near Abbey Town, 1876, Miss E. J. GLAISTER; Briggie Beck, near Langwathby, 1947, C. W. MUIRHEAD; all det. J. H. BURNETT, comm. CARLISLE MUSEUM.

†543/31. *VERONICA PEREGRINA* L. 88, Mid Perth; a garden weed at Gask House, Auchterarder near Perth, M. McC. WEBSTER, det. J. E. LOUSLEY.

†543/41. *VERONICA FILIFORMIS* Sm. H16, W. Galway; field at Gorteen Bay, W. of Roundstone (near a house), J. OUNSTED.

§545/12. *EUPHRASIA FRIGIDA* Pugsl. *70, Cumb.; Honister Crag, Buttermere, 1946, C. W. MUIRHEAD, det. E. F. WARBURG, comm. CARLISLE MUSEUM.

545/18f. *EUPHRASIA CONFUSA* Pugsl. var. *ALBIDA* (Pugsl.) Wilmott. *102, S. Ebudes; Machrins, Isle of Colonsay, C. W. MUIRHEAD, det. E. F. WARBURG.

§548/1. *RHINANTHUS MAJOR* Ehrh. 6, N. Som.; the occurrence of this plant is shown by C. I. and N. Y. Sandwith (1950, Bristol Botany in 1949, *Proc. Bristol Nat. Soc.*, 25, 19-20) to need confirmation; three independent records are known from the Somerset peat moor, and re-examination of specimens and relevant literature has shown that all are forms of *R. minor*.

550/10. *OROBANCHE MINOR* Sm. 69b, N. Lancs.; Park Woods, Barrow, 1944, G. WARD; Ramsden Dock, Barrow, 1950, on clover, G. WILSON, comm. BARROW NAT. FIELD CLUB.

§552/3. *UTRICULARIA INTERMEDIA* Hayne. *49, Caern.; pool among *Cladium*, etc., on fen, Cors Geirch, Rhyd-y-Clafdy, T. O. PRITCHARD, and M. P. M. & P. W. RICHARDS. 97, [Argyll]; amongst *Sphagnum* by small pool near Salen, Sunart, R. MACKECHNIE and E. C. WALLACE.

558. *MENTHA*. All specimens determined or confirmed by R. A. GRAHAM.

583/3i. *MENTHA LONGIFOLIA* (L.) Huds. var. *HORRIDULA* Briq. 22, Berks.; (5) in a rough dry scrubby place, Leighton Park, Reading, J. OUNSTED. 33, E. Gos.; (2a) Corporation tip, Folly Lane, Cheltenham, 1950; (7b) sandpits, Sandy Lane, Cheltenham, C. C. TOWNSEND.

558/4. *MENTHA SPICATA* L. em. Huds. var. *ANGUSTIFOLIA* Lej. †33, E. Gos.; (7b) sandpits, Sandy Lane, Leckhampton, C. C. TOWNSEND.

558/7e. *MENTHA AQUATICA* L. var. *MAJOR* Sole. 34, W. Gos.; (3) by the River Leadon at Highleadon, C. C. TOWNSEND.

558/7×3. *MENTHA* × *PALUSTRIS* Sole. 70, Cumb.; R. Eden, Corby, below the bridge, 1949, Mrs. J. S. MUIRHEAD, comm. CARLISLE MUSEUM: I have not seen a mint like this before and the identification should be regarded as tentative; the inflorescence is spicate but the other characters are those of *M. aquatica* and it is not any form of *M. piperita*; I therefore suggest that it is a sport from *M. × palustris* tending strongly to *M. aquatica*.—R. A. GRAHAM.

558/9n. *MENTHA* × *VERTICILLATA* L. var. *RUBROHIRTA* (Lej. & Court.) Briq. 34, W. Gos.; (4) by a stream between Mitcheldean and Longhope, C. C. TOWNSEND.

558/10. *MENTHA GENTILIS* L. †17, Surrey; (8) Sanderstead, of recent appearance on a building site and probably a garden outcast, D. P. YOUNG.

560/1c. *ORIGANUM VULGARE* L. var. *ALBIFLORUM* Lej. 38, Warw.; a colony composed solely of albino plants, railway bank between Stockton and Long Itchington, D. E. ALLEN and others.

572/2. *SCUTELLARIA MINOR* Huds. 38, Warw.; Ryton Wood, one small patch, 1947, D. E. ALLEN.

573/2. *PRUNELLA LACINIATA* L. 33, E. Gos.; (7a) Stanway Ash, two patches, G. CHARTERIS, comm. W. R. PRICE.

577/5b. *STACHYS PALUSTRIS* L. var. *CANESCENS* Lge. 59, S. Lancs.; roadside, Halsall; potato-field, between Hillside and Shirdley Hill, D. E. ALLEN.

578/1. *GALEOPSIS SPECIOSA* Mill. 21, Middx.: two small plants as weeds in the garden of Tandridge, Watford Road, Northwood, R. A. GRAHAM; cult. ground, Gladwell Road, Crouch Hill, London, F. R. BROWNING.

578/4c. *GALEOPSIS ANGUSTIFOLIA* Hoffm. 39, Staffs.; stony bottom of disused limestone quarry, Sedgley, V. JACOBS and P. S. GREEN.

588/8n. *PLANTAGO LANCEOLATA* L. var. *SPHAEROSTACHYA* Roehl. 70, Cumb.; damp, rocky slope, among *Sphagnum*, 1,500 ft., Gasgale Gill, above Crummock Water, C. W. MUIRHEAD, comm. CARLISLE MUSEUM.

593/1. *HERNIARIA GLABRA* L. †21, Middx.; abundant about a car park, Kenton, 1943, A. J. Potts and subsequently D. H. Kent (1950, *Lond. Nat.*, 29, 6-7).

†596/1. *AMARANTHUS CAUDATUS* L. *33, E. Gos.; (2a) grassy lane-side, Bayshill, Cheltenham, 1950. 34, W. Gos.; Cole's boneyard tip, St. Philip's Marsh, Bristol, N. Y. SANDWITH and C. C. TOWNSEND.

†596/6b. *AMARANTHUS RETROFLEXUS* L. var. *DELILEI* Thell. 33, E. Gos.; (2a) flour mills, Tewkesbury, one or two plants, C. W. BANNISTER, det. J. P. M. BRENNAN.

†600/8k. *CHENOPODIUM ALBUM* L. var. *VIRIDE* (L.). 33, E. Gos.; Cheltenham, 1948, T. A. Sprague (1950, *Proc. Cotteswold N.F.C.*, 30, 26), as *C. viride* L. (*C. suecicum* J. Murr.).

600/12. *CHENOPODIUM FICIFOLIUM* Sm. 33, E. Gos.; (2b) waste ground by the by-pass, Gloucester, 1947, C. C. TOWNSEND, det. J. P. M. BRENNAN.

600/13. *CHENOPODIUM GLAUCUM* L. 13, W. Sussex; Patching Pond, Mrs. P. GERMAN and D. McCLINTOCK.

600/14. *CHENOPODIUM VULVARIA* L. †17, Surrey; in an allotment garden on the Housing Association for Officers' Families estate, Green Lane, Morden: apparently introduced with garden peas, R. A. GRAHAM.

600/15b. *CHENOPODIUM POLYSPERMUM* L. var. *OBTUSIFOLIUM* Gaud. 33, E. Gos.; (2b) abundant on waste ground by the by-pass, Gloucester, 1947, C. C. TOWNSEND, det. J. P. M. BRENNAN.

‡611/7. *SALICORNIA GRACILLIMA* (TOWNS.) Moss. †71, Man; near the Col. Madoc Memorial, C. I. Paton, det. A. J. Wilmott (1950, *Proc. Isle of Man N.H. and Antiq. Soc.*, 5, 56).

612/2. *SUAEDA MARITIMA* (L.) Dum. 95, Elgin; around the Findhorn Estuary, Findhorn, M. McC. WEBSTER.

†613/3. *SALSOLA PESTIFERA* A. Nels. 58, Ches.; Bidston Docks, Birkenhead, D. P. YOUNG.

615/1. *POLYGONUM DUMETORUM* L. 24, Bucks.; hedge by lane near Hedgerley, west of Gerrards Cross, J. OUNSTED.

‡615/3. *POLYGONUM BISTORTA* L. *96, Easternness; "locally common in Inverness," K. N. G. MACLEAY: seen in pasture by railway, Kintraig, 1951, R. MACKÉCHNIE and E. C. WALLACE.

†615/15(2). *POLYGONUM MICROSPERMUM* Jord. 33, E. Glos.; (2a) on cinder path, Cheltenham Gas Works, C. C. TOWNSEND, det. J. E. LOUSLEY.

†615/31. *POLYGONUM POLYSTACHYUM* Wall. ex Meisn. 33, E. Glos.; (7b) roadside between Birdlip and Air Balloon: 36, Heref.; established by the Wye at Hereford in company with *Impatiens glandulifera* Royle, C. C. TOWNSEND.

†615/32. *POLYGONUM CUSPIDATUM* Sieb. et Zucc. 34, W. Glos.; (3) Newent Station, C. C. TOWNSEND.

†618/5. *RUMEX ALPINUS* L. 95, Elgin; near a cottage above Burgie House, near Forres, M. McC. WEBSTER, det. J. E. LOUSLEY.

†618/20(2). *RUMEX GRAECUS* Boiss. & Heldr. 22, Berks.; (4) plentifully established on wet waste ground by the R. Kennet, Reading, 1948, J. OUNSTED, det. J. E. LOUSLEY.

‡628/2. *EUPHORBIA DULCIS* L. *89, E. Perth; near Stormont Lodge, Blairgowrie, Miss G. ZINCK, comm. A. W. ROBSON.

‡628/11. *EUPHORBIA CYPARISSIAS* L. *†38, Warw.; railway bank near the Rainsbrook, Rugby, 1946, H. J. M. BOWEN, det. T. G. B. OSBORN, comm. D. E. ALLEN.

†636/1. *FIGUS CARICA* Linn. 33, E. Glos.; (2a) one plant at the sewage works, Lower Lade, Tewkesbury, 1949, C. C. TOWNSEND.

650/8×12. *SALIX* × *LATIFOLIA* Forbes. 104, N. Ebudes; burn above the Manse, Isle of Eigg, C. W. MUIRHEAD, det. R. MELVILLE, comm. CARLISLE MUSEUM.

‡655/1. *STRATIOTES ALOIDES* L. *†13, W. Sussex; Warnham Pond, near Horsham, Mrs. C. ESPLAN; Knepp Mill Pond, D. McCLINTOCK.

‡656/1. *ELODEA CANADENSIS* Michx. *98, Argyll; Loch Awe, and several lochans near, 1940, K. N. G. MACLEAY.

‡662/1. *NEOTTIA NIDUS-AVIS* (L.) L. C. Rich. *97, Westernness; in hazel copse, Glen Righ, Onich, R. MACKECHNIE and E. C. WALLACE.

‡667/3. *CEPHALANTHERA LONGIFOLIA* (L.) Fritsch. 98, Argyll; on a rocky bank in a small beech wood, Dalnasheen, near Port Appin, a colony of over fifty plants in flower, F. A. SOWTER. *104, N. Ebudes; amongst grass in wooded ravine of a burn near Ardvasar, Armadale, Skye, Miss V. OATES, comm. V. S. SUMMERHAYES.

668/3(2). *EPIPACTIS DUNENSIS* (T. & T. A. Steph.) Godf. 59, S. Lancs.; a strong colony in the back-garden of the Ministry of National Insurance, Birkdale; very scattered on the Birkdale dunes, occurring in "slacks," dwarf willow undergrowth and bare sandy slopes, usually singly, D. E. ALLEN.

§668/3(4). *EPIPACTIS PENDULA* C. Thomas. 33, E. Gos.; (7b) Mr. Thomas has identified the plant recorded in *Flora of Gloucestershire* from "near Birdlip" under name *E. vectensis* as *E. pendula*; *E. vectensis* now appears not to be a Gloucestershire plant, W. R. PRICE.

669/9. *ORCHIS PURPURELLA* T. & T. A. Steph. 100, Arran; damp ground just above high water mark, Blackwater Foot, J. N. MILLS.

669/10×674(1)/1. *GYMNADENIA CONOPSEA* (L.) R.Br. × *ORCHIS ERICETORUM* (E. F. Lint.) E. S. Marshall. 100, Arran; damp meadow, with abundance of both parents, Whiting Bay; somewhat resembling Godfery's description of ×*Orchigymnadenia souppensis* except for deeper colour of perianth, J. N. MILLS.

669/18. *HIMANTOGLOSSUM HIRCINUM* (L.) Spreng. 13, W. Sussex; Arundel Park, spike picked and brought to Mrs. C. ESPLAN.

§671/1. *ACERAS ANTHROPOPHORUM* (L.) Sm. 11, S. Hants.; Old Winchester Hill, C. W. MUSGROVE-BURTON: 18, S. Essex; chalk pit near Grays, 1949, B. T. WARD; not therefore extinct in S. Essex as stated in 1934, *Rep. Bot. Soc. & E.C.*, 10, 676, 680.

672/3. *OPHRYS APIFERA* Huds. 39, Staffs.; slope of disused limestone quarry, Mons Hill, Coseley, one plant only, V. JACOBS and P. S. GREEN.

§†678/1. *CROCUS NUDIFLORUS* Sm. The distribution as shown in *C.F.* can be corrected and brought up to date from Crump & Sledge (1950, *The History and Distribution of the Autumn Crocus in England, The Naturalist*, 1950, 133-141): 13, 37, 38, 39, 40, 54, 56-60, 63, 69, 72.

*†680/1. *SISYRINCHIUM ANGUSTIFOLIUM* Mill. *44, Carm.; Towyn Burrows, P. W. T. HENRY, comm. NAT. MUS. WALES.

684/1. *NARCISSUS PSEUDO-NARCISSUS* L. †98, Argyll; Eilean an t-sagart, Inishail, and other islands in Loch Awe, possibly planted but obviously naturalised now, 1940, K. N. G. MACLEAY.

§686/1. *LEUCOJUM VERNUM* L. (41, Glam.; delete the record given in 1926, *Rep. Bot. Soc. & E.C.*, 7, 898, from Caswell, which was an error for the next species.)—A. E. WADE.

§686/2. *LEUCOJUM AESTIVUM* L. *41, Glam.; Caswell Cwm, 1940, J. A. WEBB, comm. NAT. MUS. WALES.

§694/1. *CONVALLARIA MAJALIS* L. 49, Caern.; limestone pavement near Pabo, the comparatively narrow-leaved wild plant, not near houses and among typical limestone pavement flora; not, therefore, introduced in this v.-c. as stated in Hyde & Wade, 1934, *Welsh Flowering Plants*; P. W. RICHARDS. 70, Cumb.; in a wood near Castle Carrock, on limestone, evidently native, 1946, Miss HELEN OLIPHANT, comm. CARLISLE MUSEUM.

§716/1. *PARIS QUADRIFOLIA* L. *44, Carm.; Blaen-gaen, Crwbin, Miss E. M. EVANS, comm. NAT. MUS. WALES.

§718/16. *JUNCUS TENUIS* Willd. *55, Leics.; dried up bed of Thornton Reservoir, E. K. HORWOOD, comm. T. G. TUTIN. †62, N.E. York; Strensall Common, 1949, R. Lewis (1950, *The Naturalist*, 1950, 34). †72, Dumf.; Penton Lynns, 1949, R. D. Graham (see *Year Book*, 1951, 50).

718/20. *JUNCUS CASTANEUS* Sm. 97, Westernness; North-west side of Sgurr-na-Ciche, J. E. RAVEN and C. D. PIGOTT.

719/2×3. *LUZULA* × *BORRERI* Bromf. ex Bab. 14, E. Sussex; Park Wood, Hellingly, 1949, D. P. YOUNG.

§727/4. *LEMNA GIBBA* L. †70, Cumb.; Fleswick Bay, 1949, N. D. Simpson (see *Year Book*, 1951, 49).

§729/1. *ALISMA PLANTAGO-AQUATICA* L. *97, Westernness; lochan near Loch Oich, 1949, K. N. G. MACLEAY.

729/1b. *ALISMA LANCEOLATUM* With. 33, E. Glos.; (2a) the commoner species round Natton, Northway and Newtown, Tewkesbury, often in company with *A. Plantago-aquatica* L., C. W. BANNISTER.

733/1. *DAMASONIUM ALISMA* Mill. 24, Bucks.; (1) a single plant in a pond near Burnham Beeches, J. OUNSTED and P. NEWEY; (2) plentiful in a pond near Chalfont St. Peter, J. OUNSTED.

738/2. *RUPPIA ROSTELLATA* Koch. 95, Elgin; brackish ditches on the Findhorn Estuary, Findhorn, M. McC. WEBSTER, det. J. E. LOUSLEY.

§745/2. *ELEOCHARIS UNIGLUMIS* (Link) Schultes. *7, [Glos.]; Jennings Moor, Poole Keynes, C. C. TOWNSEND, det. S. M. WALTERS.

746/13. *SCIRPUS FLUITANS* L. 97, [Argyll]; in the Dig Bhan, Arevegaig, Kentra Bay, R. MACKECHNIE and E. C. WALLACE.

747/1. *ERIPHORUM LATIFOLIUM* Hoppe. 97, [Argyll]; bogs by road east of Beinn an Leathaid, Ardnamurchan, E. C. WALLACE.

753/6. *CAREX SAXATILIS* L. 97, Westernness; South-east side of Sgurr-na-Ciche, M. E. D. POORE and J. E. RAVEN.

753/9. *CAREX HIRTA* L. 21, Middx.; bombed site north of Fleet Street, E. C. WALLACE.

753/10. *CAREX PENDULA* L. 21, Middx.; on bombed site, Hart Street, City of London, 1949, Mrs. B. Welch and D. H. Kent (1950, *Lond. Nat.*, 29, 14).

753/12. *CAREX STRIGOSA* Huds. 36, Heref.; near Stifford's Bridge, Cradley, F. M. DAY, det. E. NELMES.

753/13. *CAREX LAEVIGATA* Sm. 3, S. Devon; (5n) Yarcombe, in marsh near Knightshayne Farm, 690 ft., 1949, E. MILNE-REDHEAD, det. E. NELMES.

§753/20(2). *CAREX DEMISSA* Hornem. *4, N. Devon; bog by Badgeworthy Water, Doone Valley, C. C. TOWNSEND, confirmed by E. NELMES.

§753/21. *CAREX LEPIDOCARPA* Tausch. 7, N. Wilts.; boggy ground near Poole Keynes, C. C. TOWNSEND, confirmed by E. NELMES: †16, W. Kent; Holwood Park, Keston, 1948, F. Rose (1950, *Lond. Nat.*, 29, 19).

753/28. *CAREX CARYOPHYLLEA* Latourr. 97, [Argyll]; grassy slopes by shore, Swordle, Ardnamurchan, E. C. WALLACE.

753/41. *CAREX ATRATA* L. 96, Easternness; steep sloping ledges on cliffs of mica schist above Glen Feshie, C. D. PIGOTT.

§753/61. *CAREX PAIRAEI* F. Schultz. *38, Warw.; Brandon Warren, near Rugby, P. S. GREEN, det. E. NELMES.

753/62. *CAREX DIVULSA* Stokes. 4, N. Devon; Lyn Valley, Lynmouth, C. C. TOWNSEND, confirmed by E. NELMES. 36, Heref.; by the west bank of the Wye, Symonds Yat, C. C. TOWNSEND, confirmed by E. NELMES.

†754/5. *PANICUM LAEVIFOLIUM* Hack. 17, Surrey; West End Common, Esher, 1949, R. A. BONIFACE.

†754/8. *ECHINOCHLOA CRUS-GALI* (L.) Beauv. 17, Surrey; (8) waste ground by corn-mill, casual, Croydon, no date (c. 1910), H. F. PARSONS; specimen in Herb. Parsons, Croydon, det: C. E. HUBBARD, comm. D. P. YOUNG.

§758/3. *SPARTINA TOWNSENDII* H. & J. Groves. **4, N. Devon, foreshore at Instow, opposite Appledore, E. C. WALLACE: †*45, Pemb.; Pembroke Docks, 1950, STANLEY NEALE, comm. NAT. MUS. WALES.

†765/6. *PHALARIS BRACHYSTACHYS* Link. 34, W. Glos.; (2b) Sharpness Docks, two or three plants, C. W. BANNISTER, det. C. E. HUBBARD.

§770/6. *ALOPECURUS AEQUALIS* Sobol. *35, Mon.; a form with pale-yellow anthers, large pond near Pen-bergwym Station, 1929, R. WINDSOR RICHARDS, comm. NAT. MUS. WALES.

§775/1. *MILIUM EFFUSUM* L. *97, [Argyll]; ravine of Resipol burn, Sunart, R. MACKECHNIE.

783/2. *CALAMAGROSTIS CANESCENS* (Weber) Roth. 62, N.E. York; abundant, Pretty Wood, Wellburn, C. M. ROB and E. C. WALLACE.

§783/4. *DEYEUXIA NEGLECTA* (Ehrh.) Kunth. ‡64, Mid W. York; Tarn Moss, Malham, 1949, D. Coombe and E. J. Douglas (1949, *The Naturalist*, 1949, 155).

784/1. *GASTRIDIVM VENTRICOSUM* (Gouan) Schinz & Thell. 18, S. Essex; grassy slopes on clay soil, west of Hadleigh Castle, E. C. WALLACE.

§788/1. *LAGURUS OVATUS* L. ‡11, S. Hants.; Stanpit, Miss K. Gorringe (E. Chambers, 1950, *Proc. Bournemouth N. Sci. Soc.*, 49, 73).

791/4b. *DESCHAMPSIA FLEXUOSA* (L.) Trin. var. *MONTANA* (L.) Hook. f. 70, Cumb.; crags on the south side of Hobcarton, C. W. MUIRHEAD, comm. CARLISLE MUSEUM.

†794/6. *AVENA STRIGOSA* Schreb. 71, Man; near Derby Castle, 1915, Holt (C. I. Paton, 1950, *Proc. Isle of Man N.H. & Antiq. Soc.*, 5, 57).

795/1b. *ARRHENATHERUM ELATIUS* (L.) Beauv. ex J. & C. Presl var. *BIARISTATUM* (Peterm.) Dr. 37, Wores.; Droitwich Canal, 1950, F. M. DAY, det. C. E. HUBBARD.

§822/2. *BRIZA MINOR* L. *+14, E. Sussex; two plants in Kemp Town Station yard, Brighton, D. McCLINTOCK.

§825/3(2). *GLYCERIA DECLINATA* Bréb. *70, Cumb.; coast between Ravenglass and Eskmeals, J. D. HINDE and C. W. MUIRHEAD, comm. CARLISLE MUSEUM.

825(2)/2. *PUCCINELLIA DISTANS* (L.) Parl. 21, Middx.; marshy field near Yeading, 1949, R. A. Boniface (1950, *Lond. Nat.*, 29, 13).

825(2)/4. *PUCCINELLIA PSEUDO-DISTANS* (Crép.) Jansen & Wachter. 16, W. Kent; Stone Marshes, 1947, J. A. Whellan and J. E. Lousley, det. P. Jansen (1950, *Lond. Nat.*, 29, 8).

§827/6. *BROMUS RAMOSUS* Huds. *97, [Argyll]; margin of copse by road, Ardsignish, Ardnamurchan, E. C. WALLACE.

†827/16b. *BROMUS SECALINUS* L. var. *HIRTUS* (F. Sch.) Hegi. 17, Surrey; (7) in corn, Woodcote Park, Epsom, 1949, D. P. YOUNG, det. C. E. HUBBARD.

†827/19(2). *BROMUS LEPIDUS* Holmb. H5, E. Cork; Youghal Bridge, by roadside with other agricultural aliens, D. P. YOUNG, det. C. E. HUBBARD.

827/19(3). *BROMUS THOMINII* Hard. 38, Warw.; border of field near Southam Holt, D. E. ALLEN, confirmed by T. G. TUTIN.

844/2×5. *EQUISETUM* × *LITORALE* Kühlew. 6, N. Som.; Shipham Bottom, in some quantity, and variable, 1940, 1949, J. P. M. Brennan (C. I. & N. Y. Sandwith, 1950, Bristol Botany in 1949, *Proc. Brist. Nat. Soc.*, 28, 21).

845/1. *CRYPTOGRAMMA CRISPA* (L.) Hook. & Bauer. 105, W. Ross; cliffs above Loch a' Ghlastuill on Liathach, C. D. PIGOTT.

§851/4. *ASPLENIUM OBOVATUM* Viv. *101, Cantyre; crevices of basalt dyke on sea-shore, Kintyre, M. H. CUNNINGHAM, comm. A. H. G. ALSTON.

§854/1. *POLYSTICHUM SETIFERUM* (Forsk.) Woynar. †85, Fife; near St. Andrews, 1936, 1938, K. N. G. MACLEAY; but see W. Young, 1936, *List of Fl. Plants and Ferns, Fife and Kinross*, 168, for previous records.

856/5. *DRYOPTERIS AEMULA* (Ait.) O. Kuntze. 97, Westernness; fine and abundant, rocky wooded shore of Loch Moidart, Dorlin, R. MACKECHNIE and E. C. WALLACE.

858/1. *POLYPODIUM VULGARE* L. 59, S. Lancs.; scattered in small patches for many miles over the coastal sand-dunes, and apparently spreading (cf. 1948, *Rep. Bot. Soc. & E.C.*, 13, 322), D. E. ALLEN.

864/1. *OSMUNDA REGALIS* L. 105, W. Ross; cliffs of Torridonian felspathic sandstone in a ravine by Upper Loch Torridon, C. D. PIGOTT.

870/4. *LYCOPODIUM ANNOTINUM* L. 105, W. Ross; growing in Callunetum on the lower slopes (1,600 ft.) of Maol Chean-dearg near Beinn Damh, C. D. PIGOTT.

870/5. *LYCOPODIUM CLAVATUM* L. 17, Surrey; a good patch on Walton Heath, shown by Miss J. P. PUGH to Mrs. B. WELCH; the second record in Surrey during recent years, E.C.W.

CHAROPHYTA: All specimens det. G. O. ALLEN.

§872/2. *NITELLA OPACA* Ag. 15, E. Kent; a sterile clump in North Stream, Worth Minnis, near Sandwich, L. W. WILSON and G. O. ALLEN: *71, Man; R. Greeba, W. of Crosby, E. MILNE-REDHEAD.

§872/2c. *NITELLA OPACA* Ag. var. *BRACHYCLEMA* Gr. & B.-W. *H.39, Antrim; Lough Fad, Garron plateau, 1949, R. D. MEIKLE.

§872/3. *NITELLA FLEXILIS* Ag. *50, Denb.; Chirk near Wrexham, growing freely in trout ponds, D. F. LENEY.

872/5. *NITELLA TRANSLUCENS* Ag. 17, Surrey; Blackwater Lake near Waverley Abbey, D. F. LENEY, comm. G. O. ALLEN.

§872/6b. *NITELLA MUCRONATA* Miq. var. *HETEROMORPHA* Kuetz. *13, W. Sussex; Amberley Wild Brooks, L. C. LYON and G. O. ALLEN.

872/8. *NITELLA TENUISSIMA* Kuetz. 28, W. Norf.; Foulden Common near Stoke Ferry, G. H. ROCKE, comm. C. WEST.

§876/3b. *CHARA VULGARIS* L. var. *LONGIBRACTEATA* Kuetz. *71, Man; in shallow sub-maritime pools at Scarlet, P. S. GREEN.

§876/3c. *CHARA VULGARIS* L. var. *PAPILLATA* Wallr. 6, N. Som.; for earlier records than that in 1950, *Watsonia*, 1, 262, see J. W. White, 1912, *Flora of Bristol*, 694. 54, N. Lines.; River Eau at Withern near Louth, D. F. LENEY, comm. G. O. ALLEN: *H.33, Ferm.; Knockballymore Lough near Magheraveely, R. D. MEIKLE.

876/3e. *CHARA VULGARIS* L. var. *CRASSICAULIS* Kuetz. 62, N.E. York; Keld Head, Pickering, C. M. ROB.

876/4. *CHARA RUDIS* (Br.) Leonh. H.33, Ferm.; Knockballymore Lough near Magheraveely, R. D. MEIKLE.

§876/7b. *CHARA CONTRARIA* Kuetz. var. *HISPIDULA* Br. *15, E. Kent; in quantity in ditch on Birchington Marshes, G. O. ALLEN.

§876/11. *CHARA ACULEOLATA* Kuetz. *15, E. Kent; Worth Minnis near Sandwich, L. W. WILSON and G. O. ALLEN.

876/13. *CHARA DESMACANTHA* Gr. & B.-W. 28, W. Norf.; Foulden Common near Stoke Ferry, C. WEST; 98, Argyll; Loch Balnagowan, Lismore, 1949, E. C. WALLACE.

876/17c. *CHARA DELICATULA* Ag. var. *ANNULATA* (Wallr.) Gr. & B.-W. 104, N. Ebudes; in slow running stream, Skye, J. L. LYON, comm. G. O. ALLEN.

REVIEWS

British Stoneworts (Charophyta). G. O. ALLEN, M.A., F.L.S. Pp. 52, with 18 text-figures. Published by the Haslemere Natural History Society, Haslemere Educational Museum, Surrey, 1950, price 6/-, by post 6/9; [8½" × 5½"; boards].

The charophytes are one of the most fascinating groups of green algae, but those in this country who have wished to take up their study for the first time cannot have found the way very easy. Among our standard botanical textbooks, they are unmentioned in Hooker's *Students' Flora*, Bentham and Hooker's *Handbook*, and Hayward's *Botanists' Pocket Book*; only Babington's *Manual* describes them with arid and uninviting brevity, and as far as the natural order is concerned so archaically as to be grossly misleading. The student's only recourse has been Groves and Bullock-Webster's two magnificent volumes on the *British Charophyta*, published by the Ray Society in 1920 and 1924, now too expensive for many pockets.

The concise little book here reviewed, written by our leading expert on charophytes, should be read by all interested in them and should give a welcome stimulus to more botanists to study them seriously. Mr. Allen's book is far from being a mere *précis* of Groves and Bullock-Webster's great work, although inevitably, as the author admits, following in the steps laid down by them.

There is a fairly lengthy introductory part about what charophytes are, how and where they grow, and how they are constructed. Those paragraphs on the ways of examining a specimen and mounting charophytes on slides contain matter that may be new and commendable even to old hands at this group. There then follow a list, keys and descriptions; they are concise and simple and unmistakably the product of close and intimate knowledge. A sprinkling of text-figures is adequate to show the main structural points; for plates showing the habit of the various species the student will have to go to Groves and Bullock-Webster.

Mr. Allen's easy and readable style does not conceal his great enthusiasm for his chosen group. The printing has that clarity and freedom from mistakes that we have come to associate with Buncle & Co.

I hope that this little book will entice others to share those exciting times when, up to your knees in the limpid waters of lough or lake, you wonder what harvest the next throw of the drag will bring.

J. P. M. BRENNAN.

List of Pembrokeshire Plants. F. Lillian Rees. Pp. 53. Published by the Tenby Museum and the West Wales Field Society, 1950. [Not priced.]

As members will have read in the *Year Book* a limited number of copies of this booklet have been made available gratis to members applying to the Tenby Museum. It is essentially a list of plants observed in the county over a period of years, mostly near Tenby or in other parts of the southern half of the county. Sedges and grasses are included and treated comparably with other families, but no ferns, horse-tails or stoneworts are listed. The absence of ferns may be a disappointment to some visitors to the county using the book, but they will find it useful in other ways.

Localities are given for all but the supposedly common species. Many such are listed with no comment, a failing noticed in other works of this type. The "common" plants are, when carefully looked for, frequently found, in some counties at least, to be far from ubiquitous and often inexplicably absent from apparently favourable areas. The nomenclature has been brought up to date by Messrs. Hyde and Wade: so often local publications are marred by adherence to that of the *London Catalogue*.

There has just been published in the *North Western Naturalist*, 23, 88-95 (1951), a paper entitled "Notes on the Flora of Pembrokeshire," extracted from the Pembrokeshire Journals of the late Bertram Lloyd, and edited by his wife. Some records by Mr. Lloyd are included in Mrs. Lees' list.

The records in this paper are spread over the last 20 years and a wider area of the county, and link up with, and form a supplement to, those of Mrs. Lees' list. There are, however, no grasses and only one sedge (*Cladium*), but three ferns. Together, these lists form a useful addition to our knowledge of the Pembrokeshire flora and provide recent evidence concerning many species in the county not of a critical nature.

E. C. WALLACE.

An Introduction to Historical Plant Geography. E. V. WULFF, trans. E. Brissenden. Pp. xv + 223, 35 text-figures. Waltham, Mass., U.S.A. The Chronica Botanica Co.; London, W.C.2, Wm. Dawson & Sons, Ltd. Reprinted 1950.

In 1943 *Chronica Botanica* first published this authorised translation of the late E. V. Wulff's Russian handbook *Introduction to the Historical Geography of Plants*, which was to be the first part of a projected three volume work. The publishers state that the exigencies of war-time restricted this first printing, which was sold out within two years. This reprint is welcome, therefore, as making Wulff's work available to a much wider botanical public.

Wulff, who was Curator of the Herbarium in the Dept. of Geography of Cultivated Plants in Leningrad, was killed in that city on the 21st December 1941 during an air raid; it is a pathetic commentary on the effects of war that Merrill's foreword to the book, dated Christmas 1942, can make no reference to Wulff's death, which was presumably unknown until much later. The projected second volume, referred to by Merrill, was in fact published three years after Wulff's death by the U.S.S.R. Academy of Sciences; it is entitled (in Russian) *Historical Geography of Plants*, and contains 544 pages, including an obituary of the author by S. J. Lipschitz. So far as I am aware, this interesting work has received no review in Western botanical literature; it would well repay study by those botanists to whom the Russian language is no barrier. The projected third volume was apparently never published, and in all probability Wulff was unable to complete it.

A statement by Raup of the Arnold Arboretum, which follows Merrill's foreword, makes the point that the chief value of this work to the plant geographer lies in 'the analysis and discussion of a large amount of Continental, especially Russian, literature which would not otherwise be readily available.' With this opinion I would readily agree.

The plan of the book is simple. First the scope and aim of the study of historical plant geography are defined; then follows a useful chapter on the history of the study, and then several chapters dealing with the concept of areas and definitions of types of areas (relict, endemic, etc.). Chapter 6 is interesting and on rather unfamiliar ground—it deals with parallelism between zoological and botanical distribution phenomena, and quotes interesting work on the distributions of hosts and parasites. The later chapters consider dispersal, by natural and human agencies: the migration of species and floras; and the Wegener theory of Continental Drift, which Wulff strongly supports in a useful statement of the case for and against the hypothesis.

As Raup points out, Wulff's work takes understandably little account of published American work in the various fields; and this is perhaps most obvious in his discussion of the problems of 'origin of areas'; it is here instructive to compare Wulff's approach, which is the classical one, with the newer view as set out, for example, by Cain (1944, *Foundations of Plant Geography*) who is fully aware of the importance of cytogenetic population studies in the elucidation of the problems of speciation. In some other modern fields, where the American contribution is less important, Wulff's treatment is also inadequate; thus his rather brief mention of peat stratigraphy and pollen analysis (which after all provide the only *direct* evidence of recent vegetation change) is obviously insufficient, though understandable in the absence of any major Russian contribution in this field.

The emphasis throughout the work is on the interpretation of present distribution in terms of history of change. It would seem that Wulff was not clear that any interpretation of present-day distribu-

tions *must* have both a historical and an ecological side, and that the two types of interpretation are *not* alternatives (cf. his remarks on the interpretation of local endemics, p. 62). In this confusion of thought, of course, he is not alone; for it has been present through much discussion of disjunct distribution phenomena in the British flora.

In spite of these limitations and shortcomings the book is of very great value, not only for its lucid presentation of the classical interpretations, but also for its refreshingly different emphasis. It is good for those of us who are concerned with the British flora to be reminded that it, and indeed the whole flora of N.W. Europe, is a depauperate migratory flora, or fragments of several, for the most part of very recent spread.

S. M. WALTERS.

Flowers of the Meadow. Geoffrey Grigson. Pp. 36, 24 coloured plates by Robin Tanner. Harmondsworth, Middlesex: The King Penguin Books, 1950; 3/- net.

Mr. Grigson for the purpose of his essay defines meadow as "a place where there is, or where there should be, more grass than anything else"; therefore, in addition to the flowers of our meadows in the strict sense, those of pastures, rough grazings and water-meadows come under review.

After briefly discussing the origin of meadow and pasture, the author goes on to deal with a variety of topics ranging from distribution and ecology to pollination and the scent of flowers. The inclusion of *Cichorium Intybus*, *Ajuga reptans* and *Onobrychis viciifolia* is a little surprising, and they might well have been excluded in favour of other more typical meadow flowers. Grasses are not included.

The illustrations are, on the whole, good, although in the case of the eyebright truth has to some extent been sacrificed to decorative effect. The colour rendering of a few flowers leaves something to be desired and in the case of the Meadow Cranesbill is quite incorrect and gives no idea of their rich purplish-blue hue.

This little book, by one of our most versatile authors, is a worthy addition to an admirable series of picture books and is recommended as an ideal gift book for the country lover.

A. E. WADE.

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A Magazine of Natural History

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Edited by
E. F. WARBURG, M.A., Ph.D.



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IRISH PLANT RECORDS

By D. A. WEBB.

This paper is an attempt to correct and to supplement the information given in Druce's *Comital Flora of the British Isles* on the distribution of the vascular plants in Ireland.

The records of the detailed geographical distribution of vascular plants in Ireland have been, for the most part, published in Irish journals. This is both natural and desirable; but it is equally desirable that, in view of the obvious unity of the British Isles as a floristic region, these Irish records should be readily accessible to British botanists if the latter are to form a sound judgment as to the significance of the records for Great Britain. The efficacy of the Irish Sea as a barrier to plant migration is the subject of some controversy; but its efficacy as a barrier to the migration of botanists and of information is unfortunately all too obvious. Ireland has always been the stepchild of the B.E.C. and the B.S.B.I., and it is remarkable how many botanists, resident in southern England, have an intimate acquaintance with much of the Scottish highlands and islands but have never made the shorter journey to Ireland. It is mainly, I believe, for this reason that details of Irish distribution cited in British journals are often incorrect or out of date.

It was unfortunate that the *Comital Flora* should have been published before, instead of after, Praeger's *The Botanist in Ireland*, since it means that the Irish records in the former work suffer (apart from very numerous misprints and omissions of published records) from the lack of a substantial body of information published by Praeger in 1934. *The Botanist in Ireland* is fairly well known in Britain, but it is now out of print and it never achieved as wide a circulation as the *Comital Flora*. Furthermore, it seems to be known by relatively few British workers that Praeger has, since 1934, published two substantial lists of addenda and corrigenda (1939 and 1946), and that since the appearance of the last of these a fair number of new records have appeared in print.

It seemed to me, therefore, that there was need of a general summary for the benefit of British readers of the development of our knowledge of plant-distribution in Ireland over the last 25 years. I have accordingly prepared the list that follows in the form of a series of corrections to the *Comital Flora*, since that will be the primary source of information most readily accessible to readers of this journal. In accordance with this form I have (with a very few exceptions) omitted from my list those plants (mostly recent introductions or critical segregates) whose distribution the *Comital Flora* does not purport to show. I have followed the Ecological Society's *Check-list* for nomenclature except in a

few cases, but in all cases in which Druce uses a different name I have added this in parentheses for ease of reference. In general I have limited myself to correcting such entries in the *Comital Flora* as are, in the light of our knowledge to-day, quite definitely defective, erroneous or misleading. Into the more debatable ground of native or alien status, survival or extinction, status as casual, planted or established exotic, and so on, I have not entered and I have purported to deal only with such aliens as are thoroughly established in wild situations and merit a place in the Irish Flora by the standards used by Praeger in his *Botanist in Ireland*. Records for hybrids have been included only if the parent species were not hitherto recorded from the division in question.

No attempt is made to give a full authority for every correction here published, as in some cases (especially the deletions) the citation of the composite evidence would occupy too much space. But for nearly all the additions (other than those due to misprints), and for some of the other corrections, a reference has been given to the most readily accessible source (not always the earliest) in which further information can be found.

ABBREVIATIONS.

- P1. Praeger, R. Ll., 1906, Irish Topographical Botany: Supplement 1901-1905, *Proc. R. Irish Acad.*, **26**, B, 13-45.
- P2. Praeger, R. Ll., 1929, Report on recent additions to the Irish Fauna and Flora: Phanerogamia and Cryptogamia Vascularia, *Proc. R. Irish Acad.*, **39**, B, 57-78.
- P3. Praeger, R. Ll., 1934, A contribution to the Flora of Ireland, *Proc. R. Irish Acad.*, **42**, B, 55-86.
- P4. Praeger, R. Ll., 1939, A further contribution to the Flora of Ireland, *Proc. R. Irish Acad.*, **45**, B, 231-254.
- P5. Praeger, R. Ll., 1946, Additions to the knowledge of the Irish Flora, 1939-1945, *Proc. R. Irish Acad.*, **51**, B, 27-51.
- B. in I. Praeger, R. Ll., 1934, *The Botanist in Ireland*, Dublin.
- B.E.C. *Reports of the Botanical Society and Exchange Club*.
- C.H. More, A. G., and others, 1898, *Cybele Hibernica*, ed. 2, Dublin.
- FK. Scully, R. W., 1916, *Flora of County Kerry*, Dublin.
- FNE. Stewart, S. A., & Corry, T. H., 1938, *Flora of the North-East of Ireland*, ed. 2, revised by Praeger and others, Belfast.
- FW. Bruncker, J. P., 1951, *Flora of County Wicklow*, Dundalk.
- I.N.J. *Irish Naturalist's Journal*.
- ITB. Praeger, R. Ll., 1901, Irish Topographical Botany, *Proc. R. Irish Acad.*, **7**, 1-410.

CLEMATIS VITALBA L. Add (within brackets) 3, 7 (P3); 11, 13 (P5); 17, 36, 39 (P4).

THALICTRUM ARENARIUM Butch. (*T. marinum* Dr.). Add 40 (P5).

THALICTRUM ALPINUM L. Add 39 (I.N.J., 9, 322).

- THALICTRUM FLAVUM L. Delete 16 (P1). Add 17 (P1); 30 (P4); 38 (P5).
 ANEMONE NEMOROSA L. Add 22 (P1).
 RANUNCULUS CIRCINATUS Sibth. Add 18 (P3); 40 (P4).
 RANUNCULUS TRICHOPHYLLUS Chaix. Add 20 (FW).
 RANUNCULUS HETEROPHYLLUS Weber. Add 18 (P3); 20 (FW); 40 (P4).
 RANUNCULUS RADIANUS Rével. Not discriminated in Irish records; the whole entry must be considered doubtful.
 RANUNCULUS PELTATUS Schrank. Add 19 (P3).
 RANUNCULUS PSEUDO-FLUITANS (Syme) Baker & Fogg. Add 26, 27, 35 (P3).
 RANUNCULUS BAUDOTII Godr. Add 22 (P3).
 RANUNCULUS TRIPARTITUS DC. For Cork read West Cork (3).
 RANUNCULUS LUTARIUS (Revel) Bouv. For Cork read West Cork (3).
 RANUNCULUS SCELERATUS L. Add 26, 29 (P3); 30 (P4).
 RANUNCULUS LINGUA L. Add 18, 28, 36 (P5).
 RANUNCULUS AURICOMUS L. Add 24, 34 (P3); 1 (I.N.J., 10, 80).
 RANUNCULUS PARVIFLORUS L. Delete 39.
 TROLLIUS EUROPAEUS L. For 32 read 33. Add 29 (I.N.J., 9, 312).
 AQUILEGIA VULGARIS L. Add 36 (P4).
 NUPHAR LUTEA (L.) Sm. (*Nymphaea lutea* L.). Delete 20 (P4).
 NYMPHAEA ALBA L. (*Castalia alba* (L.) Wood). Not native in 12, 13, 21; these records should stand in brackets. The record of "Galway" for var. *occidentalis* Ostenf. (= *N. occidentalis* (Ostenf.) Moss) should read W. Galway (16).
 PAPAVER DUBIUM L. (*sensu stricto*). No records yet available for 4, 5, 7, 12, 15, 17-19, 23-26, 28, 29, 31-37, though the species probably occurs in most of these divisions.
 PAPAVER LECOQII Lamotte. Add 2, 3, 5, 8, 9, 11, 12, 14, 17-20, 22, 25, 28, 31, 38, 40 (P3); 15, 30 (P4); 37 (P5).
 PAPAVER ARGEMONE L. Delete 1, 2, and for 27-31 read 27, 31. Add 12, 13 (ITB).
 PAPAVER HYBRIDUM L. The record for 4 is very doubtful.
 MECONOPSIS CAMBRICA (L.) Vig. Add 7 (P5); 29 (P3). Not native in 36 (P5).
 FUMARIA CAPREOLATA L. Add 29 (P3).
 FUMARIA PURPUREA Pugsf. Add 34, 40 (P4). Not native to Ireland.
 FUMARIA BASTARDII Bor. Delete 7, 11 (P1); also 14. Add 35 (P5).
 FUMARIA MURALIS Koch agg. (incl. *F. Boraei* Jord.). Delete all records under *F. muralis* Sonder. Under *F. Boraei* Jord., delete 17, 18, 24, 25, 28 (P1). Add 1 (FK); 3 (*Watsonia* 1, 360); 40 (FNE).
 FUMARIA MICRANTHA Lag. Add 38-40 (FNE and P5).
 FUMARIA OFFICINALIS L. Delete 13 (P1). Add 32 (P5); 33 (I.N.J., 9, 225).
 MATTHIOLA SINUATA (L.) R.Br. Delete 3, 5. Add [2] (extinct), 9, 12.
 CHEIRANTHUS CHEIRI L. For 13-20 read 13-17, 19-23. Add 1 (FK); 12 (P3).

- RORIPPA SYLVESTRIS (L.) Bess. (*Radicula sylvestris* (L.) Dr.). Add 13 (P5); 37 (P3).
- RORIPPA ISLANDICA (Oeder) Borb. (*Radicula islandica* (Oeder) Dr.). Add 1 (FK); 34 (P3).
- RORIPPA AMPHIBIA (L.) Bess. (*Radicula amphibia* (L.) Dr.). Add 21 (I.N.J., 10, 81); 32 (? hybrid; Proc. R. Irish Acad., 52 B, 61).
- BARBAREA INTERMEDIA Bor. Add 15, 23-25, 36 (P3); 30, 32, 33 (P5).
- BARBAREA VERNA (Mill.) Aschers. Add 22 (P4); 23, 34 (P5); 39 (FNE).
- ARABIS BROWNII Jord. Add 8 (B.E.C., 1935, 22).
- DRABA INCANA L. Delete 36.
- EROPHILA VERNA (L.) Chevall. Add 36 (P5).
- COCHLEARIA ALPINA (Bab.) H. C. Wats. Add [39] (FNE) (doubtful record).
- COCHLEARIA SCOTICA Druce. Rewrite as 1, 3, 9, 16, 21, 27, 28, 34, 35, 38-40 (P3 and P4).
- COCHLEARIA ANGLICA L. Delete 7. Add 2 (FK); 15-17, 20, 21, 27, 28, 34, 35, 37-39 (P3); 40 (FNE).
- ARABIDOPSIS THALIANA (L.) Heynh. (*Sisymbrium Thalianum* (L.) Gay). Add 15, 16 (P2); 35 (P3); 36 (P5).
- ALLIARIA PETIOLATA (Bieb.) Cavara & Grande (*Sisymbrium Alliaria* (L.) Scop.). Delete 3, 15. Add 12 (P3); 21-24 (ITB); 25 (P1).
- ERYSIMUM CHEIRANTHOIDES L. Add 20 (FW); 30 (P5); 38 (FNE).
- BRASSICA OLERACEA L. Delete Irish records.
- BRASSICA NIGRA (L.) Koch. For 30 read 31. Add 24 (P1).
- SINAPIS ALBA L. (*Brassica alba* (L.) Rabenh.). For 38-40 read 38, 40.
- DIPLOTAXIS MURALIS (L.) DC. Add 1, 2 (FK); 18 (P2); 19, 38 (P3); 30 (P4); 40 (P5).
- CORONOPUS DIDYMUS (L.) Sm. For 28 read 31.
- LEPIDIUM LATIFOLIUM L. Bracket 1 (extinct and doubtful). Add 28 (B.E.C., 1928, 727).
- LEPIDIUM CAMPESTRE (L.) R.Br. Add 14, 18 (P3); 38 (ITB).
- CARDARIA DRABA (L.) Desv. (*Lepidium Draba* L.). Add 6 (P5); 16 (P3); 31 (P4).
- TEESDALIA NUDICAULIS (L.) R.Br. Add 2 (FK).
- CRAMBE MARITIMA L. For 10 read 16
- CAKILE MARITIMA Scop. (*Cakile Cakile* (L.) Karst.). For 31-34 read 31, 34.
- RAPHANUS RAPHANISTRUM L. Add 11, 14 (P3).
- RESEDA LUTEA L. Add 18 (P3); 37 (P5); 38 (FNE).
- HELIANTHEMUM GUTTATUM (L.) Mill. Rewrite thus: 3, 16, 27. Var. *Breweri* is in 3, 16.
- HELIANTHEMUM NUMMULARIUM (L.) Mill. (*H. Helianthemum* (L.) Karst.). Add H 34 (I.N.J., 5, 76).
- VIOLA ODORATA L. Add 28, 29 (P3).
- VIOLA HIRTA L. Add 14 (P5).
- VIOLA CALCAREA (Bab.) Greg Add H 38 (FNE).

- VIOLA REICHENBACHIANA Bor. (*V. sylvestris* auct.). Add 29 (P3); 30 (P4); 31 (P5).
- VIOLA CANINA L. Add 35 (P3).
- VIOLA LACTEA Sm. Add 1, 2 (FK); 3, 9 (ITB, under *V. canina*); 12 (P5); 16 (B.E.C., 1936, 241).
- VIOLA STAGNINA Kit. (*V. persicifolia* auct.). Add 25 (P4).
- VIOLA TRICOLOR L. agg. The aggregate of the forms listed in *Com. Fl.* as *Tricolores* is recorded from 1-5, 8, 9, 11-14, 16, 18-40.
- VIOLA LUTEA Huds. Add 13 (P5).
- POLYGALA OXYPTERA Rchb. (*P. dubia* Bellyneck). Add 1, 2 (FK); 8, 20, 21, 27, 39 (P3). 23 is given in *B. in I.*, but the evidence cannot be traced. The records for 9 and 29 also require confirmation.
- POLYGALA SERPYLLIFOLIA Hose. Add 6 (P3).
- POLYGALA BABINGTONII Druce. Read 28, 29, 40.
- SAPONARIA OFFICINALIS L. Read All save 22, 25, 26, 32 (P3 and P4).
- SILENE MARITIMA With. For 34, 36 read 34-36.
- MELANDRIUM DIOICUM (L.) Coss. & Germ. (*Lychnis dioica* L.). Add 22 (P3).
- CERASTIUM TETRANDRUM Curt. Add 11, 13, 24 (P3); 30 (P5).
- CERASTIUM ARVENSE L. Add 36, 38 (P5).
- STELLARIA PALUSTRIS Retz. (*S. Dilleniana* Moench, non Leers). Add 9 (I.N.J., 8, 313; misprinted in P5 as 10).
- ARENARIA TENUIFOLIA L. Add 2, 6 (P3); 30 (P4).
- ARENARIA SERPYLLIFOLIA L. Add 36 (P3).
- ARENARIA LEPTOCLADOS (Rchb.) Guss. Add 5, 7, 8, 11, 13-15, 17-19, 23-26, 31 (P3).
- SAGINA NODOSA (L.) Fenzl. Add 36 (P3).
- SAGINA SUBULATA (Sw.) C. Presl. Add 2 (FK). For 17, 24, 25 read 27, 34, 35.
- SAGINA CILLATA Fr. Add 6, 14 (P3); 10, 15, 28 (P4); 40 (FNE).
- SPERGULA ARVENSIS L. Add 3, 5, 6, 11, 12, 14, 23, 36, 38, 40 (P3); 30 (P4); 32, 35, 37 (P5).
- SPERGULA SATIVA Boehn. Add 1-6, 8, 9, 11-13, 15-17, 20-23, 27, 35-38 (P3); 30 (P4); 32 (P5).
- MONTIA FONTANA L. The aggregate is recorded from all divisions; the distribution of the segregates is not known.
- ELATINE HEXANDRA (Lap.) DC. Delete 39 (FNE). Add 12 (P4).
- ELATINE HYDROPIPER L. Read 37-40 (FNE and P5).
- HYPERICUM DUBIUM Leers (*H. quadrangulum* auct.). Read All save 24, 32, 35.
- HYPERICUM PERFORATUM L. Add 29 (P3).
- HYPERICUM HUMIFUSUM L. Add 18, 19 (P3).
- ALTHAEA OFFICINALIS L. Add 4, 17 (P4).
- LAVATERA ARBOREA L. Native only in 1, 3, 5, 6, 9, 20, 21, 39. The remaining records (2, 4, 8, 12, 13, 15, 27, 28, 38) should be bracketed.
- MALVA MOSCHATA L. Add 30 (P4); 36 (P5).
- MALVA NEGLECTA Wallr. (*M. rotundifolia* auct.). Add 13 (P5); 34 (P3).

- LINUM BIENNE Mill. (*L. angustifolium* Huds.). The query after 15 can be deleted (P4).
- GERANIUM SANGUINEUM L. 35 should stand outside the bracket; 39 should stand within it.
- GERANIUM VERSICOLOR L. For 2 read 4. Add 38 (P4).
- GERANIUM SYLVATICUM L. Add, within the bracket, 31 (P3) and 36 (P5).
- GERANIUM PYRENAICUM Burm. f. Add 3 (*Watsonia*, 1, 361).
- GERANIUM COLUMBINUM L. Delete 2, 32. Add 38-40 (FNE).
- GERANIUM ROTUNDFOLIUM L. Add 11 (P5).
- GERANIUM PUSILLUM L. Add 1 (P4); 11 (P5); 13 (B.E.C. 1943-4, 704); 20 (FW).
- GERANIUM LUCIDUM L. Add 13, 36 (P5). Not native in 12.
- GERANIUM PURPUREUM Vill. Add H 1, 2 (FK); 9, 16 (Cyb.).
- ERODIUM MARITIMUM (L.) L'Hérit. Delete 16.
- IMPATIENS GLANDULIFERA Royle. Add 5, 19, 21, 28 (P3); 11, 13, 34 (P5); 16 (P4); 38-40 (FNE).
- ILEX AQUIFOLIUM L. Add 22 (P3).
- FRANGULA ALNUS Mill. (*Rhamnus Frangula* L.). Add 37 (P3); 23 (P4).
- RHAMNUS CATHARTICUS L. Add 22 (P4); 29 (P3). Remove brackets from 39, 40 (FNE).
- ONONIS REPENS L. Add 37 (P5).
- TRIGONELLA ORNITHOPODIOIDES (L.) DC. Add 4 (see P3 and P4).
- MEDICAGO ARABICA (L.) Huds. Add 11 (P3).
- TRIFOLIUM MEDIUM L. Delete 3. Add 11, 13, 23-25, 29 (P3).
- TRIFOLIUM ARVENSE L. Add 16 (I.N.J., 9, 100).
- TRIFOLIUM SQUAMOSUM L. (*T. maritimum* Huds.). The Irish record is exceedingly doubtful.
- TRIFOLIUM FRAGIFERUM L. Add 3 (P3).
- TRIFOLIUM HYBRIDUM L. Present in all Irish divisions (ITB, P1 and P3).
- TRIFOLIUM AGRARIUM L. Read 13, 34, 38. Even in these it is little more than a casual.
- TRIFOLIUM CAMPESTRE Schreb. (*T. procumbens* auct.). Add 29 (P3).
- TRIFOLIUM FILIFORME L. The entry in *Com. Fl.* is apparently that for some other species. Read 1-5, 7, 9, 10, 12-14, 16, 19-21, 27, 31, 35, 37-39.
- ANTHYLLIS VULNERARIA L. Add 30 (P5). 29 is given in *B. in I.*, but the authority cannot be traced.
- LOTUS ULIGINOSUS Schkuhr. Add 25, 26 (P3).
- ASTRAGALUS DANICUS Retz. The Aran Islands are botanically in Clare (9), not Galway.
- ORNITHOPUS PERPUSILLUS L. For 9 read 3. Add 20 (FW).
- VICIA SYLVATICA L. Add 30 (P5).
- VICIA OROBUS DC. Delete 38. Add 26 (*B. in I.*, 367a).
- VICIA ANGUSTIFOLIA L. Add 23, 25, 27 (P3).
- VICIA HIRSUTA (L.) S. F. Gray. Add 10, 14, 27, 29 (P3).

- LATHYRUS JAPONICUS Willd. (*L. maritimus* Bigel.). For Kerry read S. Kerry (1).
- LATHYRUS MONTANUS Bernh. Add 23 (P3).
- PRUNUS PADUS L. Add 13 (P3).
- PRUNUS AVIUM (L.) L. Add 15, 18, 29 (P3); 30 (ITB).
- PRUNUS CERASUS L. Add 9 (P1).
- PRUNUS INSITITIA L. Add 12-15 (P3).
- RUBUS CAESIUS L. Add 2 (ITB); 13, 16, 38 (P3).
- RUBUS SAXATILIS L. Add 30 (P3).
- RUBUS CHAMAEMORUS L. Never in 40 (P1); probably extinct in 36.
- POTENTILLA FRUTICOSA L. Delete 4.
- POTENTILLA PROCUMBENS Sibth. Add 1, 2, 9 (P1); 27 (ITB).
- ALCHEMILLA ALPINA L. For Kerry read S. Kerry (1).
- ALCHEMILLA VULGARIS L. Agg. Records backed by specimens checked according to Walters's revision are given below (see Webb, *I.N.J.*, 1952). The information is still very incomplete.
- ALCHEMILLA MINOR Huds. 29.
- ALCHEMILLA VESTITA (Bus.) Raunk. 1, 2, 5-11, 13-25, 29, 31, 33, 36, 39 [3, 4, 26-28, 32, 34, 37, 38, 40].
- ALCHEMILLA XANTHOCHLORA Rothm. (*A. pratensis* auct.). 1, 9, 16-18, 22-25, 27-34, 36, 38-40 [15, 21].
- ALCHEMILLA GLABRA Neygenf. (*A. alpestris* auct.). 1, 8, 10, 21, 26-29, 31, 33, 36, 39, 40 [2, 3, 9, 16, 30, 34, 35, 38].
- AGRIMONIA ODORATA Mill. Add 7 (P4); 18, 30, 33, 36 (P5); 37 (P3); 40 (FNE).
- POTERIUM SANGUISORBA L. Add 5 (ITB); 31 (P4). Delete 39 (FNE).
- SANGUISORBA OFFICINALIS L. (*Poterium officinale* (L.) A. Gray). Delete 40 (FNE).
- ROSA STYLOSA Desv. agg. Add 7, 11, 14, 18, 20 (P3).
- ROSA AFZELIANA Fr. agg. (*R. glauca* Lois., non Pourr.). Read 3, 8, 9, 33, 37-40.
- ROSA DUMETORUM Thuill. agg. Read 1, 2, 7, 8, 19, 23, 33, 37-40.
- ROSA CAESIA Sm. agg. Read 33, 38-40.
- ROSA OBTUSIFOLIA Desv. agg. Read 8, 39.
- ROSA VILLOSA L. agg. Add 3 (ITB); 30 (P5).
- ROSA TOMENTOSA Sm. agg. Read 1-40.
- ROSA RUBIGINOSA L. agg. (*R. eglanteria* L.). Add 16 (P3).
- ROSA SPINOSISSIMA L. Read All save 32.
- SORBUS. Records for the whitebeams should be rewritten thus:—
- SORBUS ANGLICA Hedl. 2.
- SORBUS ARIA (L.) Crantz (*Pyrus Aria* (L.) Ehrh.). 15-17 [21, 36, 39].
- SORBUS RUPICOLA (Syme) Hedl. 2, 16, 27-29, 39, 40.
- SORBUS HIBERNICA E. F. Warb. 9-12, 14-15, 17-26, 28 [2, 39].
- SORBUS DEVONIENSIS E. F. Warb. (*Pyrus latifolia* auct.). 11-13.
- CRATAEGUS MONOGYNA Jacq. Doubtless present throughout Ireland, but records for 7, 8 and 11 are still lacking.

- CRATAEGUS OXYACANTHOIDES Thuill. Known from 1-3, 10, 11, 14, 16, 20, 22, 27, 28-30, 32-40 (P3, P4 and P5); doubtless present in most others.
- COTONEASTER MICROPHYLLUS Lindl. *Read* 1, 9, 15-17, 21, 27, 34, 35, 38, 40.
- SAXIFRAGA. Irish records for the species numbered 3-16 in *Com. Fl.* should be rewritten thus:—
- SAXIFRAGA HYPNOIDES L. 6-9, 15, 20, 28-30, 33, 39, 40 [35].
- SAXIFRAGA ROSACEA Moench. 1, 2, 7-9, 16, 27.
- SAXIFRAGA HARTII D. A. Webb. 35.
- SAXIFRAGA GRANULATA L. 37-40 should stand within brackets (FNE).
- SAXIFRAGA TRIDACTYLITES L. Add 20 (FW); 30 (P5); 31 (P1).
- SAXIFRAGA STELLARIS L. *For* 39 *read* 40 (ITB).
- SAXIFRAGA SPATHULARIS Brot. (*S. umbrosa* auct.). 34 should stand within brackets.
- SAXIFRAGA HIRSUTA L. (*S. Geum*, auct.). Add 16, 27 (I.N.J., 9, 105).
These records refer to the hybrid *S. hirsuta* × *spathularis*.
- PARNASSIA PALUSTRIS L. Delete 38 (FNE).
- RIBES NIGRUM L. Add 33 (I.N.J., 9, 226).
- UMBILICUS PENDULINUS DC. (*Cotyledon Umbilicus-veneris* auct.). Add 14 (P3).
- SEDUM TELEPHIUM L. (*S. purpureum* (L.) Schult.). Delete 29. Add 2, 20 (P3); 33 (P5).
- SEDUM RUPESTRE L. Add 11 (P5); 21 (FD); 22 (P3); 30 (P4); all within the brackets.
- SEDUM REFLEXUM L. *For* 14-21 *read* 14, 21.
- SEDUM ALBUM L. Add 1, 12, 20, 22, 30, 34 (P3); 40 (FNE).
- SEDUM ANGLICUM Huds. Add 7, 19 (P3).
- DROSERA LONGIFOLIA L. *For* 33, 35 *read* 33-35. Add 39 (I.N.J., 9, 105).
- MYRIOPHYLLUM SPICATUM L. Add 31 (P4).
- MYRIOPHYLLUM ALTERNIFLORUM DC. Add 6 (P3); 20 (FW).
- CALLITRICHE STAGNALIS Scop. Add 24, 25 (P3).
- CALLITRICHE OBTUSANGULA Hegelm. Add 8 (P1).
- CALLITRICHE PALUSTRIS L. Add 30 (P5).
- CALLITRICHE INTERMEDIA Hoffm. Add 11 (P4); 30 (P5); 36 (P3).
- CALLITRICHE AUTUMNALIS L. Add 16 (B.E.C., 1939, 424); 29 (P4).
- PEPLIS PORTULA L. Add 7, 13 (P5); 18 (P3).
- CHAMAENERION ANGUSTIFOLIUM (L.) Scop. (*Epilobium angustifolium* L.).
Rewrite thus:— 7, 8, 20, 27-29, 33-36, 38-40 [11, 13, 14, 18, 19, 23, 30-32, 36, 37]. Gradually spreading, but not nearly as fast as in Britain.
- EPILOBIUM ROSEUM Schreb. Add 32, 40 (*Proc. R. Irish Acad.*, 52 B, 67).
- CIRCAEA ALPINA L. Delete 16, and enclose 20 in brackets.
- ERYNGIUM CAMPESTRE L. The Irish record as it stands makes nonsense.
The species is only recorded from West Cork (3), and was apparently little more than casual there.
- SMYRNIUM OLUSATRUM L. Add 16, 25 (P3).

- APIUM INUNDATUM** (L.) Reichb. f. Add 13 (P5).
APIUM MOOREI (Syme) Druce. Add 8, 9, 15, 28 (*B. in I.*); 14, 16, 17, 19, 22-27, 32, 34 (P3).
CARUM CARVI L. Casual, except in 37, 39.
PETROSELINUM CRISPUM (Mill.) Airy-Shaw (*Carum Petroselinum* (L.) Benth.). Add 17, 34, 36, 40 (P3).
SIUM ERECTUM Huds. Add 37 (P3).
MYRRHIS ODORATA (L.) Scop. Add 20, 30, 33 (P3); 24 (P5).
CHAEROPHYLLUM TEMULUM L. Add 12 (B.E.C. 1943-4, 726); 15 (P4); 36 (P3); and for 18, 22 read 18-22.
SCANDIX PECTEN-VENERIS L. For 4, 12 read 4-12. Add 13 (P3).
ANTHRISCUS SCANDICINA Mansf. (*Chaerrefolium Anthriscus* (L.) Schinz & Thell.). Add 1 (FK).
FOENICULUM VULGARE Mill. (*F. Foeniculum* (L.) Karst.). Add 15 (P4); 28 (P3); 31 (P5). Bracket 39 (long extinct).
CRITHMUM MARITIMUM L. Delete 29. Add 39 (FNE).
OENANTHE spp. The records for *O. aquatica* and *O. fluviatilis* have not yet been entirely sorted out. The former is recorded for 2, 4, 5, 7, 9, 11, 13-15, 18-23, 25, 27, 28, 30-33, 36-40; the latter for 10, 11, 13, 14, 17, 19, 21, 22, 26-28, 31, 32, 36, 37. Ambiguous records, which may belong to either species, exist for 6, 8, 16, 24, 29.
OENANTHE CROCATA L. Add 14, 19, 25 (P3).
OENANTHE PIMPINELLOIDES L. For Cork read East Cork (5).
OENANTHE LACHENALII C. C. Gmel. Delete 13.
OENANTHE FISTULOSA L. Add 16, 25, 29 (P3).
LIGUSTICUM SCOTICUM L. Add 16 (B.E.C., 1939-40, 280).
CORNUS SANGUINEA L. Of the divisions given in *Com. Fl.* 3-5, 13, 32, 36, 37 should stand within brackets (not native). Add 21 within the brackets, and 7 outside them (P3 and P5).
GALIUM BOREALE L. Add 30 (P3); 38 (FNE).
GALIUM MOLLUGO L. For 33 read 35.
GALIUM ERECTUM Huds. Add 1, 2 (FK); 8, 33 (P1); 6, 10, 17 (P3); 40 (FNE).
GALIUM ULIGINOSUM L. Add 14, 22 (P3).
GALIUM CRUCIATA (L.) Scop. Extinct in 33, where it seems to have been only casual.
KENTRANTHUS RUBER (L.) DC. Add 7 (P3); 39 (FNE).
VALERIANELLA LOCUSTA (L.) Betcke (*V. olitoria* (L.) Poll.). Add 10, 15, 18, 26-29, 33 (P3).
VALERIANELLA CARINATA Lois. Add 12, 13 (P5); 21 (P4). Alien.
VALERIANELLA RIMOSA Bast. Add 17 (P4).
DIPSACUS FULLONUM L. (*D. sylvestris* Huds.). Add 36 (P5).
ERIGERON ACRIIS L. Add 25 (P5).
FILAGO GERMANICA (L.) L. Add 28 (P3).
FILAGO MINIMA (Sm.) Pers. For 27-34 read 27, 34.
GNAPHALIUM SYLVATICUM L. Add 18 (P3).
INULA HELENIUM L. Add 11 (P5).

- INULA SALICINA L. *Read* North Tipperary and South-east Galway (10 and 15).
- ACHILLEA PTARMICA L. Add 6 (P3).
- ANTHEMIS NOBILIS L. *For* 20-23 *read* 20, 23. Add 36 (P3).
- ANTHEMIS COTULA L. Add 31 (P5); 36 (P3).
- MATRICARIA MATRICARIOIDES (Less.) Porter (*M. suaveolens* (Pursh) Buch., non L.). In all divisions now (P3, etc.).
- TANACETUM VULGARE L. Add 15, 26 (P3).
- ARTEMISIA ABSINTHIUM L. Add 2 (FK); 36 (P5).
- ARTEMISIA MARITIMA L. Add 38 (FNE).
- SENECIO SARRACENICUS L. Add 23 (P5).
- SENECIO SQUALIDUS L. Add 7, 10 (P4); 14, 19 (P3).
- SENECIO VISCOSUS L. Add 18 (P5); 38 (I.N.J., 10, 153).
- SENECIO SYLVATICUS L. Add 23, 32 (P1).
- SENECIO CINERARIA DC. In last line, for *vulgaris* *read* *jacobaea*.
- CARLINA VULGARIS L. Add 28, 29 (P3).
- ARCTIUM VULGARE (Hill) Evans (*A. nemorosum* Lej.). Add 34 (P1).
- ARCTIUM MINUS (Hill) Bernh. Add 6, 17, 18, 22, 36 (P3); 7 (P1); 40 (FNE).
- CARDUUS NUTANS L. Add 5 (ITB); 13 (P5); 16 (P3). Delete 1. *For* 26 *read* 27 (P1).
- CARDUUS CRISPUS L. (*C. acanthoides* L.). *For* 5 *read* 8. Add 21, 31 (ITB).
- CARDUUS TENUIFLORUS Curt. (*C. pyenocephalus* var. *tenuiflorus* (Curt.) Dr.). Add 29 (P3).
- CIRSIUM HETEROPHYLLUM (L.) Hill. Add H 33 (I.N.J., 9, 311).
- SAUSSUREA ALPINA (L.) DC. *For* 10 *read* 16.
- SERRATULA TINCTORIA L. Add H 12 (P2).
- CICHORIUM INTYBUS L. Add 1, 2 (FK); 30 (P4); 32 (P1). Delete 33.
- PICRIS ECHIOIDES L. Add 9 (P1); 13 (P5); 20 (FW).
- PICRIS HIERACIOIDES L. Delete 9. Add 11, 19 (P3).
- CREPIS BIENNIS L. Add 14, 23 (P3); 19, 30, 33 (P4); 36 (ITB). Delete 28, 40.
- HYPOCHOERIS GLABRA L. Delete all the records printed. Add 40 (FNE).
- LEONTODON LEYSSERI (Wallr.) Beck (*L. nudicaulis* auct.). Add 32, 36 (P1); 40 (FNE).
- LEONTODON HISPIDUS L. Add 9 (P1).
- TARAXACUM LAEVIGATUM (Willd.) DC. (*T. erythrospermum* Bess.). Write 1, 2, 5, 6, 9, 15, 20, 21, 39 (P3).
- TARAXACUM PALUSTRE (Lyons) DC. (*T. paludosum* (Scop.) Schlecht.). *For* "Cork" *read* 4 (CH). Add 8, 9, 15, 16, 26, 29, 30, 32, 35 (P3); 34 (*Proc. R. Irish Acad.*, 52 B, 70); 40 (FNE).
- LACTUCA MURALIS (L.) Gaertn. Add 6, 28 (P3); 9, 40 (P4); 39 (P5).
- TRAGOPOGON PRATENSIS L. Add 12 (B.E.C. 1943-4, 735); 38 (P4). Delete 6.
- LOBELIA DORTMANNA L. Add 30 (P5); 32 (P3).
- JASIONE MONTANA L. Add 22, 30 (P1).

- WAHLENBERGIA HEDERACEA (L.) Rehb. (*Cervicina hederacea* (L.) Dr.). Add 11, 13 (P5); 27 (P3).
- CAMPANULA ROTUNDIFOLIA L. Delete 5.
- VACCINIUM VITIS-IDAEA L. Add 8 (P5).
- ARBUTUS UNEDO L. Write 1-3, 28.
- ARCTOSTAPHYLOS ALPINUS (L.) Spreng. Delete Irish record.
- ERICA CINEREA L. Add 24 (Longford) (P3).
- ERICA MACKAIANA Bab. (*E. mackaii* Hook.). Add 35 (*Proc. R. Irish Acad.*, 54 B, 6).
- ERICA VAGANS L. Add H 33 (P5).
- ERICA MEDITERRANEA L. For 2 write 27.
- PYROLA ROTUNDIFOLIA L. Delete the existing entry and add 23.
- PYROLA MEDIA Sw. Add 29 (P3).
- PYROLA MINOR L. Add 11, 27 (P5); 28 (P3).
- MONOTROPA HYPOPITYS L. (*Hypopitys Hypopitys* (L.) Small). Add 40 (P5).
- LIMONIUM HUMILE Mill. Add 28, 34 (P3).
- ARMERIA MARITIMA (Mill.) Willd. (*Statice pubescens* Dr.). Add 8 (ITB).
- HOTTONIA PALUSTRIS L. Write 38 [21, 22, 33, 39].
- PRIMULA VERIS L. Add 36 (P1).
- LYSIMACHIA NUMMULARIA L. Add 7, 28, 30 (P2); 24 (P3).
- GLAUX MARITIMA L. For 27, 29 read 27-29.
- CENTUNCULUS MINIMUS L. Add 2 (FK); 12-14 (P5); 32 (*Proc. R. Irish Acad.*, 52 B, 70).
- SAMOLUS VALERANDI L. Add 7 (P1).
- LIGUSTRUM VULGARE L. Add 10 outside bracket, and 25-27 inside it (P3).
- CICENDIA FILIFORMIS (L.) Delarb. (*Microcala filiformis* (L.) Hoffm. & Link.). Irish distribution omitted. Write H 1-3, 27. (For 27 see I.N.J., 9, 339).
- CENTAURIUM LITTORALE (D. Turner) Gilm. (*C. vulgare* Rafn). The record for 40 is authentic (FNE).
- GENTIANA AMARELLA L. agg. Absent from several Irish divisions. Read H 3-5, 7-28, 30, 31, 33-35.
- GENTIANA CAMPESTRIS L. agg. Add 25 (P5); 29 (P3).
- SYMPHYTUM OFFICINALE L. Doubtless general, but records exist only for 1-3, 5, 9-10, 13, 15, 17, 21, 22, 27, 30, 33, 36-40.
- SYMPHYTUM TUBEROSUM L. Read H 8, 31, 38, 39.
- SYMPHYTUM PEREGRINUM Ledeb. Recorded from 1, 2, 7, 12-15, 18-21, 23, 25, 27-30, 33-40, and probably present in several other divisions.
- ANCHUSA SEMPERVIRENS L. Add 12 (B.E.C., 1937, 490).
- MYOSOTIS SECUNDA A. Murr. (*M. repens* Don). Write All save 14, 17, 23.
- LITHOSPERMUM OFFICINALE L. Add 33 (P4). Delete 38.
- ECHIAM VULGARE L. Delete 40 (casual only).
- CONVOLVULUS ARVENSIS L. Add 14 (P3); 29 (P1).
- CUSCUTA EPITHYMIUM (L.) L. In the joint record for this and *C. trifolii* Bab., delete 5 and 19 (casual), and add 40 (P5).

- SOLANUM DULCAMARA L. Delete 10. Add 3 (P3).
- SOLANUM NIGRUM L. Add 11 (P5). Seldom more than casual.
- ATROPA BELLA-DONNA L. Write [9, 22, 35]. Elsewhere only casual.
- HYOSCYAMUS NIGER L. Add 15 (P4); 27 (P1).
- VERBASCUM THAPSUS L. Add 19 (P3). Delete the query after 30 (P5).
- LINARIA VULGARIS Mill. (*L. Linaria* (L.) Karst.). Add 1 (FK); 28 (P1).
- LINARIA REPENS (L.) Mill. Add 31, ? 40 (P5).
- LINARIA MINOR (L.) Desf. Add 2, 29, 33, 34, 37, 38 (P3); 39, 40 (FNE).
- LINARIA CYMBALARIA (L.) Mill. Add 24 (P3).
- SCROPHULARIA AQUATICA L. Add 30, 36 (P5).
- SCROPHULARIA UMBROSA Dum. (*S. alata* Gilib.). Add 8, 40 (P3); 33 (P4).
- MIMULUS GUTTATUS DC. Add 13, 22, 31 (P5); 16 (P3).
- VERONICA ANAGALLIS-AQUATICA L. (*sensu stricto*). Recorded from 1, 2, 5, 10, 11, 13, 15-17, 19-28, 30, 33, 34, 37-40.
- VERONICA CATENATA Pennell (*V. aquatica* Bernh., non S. F. Gray). Recorded from 5, 9, 12-15, 17-19, 21-28, 33, 34, 36, 38-40.
- VERONICA POLITA Fr. Add 31, 33 (P3).
- EUPHRASIA SALISBURGENSIS Hoppe. For 3 read 8. Add 34 (P3). Since other species of *Euphrasia* are not set out in *Com. Fl.*, and records are still very incomplete, they are not given here; but attention should be drawn to an error in *Watsonia*, 2, 48-9, in which *E. nemorosa* and *E. anglica* are attributed to H 34: the locality in question is in Sligo (H 28).
- PARENTUCELIA VISCOSA (L.) Caruel (*Bartsia viscosa* L.). Add 28 (P4).
- RHINANTHUS STENOPHYLLUS (Schur) Druce. Write 1-3, 6, 11, 13, 14-16, 22, 23, 25, ? 26, 27, 29-31, 33-37, 39, 40.
- RHINANTHUS SPADICEUS Wilm. (*R. monticola* auct.). For Kerry read South Kerry.
- RHINANTHUS BOREALIS (Stern.) Dr. Connor Hill is in South Kerry (1).
- OROBANCHE HEDERAE Duby. Add 10, 33 (P4); 18 (P3).
- OROBANCHE APICULATA Wallr. (*O. minor* Sm.). Add 9, 40 (P3); 18 (P4).
- UTRICULARIA VULGARIS L. Add 33 (P3).
- UTRICULARIA NEGLECTA Lehm. (*U. major* auct.). Add 3 (*Watsonia*, 1, 362); 10, 12, 17, 36 (P3); 15 (*Proc. R. Irish Acad.*, 52 B, 74); 30 (P5); 33 (I.N.J., 9, 51); 38, 39 (FNE).
- PINGUICULA GRANDIFLORA Lam. Add 8 (P4). The record for 9, till recently doubtful, has been confirmed in a new station (I.N.J., 9, 311).
- PINGUICULA LUSITANICA L. Delete 22. Add 18 (P3); 23 (P1); 31 (ITB).
- VERBENA OFFICINALIS L. Add 18 (P3).
- MENTHA ROTUNDIFOLIA (L.) Huds. Add 10, 13, 16, 40 (P3); 33 (P4); 36 (P5); 39 (*Proc. R. Irish Acad.*, 52 B, 74).
- MENTHA ALOPECUROIDES Hull. Add 6 (P3).
- MENTHA LONGIFOLIA (L.) L. Write [1-3, 5, 11, 15, 20, 21, 25, 29, 36].
- MENTHA SPICATA L. Write 3-5, 18, 23, 34, 38, 39.
- MENTHA PIPERITA L. Add 12, 18, 23, 24, 27, 33 (P3); 35-40 (ITB).
- MENTHA GENTILIS L. Delete 1, 2. Add 5 (CH); 30 (P4).

- MENTHA GRACILIS Sole (*M. cardiaca* (S. F. Gray) Baker). Add 7 (P3).
- MENTHA SMITHIANA R. Graham (*M. rubra* auct.). Delete 1. Add 4, 21, 38 (P3); 35 (B.E.C., 1928, 752).
- MENTHA PULEGIUM L. Add 36, 37 (P3).
- LYCOPUS EUROPAEUS L. Add 26 (P3).
- ORIGANUM VULGARE L. Add 29 (P3).
- THYMUS DRUCEI Rohd. All Irish plants seem referable to this species which is in H 1-12, 14-35, 37-40.
- CALAMINTHA ASCENDENS Jord. (*Satureja ascendens* (Jord.) Maly). Add 14 (P3).
- ACINOS ARVENSIS (Lam.) Dandy (*Satureja Acinos* (L.) Scheele). Add 18 (P3).
- NEPETA CATARIA L. Delete 3, 19, 22, 23.
- SCUTELLARIA GALERICULATA L. Add 18, 27 (P3).
- SCUTELLARIA MINOR Huds. Add 28 (P3); 22 (P5).
- STACHYS ARVENSIS (L.) L. Add 30 (P4).
- GALEOPSIS SPECIOSA Mill. Delete 16, and remove 37 to within the brackets. Add 20 (FW); 33 (I.N.J., 9, 226).
- GALEOPSIS LADANUM L. (*sensu stricto*). So far recorded for 14 and 22 only.
- GALEOPSIS ANGUSTIFOLIA Hoffm. 11, 13, 14, 18-23.
- LAMIUM ALBUM L. Delete 3. Add 2, 9 (P3).
- LAMIUM HYBRIDUM Vill. Add 25, 28 (P3).
- LAMIUM MOLLUCCELLIFOLIUM Fr. Add 13, 25 (P3).
- LAMIUM AMPLEXICAULE L. Add 2 (FK).
- BALLOTA NIGRA L. Add 13 (B.E.C., 1943-4, 748).
- PLANTAGO MARITIMA L. Delete 13, 14. Add 10, 26, 37 (ITB); 33 (I.N.J., 9, 226).
- PLANTAGO MEDIA L. Add 2 (FK); 7 (P5); 20 (FW).
- SCLERANTHUS ANNUUS L. Add 13 (P5).
- CHENOPODIUM RUBRUM L. Add 3 (*Watsonia*, 1, 362); 33 (P3).
- CHENOPODIUM BONUS-HENRICUS L. Add 10, 13, 14, 25 (P3).
- CHENOPODIUM POLYSPERMUM L. The previous records were casual; now established in 39 (FNE).
- ATRIPLEX PATULA L. Add 26 (P3).
- ATRIPLEX HASTATA L. If *A. deltoidea* Bab. is merged with this, add to the joint record 13, 23 (P3).
- ATRIPLEX LACINIATA L. (*A. maritima* Hallier, non Crantz). Add 3 (*Watsonia*, 1, 362).
- OBIONE PORTULACOIDES (L.) Moq. (*Atriplex portulacoides* L.). Add 3, 15 (P5).
- SALICORNIA SPP. Very incompletely known, but the following additions can at least be made (P3 and FNE):—
- S. DOLICHOSTACHYA Moss. 38.
- S. RAMOSISSIMA Woods. 6, 21, 40.
- S. PUSILLA Woods. 38.
- POLYGONUM BISTORTA L. Delete 2 (FK). Add 26 (P5); 30 (P4).

- POLYGONUM LAPATHIFOLIUM L. (*P. scabrum* Moench). Add 6, 11, 14, 23 (P3).
- POLYGONUM NODOSUM Pers. (*P. petecticale* (Stokes) Dr.). Add 16, 26, 27, 36 (P3); 40 (FNE).
- POLYGONUM MITE Schrank. Add 2, 28, 36 (P3); 15 (P4); 40 (FNE).
- POLYGONUM MINUS Huds. Add 15, 36 (P3); 9 (P5).
- OXYRIA DIGYNA (L.) Hill. Add 8 (P5).
- RUMEX PULCHER L. Add 12 (P3).
- RUMEX MARITIMUS L. Delete query before 21 (I.N.J., 9, 340).
- EUPHORBIA HYBERNA L. Add 7(P4).
- EUPHORBIA CYPARISSIAS L. Delete Irish records; casuals at best.
- EUPHORBIA PORTLANDICA L. Add 40 (FNE).
- EUPHORBIA EXIGUA L. Add 29 (P3).
- MERCURIALIS PERENNIS L. Add 11 (P5); 15, 30, 36 (P4). Introduced in many stations but apparently native in some.
- MERCURIALIS ANNUA L. Add 13 (P5); 19 (P3).
- ULMUS GLABRA Huds. (*U. montana* Stokes). To the list of divisions in which it is native, add 11, 12, 13, 15, 17 (P3); 26, 27 (P2); 30 (P5); 38, 40 (FNE); and delete 4.
- ULMUS PLOTII Dr. Only as a planted tree in Ireland.
- HUMULUS LUPULUS L. Add 13 (P5); 15 (P4); 40 (FNE). Nowhere native in Ireland.
- PARIETARIA DIFFUSA Mert. & Koch (*P. ramiflora* auct.). Add 24, 33, 35 (P3).
- MYRICA GALE L. Add 13 (P5).
- BETULA PENDULA Roth (*B. alba* auct.). Delete 2, 5. Add 12, 23, 27, 28, 33, 36, 37, 39, 40 (P3).
- ALNUS INCANA (L.) Moench. Naturalized in 1, 14, 36, 39, 40 (P4 and P5).
- QUERCUS ROBUR L. Not yet recorded for 3, 8, 10, 12, 16, 17, 22, 23, 24, 26, 27, 31, 32. In some of the other divisions it is a doubtful native.
- QUERCUS PETRAEA (Matt.) Liebl. (*Q. sessiliflora* Salisb.). Probably in all, but not yet recorded for 6-8, 11-13, 17, 19, 21-24, 31, 37.
- FAGUS SYLVATICA L. Naturalized in 1, 2, 4-6, 13, 19-23, 28-31, 33-36, 38-40.
- SALIX FRAGILIS L. Add 16 (P3); 28 (P1); 33, 37 (P5); 36 (P4).
- SALIX PURPUREA L. Add 7 (P5); 16 (P3).
- SALIX NIGRICANS Sm. (*S. Andersoniana* Sm.). Delete 34 (never confirmed). Naturalized in 19 and 30 (I.N.J., 10, 38).
- POPULUS TREMULA L. Add 25 (P1).
- POPULUS NIGRA L. Scarcely naturalized in Ireland.
- EMPETRUM NIGRUM L. Add 8 (P5); 22 (P3); 27 (ITB).
- HYDROCHARIS MORSUS-RANAE L. Add 18 (I.N.J., 9, 30).
- HYDRILLA VERTICILLATA (L. f.) Royle. Add H 16 (P4).
- NEOTIA NIDUS-AVIS (L.) Rich. Add 22 (P4); 29 (P3).
- LISTERA CORDATA (L.) R. Br. For 17 read 16.

- SPIRANTHES SPIRALIS (L.) Chevall. Add 13 (B.E.C., 1943-4, 756); 20 (FW); 18, 25 (P4).
 SPIRANTHES GEMMIPARA (Sm.) Lindl. For Cork, Kerry read S. Kerry, W. Cork (1, 3).
 EPIPACTIS PALUSTRIS (L.) Crantz (*Helleborine palustris* (L.) Schrank) Add 24 (P4); 37 (P5).
 EPIPACTIS HELLEBORINE (L.) Crantz. (*Helleborine Helleborine* (L.) Druce). Add 4, 19 (P3); 25 (P5).
 ORCHIS MORIO L. Add 9, 28 (P1).
 ORCHIS PRAETERMISSA Druce. Delete all Irish records (P3 and B.E.C., 1936, 330).
 ORCHIS PURPURELLA T. & T. A. Steph. Add H 5-7, 12, 15-17, 20-23, 26-29, 31-40 (J. Heslop-Harrison *in litt.*).
 ORCHIS MAJALIS Reichb. (incl. *O. kerryensis* Wilm. and *O. occidentalis* (Pugs.) Wilm.). H 1-3, 7-9, 15, 16, 27 (P3-5).
 ORCHIS TRAUNSTEINERIOIDES Pugs. 20 (FW); 33 (I.N.J., 9, 227).
 ORCHIS CRUENTA Müll. H 17, 26 (*Watsonia*, 1, 366).
 ORCHIS TRAUNSTEINERI Reichb. 23 (I.N.J., 10, 82); 25 (*Acta phytogeog. suecica*, 26).
 ORCHIS ERICETORUM (Lint.) E. S. Marsh. (*O. maculata* L.). Recorded from all divisions but 8, 11 and 33, and probably present in these (P3 and P5).
 ORCHIS FUCHSII Druce. Recorded from all divisions but 3-5, 7, 10, 18, 19, and probably present in these (P3).
 ORCHIS MASCUA (L.) L. Add 22 (P1).
 OPHRYS APIFERA Huds. Add 23 (ITB); 31, 36 (P3); 40 (FNE).
 OPHRYS INSECTIFERA L. (*O. muscifera* Huds.). Add 10 (P5); 14 (I.N.J., 10, 107).
 LEUCORCHIS ALBIDA (L.) Schur (*Habenaria albida* (L.) R. Br.). Add 7 (P5).
 PLATANATHERA BIFOLIA (L.) Rich. (*Habenaria bifolia* (L.) R. Br.). Add 37 (P5).
 IRIS FOETIDISSIMA L. Add 39 (P3); 12 (P5).
 SISYRINCHIUM ANGUSTIFOLIUM Mill. 39 should be bracketed as a doubtful record (FNE). Add 29 (P3).
 NARCISSUS BIFLORUS Curt. Read 4, 8, 9, 12, 14, 21, 38.
 LEUCOJUM AESTIVUM L. Add 4 (I.N.J., 9, 213); 30 (P4). Its status in Ireland is doubtful, but it may well be native in the South.
 TAMUS COMMUNIS L. Read 28, 29.
 ASPARAGUS MARITIMUS (L.) Mill. Add 20 (FW). Delete 21.
 SIMETHYS PLANIFOLIA (L.) Gren. & Godr. (*Pabularia planifolia* (L.) Dr.). The Irish station is in S. Kerry (1).
 ALLIUM SCORODOPRASUM L. Add 34 (P5); 33 (I.N.J., 8, 397); 38 (I.N.J., 9, 305); 40 (FNE). Not native in Ireland.
 ALLIUM VINEALE L. Delete 38 (FNE). Add 40 (P5).
 ALLIUM TRIQUETRUM L. Add 1 (P2); 4 (P4); 12 (P5).
 ALLIUM CARINATUM L. Add 38-40 (P5).

- ALLIUM OLERACEUM L. Delete 38 (Down) and add 21 (P5).
 ALLIUM SCHOENOPRASUM L. For Mayo read E. Mayo (26).
 JUNCUS ACUTUS L. Add 21 (P4).
 JUNCUS SUBNODULOSUS Schrank. Delete 5.
 JUNCUS SCUARROSUS L. Add 23 (P3).
 JUNCUS TENUIS Willd. (*J. macer* S. F. Gray). Add 13 (P5); 20 (FW); 39 (I.N.J., 9, 27). Possibly native in 1-3 and 9; introduced elsewhere.
 LUZULA PILOSA (L.) Willd. Add 12 (B.E.C. 1943-4, 761).
 TYPHA ANGUSTIFOLIA L. Add 7 (I.N.J., 9, 28); 18. (P5); 23 (*B. in I.*); 33 (P3).
 SPARGANIUM NEGLECTUM Beeby. Write 1-3, 5, 10, 11, 14, 19-22, 30, 31, 33, 36-40.
 SPARGANIUM SIMPLEX Huds. Add 6, 10 (P3).
 SPARGANIUM ANGUSTIFOLIUM Michx. Add 10, 13, 23, 36 (P3).
 SPARGANIUM MINIMUM (Hartm.) Fr. Add 34 (P3). Delete 40.
 LEMNA POLYRRHIZA L. Add 15 (P5); 17 (ITB); 33, 36, 37 (P3); 39 (FNE). Delete 40.
 LEMNA TRISULCA L. Add 35 (P3).
 LEMNA GIBBA L. Add 15 (P4); 19 (P5).
 LURONIUM NATANS (L.) Raf. (*Elisma natans* (L.) Buch.). Delete Irish record (*B. in I.*).
 SAGITTARIA SAGITTIFOLIA L. Add 29 (P3).
 BUTOMUS UMBELLATUS L. Add 21 (P4).
 SCHEUCHZERIA PALUSTRIS (L.) Add H 18 (I.N.J., 10, 248).
 POTAMOGETON COLORATUS Hornem. Add 12 (P4); 21, 34 (P3); 33 (P5).
 POTAMOGETON GRAMINEUS L. Add 11 (ITB); 18, 36 (P3).
 POTAMOGETON LUCENS L. Add 16 (P3); 25 (P5).
 POTAMOGETON PRAELONGUS Wulf. Add 33 (I.N.J., 9, 227); 37 (P5); 38 (P3).
 POTAMOGETON PERFOLIATUS L. For 21 read 31.
 POTAMOGETON COMPRESSUS L. Delete the Irish record (FNE).
 POTAMOGETON OBTUSIFOLIUS Mert. & Koch. Add 13, 14, 33 (P3); 16 (P4).
 POTAMOGETON PUSILLUS L. (*P. panormitanus* Biv.). Recorded only for 12, 35, 39, 40, but doubtless present elsewhere.
 POTAMOGETON BERCHTOLDII Fieb. (*P. pusillus* auct.; *P. lacustris* (Pear-sall & Pearsall f.) Dr.). Add H 16 (B.E.C., 1939, 424). Doubtless elsewhere. The old records of *P. pusillus* have not yet been re-distributed.
 POTAMOGETON FILIFORMIS Pers. Add 17 (P4); 30, 36, 40 (P3); 38, 39 (FNE).
 ZANNICHELLIA PALUSTRIS L. Add 13 (B.E.C., 1943-4, 763); 21, 27, 28 (P3); 14 (P5); 32 (*Prov. R. Irish Acad.*, 52 B, 78); 33 (I.N.J., 9, 227).
 ZANNICHELLIA PEDICELLATA Fr. (*Z. maritima* G. F. W. Mey.). Add 37 (P3).
 ZOSTERA NANA Roth. Add 1 (FK); 3, 40 (P3); 39 (FNE).

- NAIAS FLEXILIS (Willd.) Rostk. & Schmidt. Add 27 (P4).
 ELEOCHARIS UNIGLUMIS (Link) Schult. Add 2 (FK); 3 (*Watsonia*, 1, 363); 35, 36 (P5).
 ELEOCHARIS MULTICAULIS (Sm.) Sm. Add 6 (P3).
 ELEOCHARIS ACICULARIS (L.) Roem. & Schult. Add 29 (P3).
 ELEOCHARIS PARVULA (Roem. & Schult.), B., N. & S. (*Scirpus nanus* Spreng., non Poir.). For 29 read 20. Add 40 (FNE).
 SCIRPUS SYLVATICUS L. Add 19 (P4).
 SCIRPUS LACUSTRIS L. Add 6 (P3).
 SCIRPUS PAUCIFLORUS Lightf. Add 20 (P3).
 SCIRPUS SETACEUS L. Add 31 (P3).
 SCIRPUS FLUITANS L. Read All save 23.
 ERIOPHORUM LATIFOLIUM Hoppe (*E. paniculatum* Dr.). Add 10, 14, 17, 23, 25, 28 (P3); 22 (I.N.J., 10, 83); 30 (P5); 38, 40 (FNE).
 RHYNCHOSPORA FUSCA (L.) Ait. f. Add 19 (P4); 30 (P5).
 SCHOENUS NIGRICANS L. Add 6 (P3).
 CLADIUM MARISCUS (L.) R. Br. (*Mariscus Mariscus* (L.) Borb.). Add 7, 30 (P5); 10 (P3).
 CAREX PSEUDOCYPERUS L. Add 3 (*Watsonia*, 1, 363); 11 (P1); 19 (P4); 33 (I.N.J., 10, 50).
 CAREX RIPARIA Curt. Add 37 (P3).
 CAREX ACUTIFORMIS Ehrh. Add 1 (I.N.J., 10, 84).
 CAREX LASIOCARPA Ehrh. Add 31, 36 (P3), and remove 39 to outside the brackets (FNE).
 CAREX PENDULA Huds. Add 13, 19 (P5); 27, 34 (P3).
 CAREX STRIGOSA Huds. Add 18, 23 (P3); 30 (P5).
 CAREX DISTANS L. Add 11, 33 (ITB).
 CAREX PUNCTATA Gaud. Add 16 (B.E.C., 1946-7, 315); 35 (*Watsonia*, 2, 57).
 CAREX HOSTIANA DC. (*C. fulva* Host). Add 31 (P5).
 CAREX FLAVA L. agg. The Irish records are still confused and incomplete.
 CAREX PALLESCENS L. Add 12 (P5); 13 (B.E.C., 1943-4, 767).
 CAREX LIMOSA L. Add 20 (FW).
 CAREX ELATA All. Add 35 (P3). Delete 21.
 CAREX ACUTA L. (*C. gracilis* Curt.). Add 1 (FK).
 CAREX AQUATILIS Wahl. Add 23 (ITB); 15 (P4).
 CAREX BIGELOWII Schwein. (*C. concolor* auct.). Add 8 (P5); 30, 33 (I.N.J., 9, 52).
 CAREX ELONGATA L. Add 30 (I.N.J., 9, 247 and 10, 50).
 CAREX CURTA Good. (*C. canescens* auct.). Add 1, 3, 18, 23 (P3); 13 (P5).
 CAREX OTRUBAE Podp. (*C. vulpina* auct.). Add 23, 25, 26 (P3).
 CAREX SPICATA Huds. (*C. muricata* auct.). Read 2, 12, 14, 28, 33, 38, 39
 CAREX PAIRAEI F. Schultz. Read 5-7, 11-13, 20, 21. Records for the aggregate *C. muricata*, not yet assigned to this or *C. spicata*, exist for 3, 4, 8-10, 16, 19.
 CAREX DIVULSA Stokes. Add 11 (P4).
 CAREX DIOICA L. Add 7, 30 (P5); 17 (P4).

- ECHINOCHLOA CRUSGALLI (L.) Beauv. (*Panicum crusgalli* L.). Only casual in Ireland.
- DIGITARIA SANGUINALIS (L.) Scop. (*Panicum sanguinale* L.). Only casual in Ireland.
- SPARTINA TOWNSENDII H. & J. Groves. Planted in H 3, 5, 8, 9, 21, 27, 38 (P3 and P5).
- HIEROCHLOE ODORATA (L.) Beauv. (*Savastana odorata* (L.) Scribn.). Add H 39 (I.N.J., 8, 377).
- ALOPECURUS MYOSUROIDES Huds. Only casual in Ireland.
- ALOPECURUS GENICULATUS L. Apparently not recorded from 13, though doubtless present.
- MILIUM EFFUSUM L. Add 8 (P1); 12, 31 (P3). Delete 22.
- PHLEUM ARENARIUM L. For 4 read 5.
- AGROSTIS CANINA L. Add 14, 24, 25 (P3).
- CALAMAGROSTIS EPIGEJOS (L.) Roth. Add 26 (P3).
- DESCHAMPSIA ALPINA (L.) Roem. & Schult. All Irish records are doubtful and should be bracketed.
- AVENA FATUA L. Only casual in Ireland.
- HELICOTRICHON PUBESCENS (Huds.) Pilger (*Avena pubescens* Huds.). Add 31 (P3).
- CYNOSURUS ECHINATUS L. Add 39 (P5).
- KOELERIA GRACILIS Pers. Add 3 (*Watsonia*, 1, 363).
- MELICA UNIFLORA Retz. Add 27 (P3).
- DESMAZERIA LOLIACEA (Huds.) Nym. Add 40 (ITB).
- POA PALUSTRIS L. Add 32, 33 (P4).
- POA NEMORALIS L. Add 1 (FK); 12, 25 (P3); 31 (P5); 33 (I.N.J., 9, 227).
- POA COMPRESSA L. Delete 4. Add 16 (P3); 30 (P5).
- GLYCERIA MAXIMA (Hartm.) Holmb. (*G. aquatica* (L.) Wahl. non J. & C. Presl). Add 7 (P3); 33 (I.N.J., 9, 227).
- GLYCERIA PLICATA Fr. Now recorded from all divisions except 24 and 25.
- PUCCINELLIA DISTANS (L.) Parl. (*Glyceria distans* (L.) Wahl.). Add 28 (P3).
- PUCCINELLIA MARITIMA (Huds.) Parl. (*Glyceria maritima* (Huds.) Wahl.). Delete 36. Add 12 (ITB); 16 (P2); 28 (P1).
- SCLEROPOA RIGIDA (L.) Griseb. (*Festuca rigida* (L.) Rasp, non Roth). Add 33, 36 (P3).
- FESTUCA GIGANTEA (L.) Vill. Add 31 (P3).
- FESTUCA ARUNDINACEA Schreb. Add 24, 25 (P3).
- FESTUCA PRATENSIS Huds. (*F. elatior* auct.). Read All save 5, 7, 10, 12, 17 (P3 and P5).
- FESTUCA ALTISSIMA All. (*F. silvatica* Vill., non Huds.). Add 13 (B.E.C., 1943-4, 774); 33 (I.N.J., 10, 50).
- VULPIA MYUROS (L.) C. C. Gmel. (*Festuca myuros* L.). Add 16 (P3).
- BROMUS ERECTUS Huds. Add 31 (P5).
- BROMUS COMMUTATUS Schrad. (*B. pratensis* Hoffm., non Lam.). Add 1 (FK); 3 (*Watsonia*, 1, 363); 38 (I.N.J., 9, 306).
- BROMUS RACEMOSUS L. Add 20 (P3).

- BROMUS ARVENSIS L. Only casual in Ireland.
- BRACHYPODIUM PINNATUM (L.) Beauv. Add 11 (P4); 13 (P3); 22, 31, 33 (P5); 39 (FNE).
- LOLIUM TEMULENTUM L. Add 13, 27, 29, 33 (P3).
- AGROPYRUM CANINUM (L.) Beauv. Add 40 (FNE).
- HORDEUM NODOSUM L. Add 22 (P3). 38 and 39 should stand within brackets (FNE).
- HORDEUM MURINUM L. Delete 4.
- ELYMUS ARENARIUS L. Add 38 (I.N.J., 9, 28).
- JUNIPERUS COMMUNIS L. Delete 3, and add 8, 9, 29, 33, 39, 40 (P3 and FNE).
- JUNIPERUS SIBIRICA Burgsd. Write 1-3, 16, 27, 28, 38 (P3 and FNE).
- TAXUS BACCATA L. For 32 read 33.
- PINUS SYLVESTRIS L. More or less naturalized in 3, 9, 10, 15, 16, 18, 19, 23, 27-30, 33, 36, 37.
- PINUS PINASTER Ait. Does not deserve to be included in the Irish list.
- EQUISETUM MOOREI Newm. Not recognized in *Com. Fl.*; it is in H 12, 20.
- EQUISETUM TRACHYDON A. Braun. Add 14, 21, 26, 35, 36 (P3); 16, 38 (P4).
- EQUISETUM VARIEGATUM Weber & Mohr. Add 1 (FK); 13, 20, 24, 25 (P3); 33 (P4). Delete 16 and 26 (P3 and P4).
- CRYPTOGRAMMA CRISPA (L.) Hook. Add 30 (P4), but here, as in most of its Irish stations, only casual, though arriving by natural means.
- ADIANTUM CAPILLUS-VENERIS L. For 22 read 27.
- ASPLENIUM VIRIDE Huds. Add 8 (P5).
- ATHYRIUM ALPESTRE (Hoppe) Rylands. The Irish record is doubtful and should be bracketed.
- POLYSTICHUM LONCHITIS (L.) Roth. Add 34 (*Proc. R. Irish Acad.*, 52 B, 82).
- DRYOPTERIS SPINULOSA (Müll.) Watt. Delete 21.
- THELYPTERIS OREOPTERIS (Ehrh.) Slosson (*Dryopteris oreopteris* Maxon). Add 28 (P3).
- THELYPTERIS PALUSTRIS Schott (*Dryopteris Thelypteris* (L.) A. Gray). For 2-9 read 2, 9. Add 24-26, 30, 34, 36 (ITB). The query may be removed from 20 (FW). Extinct in 39 (FNE).
- THELYPTERIS PHEGOPTERIS (L.) Slosson (*Dryopteris Phegopteris* (L.) C. Chr.). Delete 15 (P3).
- GYMNOCARPUM DRYOPTERIS (L.) Newm. (*Dryopteris Dryopteris* (L.) Christ). Remove brackets from 39 (I.N.J., 9, 320). This is the only station in Ireland in which the plant has been seen since 1879; it is really a casual.
- TRICHOMANES SPECIOSUM Willd. (*T. radicans* auct.). Add 28 (P3). The query should be removed from 20, as the plant certainly grew in this division; but it is very possibly extinct now in all but 1, 3, 8, 13, 28 and 35.

- HYMENOPHYLLUM TUNBRIGENSE* (L.) Sm. Delete 7 and add 30 (P5).
HYMENOPHYLLUM PELTATUM (Poir.) Desv. Delete 37. Add 8 (P5).
OSMUNDA REGALIS L. Add 30 (P4). In 32 it is present but not native.
OPHIOGLOSSUM VULGATUM L. Add 24 (P3).
PILULARIA GLOBULIFERA L. Add 2 (FK); 35 (P5).
ISOETES LACUSTRIS L. Add 6, 35-40 (ITB); 33 (I.N.J., 9, 52).
ISOETES ECHINOSPORA Durieu. Delete 40.
LYCOPodium ALPINUM L. Add 29 (I.N.J., 9, 72).
LYCOPodium CLAVATUM L. Add 31 (P5).
LYCOPodium INUNDATUM L. Add 18 (P4).
SELAGINELLA SELAGINOIDES (L.) Link. Add 36 (P3).

HOMOZYNE ALPINA IN SCOTLAND.

By B. W. RIBBONS.

Homogyne alpina (L.) Cass. was found in August 1951 in the parish of Cortachy and Clova, Angus, by A. A. P. Slack.* It covered an area of a few square feet and was associated with the following species: *Thalictrum alpinum*, *Viola Riviniana*, *Hypericum pulchrum*, *Alchemilla vulgaris* agg., *A. alpina*, *Saxifraga oppositifolia*, *Galium saxatile*, *Solidago virgaurea*, *Campanula rotundifolia*, *Calluna vulgaris*, *Pinguicula vulgaris*, *Oxyria digyna*, *Carex binervis*, *C. lepidocarpa*, *Anthoxanthum odoratum*, *Agrostis canina*, *Deschampsia cespitosa*, *Festuca* sp., *Blechnum spicant*. A small number of *Homogyne* plants was in fruit, the rest being merely vegetative.

Homogyne alpina occurs in Europe in the Pyrenees, Alps, Jura, Black Forest (Feldberg), Upper Swabia (on the Adelegg), Bayerischer Wald, Riesen- and Erzgebirge, Carpathians, north-western Balkans and Apennines. It is very common on pastures rich in humus, among mountain pine, on boggy heaths, and in woods in the Alps up to 10,500 ft. (Hegi). It is absent from Scandinavia.

In the vegetative state it might be mistaken for very young and/or dwarfed *Tussilago Farfara* but the leaves are green in colour on both surfaces and much smaller than those of *Tussilago* or *Petasites*. The lower leaves are long-stalked, cordate-reniform, toothed-crenate, and those of the stem ovate-lanceolate. The radical leaves often wither before flowering time (May to August in the Alps). The rootstock is short and thick. The stem is erect (about 12 in. high in our specimens), woolly (not scaly, as in *Tussilago*) and bears a solitary flower-head. All the florets are fertile and bisexual, excepting one row of ray-florets which are female. The corolla is purplish in colour.

George Don records *Homogyne alpina* (as *Tussilago alpina*) as new to Britain (1813, Account of the Native Plants in the County of Forfar and the Animals to be found there, in Headrick, *General View of the Agriculture of the County of Angus or Forfarshire*, Edinburgh). Gardiner (1848, *Flora of Forfarshire*) suggests that Don's plant might be *Erigeron alpinus*. Watson (1849, *Cybele Britannica*, 2, 110) remarks that no other botanist appears to have found it in Britain and thinks it could not be mistaken for *Erigeron alpinus*, and later (1852, *Cybele Britannica*, 3, 459) he quotes Borrer: "My specimen from G. Don is of the true plant",† and comments: "Such being the case I do not under-

*Specimens at Royal Botanic Gardens, Kew; Royal Botanic Garden, Edinburgh; and University of Glasgow.

†In Herb. Borrer at the Royal Botanic Gardens, Kew. There is also a specimen from G. Don in the general Herbarium at Kew.

stand why the *Homogyne alpina* should be totally excluded from British Floras (*ex. gr.* Bab. Man.) . . . I do not, however, believe this to be a British species". Hooker and Arnott (1860, *British Flora*, ed. 8) write: "There is a specimen in Herb. Brodie, from G. Don, with the following station attached to it: 'on rocks by the sides of rivulets on the high mountains of Clova, as on a rock called Garry-barns'; . . . but we are not on that account prepared to admit the plant as indigenous." Druce (1884, *Scottish Naturalist*, 1884; 1920, *Bot. Soc. & F.C.*, 5) says there is a specimen in Miss Palmer's‡ collection labelled: "moist rocks on the Clova Mountains."

Druce (1904, *Notes from the Royal Botanic Garden, Edinburgh*, 1904) suggests the following explanation: "Mr Gardiner's suggestion that Don mistook it for *Erigeron alpinus* will not do, since, in correspondence, he mentions finding the plant in Clova. I am more inclined to think that some young leafy specimens of *Tussilago Farfara*, which becomes very dwarfed in the alpine districts of Scotland—and I have seen such at nearly 3000 feet—and which is rare in such situations, may have been thought by Don to have been different from the lowland Coltsfoot, and planted in his garden may have afterwards been confused with *Homogyne alpina* Cass. I suspect labelling in his garden was not a strong point, memory being probably in most cases relied on, and this eventually was sure to lead to error."

Druce (1924, *Rep. Bot. Soc. & F.C.*, 7) records "a small-leaved barren" *Tussilago Farfara* in the Yellow Corrie of Glen Lyon, Mid Perth, with leaves $\frac{1}{2}$ -1 in. long by $\frac{3}{4}$ -1 $\frac{1}{4}$ in. broad, and suggests that this was the plant which Don mistook for *Homogyne*.

I have been unable to find out whether Don knew the plant in more than one place in Clova; nor do I know if the present station is Don's.

If Druce's suggestion that Don did not really find the species in Angus is accepted, then either the plant was there but not discovered by Don or it has been introduced since by some unknown agency. Otherwise it may be supposed that Don either deliberately planted it or found it as he describes. In the absence of evidence to the contrary it seems most reasonable to accept Don's own account. The European distribution of *Homogyne alpina* seems to be against its being native here, but there are comparable British plants, such as *Alchemilla conjuncta*, with a somewhat similar though more restricted European distribution and a very restricted range in this country. *Primula Auricula* is similarly distributed on the Continent and is also known from Angus. However, this species has undoubtedly been planted in Scotland and there is no evidence going back as far as Don's time.

My warm thanks are due to Mr. J. E. Lousley, Mr. R. Mackechnie, and Dr. E. F. Warburg for their advice.

‡Miss C. E. Palmer, the granddaughter of the fourth Countess of Aylesford of Packington Hall.

NOTE ON THE PERENNATION OF DODDERS

By J. F. SHILLITO.

The British species of the genus *Cuscuta* L., existing knowledge of which has been well summarised by Verdcourt (1948; 1950), are usually described as annuals, and, for no apparent reason, doubt has often been cast on their ability to survive the winter except as seed.

For *C. europaea* L. this is probably correct; the only opportunity of searching for over-wintered forms on nettles (Leatherhead, 12th May 1951) gave negative results though seedlings were plentiful; further search, supplemented by experiment, is required before this can be accepted as final. It is sufficient for present purposes to emphasise that both the normal hosts (*Urtica dioica* L. and *Humulus Lupulus* L.) have underground perennating systems not readily accessible to the attaching stems of the parasite.

The other species, *C. epithymum* (L.) L., is perhaps an aggregate consisting of several physiological races; *C. trifolii* Bab., usually quoted as a synonym, is one of these but its status cannot be finally settled until these races have been further investigated experimentally. Thus several attempts (1951) to infect white clover from dodder growing on gorse gave completely negative results.

Perennation of *C. epithymum*, *sensulato*, has been recorded by several observers in other countries—their results have been summarised by Stewart & French (1909). In an interesting earlier paper, Stewart (1908) gave full details of his own observations and experiments on alfalfa in America. Marre (1905) also described the formation of "tubercles" "on the soil" at the onset of adverse conditions; these tubercles he stated were capable of surviving the winter and of developing in the following year. It seems most likely that this is a slightly inaccurate description of the forms described by Stewart (1908, cf. his Plate IV) as "hibernating on the crowns of alfalfa" and that Marre's tubercles are not independent of the host plant.

The result of recent experiments, supported by field observation, has shown that perennation can be readily effected by similar tubercles formed by *C. epithymum* on the stem of gorse, *Ulex europaeus* L. (laboratory and field) and on broom, *Sarothamnus scoparius* (L.) Koch (laboratory and garden).

In this connection it may not be out of place to refer to a paper by Rao (1937) on perennation of *C. reflexa* Roxb. in India. The normal hosts of this species are *Strobilanthes* spp. (*Acanthaceae*)—woody shrubs capable of producing seed only at intervals. Rao describes and figures "growths" embedded in the stem, not completely overcome by its repairing activities, and so capable (in this case) of resisting drought conditions.

The ecological conditions of the hibernating tubercles on the stem of gorse seem parallel, i.e.

- i. dense thicket growth of host with considerable litter at the base,
- ii. replacement of host by seed at irregular intervals,
- iii. sufficient protection and nutrition for survival over adverse conditions.

One must therefore agree with Rao that this form of tubercle formation must be regarded as a positive adaptation for survival, and with Stewart (1908) that it is neither accidental nor occasional, but the chief method by which this dodder is carried on from one year to another.

EXPERIMENTS AND OBSERVATIONS. 1950-1951.

The seed used for this series of experiments was obtained from some of the abundant growth of the parasite on gorse bushes on Beeston Regis Common, near Sheringham, Norfolk, in September 1949. The seed was stored over winter, threshed out and sown with the litter next spring. Germination of these seeds took place a few days after the gorse seeds accompanying them (May 1950) and in nearly every case attachment (if made at all) was to the cotyledons or to the first true leaves of the gorse seedlings. A small sample of seeds retained some viability till the following year.

Subsequently the parasite was grown-on to larger seedlings of gorse and broom and also transferred to a larger broom plant in the garden. None of the dodder plants flowered in 1950, despite extensive growth, and at the end of the season, when frosts killed off the threadlike stems of the parasite, many small tubercles, closely adpressed to the host-stem, remained. These gave rise (April-May 1951) to a multiplicity of new shoots, which branched freely, growing both upwards and outwards, later freely flowering. These plants, under conditions of careful cultivation, eventually gave rise to a second generation of tubercles in the late autumn of 1951. It is interesting to confirm Stewart's observation that branches arising from one node of the parasite are never equal in length, another positive adaptation which increases chances of attachment. Another feature (discovered by accident when one of the potted broom plants, carrying over-wintered parasites, dried out shortly after the first spring growth from the tubercles) was that the stems of the parasite died back but, when the pot was watered again, growth started anew from the original tubercles. The detailed morphology of these tubercles should prove interesting and might also throw some light on the true homology of the haustoria.

A visit to Beeston in June 1951 confirmed that similar new growths were forming on the gorse bushes under natural conditions (Plate 4); here too it was apparent that the parasite affects the host in three degrees of severity:—

- i. dead gorse in an inner zone—apparently killed by the previous year's infestation.

PLATE 4.



Cuscuta epithymum: early growth (erect phase) from overwintered tubercles.



Cuscuta epithymum: spreading phase of growth following hibernation; note the relative reduction of flowering.

- ii. flowering of gorse totally inhibited by a heavy infestation developing from many tubercles,
- iii. flowering of gorse merely retarded—a lighter infestation from fewer tubercles.

Uninfected zones in full flower formed a magnificent spectacle on that occasion (Plate 4).

One other effect noted during these studies deserves comment: tubercles exercise an hypertrophying effect on both gorse and broom—buds just below the tubercle develop more rapidly than those distally situated, and the resulting growth of the host provides soft stem within reach and suitable for haustorial formation by the “tendrils” developing at the same time. The interaction of hormones of host and parasite calls for further investigation—thus it may be found that tubercle formation is in some way an alternative to flowering, and the following questions remain to be solved by continued observation under controlled conditions:

- i. Can this species flower (or be made to flower) in its first season?
- ii. Does it continue perennially under natural conditions, or is it sometimes a biennial?
- iii. Can flowering be postponed almost indefinitely by repeated transfer to new hosts? (cf. Stewart, *loc. cit.*).

Towards the end of the period under review, an infestation of *C. epithymum* was located on *Ulex minor* Roth and this too requires fuller investigation—ecological conditions are rather different and the host flowers later in the season than does the parasite, whereas the main flowering of *U. europaeus* is much earlier.

Finally perhaps it may be permitted to consider briefly the theoretical bearing of this study on the evolution of the parasite; any parasite whose survival mechanism involves destroying seedlings of its host may either

- a. reduce the population of its host to a danger level, or
- b. accelerate any tendency of its host to propagate vegetatively.

In the latter case, the parasite must then adapt itself by providing a new survival mechanism or attack alternative hosts, developing new host-specificity reactions and possibly giving rise to physiological races, and eventually new (morphological) species. It is suggested that the relationship of *C. epithymum* to *U. europaeus* (and possibly *U. minor* also) shows just the balance that may be expected from a well-established parasite.

CONCLUSIONS.

1. *C. epithymum* (L.) L. has been shown to form hibernating tubercles on the stems of gorse and broom.
2. Much of the localised spreading of this parasite is due to vegetative growth from these tubercles in spring.

3. It is agreed with Rao that this tubercle-formation is a positive adaptation permitting survival where growth from seeds is frequently impracticable.

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SALIX CALODENDRON WIMM. in BRITAIN

By R. D. MEIKLE.

Two recent references to *Salix dasyclados* Wimm. in Britain (Rehinger, 1950, 273-4; Polunin, 1950, 362) show that there is some confusion concerning the identity of this willow, since I feel certain that, in both cases, the plants so named should have been referred, not to *S. dasyclados*, but to the closely related *S. calodendron* Wimm.

The confusion originated as far back as 1804 with the description by Sir J. E. Smith (1804, 1068) of a willow which he named *Salix acuminata*, under the mistaken belief that it was identical with the *S. acuminata* of Miller (1768, no. 14). Smith's plant was subsequently figured—again as *S. acuminata*—in *English Botany* (1805, t. 1434), and it was not until twenty-three years later that the mistake was corrected (Smith, 1828, 227), though in accordance with the fashion then prevailing, the name *S. acuminata* Sm. was retained, despite the fact that it was antedated by *S. acuminata* Mill., which, on Smith's own admission, was applicable to a different plant. Incidentally it is worth noting that *S. acuminata* Mill. may prove the correct name for the willow generally named *S. atrocinerea* Brot., for Miller expressly states it is the "common willow"—presumably the British shrub—though, following Ray, he cites as a synonym the "*Salix folio ex rotunditate acuminato*" of Bauhin (1623, 474). This, however, is a problem to be debated elsewhere.

S. acuminata (non Mill.) Sm. remained throughout the nineteenth century the name for the plant figured in *English Botany*, and continued to appear in plant-lists and local Floras until Fraser (1933, 368), acting on the advice of Floderus, discarded it in favour of *S. dasyclados* Wimm., a name which has since persisted, though examination of authentic material reveals that *S. acuminata* Sm. and *S. dasyclados* Wimm. are not identical.

The name *S. dasyclados* was first proposed by Wimmer (1849, 35) for a willow closely resembling the British *S. stipularis* Sm. but distinguished from that species by its more broadly lanceolate leaves, which are less silky beneath, and by its darker brown, sub-obtuse catkin-scales. The type material of *S. dasyclados* came from the neighbourhood of Troppau and Breslau, in Silesia.

Wimmer subsequently (1866, 42) reduced *S. dasyclados* to synonymy under *S. longifolia* Host (1828, 63), overlooking the fact that this name was invalidated by the earlier *S. longifolia* of Lamarck (1788, 232); in consequence *S. dasyclados* again becomes the valid name for a willow species (or hybrid) apparently not infrequent in some parts of northern and central Europe, though not yet correctly recorded from the British Isles.

The close relationship between *S. dasyclados* Wimm. and the *S. acuminata* of Smith and British botanists was recognized by Wimmer (1853, 163), and he first regarded *S. acuminata* as a hybrid, *S. Caprea* L. \times *dasyclados* Wimm., but later (1866, 187), feeling less certain concerning the affinities of these puzzling shrubs, he proposed the name *S. calodendron* in place of the supposed *Caprea* \times *dasyclados*, at the same time making it quite clear that this name and the invalid *S. acuminata* Sm. are synonymous, and that *S. calodendron* Wimm. and *S. dasyclados* Wimm. are distinct.

Andersson (1867, 71) wrongly united *S. dasyclados* and *S. calodendron* Wimm., and in this he has been followed by Buchanan-White (1890, 420) C. E. Moss (1914, 63) and Hylander (1945, 122). The attitude taken by Floderus (1931) is somewhat perplexing; on p. 78 he cites *S. calodendron* Wimm. (= *S. acuminata* Sm.) under *S. Caprea* L. \times *dasyclados* Wimm., but, on p. 83, *S. acuminata* Sm. is said to be the hybrid *S. Caprea* L. \times *viminialis* L., while, to make matters worse, he subsequently (*teste* Fraser, 1933, 368) refers *S. acuminata* Sm. to *S. dasyclados* Wimm.!

The male plant of *S. calodendron* Wimm. is unknown, and it has been suggested that this willow, also *S. stipularis* Sm. and *S. dasyclados* Wimm., are merely "nothomorphs" or variants of *S. Caprea* \times *viminialis* (Nilsson, 1928, 68-70. 82). It has also been argued that *S. calodendron* is a triple hybrid—*S. Caprea* \times *cinerea* \times *viminialis*, whilst some European botanists now give *S. dasyclados* specific rank and, following Wimmer's original opinion, cite *S. calodendron* as a hybrid—*S. Caprea* \times *dasyclados*. In the absence of additional data, it is impossible to confirm or to deny the correctness of any of these opinions, and, for the present at least, I feel it is better to employ binomials in distinguishing *S. calodendron* and its allies, thereby avoiding the difficulties which await those who attempt to unravel genetical problems without the necessary experimental evidence. In any case, it is clear that existing nomenclature should be put straight before the more complex problems of taxonomy can be dealt with. With this object in mind, I add the detailed synonymy of *S. calodendron*, together with a short account of its morphology and distribution. For the sake of completeness, very brief notes on the allied *S. stipularis* and *S. dasyclados* are included, and a key to the three willows.

1. Leaves broadly lanceolate or ovate (9-11 cm. long, 2.5-4 cm. wide); stigma shorter than style *S. calodendron*.
1. Leaves narrowly lanceolate (10-13 cm. long, 1.5-3 cm. wide); stigma as long as or longer than style 2.
2. Catkin-scales light brown, acute; leaves 1.5-2.5 cm. wide, silky-pubescent beneath *S. stipularis*.
2. Catkin-scales dark brown, subobtuse; leaves 2-3 cm. wide, thinly pubescent or subglabrous beneath *S. dasyclados*.

1. *SALIX CALODENDRON* Wimm., 1866, *Salices Europaeae*, 187.

S. acuminata Smith, 1804, *Fl. Brit.*, **3**, 1068; 1805, *Eng. Bot.*, **20**, 1434; in Rees, 1815, *Cyclopaedia*, **31**, no. 129; 1828, *Eng. Fl.*, **4**, 227; Forbes, 1829, *Salicetum Woburnense*, 261; Hooker, 1830, *Brit. Fl.*, ed. 1, 424; Babington, 1843, *Mam. Brit. Bot.* ed. 1, 274; Watson, 1849, *Cyb. Brit.*, **2**, 394; Syme, 1868, *Eng. Bot.*, **8**, 229; non Mill., 1768, *Gard. Dict.*, ed. 8, no. 14.

S. × *Smithiana* Willd. var. *acuminata* (Sm.) Anderss. in DC., 1868, *Prodr.*, **16**, pt. 2, 268, *pro parte*; White, 1890, in *Journ. Linn. Soc. Bot.*, **27**, 420, *pro parte*; cf. Hook. f., 1870, *Student's Flora*, 340.

S. Caprea-dasyclados Wimm., 1853, *Denkschr. Feier fünfzigjähr. Besth. Schles. Ges.*, 163.

S. dasyclados Wimm. sec. Anderss., 1867, *Bot. Notiser*, 61, *pro parte*; Floderus sec. Fraser, 1933, *Rep. Bot. Soc. & E.C.*, **10**, 368; Hylander (as "*S. dasyclada*"), 1945, *Uppsala Univ. Årsskr.*, **7**, 122-3, *pro parte*: non Wimm. in *Flora* (Regensb.), **32**, 35 (1849).

S. (*cinerea* L. × *viminalis* L.) × *Caprea* L., A. & E. G. Camus, 1905, *Mon. Saules d'Europe*, **2**, 265.

S. × *acuminata* Linton, 1913, *Journ. Bot. Suppl.*, 33, *pro parte*, Moss, 1914, *Cambr. Brit. Fl.*, **2**, 63, *pro parte*.

S. Caprea L. × *viminalis* L., Floderus in Holmberg, 1931, *Skand. Fl.*, **1b**, 83.

S. viminalis L. var. *acuminata* (Sm.) Druce in Hayward, 1930, *Bot. Pocket-book*, ed. 19, 178.

An erect much-branched shrub 4-6 m. high; branches and twigs dark brown, thinly pubescent, the wood marked with scattered, long *striae*; young growing shoots densely and softly ashy-tomentose. Buds acute, silky-pubescent. Stipules conspicuous, caducous, reniform-acuminate, 0.5-1 cm. long, about 5 mm. broad, distinctly veined, upper surface thinly pubescent, lower surface densely ashy-pubescent, margin recurved glandular-denticulate. Petiole densely pubescent, 1-1.5 cm. long, slightly channelled above, strongly convex below; lamina broadly lanceolate or sometimes ovate, (8) 9-11 (13.5) cm. long and 2.5-4 cm. broad, gradually acuminate towards apex, cuneate or rounded at base, deep green and thinly puberulous above, ashy below, at first densely pubescent, later subglabrous; midrib yellowish or reddish, slightly depressed above, prominent and convex below, pubescent lateral nerves 20-25 pairs, rather prominent below; leaf-margin sharply and narrowly recurved, remotely glandular-denticulate. ♀ catkins appearing before the leaves, cylindrical, 4-7 cm. long and about 1 cm. broad, shortly pedunculate, the peduncles densely villous, and bearing 2-4 ovate, silky bracts; catkin-scales 2-3 mm. long and 1-1.5 mm. wide, ovate-acute or subobtusate, rarely acuminate, pale brown towards base, dark brown above, clothed with long, silky white hairs; nectary single, narrow, about 1 mm. long; ovary shortly pedicellate, narrowly ovoid, 2.5-3.5 mm. long, densely white-villous, style conspicuous, about 1 mm. long, stigmas

2. undivided, about 0.75 mm. long, abruptly pointed or almost obtuse, greenish-yellow. The ♂ catkins are unknown.

BRITISH ISLES.

- V.-C. 17, SURREY; Thames bank near Kingston, 1899, 1913, and 1925, *J. Fraser*, 36, 534 (K.); Basingstoke canal, Woking, 1926, 1928, *J. Fraser*, 630 (K.).
 19, N. ESSEX; Audley End, 1842, *Leeke*, 37 (K., B.M.).
 20, HERTS.; Ickleford, 1921, *J. E. Little* (K., B.M.); pond by Midland Rly., Icknield Way, 1921, *J. E. Little* (K., B.M.); Brook End, St. Ippolitts, 1922, *J. E. Little*, 527 (K., B.M.); Roxley, Willian, 1923, *J. E. Little*, 570 (K.).
 21, MIDDLESEX; Margin of Welsh Harp reservoir, 1948, *R. D. Meikle* (K.).
 25, E. SUFFOLK; Hopton, cult. Bournemouth, *E. F. Linton*, Set of British Willows, 13 (K., B.M.).
 27, E. NORFOLK; Near R. Wensum, Norwich, 1883, *E. F. Linton* (B.M.); Dolphin Ferry, Norwich, 1883, *E. F. Linton* (B.M.).
 28, W. NORFOLK; King's Marsh, Wolferton, 1922, *J. E. Little*, 512 (K.); Coalyard Creek, Wolferton, 1950, *E. L. Swann*, 1981 (K.); Holme next the Sea, 1950, *E. L. Swann*, 1982 (K.).
 29, CAMBS.; Cherry Hinton, *herb. Borrer* (K.); near end of Jesus Lane, *Ed. Forster* (B.M.).
 30, BEDS.; St. Neots Bridge, 1888, *E. F. Linton* (B.M.); pond at Turvey, 1890, *E. F. Linton* (B.M.).
 38, WARWICK; Shrewley, 1876, *R. L. Baker* (B.M.) and, same place, 1881, *E. A. Lomax & H. Bromwich* (B.M.).
 39, STAFFS.; Trysull, Wolverhampton, 1873 and 1878, *W. & J. Fraser* (K., B.M.).
 53, S. LINCS.; Pond near Medlam House, between Carrington and New Bolingbroke, 1945 (= *Simpson*, 165), *A. H. G. Alston* (B.M.).
 64, MID WEST YORK; York, by the Ouse; *herb. Borrer* (K.).
 68, CHEVIOTLAND; Roadside, Carham, planted, 1876, *A. Brotherston* (B.M.).
 90, FORFAR; Barry Links, near Carnoustie, 1947, *K. H. Rechinger*, 28 (B.M.).
 93, N. ABERDEEN; Wayside near Old Pitsligo, Rosehearty, 1927, *J. Fraser*, 687 (K.).
 H.3, W. CORK; Hare Island, (1947 or 1948), *P. J. Newbold* (K.).
 H.38, DOWN; Roadsides near Newtownards, 1945, *R. D. Meikle* (K.).

EUROPE. Germany, Sweden, Denmark, cultivated or escape.

2. *SALIX STIPULARIS* Sm., 1803, *Eng. Bot.*, 1214.

Habit and height as in *S. calodendron*. Young shoots densely whitish-pubescent, older twigs brown, glabrous or subglabrous. Stipules as in *S. calodendron* but narrower, and often produced into a long subulate apex, margins glandular, sub-entire or inconspicuously denticulate. Petioles rather short, usually less than 1 cm. long, very shortly puberulous; lamina narrowly lanceolate, or linear-lanceolate, 10-13 cm. long, 1.5-2.5 cm. broad, gradually narrowed towards apex and base, thinly puberulous above, white silky below; leaf-margin very narrowly recurved, undulate but scarcely denticulate. ♀ catkins 4-5 cm. long, pedunculate; peduncles silky, with 2-4 thinly villous leaf-like bracts; catkin-scales narrower and more acuminate than in *S. calodendron*, light brown below, darker at apex; nectary as in *S. calodendron*; ovary subsessile or very shortly pedicellate, narrowly ovoid, 3-4 mm. long, closely white-silky; style almost 1 mm. long, stigma 2 mm. or more long,

filiform, tapering. ♂ catkins unknown, all records being based on erroneous identifications.

GREAT BRITAIN.

- V.-C. 13, W. SUSSEX; Osier-bed, Warnham, 1860, *H. Trimen* (B.M.).
 18, S. ESSEX; Walthamstow, by Lea Bridge, *herb. Borrer* (K.).
 19, N. ESSEX; Near Audley End, 1874, *Leeffe* (K.).
 26, W. SUFFOLK; Bury St. Edmonds, *Smith* (K.).
 728, W. NORFOLK; "Norfolk, 1805, *Mr. Crowe*" (K.).
 41, GLAMORGAN; Swansea, cult. Shirley, Derby, 1893, *W. R. Linton*, Set of British Willows, no. 9 (K.).
 68, CHEVIOTLAND; Tweedside, Carham, 1874-76, *A. Brotherston* (B.M.).
 70, CUMBERLAND; Keswick, 1853, *herb. Borrer* (K.).
 72, DUMFRIES; Annan Water, Oakridge side, *J. T. Johnston* (B.M.).
 79, SELKIRK; Robertson Moss, Borthwickshiels, 1879, *A. Brotherston* (B.M.).
 80, ROXBURGH; Peatry Bog, 1874, *A. Brotherston* (B.M.). Side of Bowmont Water, above Prinside Mill, 1876, *A. Brotherston* (B.M.).
 81, BERWICK; Boggy ground at Coldingham Loch, 1877, *A. Brotherston* (B.M.).
 (85, FIFE; "Cultivated at Balmuto, from Rev. J. E. Leefe, 1877," *J. T. Boswell-Syme* (B.M.).)
 88, MID PERTH; Glen Lyon near Fortingal, 1894, *W. R. Linton* (B.M.), and ? from same locality, cult. Shirley, 1896, *W. R. Linton*, Set of British Willows, no. 84 (K.).
 90, FORFAR; Near Easthaven station, 1911 and 1912, *R. & M. Corstorphine* (K.).
 107, W. SUTHERLAND; Railway cutting, Helmsdale, *E. F. Linton* (B.M.).

EUROPE. Cultivated in Germany, Sweden and Western Russia.

3. *SALIX DASYCLADOS* Wimm., 1849, in *Flora* (Regensb.), 32, 25.

Habit and height as in *S. calodendron*. Young shoots densely white tomentose, older twigs dull or (rarely) rather lustrous dark brown. Buds acute, densely pubescent. Stipules conspicuous, narrowly reniform-acuminate, intermediate in appearance between those of *S. calodendron* and *S. stipularis*. Petioles 1-1.5 cm. long, flattened above, convex below, thinly pubescent; lamina lanceolate, (8) 11-13 (23) cm. long, 2-3 cm. wide, gradually narrowed towards apex and base, glabrous or subglabrous and rather glossy above, ashy-pruinose below and subglabrous except on midrib and nerves or very sparsely pubescent; leaf-margin narrowly recurved, inconspicuously undulate-denticulate. ♀ catkins 4-5 cm. long and 1 cm. broad, with short white-silky peduncles; bracts 2-4 small, ovate, thinly silky-villose; catkin-scales smaller than those of *S. calodendron*, obtuse or almost rounded above, rich brown with a darker apex, clothed with long, silky, white hairs; nectary as in *S. calodendron*; ovary sessile or very shortly stalked, narrowly ovoid, 3-4 mm. long, densely white-silky; style 1-2 mm. long, stigmas tapering, a little shorter than in *S. stipularis* but longer than in *S. calodendron*. ♂ catkins similar in shape and size to ♀, but perhaps a little more villose; stamens 2, filaments glabrous, 4-5 mm. long.

EUROPE. Germany; Austria; Czechoslovakia; Poland.

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NOTES ON BRITISH CARICES — VIII*

By E. NELMES.

CAREX FILIFORMIS L.

The name *Carex filiformis* L. (1753, *Sp. Pl.*, 976) was published as follows:—

17. CAREX spica mascula oblonga, femineis sessilibus oblongis, inferiore foliolo proprio brevior. *Fl. suec.* 760.

Cyperoides sylvaticum tenuifolium, spicis parvis tenuibus spadico-viridibus. *Scheuch. gram.* 425. t. 10. f. 11.

Habitat in Europae nemoribus.

No type specimen appears to have been preserved (as explained later in this paper), and it is therefore necessary to consider at some length the correct application of the name.

DIAGNOSTIC PHRASE.

The short Linnaean diagnosis quoted above is taken unchanged from the *Flora Suecica*. It applies more or less to several other European *Carices*, besides *Carex filiformis*, described in the *Species Plantarum* as having a solitary male spike and sessile female spikes. These species are: *C. flava*, *C. montana*, and *C. pilulifera*. Apart, however, from the improbability of Linnaeus's describing any one of these distinct sedges twice in the same work, *C. flava* has at least its lowest spike peduncled (Linnaeus says "spicis confertis subsessilibus"), and is obviously too robust in habit to be named 'filiformis'. This epithet, agreeing with the words "tenuifolium" and "tenuibus", used by Scheuchzer to describe the leaves and spikes of his plant, surely suggests a markedly slender sedge. *C. montana* and *C. pilulifera* are distinct and well-marked species, well known to Linnaeus, and their female spikes cannot be accurately described as 'oblongis'.

As Linnaeus places *C. filiformis* between *C. globularis* and *C. pilulifera*, which have pubescent utricles, it is permissible to assume that it also has a pubescent utricle. Taken in conjunction with its other characters, this greatly restricts the possible claimants to the name *C. filiformis* among *Carices* described since the publication of the *Species Plantarum*. Indeed, there appear to be only three species occurring in Sweden that remain to be considered: *C. ericetorum* Poll., *C. caryophyllea* Latourr. (a common plant, apparently and surprisingly absent from the *Species Plantarum*), and the species known as "*C. tomentosa* L.", which may or may not be the plant described as *C. tomentosa* by Linnaeus in his *Mantissa*, 1123 (1767). *C. caryophyllea* is a plant of dry open hillsides rather than of woods, and both it and *C. ericetorum* normally have a somewhat clavate male spike and a setaceous lowest bract.

*Continued from 1948: *Rep. Bot. Soc. & E.C.*, 13, 337.

Linnaeus's description of *C. globularis*, "16. *Carex spica mascula oblonga, feminea sessili ovata, foliolo florali breviori approximata. Fl. succ. 759*", if compared with that of *C. filiformis*, strongly suggests that the two species are closely related. The type specimen of *C. globularis* in the Linnean herbarium, marked by Linnaeus "16 *globulifera*" [sic], agrees perfectly with the description of this species in the *Species Plantarum*, where it is no. 16. There is, in fact, no question about the identity of this well-marked northern species. Its nearest European relative, apart from *C. Grioletii* Roem., which has peduncled female spikes and is a southern species, is the plant known as "*C. tomentosa* L.", and this species is distinguished from *C. globularis* in exactly the same way in which Linnaeus distinguishes *C. filiformis*. It seems evident, therefore, that *C. filiformis* L. is the plant usually known as "*C. tomentosa* L."

HABITAT.

Linnaeus gives the habitat of his *C. filiformis* as "in Europae nemoribus". In England the species known as "*C. tomentosa*" occurs in water-meadows, drier fields, dry roadsides, dry to damp grassy rides in woods, and dry wood-borders, from about sea-level up to at least 600 ft. On the Continent "*C. tomentosa*" is a still more pronounced woodland plant than in this country.

CITATIONS.

Linnaeus's first reference under *C. filiformis* in the *Species Plantarum* is to the *Flora Suecica* (1745), whence he takes his diagnosis unchanged. In fact, the treatment of species no. 760 in the earlier work is the same as that in the *Species Plantarum* except that there is a citation from "*Haller helv.*" and an *observatio* below the description of the habitat. As the Haller reference and the *observatio* are omitted from both the *Species Plantarum* (1753) and edition 2 of the *Flora Suecica* (1755), they are not taken into account in this investigation.

There is one important point, as will be seen later in this paper, arising from the *Flora Suecica* reference. Linnaeus describes in the *Flora* six species in his section "Spicis sexu distinctis: foemineis sessilibus", corresponding to those in the same section in *Species Plantarum*, where are added *C. montana* and *C. pilulifera*. Under five of these species there is a reference to his *Flora Lapponica*, but not under the sixth, no. 760, which in the *Species Plantarum* becomes *C. filiformis*. This clearly indicates that *C. filiformis* was not known to Linnaeus from Lapland.

The only citation under *C. filiformis*, apart from the *Flora Suecica* definitive reference, is of a description and figure published in Scheuchzer's *Agrostographia* ('*Scheuch. gram.*'). My colleague, Mr. H. K. Airy Shaw, has kindly translated Scheuchzer's detailed Latin description for me, and this puts beyond all doubt, what his figure had already made clear, that his plant is the '*Carex tomentosa* L.' of botanical authors. Phrases such as "culms a foot high or slightly more, slender".

"lower sheaths . . . spadiceous or fuscous-purplish", "one or two seed-bearing spikes" [from axils] " $\frac{1}{2}$ -1 inch . . . long", "these seed-bearing spikes . . . have either no peduncle or a very short one entirely hidden in the sheath", "they are 3-4 lines long [and] 1-1 $\frac{1}{2}$ lines in thickness", "utricle, which is greenish, about $\frac{1}{2}$ line long [and] if examined through a lens, is villous with very short dense hairs", refer unmistakably to this plant.

"TYPE" SPECIMENS.

There are no specimens of '*C. tomentosa*' in the Linnean herbarium, and if this is indeed *C. filiformis* L., as is argued in this article, then Linnaeus did not preserve the specimen or specimens from which he drew up his descriptions in the *Flora Suecica* (1745) and *Species Plantarum* (1753). (See quotation from Th. Holm below.) The fact that Linnaeus takes the *Flora Suecica* diagnosis and uses it without alteration in the *Species Plantarum*, cuts out the Haller reference and the "Obs.", and retains the Scheuchzer reference, suggests that the discarded specimen of 1745 had not been replaced by 1753, and that his conception of *C. filiformis* in the *Species Plantarum* was based on his knowledge of the plant in the field, or on his memory of the *Flora Suecica* specimen, and on the figure and very full description of Scheuchzer.

It should be mentioned that Kükenthal, the great authority on the *Cyperaceae*, has the following synonym and note under '*C. tomentosa* L.' in his monograph (in Engler, *Das Pflanzenreich*, 1909). '*C. filiformis* Thuill. Fl. Paris. 440 (1790); verisimiliter etiam L. Sp. Pl. 976 (1753) (excl. herbar.)'. Further, at the end of his description of *C. lasiocarpa* Ehrh. he has this note: "In herbario Linnaei sub nomine *C. filiformis* species nostra asservatur, sed descriptio et locus natalis non ad hanc sed ad *C. tomentosam* quadrant."

In the Linnean herbarium *C. lasiocarpa* Ehrh. is represented by two specimens (on two sheets). At the foot of the first sheet Linnaeus first wrote "*angustifolia*", but later crossed it through and substituted "*elongata*", which was in turn also struck out, the final epithet being "*filiformis*". At the left of this appears, in pencil, "*Lasiocarpos* of Ehrh. G [oodenough].", and below it the name "*tomentosa* Light [foot] herb.", both apparently in Goodenough's hand. Other notes (by Smith) on the sheet are: "rara", "*angustifolia* conf. Faun. Suec. 558 mss." Just beneath the stem Linnaeus has written: "Lapp. s. [i.e., Lapland, Solander]." Another specimen of the same species follows, with merely "30" written at the foot of the sheet.

In Smith, 1828, *English Flora*, 4: 128, under *C. filiformis*, is this synonym, among others: "*C. angustifolia*, Linn. Ms. in Sp. Pl. ed. 1, 975." This refers to Linnaeus's own interleaved copy of the *Species Plantarum*, on the blank page of which, exactly opposite *C. hirta* (p. 975), are written a diagnosis and full description of "*angustifolia*". This diagnosis and description agree well with the specimens of *C. lasiocarpa* mentioned above, a species which is most closely related to *C. hirta* L. Following the diagnosis is the habitat, given as "Lapponia, Anglia".

no doubt referring to the Solander specimen and the one placed next to it in Linnaeus's herbarium.

Most of the species described by Linnaeus in manuscript in his interleaved copy of the *Species Plantarum* were incorporated into his second edition, but that of *C. angustifolia* was struck out and discarded. This corresponds with the change of epithet on the 'type' sheet, and it seems certain that Linnaeus changed his mind about this being a distinct species, hesitantly referring it to his *C. filiformis*.

At this point it may be of interest to quote from Th. Holm, "Studies in the Cyperaceae, XVIII." (1903, *Amer. Journ. Sci.*, Ser. 4, 15: 147): "It is a well known fact that a large number of the specimens collected by Linnaeus do not correspond with the diagnosis, written by himself, and the reason for this is thus explained: Linnaeus did not preserve such material as he had already described, and which he described in the field, but he preserved such specimens which were either very rare and not readily accessible or such as he thought differed somewhat from those already described. These he laid into his herbarium with the intention of comparing and studying them later."

The above evidence appears sufficient to dispose of the view of Goodenough and certain later authors that the Solander specimen from Lapland represents the true *C. filiformis* L. There is, however, further proof. Solander's specimen cannot have been the *Flora Suecica* plant, on which, with Scheuchzer's, *C. filiformis* was founded, because Solander was only nine years old when the *Flora Suecica* was published, and his specimen was collected in Lapland (for which country *C. filiformis* L. was not recorded), probably in 1755, two years after this species was published in the *Species Plantarum*.

It is, therefore, reasonably certain that the plant described in the *Flora Suecica*, no. 760, to which Linnaeus gave the name *C. filiformis* in the *Species Plantarum*, p. 976, but of which no specimen was preserved, is that known hitherto to British and other European botanists as '*C. tomentosa* L.' I therefore formally typify *C. filiformis* L. in this sense, choosing as lectotype Scheuchzer's description and figure.

STUDIES IN THE BRITISH EPIPACTIS.

By D. P. YOUNG.

III. EPIPACTIS PHYLLANTHES G. E. SM., AN OVERLOOKED SPECIES

In 1852 Gerard Smith described in the *Gardeners' Chronicle* a new species of *Epipactis*, to which he gave the specific epithet *phyllanthes*. In view of the complete oblivion into which his observations have fallen, no apology is needed for repeating his note in full:

EPIPACTIS PHYLLANTHES

The recent notice of an *Epipactis* in your pages, as being sent to you by Mr. Harcourt, of Westdean House, has led me to send you a copy of the lithograph of an *Epipactis*, and of the MS. notes upon it, which I collected in the upper part of Phillis Wood, near Westdean, Sussex, in the years 1832-9, and described by comparison at the time. I do not doubt that Mr. Harcourt's plant and mine are the same. In its lip, flowering season, and general structure, it differs widely from *E. latifolia*. I named it *phyllanthes*, for distinction's sake. Some notes in addition I have given on the same sheet with the description. *Gerard Smith, Ashton Hayes Parsonage, September 29.*

" EPIPACTIS PHYLLANTHES, G.E.S.

(GREEN-FLOWERED HELLEBORINE. PHILLIS WOOD, SUSSEX.)

Spec. char. : Root leaves sheathing, broad-elliptic-ovate : upper ovate-lanceolate, all *firm*, keeled, *smooth*. Flowers secund, cernuous. *Lip ovate, undivided, pointed, convex and keeled on the back. Stigma rounded-angular.*

COMPARATIVE DESCRIPTION OF

<i>E. phyllanthes.</i>	<i>E. latifolia.</i>
<i>Plant</i> , scattered in groups, or solitary, 6 to 18 inches high.	The same, on similar stations.
<i>Roots</i> , copious, zigzag, uniform, simple, blunt, downy.	
<i>Stems</i> , erect, wavy, round and purple at the base, angular and yellowish-green above. Young shoots pink. Stem occasionally glandular, downy above.	The same, but dull grey-green or purple, and <i>downy</i> .
<i>Leaves</i> , broadly elliptic below, with <i>smooth sheaths</i> , narrowing upwards into the lanceolate bractees : their substance <i>firm</i> , scarcely plaited, but rather <i>striated</i> : with 1 to 3 principal, and many smaller parallel veins, edged with minute glandular hairs, obtusely pointed.	Substance thin, <i>platted</i> . Principal veins many; <i>edges serrulate</i> .
<i>Raceme</i> , of alternate cernuous flowers, on longish green stalks.	<i>Flower-stalks</i> shorter, and purplish in many cases.
<i>Germen</i> obovate <i>taper</i> , roughish.	The same, but short.
<i>Flower bud</i> , triquetrous; point long deflexed.	<i>Bud</i> with a <i>short straight point</i> .

E. phyllanthes.

Sepals ovate, taper pointed, often cohering at the points, pale green; keels, darker green.

Petals ovate, concave, keeled, yellowish green.

Lip, similar in form and texture to the petals, *ovate, pointed*, presenting a smooth gibbous convexity at the back, and *keeled*.

Pollen masses, in two close, ovate cells. *Stigma* rounded angular, *point prominent*.

Flowering at least one month earlier than *E. latifolia*, and in seed when *E. latifolia* was in full bloom.

Flowers scentless, Sept. 1838, July 1839.

E. latifolia.

Sepals broader, green or purple.

Petals purplish, or pink.

Lip of two portions. 1, the upper, cup-shaped, crenate, shining and ribbed on the convex back; 2, the lower, uniform, with an obtuse, recurved point; above, communicating by a channel which has callosities on either side with the cup-shaped superior portion.

Pollen masses the same. *Stigma* squarish, *point flattened*.

E. latifolia had scarcely expanded its dark-green cluster, on every locality as to elevation, when *E. phyllanthes* was in perfection.

This pretty plant was gathered from a single locality, upon the elevated part of Phillis Wood, near Westdean, Sussex, on a gravelly soil, where it occurred with *Galium verum*, *Fragaria vesca*, &c., under the shade of dwarf Sallows and Birches, first in seed in Sept. 1838, and the second time in blossom July, 1839; and was regarded as a variety of *E. latifolia* in which the lip had been replaced by a petaloid leaf. The form of this part has proved uniform in all the specimens examined.

I have specimens of *Ophrys fucifera* E.B.S. to 2649, in which the lip is replaced by a sepal; and this year I gathered at Killin, in Perthshire, a plant of *Habenaria bifolia* with a sepaliform lip.

But there are points in the structure, texture, and flowering season of *E. phyllanthes*, G.E.S., which render its distinctness from *E. latifolia* possible.

The lip and petals being uniform, the plant in description approximates *Goodyera*, and when I gathered it, it occurred to me that this might be the plant mentioned in Camden as *G. repens*.

Excepting the crenulated lip, the following species closely resembles our plant:—

Serapias microphylla, fol. caulinis ovato-lanceolatis, inferioribus brevissimis, flor. cernuis, labello ovato acuto crenulato, cal. subaequali. Ehrhart Beitrage [sic], 4, p. 42. Habit. in sylvis montosis. Persoon. Syn. Pl. 1807, 1990, 2.

Sir James E. Smith, under *E. latifolia*, Engl. Flora, vol. iv, 418, 1, p. 41, observes, "a specimen in which the lip is perfectly entire, was sent me from Worcestershire many years ago as a new species."

The examination of a large number of specimens of *E. latifolia* has not afforded a single instance of approximation to *E. phyllanthes*, in the form of the lip.

This plant is evidently the same with that figured in the *Gardeners' Chronicle*. No. 34, p. 536 [scilicet 532], for August 21, 1852, as having been received from the Hon. and Rev. L. V. Harcourt, of Westdean-house, and described in that number, as well as referred to again in No. 35, p. 549, for Aug. 28."

In the Borrer herbarium at Kew is a sheet with four stems of what is undoubtedly Gerard Smith's plant (see Plate 5). It is labelled in his handwriting, "Epipactis Phyllis. Phillis Wood, Sussex, 1839." Attached to it is a copy of a lithograph, evidently the one to which he refers (Fig. 1). This also bears the name "*E. Phyllis*", as does another



Epipactis phyllis
(var. *E. latifolia*?)

Leaf of the same texture & form as
with the petals: keeled behind: concave
in front. Leaves firm, not pliant;
rough edged. Perianth smooth. Calyx &
petals often covering at the base, &
somewhat irregular in proportion in
different flowers. Color pale yellowish green.
Phillip wood. Sussex. July. 1839.

Fig. 1.

Gerard Smith's lithograph of *Epipactis phyllanthos* ("Phyllis").

Courtesy of Royal Botanic Gardens, Kew.

copy in the main herbarium (ex hb. Bromfield), so that this can hardly be a *lapsus calami*; more likely he first intended to call it *Phyllis*, but later decided that this was unsuitable. "*Phyllis*" no doubt led by mental suggestion to "*phyllanthes*", which is an apt reference to the thick green tepals. The lithograph attached to Smith's sheet further bears a reference to the above paper, and so the sheet is without a shadow of doubt to be taken as the type for his species.

The substance of the earlier note referred to by Smith is as follows:

"In August, 1851, we received from the Rev. L. Vernon Harcourt a few flowers of an *EPIPACTIS*, which he had found wild near Chichester. From these, and a sketch which accompanied them, it was evident that the plant varied in some striking particulars from *E. latifolia*. Mr. Vernon Harcourt had observed that the specimens, of which a great many were found, were widely different from that species in the form of their flowers, and in the want of downiness upon the flower-stalks and ovary . . . The general habit, form of leaves, and stature, are those of *E. latifolia*: except that the lowest leaf is much narrower than in the usual forms of that species. The rachis, pedicels and ovaries are perfectly smooth, not a trace of the coarse short down that belongs to *E. latifolia* being observable. The flowers themselves are greenish-yellow, with very acute divisions: in the lip the middle lobe is narrower than usual, as well as much sharper pointed. The ovary is clavate, instead of being linear oblong. The raceme itself has a drooping character, which at once catches the eye of the observer.

Were we to follow the custom of many modern botanists, we should at once declare that our *Epipactis* is a new species, for it differs much more from *E. latifolia* than numbers of so-called modern species differ from others. Its smoothness, its sharp flower-divisions, its colour, its peculiar drooping flowers, and we might add its occurring wild in some quantity, might all be regarded as proofs that it must be essentially distinct from that with which we have compared it. Nevertheless we are obliged to confess that although we should be proud of the honour of once more announcing the existence of a plant that no one had ever before been acute enough to distinguish in this kingdom, yet we must regard that in question as no better than an accidental variety, having the same relation to *E. latifolia* as *Rosa canina* bears to the *R. dumetorum* of Woods [sic]."

The note is initialled by J. Lindley. Accompanying it is a splendid engraving of what is currently known as *E. pendula* C. Thomas; an enlarged view of the flower shows that the labellum of this plant, unlike Smith's *E. phyllanthes*, is differentiated into hypochile and epichile. Harcourt's specimen is in the Lindley herbarium at Kew. It is labelled (not in Smith's hand) "*E. phyllanthes* G. E. Smith".

Mr. V. S. Summerhayes and I have independently searched Phillis Wood (which is actually in the parish of Treyford, and some 3 miles from West Dean) on many occasions in the last few years without re-finding Smith's plant. Much of the wood has been converted into a conifer plantation, and the small area which is on a drift of gravel (most of the wood is directly on chalk) and so answers to his description, is very over-grown now. One may hope that diligent search will nevertheless turn up *E. phyllanthes* in its *locus classicus*.

Only two other sheets of the same plant from the same locality have come to light. These are two small specimens in Herb. Druce (Oxford), ex herb. N. Tyacke, and are undated. Tyacke lived at Chichester from

PLATE 5.



Epipactis Phyllis
Wales wood. Swona.
1839.
Leaving & notes.

Epipactis phyllanthes G. E. Sm., type specimen.

Courtesy of Royal Botanic Gardens, Kew.

1840 till 1900; the specimens look nearer 100 years old than 50. One is labelled "*E. latifolia*, var. Lip replaced by a concave calycine leaf, nicked behind".

What is to be made of these plants?

Gerard Smith's description, figure, and specimens clearly refer to an *Epipactis* closely related to *E. pendula* C. Thomas and *E. vectensis* Brooke & Rose. In fact, the lithograph makes it plain that the anther is cylindrical and pedunculate—a detail confirmed by dissection of Smith's and Tyacke's specimens—which relate it more closely to the Kentish "*E. vectensis*" (cf. Part II; Young 1949). The sole difference is the labellum, which in the Kentish plant is degenerate but nevertheless shows some relics of differentiation, and in the Phillis Wood plant is completely undifferentiated, or as Tyacke remarks, with only nicks as the sign of division between hypochile and epichile. Smith does not comment on the discrepancy in the lip-form between *phyllanthes* and Harcourt's plant. It would be too much to say that he *intended* his species to include both forms, although he obviously realised that they were closely related. Since he lacked the conviction that it was a good species, he may have forborne from pressing the matter, especially in the teeth of criticism from Babington (see below)

Smith makes no mention of the fertilisation mechanism, which would hardly have been expected at that pre-Darwinian period. The "point" of the stigma probably refers to the protuberance carrying the rostellum or relics thereof. No sign of a rostellum can be seen in his drawing. It can be argued that the plant cannot have been insect-fertilised, since the sepaloïd labellum would be unlikely to have secreted honey: the undifferentiated lip and the pendent and sometimes non-opening flowers would also discourage visits from insects. Nevertheless, it set good seed in the majority of capsules, as shown by Smith's specimens. Therefore it must have resorted to some form of autogamy. One may also appeal to analogy with the other British forms related to or apparently identical with Smith's plant, and which are known to be autogamous.

The relationship between the present plant and the other members of this group of *Epipactis* will be discussed in Part IV (following paper). It must first be established that Smith's name *Epipactis phyllanthes* is valid.

Despite the somewhat diffident tone of his paper, there can be no doubt that Smith definitely proposed and published the name therein. His description is clear and adequate, and is supported by type-material. If it be accepted—as can now be done unhesitatingly—that the plant is specifically distinct from *E. Helleborine*, *purpurata*, *atrorubens*, and (despite Smith's opinion) *microphylla*, it has no earlier synonyms. The remaining objection to its validity is that it is a monstrosity, on account of its sepaloïd labellum.

Now, abnormalities are purely relative, in that their abnormality depends on rarity compared with the "normal". In the present case, all the plants in one colony appear to have been uniform in respect of the

sepaloid labellum, *teste* Smith, and supported by all extant specimens (eight plants in three gatherings). Plants of this group with similar lips have occurred at Wellow, Andover, Selborne, and Passfield (Hants), Byfleet (Surrey), Ascot (Berks), Melton (Suffolk), and Painswick (Glos.), either in uniform populations, in association with plants with "normal" (i.e. completely differentiated) labella, or with a series of intermediates with the completely undifferentiated form as one extreme (see Part IV following for further details). A variety of such frequency can hardly be classed as an abnormality. Nor can one regard it as abnormal on the ground that the modified lip interferes with reproduction, for this is simply not true. On the other hand, the form of *E. Helleborine* with a petaloid labellum which (I believe) occurs very rarely, can justly be regarded as an abnormality—a teratological sport—since it effectively prevents the normal means of reproduction.

The way in which Smith's paper has escaped further notice is very remarkable.

His name and specimen are referred to by Wolley-Dod (1937), who erroneously ascribes it to Borrer and states that it was never published. It is also mentioned without comment by Brooke (1950). Brooke & Rose (1940) refer to the specimen, which they include under their *E. vectensis*, without mentioning that it had previously been described.

The only contemporary comment that I have been able to trace is two letters to the *Gardeners' Chronicle* by Babington (1852); the first of these carries an editorial comment (by Lindley). Babington insisted that both Harcourt's and Smith's plants were his "*E. media*". His letters are polemical in tone and too long to repeat here, but they demonstrate that he himself had no clear conception of what "*E. media*" really was. He seizes upon the discrepancy in lip-form, but glosses over the question of the characteristic glabrous stem, remarking that he had never seen an *Epipactis* with a glabrous rachis. Since *E. media* Fries was a *nomen abortivum* (Fries cited two earlier valid specific names as synonyms), and Babington himself (*loc. cit.*) entertained grave doubts as to whether what he called *media* was the same thing as Fries's "species", his remarks have no sound basis at all.

It is tempting to speculate how the involved history of the study of *Epipactis* might have been altered had Smith and Lindley pushed their opinions more vigorously. They had grasped, more clearly than any author up to Brooke & Rose (1940), the essential features of this group of plants.

No doubt can now remain that *Epipactis phyllanthes* G. E. Smith must be regarded as a valid specific name and added to the British list. How this affects present nomenclature will be discussed in the following paper.

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IV. A REVISION OF THE PHYLLANTHES-VECTENSIS-PENDULA GROUP

Part II of this series (Young 1949b) drew attention to the close similarity between *Epipactis vectensis* (T. & T. A. Steph.) Brooke & Rose and *E. pendula* C. Thomas (an illegitimate name; see p. 265). It was shown that supposed distinctions based upon stature or vegetative characters could not be upheld, and that the only constant difference lay in the floral structure. It was further suggested that these two species showed variations which approached one another. At the time that Part II was written, not enough stations for plants of this group were known to make it possible to decide whether a complete range of variation linked them.

Part III (pp. 253-259 above) calls attention to a further plant of the same group, *E. phyllanthes* G. E. Sm. Yet another related plant is *E. cambrensis* C. Thomas (but see p. 268).

A search of various herbaria and the kind co-operation of various botanists in the field has now brought to light a goodly number of further records for plants of this group, sufficient for it to be reviewed with some confidence. Forty-five stations, of which 25 are still extant, are now known in 22 vice-counties. Perhaps the most gratifying individual discovery has been the re-finding, by Dr. F. F. Laidlaw, of a colony in the Isle of Wight, which corresponds exactly as to plant, and very nearly as to locality, with Hunnybun's original *Helleborine viridiflora* f. *vectensis* T. & T. A. Stephenson (1918) which later formed the type for the species *E. vectensis*. (Since this discovery, however, Mr. E. H. White has told me *in litt.* that in 1930 he found a plant which P. M. Hall thought was this. His specimen appears to have been lost. The site was not the same as Dr. Laidlaw's, but only 2-3 miles removed.)

Wherever possible fresh material, or occasionally spirit material, has been examined. Otherwise, flowers from herbarium specimens have been dissected after soaking out in dilute ammonia; I am very grateful to those in charge of the various herbaria for permitting this to be done. The results of this research have amply demonstrated that a continuous range of variation exists, embracing the whole of this group of plants. The present classification of it has proved unsatisfactory to the point of being unworkable. The overall picture is therefore presented here without reference to nomenclature, and on the basis of it a new classification is proposed afterwards. To save repetition, a complete list of known stations and details of the plants therein is given at the end of this paper, each one numbered. In the body of the paper, these stations will be referred to by numbers in parentheses, thus (42).

The characters that unite the group may be briefly summarised first as: Stems rather stout, *glabrous* or *subglabrous*, sometimes in pairs or clusters from a single rhizome; roots *very stout* and copious; leaves small, *ovate*, *acuminate*, often *concave*, of a smooth thick texture, with minute *grouped* ciliolae on the margin; flowers *pendulous*, maturing early, *autogamous*, entirely *green* or with a white or pinkish epichile; tepals (except lip) persistent; ovary large, *pyriform*, shining-glabrous; seeds *long*. The variation found in vegetative characters is only what would be expected from varying habitat. It should be emphasised that weak or juvenile plants may give misleading characters. Weak states of the plant often have narrow leaves, narrow or flattened ovaries, and scarcely pendulous flowers, and can be very deceptive unless considered in relation to the population as a whole. Flowers from the top of the raceme, too, may show abnormalities which are not evident in the lower flowers; the descriptions which follow always refer to the lowest flowers of the raceme.

The distribution of the plant is shown in fig. 2. It is rather western and southern, although extending well into East Anglia. The continental European counterpart is discussed on p. 269.

The only variation of importance within the group is in the flower-structure. This variation is not only from one colony to another, but sometimes occurs within a single population. For instance, in a single wood on the Cotswolds (32), in an area of $\frac{1}{4}$ square mile, can be found plants with perfectly formed or completely undifferentiated labella and various stages between, stipitate or sessile anthers, and open or cleistogamous flowers, and all these in various combinations. On the other hand, some other colonies are very uniform.

There is an ill-marked cline in the floral structure over the plant's geographical range. The plant attains its best development in the north-west (38-45), and incidentally its strongest colonies. This is the race called *E. pendula* by Thomas (1942). Its floral structure was detailed in Part II: briefly, the anther is sessile with the pollinia lying behind the vertical stigma (Fig. 3k), and the labellum is fully developed. It should be added that the hypochile is about 4 mm. long, and the epichile as long or slightly longer, and normally reflexed at the tip (Fig. 3a). The flowers open widely, and cleistogamic flowers are rare.

In the colonies which occur in the south, south-west, and east of England, the basic type of flower has a distinctly less well-developed labellum (3, 4, 12, 13, 16, 17, 19, 24-26, 28-32, 34, 37). It does not stand away from the column as in the north-western type, and often the hypochile embraces the stigma quite closely. The hypochile is smaller, seldom above 3 mm. long, and sometimes very deep in comparison, so that it becomes precisely hemispherical. The epichile is usually distinctly longer than the hypochile, sometimes markedly so, and then becomes long-cordate or -triangular. The tip is never reflexed, and the whole lip is usually porrect (Fig. 3b). The column-shape associated with this type of lip is much like the north-western type, but the anther is some-

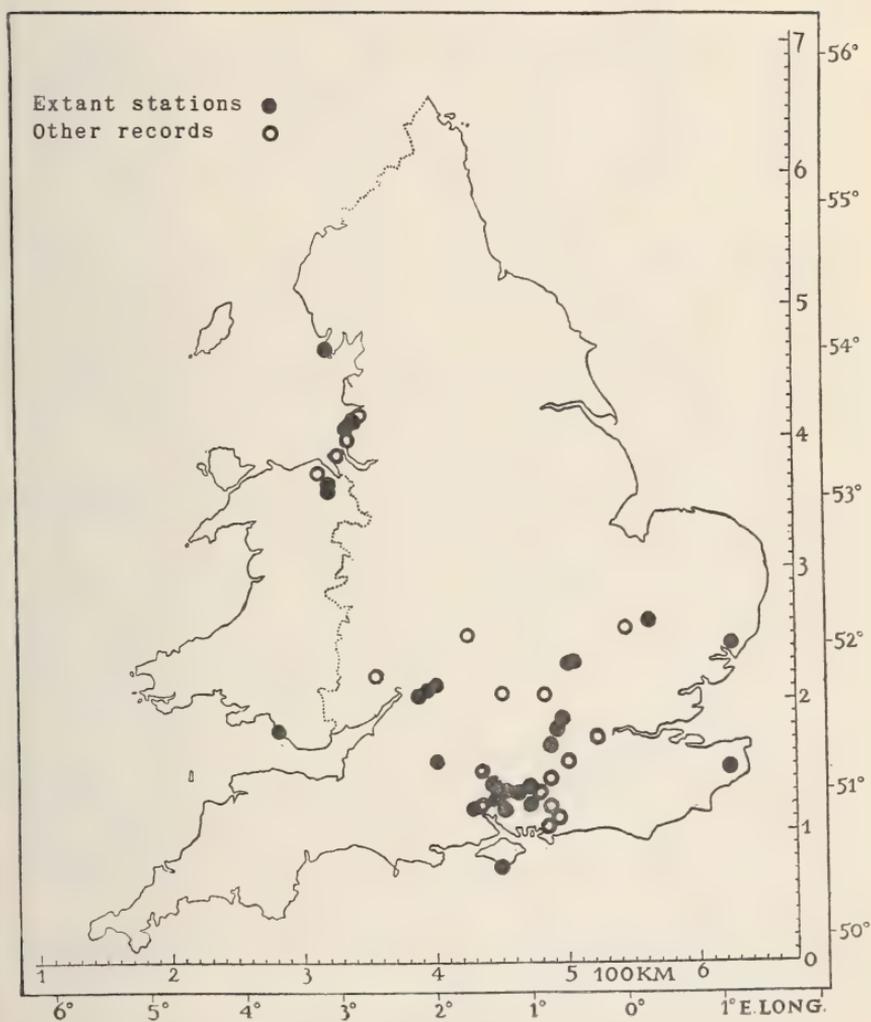


Fig 2.

Distribution of *Epipactis phyllanthes*.

Base-map by courtesy of "New Naturalist" Series.

times slightly pedunculate and the stigma tends to recede somewhat (Fig. 3l). Cleistogamy is very much more frequent in the south; the flowers either do not open at all until long past anthesis, or only part their tepals slightly; some, on the other hand, open as widely as in the north.

As mentioned in Part II (Young 1949b), the Flintshire plants (39) sometimes show characters, such as a slightly pedunculate anther, which approach towards the southern type. Specimens from the S.W. Midlands (35, 36), unfortunately very old, show characters which may provide a connecting link with these northern plants, and it would be very desirable to refine the plants in this area.

In the southern area of distribution many plants occur with degenerate flower characters (2, 5-11, 13-15, 20-23, 27). The lip is no longer perfectly differentiated into hypochile and epichile, but is malformed, and assumes many curious shapes, a few of which are shown in Figs. 3c-h. The first stage is the loss of the central channel connecting the hypochile with the epichile, so that there is a straight fold from side to side at the joint (Fig. 3c). This happens because the lip is not pinched inwards so much at the joint. In even more degenerated forms, either the hypochile becomes more shallow (Figs. 3d, f), or it becomes smaller and recedes into the base (Fig. 3e). The limiting case is where it has completely lost all differentiation, and it may then be ovate (Fig. 3g) or exactly like the lateral petals (Fig. 3h). At the same time, various alterations happen to the column. The anther may develop a filament or peduncle (Figs. 3m-o). As a result the pollinia are brought further forward relative to the stigma, and the stigma tends to move in the opposite direction, and becomes short or receding (Figs. 3n, o). Sometimes the stigma is transversely compressed, this being associated with a generally shrunken size of column (Fig. 3p). The anther, which in the most perfect forms is wedge-shaped, rectangular in profile and deltoïd or ovate seen from above (Figs. 3k, l), also becomes more cylindrical and pointed (Fig. 3o), and sometimes bent downward (Fig. 3n). The staminodes on either side of the stigma also show varying development, but the column is such a plastic organ that close study of the staminodes is an unprofitable occupation.

Note here that the classical Isle of Wight colony (3) belongs to the perfectly developed southern form, but the Kentish plants (18) (Brooke & Rose 1940; Young 1949b) have degenerate flowers.

In colonies with degenerate flowers, a good deal of variation in flower structure is found from plant to plant, and to a lesser extent from

Fig. 3.

Some lip and column forms in *E. phyllanthus*. (Numbers in parentheses refer to the list of stations). Labella in profile and plan view: a, Freshfield (42); b, Stetchworth (29); c, Lavington (2); d, Ascot (22); e, Winchester (7); f, Crawley (8); g, Byfleet (20); h, Wellow (5). Columns in profile and plan view; k, Freshfield (42); l, Ventnor (3); m, Winchester (7); n, Ascot (22); o, Womenswold (18); p, Melton (27). The floral axis is horizontal in all cases.

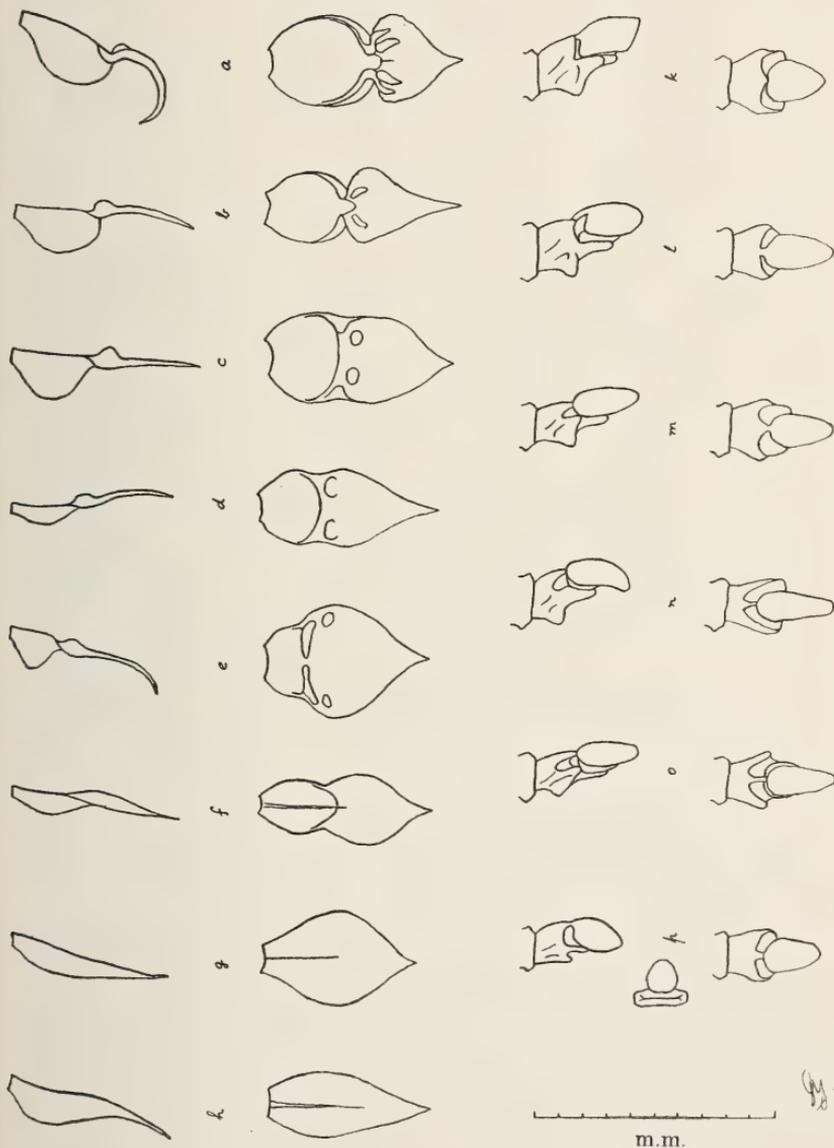


Fig. 3. (For explanation see foot of opposite page.)

flower to flower in one raceme. Degeneration in flower structure is also sometimes associated with malformation, e.g. fusion of two or more tepals. The range of variation which can be found may not be large, or it may embrace the entire gamut from perfect differentiation of the labellum to a completely sepaloid lip, as in the Gloucestershire colony already mentioned. Again, different column structures can be found in a single population, in a wide or narrow range. The only correlation between lip and column shape is that a noticeably stipitate anther is always associated with a more or less degenerate labellum; the reverse is not necessarily true.

The evolution of these degenerated forms may now be considered. Accepting the hypothesis that the group has descended from a cross-fertilised species, then the Lancashire form, which approaches *E. Helleborine* most closely in floral structure, is the least degenerate and the most primitive. Now, the allogamous species, such as *E. Helleborine*, have developed their labellum as a combined nectar-reservoir and alighting platform for visiting insects. No obvious ancestral forms to these are known, but one can easily imagine that in a petal with a central nectar-gland or canal, as in *Listera*, the nectar-pocket gradually became larger and more basin-like. Then the rest of the lip, by being pinched and puckered inwards at the centre, developed a springy junction with the nectar-basin, with a central-V-shaped channel to guide the attentions of insects. The section *Arthrochilium* (*E. palustris*) has progressed even further in lip-differentiation, but this does not concern us here. The self-fertilised species have no need to attract insects, and the plants considered here do not secrete nectar at all. The specialised shape of the lip thus no longer performs any useful function, and no selection mechanism operates to preserve it. Atavistic forms which have partially or entirely lost the genes which control the differentiation of the lip will, therefore, have at least an equal chance of survival to the perfectly-developed plants; possibly greater, as the lack of differentiation represents an economy. Furthermore, such a form once produced will continue to reproduce its kind by autogamy, and there is no cross-fertilisation to act as a levelling influence and to keep down recessive characters. The series of degenerate lips may, then, represent a reversion to the shape in some ancient cross-fertilised species.

Plants with completely sepaloid labella occur mixed with, and representing the limiting stage of, those with partially degenerated lips (e.g. 27, 32), and also in pure populations (5, 15); further, sometimes with perfect forms apparently without intermediates (13). This would suggest two routes to degeneration: either a gradual loss, one by one, of the genes that determine the complex shape of the perfect labellum, or loss of the whole set (or of a controlling gene that governs them) at once by a sudden mutation. Evolution by slow forward development and sudden backward mutations is considered to be a normal process (cf. Darlington & Mather 1947).

The reason for the alteration in the column is not so clear. In *E. leptochila* (Godf.) Godf., which regularly has a stipitate anther, this de-

velopment is of service in allowing the pollinia to fall on the stigma. The same may be (or have been) true of the present series, but the form of the column often looks as if it were due to mechanical pressure from the perianth in bud, in its reduced and malformed condition, leading to attrition of the column. Krösche (1936) describes a similar series of column-forms in *E. leptochila* in Germany.

We are now in a position to reconsider the classification of the group.

A continuous range of variation has now been shown to exist between the north-western form as one extreme, and the highly degenerate forms with sepaloid labella and elongated column as the other. No natural boundary can be discerned that would separate this group into two or more species. The only gap—which may yet be closed by further discoveries—is between the northern and southern group of forms, and this is exceedingly small and difficult to define. Nor does the distribution of characters appear to be bimodal in frequency, although material is too scanty for the application of rigorous biometric methods. Accordingly, the only course is to treat the whole group as a single species.

There are three binomials which have been applied to the group, or sections of it: *E. phyllanthes* G. E. Sm., *E. vectensis* (T. & T. A. Steph.) Brooke & Rose, and *E. pendula* C. Thomas. The last of these is illegitimate; Mr. V. S. Summerhayes has drawn my attention to the earlier and valid combination *Epipactis pendula* (Maxim.) A. A. Eaton (1908) (= *Goodyera pendula* Maxim.), which invalidates Thomas's later use of the same name. As has been shown in Part III, the combination *E. phyllanthes* refers to a plant in this group, was validly published, and antedates *E. vectensis*. It must therefore be adopted, with an extended definition, as the correct name for the species.

Again, on account of the continuous and even distribution of forms, any subdivision of the aggregate species must of necessity be artificial. Such a division would, however, be useful at least for classifying specimens and records of this variable species. It is accordingly proposed to divide it into four varieties: (i) the north-western race, (ii) the perfectly developed southern race, (iii) plants with completely sepaloid labella, and (iv) degenerate forms intermediate between and connecting (ii) and (iii). Since the flower characters are genetic, these divisions are best treated as varieties. Variety (iii) includes the type of *E. phyllanthes*, and so under the new International Rules must be called var. *phyllanthes* if a trinomial is employed at all. Variety (i) is the *E. pendula* of Thomas, and although his specific name is illegitimate, the same epithet may be employed as a varietal epithet. Variety (ii) includes the Isle of Wight form, which provides the type of *E. leptochila* Godf. var. *vectensis* (T. & T. A. Steph.) T. & T. A. Steph., and so the varietal epithet *vectensis* must be retained for this. Variety (iv) includes the Kentish plant, on which Brooke and Rose largely based their description of *E. vectensis* (as species). They cited *E. leptochila* var. *vectensis* T. & T. A. Steph. as synonym, and referred to their name as "comb. nov." only. No question of a new type (they did not designate one) therefore arises; the type of *E. vectensis* remains the Isle of Wight plant (Hun-ny-

bun's specimen at the British Museum). No earlier separate name therefore exists for variety (iv), and it is proposed to call it var. *degenera*. In fairness to Brooke and Rose, it should be pointed out that they clearly intended their species to cover the same range as is here included under *E. phyllanthes*.

Epipactis phyllanthes G. E. Smith (1852), emend. et ampl. *E. vectensis* (T. & T. A. Steph.) Brooke & Rose (1940).

Autogamous. Rhizome short, horizontal or ascending, with numerous thick fleshy roots (2.5-3 mm. diameter) emerging from it and sometimes from the buried portion of the stem. Stems solitary or more rarely 2-3 together from the same rhizome, (8-) 20-45 (-65) cm. above ground level plus another 5-20 cm. below, stout, glabrous or with very sparse short pubescence. Leaves few (3-6), obscurely bifarious, rather small, orbicular, ovate, or lanceolate, 3.5-6 (-7) cm. long, smooth and thick in texture, acuminate; the lowest reduced to sheaths, the uppermost lanceolate and sometimes reduced to sterile bracts; lower leaves with rather long sheaths; edges interruptedly ciliolate, often undulate; main ribs few, not prominent. Raceme of up to 35 flowers, sometimes aggregated, with lower bracts much longer than the flowers. Flowers cernuous or, most characteristically, hanging vertically downwards. Ovary large (0.9-1.3 cm. long), pyriform, shining-glabrous, with 6 prominent ribs, tapering insensibly into a short curved peduncle. Perianth thick and waxy in texture, entirely pale green or with a slight dull violet tinge, except the epichile which may be whitish or pinkish and is sometimes thin and papery; opening widely or not, sometimes remaining closed until after anthesis is complete; persistent, except the labellum, which with the column rapidly decays after anthesis. Labellum variously shaped (see under vars.). Anther sessile or stipitate, cuneiform or cylindrical; glandular rostellum absent, except sometimes in bud, represented by a horn-like projection above the stigma. Fruit pyriform; seeds long (1.0-1.5 mm.), tapered at each end, areolation elongated. In flower from mid-July to end of August.

Type in Hb. Borrer (Kew): Phillis Wood, Sussex, 1839, *G. E. Smith. Hab.* and *exsic.*, see list of stations at end of this paper.

Icon. See below, under individual vars.

a var. **phyllanthes**. *E. phyllanthes* G. E. Smith, sensu stricto. "*E. Phyllis*" G. E. Smith MS.

Labellum completely undifferentiated, ovate or lanceolate, with a central rib, in form, colour, and texture like the lateral petals. Anther sessile or stipitate. Flowers not rarely cleistogamous.

Hab. Woods in S. England, often with vars. *vectensis* and *degenera*.

Icon. Part III (preceding paper), Fig. 1; (dissections) this paper, Figs. 3g, h.

β var. **vectensis** (T. & T. A. Stephenson), comb. nov. *E. leptochila* (Godf.) Godf. var. *vectensis* (T. & T. A. Steph.) T. & T. A. Stephenson (1921), et syn.; *E. vectensis* (T. & T. A. Steph.) Brooke & Ross sensu stricto quoad nomen, haud descr.

Labellum embracing the stigma \pm closely; hypochile small, 2.5-3.0 (-3.5) mm. long, hemispherical, entirely green; epichile cordate-deltoid, longer than the hypochile, usually elongated and acuminate, often whitish or pinkish, usually with two lateral bosses; joint with the epichile perfectly formed, with a central sinus. Anther sessile or subsessile. Flowers not rarely cleistogamous.

Type in Hb. Mus. Brit.: Isle of Wight, 1917 [*E. W. Hunnybun*].

Hab.: as var. *phyllanthes*, but more frequent.

Icon. *Gardeners' Chronicle*, 1852, 532; *Watsonia*, 1949, 1, 103, Fig. 1c; Brooke (1950), t. 7 (as *E. cambrensis*); Summerhayes, 1951, t. 13b; (dissections) *J. Bot.*, 1918, 56, 3; this paper, Figs. 3b, 1.

γ var. *degenera*, var. nov. *E. vectensis* Brooke & Rose (1940), quoad descr.

A var. *vectensi* recedit labello in hypochilium epichiliumque imperfecte fincto; anthera saepe stipitata.

Labellum imperfectly differentiated, lanceolate or ovate, with a shallow or ventricose depression at the base representing the hypochile; constriction dividing hypochile from epichile absent, or at most imperfect, with no central sinus; coloured as in var. *vectensis*; often with two lateral bosses. Anther sessile or frequently \pm longly stipitate, cuneiform or ovate-cylindrical. Flowers not usually opening widely, and often not at all until after anthesis.

Hab.: as var. *vectensis*.

Type in Hb. Kew: Market Lavington, Wiltshire, 23 Aug. 1950, *E. M. Marsden-Jones*.

Icon. Brooke, 1950, t. 6 (as *E. vectensis*); Summerhayes, 1951, t. 14; (dissections) *J. Bot.*, 1940, 78, 82, Figs. B, D, E; 83; *Watsonia*, 1949, 1, 110, Fig. 4; this paper, Figs. 3c-f, m-p.

δ var. *pendula*, var. nov. *E. pendula* C. Thomas (1942), non A. A. Eaton (1908).

A var. *vectensi* differt floribus raro cleistogamis; labello magno, patente; epichilio hypochilium (4 mm. longum) aequante vel vix superante, cordato, acuminato, reflexo. Anthera cuneiformis, sessilis.

Labellum perfectly differentiated, large, patent; hypochile 4 mm. long; epichile as long or scarcely longer, cordate, rugose at the base or with two bosses, acuminate, usually strongly reflexed. Anther cuneiform, sessile. Rarely cleistogamous.

Type in Hb. Mus. Brit.: near Formby, Lancs., Aug. 1941, *C. Thomas*.

Hab. Woods, plantations, and sand-dunes in N.W. England.

Icon. *J. Bot.*, 1941, 79, 201, Fig. a; Brooke, 1950, t. 10 (as *E. pendula*); (dissections) *Watsonia*, 1949, 1, 110, Fig. 3; this paper, Figs. 3a, h.

It should be made clear that the plant interpreted in Part II as *E. vectensis* is here named var. *degenera*, and that var. *vectensis* is not the same thing but was included under *E. pendula* in Part II.

The Isle of Wight examples of var. *vectensis* are unlike other material in having narrow flaccid leaves with poorly developed marginal ciliolae, and are more pubescent than usual on the rhachis. The plants

seen were growing in unusually dense shade, which may be a factor in producing the unusual habit. It is difficult to know how much importance to place upon this, but the leaf characters of *Epipactis* are so variable that it is better disregarded taxonomically.

I do not understand *E. cambrensis* C. Thomas, and have left it out of account here. Thomas's type in Hb. Mus. Brit. is immature; specimens in various other herbaria determined (by him or others) as *E. cambrensis* appear to me to be *E. phyllanthes* var. *vectensis*, which he himself (1950) records (as *E. pendula*) from the same locality (37). On several visits to the Kenfig dunes I have not been able to find plants corresponding exactly to his description of *E. cambrensis* (especially further points emphasised *in litt.*), although *E. phyllanthes* was seen both on tops of dunes and in the slacks. More definite evidence that *E. cambrensis* is distinct from *E. phyllanthes* and not just a dwarfed state of it would be welcome.

E. pendula var. *minor* Brooke (1950, 122) refers to various weak and juvenile states of vars. *pendula* and *vectensis*, and is not worth retaining.

Finally, the ecology of *E. phyllanthes* may be discussed. Its distribution (Fig. 2) follows in a general way the calcareous areas of the country, but it is not confined to chalk or limestone areas. Nevertheless, where samples have been available from stations which are away from calcareous districts (2, 5, 22, 27), the soil has proved to have a surprisingly high calcium content, and has often contained visible particles of chalk. The sand-dunes in which it also flourishes are also highly calcareous with comminuted shells. Soils supporting the plant have always proved to be alkaline (pH 7-8). The plant, then definitely favours an alkaline calcareous soil. As to moisture it seems to be fairly indifferent; of 28 stations for which information is available (not including dunes), 8 are moist or beside water, whilst some others are exceedingly dry. It has often been noted as growing amongst ivy, in fact in 12 stations this forms a close ground-cover through which the plant grows. In the dunes it grows characteristically amongst *Salix repens** mixed sometimes with *Rubus caesius*. In other inland stations it is associated with a low open ground-flora of *Viola Riviniana*, *Sanicula europaea*, *Fragaria vesca* and *Asperula odorata*. It appears that it can tolerate, and possibly benefit from, a closed bushy cover, provided that this is not too tall (not above 15-20 cm.) and with roots not too closely spaced. It cannot tolerate such plants as *Mercurialis perennis* or *Nepeta hederacea* as associates, except in very small quantity, possibly because their roots occupy too much of the soil, or else because their requirements are in some way different. Still less can it tolerate tall rank undergrowth. As to the kind of tree cover it appears to be indifferent provided that the ground cover is to its liking. Besides beech it occurs under birch, ash, hazel, or planted trees, but rarely under oak which usually encourages a ground-flora that is too vigorous. It shows a

*The plant referred to here as *S. repens* is that regarded by Floderus as *S. arenaria* L. and hybrids of *S. repens* L. therewith.

marked preference for small woods or copses, tree-belts, or the shelter of tall hedges bordering woods; of 32 woodland stations for which information is available, 22 are in such situations. A curious feature is that no less than 13 stations are under trees (native or exotic) known to be planted, or else to have colonised the spot quite recently. It may be that the plant requires more light than is to be found in the middle of large woods, and is happier in small woods where light enters on all sides, or in marginal situations. Possibly some of the associations in which it occurs are not ecologically stable, but only represent one stage of development in the woodland community; if so this would explain the plant's frequent occurrence in comparatively new plantations or woods.

Since Part I (Young 1949a) was written, it has become clear that sand-dunes are a normal habitat for *E. phyllanthes*. Besides the Formby locality (42), the plant has been recorded from three other dune habitats (37, 41, 45) where no tree plantations exist. It has evidently spread to, or persisted in, the plantations at Formby from the dunes. Mr. Thomas mentions *in litt.* that he has found it also under a birch copse, apparently natural, behind the dunes. He thought that this was perhaps its original habitat. Some information *in litt.* from Mr. F. W. Holder suggests that the conditions for establishment and optimum growth may not be the same. At Ainsdale (43), he says, he had not noticed the plant until 1942, the year after part of the plantations had been burned down. In the clearing, *E. phyllanthes* var. *pendula* appeared in great vigour and quantity, one plant having 46 stems in a cluster. From what is known of the rate of growth of *Epipactis* (cf. Ziegenspeck 1936), these plants must have been nearly 10 years old at least, and must have escaped notice before the trees were destroyed. Subsequently, and presumably as the site became overgrown, they decreased greatly in numbers and size. *E. dunensis* f. *pinetorum*, on the other hand, in the same spot made little response to the changes. When growing in open dunes, *E. phyllanthes* assumes a chlorotic and stunted appearance, as most plants do in such situations.

A related plant is quite widespread in the countries around the Baltic, especially Denmark, and was identified by Nannfeldt (1946) as *E. persica* (Soó) Hausskn. ex Nannf. As pointed out in Part II, *E. persica* is described (Soó 1927) as having a rostellum. With the kind co-operation of Dr. J. Renz and the Kew Herbarium, I have been able to see a set of Persian material of *E. persica*, and it is clearly different from the European plant. It is characterised by very long bracts (longer even than in *E. phyllanthes*) and very small, not pendulous, flowers which develop into large fruit. It is doubtless allogamous. Spirit material supplied by Dr. Nannfeldt appeared also to show a rostellum, but according to specimens and information kindly supplied by Dr. O. Hagerup, there is no doubt that the Danish plants are self-fertilised. Tentatively, the continental plant may be assigned to *E. phyllanthes*, but it does not agree with any of the British forms. It is hoped to study this plant further.

I am very much indebted to many botanical colleagues who have supplied specimens and information, and given other assistance. My particular thanks are tendered to Dr. J. L. Farmer, Miss E. P. A. and Mr. T. Jones, and Dr. F. F. Laidlaw for hospitality and transport; and to Mr. V. S. Summerhayes of Kew and to the botanical staff at the British Museum for their co-operation in bringing new records to my notice.

SUMMARY OF PARTS III AND IV.

Attention is drawn to *Epipactis phyllanthes* G. E. Smith, a name which has been overlooked since the time of its publication (1852). This plant, *E. vectensis* (T. & T. A. Steph.) Brooke & Rose, and *E. pendula* C. Thomas (*nomen illegitimum*) all represent parts of an aggregate species which presents a continuous range of variation. The valid name for the aggregate species is *E. phyllanthes*, and an artificial division into four varieties, based on the form of the labellum and column, is proposed, as follows:

- Labellum imperfectly differentiated. Anther sessile to longly stipitate.
 Labellum completely sepeloid var. *phyllanthes*.
 Labellum with rudimentary hypochile var. *degenera*.
 Labellum perfectly formed. Anther sessile or very shortly stipitate.
 Epichile longer than hypochile, porrect. Southern var. *vectensis*.
 Epichile about equalling hypochile, reflexed. Northern var. *pendula*.

It grows in woods (usually marginally) and sand-dunes in England, and requires a calcareous soil. It is only associated with certain types of ground-flora, especially closed communities of *Hedera Helix* (in woods) or *Salix repens* (in dunes). A Scandinavian plant, which has been incorrectly called *E. persica* (Soó) Hausskn. ex Nannf., appears to belong under or near *E. phyllanthes*, but requires further study.

LIST OF STATIONS.

Information is given for each station in the following order:

Name of station. In the case of extant localities, only the name of the parish is given for security reasons. This may differ from the locality as named on herbarium sheets or in other records, but the names may be reconciled by consulting Ordnance Survey maps showing parish boundaries. All available details are given for localities which have not been refunded.

Records. Names of discoverers not previously acknowledged are in italics, with date when first noted (this may be earlier than any specimen). Names in roman type and dates in parentheses are literature references. ! indicates that I have seen the plant *in situ*, but not necessarily in the year stated. All known exsiccata are listed, but full collection data are only given for non-extant localities. Abbreviations for herbaria: B = British Museum, C = Cambridge Univ., K = Kew, O = Oxford Univ., S = South London Botanical Inst., W = Nat. Museum of Wales (Cardiff), Y = Hb. D. P. Young. The following herbaria have been searched but contained no *E. phyllanthes*: Harrow school, Holmesdale N.H. Soc. (Reigate), Derby, Haslemere, Taunton, and Torquay museums.

Present status. Colonies seen within the last three years are noted as "still extant"; absence of this remark implies that it has not been seen since the last date mentioned. Present size of colony: * = less than 10 plants, ** = 10-100 plants, *** = hundreds of plants.

Nature of locality. (i) Tree cover, (ii) ground flora (G.F.), (iii) geological formation (Geol.), (iv) nature of soil (sample taken from around roots; pH determined with B.D.H. Universal Indicator; Ca = total calcium). Conventions used for G.F.: thin ivy=*Hedera Helix* in open association, thick ivy=*H. Helix* dominant in closed association, violet = mostly *Viola Riviniana*, sanicle = *Sanicula europaea*.

Description of plants. (i) Range of height, (ii) frequency of cleistogamous flowers (cleisto.), (iii) description of column (col.), (iv) of labellum (lab.), (v) other noteworthy features.

Determination, based on examination of fresh material from extant colonies, otherwise on dissected herbarium material or sketches when available.

Other abbreviations: *E.* = *Epipactis*, *H.* = *Helleborine*, *lat.* = *latifolia*, *lepto.* = *leptochila*, *med.* = *media*.

V.-C. 3 OR 4, DEVON.

(1) "Devonshire", Brook & Rose (1940). Specimen lost and no details traceable.

V.-C. 8, S. WILTS.

(2) Market Lavington, *C. Rheiganum*, comm. *E. Marsden-Jones*, 1950 (K). Still extant **. Margin of wood, under *Alnus*, *Salix*, *Acer*, and conifers, and under *Crataegus* hedge; near a stream. G.F.: ivy. Geol.: Lower Greensand. Soil: loam, pH 7.5-8, Ca high. 20-65 cm. Not cleisto. Col.: anther pointed, shortly pedunculate; stigma receding. Lab. incompletely differentiated; hypochile hemispherical; epichile cordate with 2 bosses; not constricted at the joint, no central channel. Var. *degenera* (type).

V.-C. 10, I. OF WIGHT.

(3) Ventnor, *E. W. Hunnybun* 1913 (C), 1917 (B); T. & T. A. Stephenson (1918); *E. H. White* 1930? (see p. 259); *F. F. Laidlaw* 1950! (C). Still extant*. (Laidlaw's locality:) small plantation of *Tilia*, *Ulmus glabra*, *Populus canadensis*, rather heavily shaded. G.F.: thick ivy, with *Phyllitis* and *E. Helleborine*. Geol.: chalk? (landslip). Soil: dark poor loam; pH 6.5; Ca present. Flowers not opening widely, sometimes cleisto. Col.: anther almost rectangular in profile, on very short erect peduncle. Stigma vertical. Lab. completely differentiated but small; hypochile deepest towards front, close to ventral side of col.; epichile cordate, acuminate, long, with 2 elongated hunches. Leaves narrow, flaccid; rachis slightly pubescent. Var. *vectensis* (type).

V.-C. 11, S. HANTS.

(4) Romsey, *F. Townsend*, 1878 (as ?*E. med.*) (S). May refer to the following station, but the flower structure is different. Wood. Geol.: Eocene sands. 30-40 cm. All cleisto. Anther rectangular in profile, sessile. Lab.: hypochile small, rather shallow; epichile cordate, with 2 elongated bosses. Differentiation appears perfect. Var. *vectensis*.

(5) Wellow, *Miss M. Howard*, 1951! (K). Still extant*. Roadside, under hedge bordering beech wood and spinney. G.F.: thick ivy; with *E. Helleborine*. Geol.: Eocene sands. Soil: loam with Eocene pebbles and fragments of chalk; pH 7.5; Ca present. 15-30 cm. Anther slightly pedunculate. Lab. completely sepaloïd (Fig. 3h). Var. *phyllanthes*. Mr. G. W. Pierce tells me that he has seen the plant in another spot in the same parish.

(6) Owslebury, *G. W. Pierce*, 1929; Godfery (1933)! (B, K, O). Disappeared about 1935, but reappeared in 1949 and is still extant*. Beech wood. G.F.: sanicle, *Asperula odorata*; with *E. Helleborine*. Geol.: chalk. Soil: chalky loam; pH 8; Ca high. 5-20 cm., never larger. Frequently cleisto. Col. small, short; anther subsessile; stigma receding. Lab. brownish, degenerate; lanceolate to ovate, with or without median constriction; hypochile a small depression in the base, embracing the stigma. Var. *degenera*.

(7) Winchester, *G. W. & G. G. Pierce*, 1949! (Y). Still extant*. Planted beech belt. G.F.: thick ivy. Geol.: chalk. Soil: leaf-mould over loam; pH 8; Ca high. 15-30 cm. Flowers scarcely opening. Anther pointed, shortly pedunculate, forward of stigma. Lab. imperfectly differentiated; hypochile very small; epichile cordate, much broader than hypochile, separated from it by a pair of curved ridges, and with 2 small bosses, green with pink edges (Figs. 3e, m). Var. *degenera*.

V.-c. 12, N. HANTS.

(8) Crawley, *G. G. Pierce & Mrs. E. W. Churches*, 1951! (Y). Still extant **. Beech belt. G.F. nil; with *E. Helleborine*. Geol.: chalk. Soil: leaf-mould over chalk; pH 8; Ca high. 10-30 cm. Flowers scarcely opening. Col.: anther pedunculate, pointed; stigma slightly receding. Lab. imperfect; hypochile shallow, oval, embracing stigma; epichile ovate, acute; median folds absent. (Fig. 3f). Var. *degenera*.

(9) Headbourne Worthy, *M. P. Dann*, comm. *G. G. Pierce*, 1951! Still extant *. Small spinney beside stream; *Aesculus*, *Crataegus*, *Salix fragilis*, *Betula*. G.F.: thick ivy. Geol.: chalky alluvium. Soil alluvial; pH 8; Ca high. 30 cm. Usually cleisto.? Col. short; anther ovoid, on a short erect peduncle; stigma transversely compressed. Lab. small, very imperfect; lanceolate or ovate, with median constriction; hypochile a small wide depression; epichile \pm concave, whitish with green centre. Var. *degenera*.

(10) Easton, *Miss M. Jaques*, 1951! (Y). Still extant *. Hedge beside stream; *Salix alba*, *Taxus*, *Ulmus*. G.F.: thick ivy, *Caucalis Anthriscus*. Geol.: alluvium. Soil: alluvial, chalky; pH 7.5-8; Ca high. 12-35 cm. Usually cleisto. Col.: anther pointed, pedunculate; stigma receding. Lab. small, differentiation imperfect; hypochile deep; epichile cordate, without bosses, greenish white with pink edges. Var. *degenera*.

(11) Andover, *F. Townsend*, 1860, 1864 (S); *idem* (1883); *C. B. Clarke*, 1877 (K) (all as *E. med.*). "Canal Swamp", now a meadow by the railway; possibly under *Salix*. Geol.: alluvium. 25-35 cm. Doubtfully cleisto. Anther sessile or nearly so, short, deltoid from above. Lab. sepaloïd, lanceolate. Var. *phyllanthes*.

(12) Colemore, 1938, Hall (1942) (as *E. lept.*); 1950! (B, Y). Still extant *. Small coppice colonising old clay (or chalk?) pit; hazel, beech, oak. G.F.: thick ivy. Geol.: chalk. Soil: chalky loam; pH 8-8.5; Ca high. 30 cm. Not cleisto. Col.: anther sessile, rectangular in profile; stigma almost vertical. Lab. perfectly differentiated; hypochile hemispherical, 3.5 mm.; epichile about as long as hypochile, cordate-orbicular, not reflexed, green with white edge, with 2 prominent pinkish bosses and median ridge. Var. *vectensis*, approaching *pendula*.

(13) Selborne, *P. M. Hall & M. J. Godfery*, 1931 (as *E. lept.*); 1951! (B, Y). Still extant *. Beech wood on escarpment. G.F.: thin ivy. Geol.: chalk. Soil: loam, apparently leached; pH 6.5; Ca present, low. 20-30 cm. Col.: anther subsessile or shortly pedunculate, rectangular in profile or somewhat compressed; stigma rather receding. Lab.: sometimes perfectly differentiated, hypochile small, deep; epichile long-deltoid, pale green with 2 pinkish bosses; sometimes completely undifferentiated, sepaloïd, lanceolate. Vars. *vectensis* and *phyllanthes*.

(14) Passfield, *E. C. Wallace*, 1938 (as *E. purpurata*) (Hb. Ips.). Side of lane. Geol.: Lr. Greensand. 40 cm. Not cleisto., opening widely. Col.: anther sessile, ovate-rectangular in profile; stigma receding diagonally. Lab. completely sepaloïd, lanceolate, or with faint trace of hypochile at base in form of a small depression. Var. *phyllanthes*.

V.-c. 13, W. SUSSEX.

(15) Treyford; Phillis Wood, 1838 (K, O). See Part III. Geol.: gravel over chalk. 15-45 cm. Anther cylindrical, shortly pedunculate; stigma receding. Lab. completely sepaloïd or with faint trace of hypochile at base. Var. *phyllanthes* (type).

(16) Near Chichester, *L. Vernon Harcourt*, 1851 (K), see Part III. May refer to localities (15) or (17). 20 cm. Not cleisto. Anther sessile, ovate, pointed. Lab. completely differentiated. Cf. var. *vectensis*.

(17) West Dean, *W. Wallinger*, 1852 (as *E. med.*) (K). Geol. probably chalk, 20 cm. Not cleisto. Anther pointed, shortly pedunculate. Lab. differentiated; hypochile small; epichile long-cordate, acuminate. Cf. var. *vectensis*.

V.-c. 15, E. KENT

(18) Womenswold, Brooke & Rose (1940), Young (1949b)! First record 1926, seen irregularly since (S, K, Y). Still extant*. Small beech wood. G.F.: thick ivy. Geol.: chalk. 15-40 cm. Flowers scarcely opening. Anther cylindrical, usually longly pedunculate; stigma very receding (Fig. 3o). Lab.; differentiation imperfect; see *loc. cit.* Var. *degenera*.

V.-c. 17, SURREY.

(19) Waverley, *Miss Parker*, 1838 (as *E. lat.*) (C). Geol.: Lr. Greensand. 15-25 cm. Flowers not opening widely. Col.: anther sessile; stigma almost vertical. Lab.: hypochile small, shallow; epichile deltoid; differentiation complete. Var. *vectensis*.

(20) Between Byfleet and Ripley (this may be in Pyrford parish), *C. E. Britton* 1927 (K). Canal towpath: presumably under hedge trees, or on margin of a coppice (felled about 1948). Geol.: Bagshot Sands (alluvium?). 40 cm. Flowers not opening widely. Col.: anther pedunculate; stigma receding diagonally. Lab. completely undifferentiated, ovate-acuminate with central rib (Fig. 3g). Var. *phyllanthes*.

(21) Mortlake, *J. T. Syme*, 1853 (as *E. lat.*). Between Kew and Mortlake, *M. Moggridge*, 1870 (as *E. lat.* var. *foliis minoribus subcoriaceis*) (B). Geol.: London Clay. 30 cm. Flowers not opening widely. Col.: anther pedunculate, pointed; stigma very receding. Lab. imperfectly (sometimes perfectly?) differentiated, lanceolate, constricted $\frac{1}{2}$ way from base, hypochile a shallow depression, epichile with 2 bosses. Var. *degenera*.

V.-c. 22, BERKS.

(22) Ascot, *J. S. Wilkinson* 1945! Young (1949b) (B, K, Y). Still extant*. Birch wood. G.F.: violet, sanicle, *Fragaria*; with *E. Helleborine*. Geol.: Bagshot Sands (brick earth). Soil: rather moist; pH 6-7; Ca present. 20-40 cm. Invariably cleisto. Anther usually pedunculate, pointed, often depressed at end; stigma receding. Lab. degenerate, variable; lanceolate with \pm median constriction; hypochile a basal depression or almost absent (Fig. 3d, n). Var. *degenera*, approaching *phyllanthes*.

V.-c. 23, OXFORD.

(23) Oxford: The Parks, *G. C. Druce*, 1909 (as *H. lat.* var. *angustifolia*). (O). Geol.: Oolitic clay? 20-30 cm. Flowers not opening widely. Anther cylindrical, pointed, shortly pedunculate. Lab. degenerate, lanceolate with constriction $\frac{1}{2}$ way from base; hypochile a shallow depression. Var. *degenera*.

Druce (1927) records from Shotover "*E. lat.* A var. with smooth germen and entire lip" which may belong here.

V.-c. 24, BUCKS.

(24) Dorney, *W. C. Worsdell*, 1917 (as *E. lepto.*); *V. S. Summerhayes* 1950! (K, Y, Hb. J. Renz). Still extant**. Plantation belt on river bank; mainly *Aesculus*. G.F.: thick ivy. Geol.: alluvium. Soil: loamy; pH 8; Ca high. 20-40 cm. Usually cleisto. Col.: anther subsessile, rectangular in profile; stigma receding or transversely compressed. Lab. perfectly differentiated; hypochile small; epichile long-deltoid, pale yellow-green with whitish bosses. Tepals with purplish flush inside and out; frequently imperfectly formed, fused together. Var. *vectensis*.

(25) Beaconsfield, *E. F. Taylor*, comm. *D. I. Gatfield*, 1950! (B, Y). Still extant*. Grass verge of residential road, bordered by remains of beech woods. G.F.: planted turf. Probably a relic, although the locality has been unchanged for 25 years. Geol.: margin of chalk and London Clay. Soil: loam; pH 7-7.5; Ca high. 30 cm. Flowers not opening widely. Col.: anther sessile, rectangular in profile; stigma slightly receding. Lab. perfectly differentiated; hypochile small, deepest at front; epichile long-cordate, with 2 bosses. Var. *vectensis*.

(26) Ellesborough: Warley Wood, Chequers Park, *F. L. Foord Kelcey*, 1910 (as *E. lat. med.*) (B). Beech wood; with *E. lepto*. Geol.: chalk. 20 cm. Not cleisto. Anther sessile, pointed. Lab.: hypochile 3.5 mm. long, deep; epichile 4 mm., ovate-acuminate; differentiation perfect or nearly so. Cf. var. *vectensis*.

V.-C. 26, E. SUFFOLK.

(27) Melton, *Miss N. Churchman*, ca. 1944! (K, Y). Still extant*. Small group of planted trees; *Aesculus*, beech, oak. G.F.: thick ivy. Geol.: Pliocene. Soil: sandy loam; pH 7-7.5; Ca high. 15-40 cm. Invariably cleisto. Col.: anther cylindrical, often depressed or bent, on arching filament; stigma sometimes transversely compressed (Fig. 3p). Lab. very degenerate, lanceolate, with or without median constriction, variable. Var. *degenera*, varying through to *phyllanthes*.

V.-C. 29, CAMBRIDGE.

(28) Cambridge: Robinson Crusoe's I., *A. S. Stubbs*, 1899 (as *E. med.*) (C). Willow holt? Geol.: alluvium. 40 cm. Anther sessile? Lab.: hypochile small; epichile long-deltoid; differentiation \pm perfect. Var. *vectensis*.

(29) Stetchworth, *F. Rose*, 1941! (Y). Still extant*. Beech belt. G.F.: thick ivy. Geol.: chalk. Soil: poor loam; pH 8; Ca present. 30 cm. Usually cleisto.? Col.: anther rectangular in profile, slightly pointed, sessile; stigma vertical, pollinia behind stigma. Lab. perfectly differentiated; hypochile small, hemispherical; epichile long-cordate, with 2 bosses (Fig. 3b). Var. *vectensis*.

V.-C. 30, BEDFORD.

(30) Streatley, 1926, Dony (1946)! (Hb. Luton Mus.). Still extant*. Beech wood. G.F.: thin ivy. Geol.: chalk. 15-30 cm. Other details as (31), which is not far away.

(31) Barton-in-the-Clay, *R. G. Crabb*, 1929 (B); Dony (1946)! (K, Y, Hb. Luton Mus.). Still extant*. Beech wood. G.F.: thin ivy. Geol.: chalk. 15-40 cm. Frequently cleisto. Col.: anther sessile, rectangular in profile, deltoid in plan; stigma vertical, behind pollinia. Lab. perfectly differentiated; hypochile small, hemispherical, embracing stigma; epichile long-cordate, with 2 bosses. See also Young (1949b). Var. *vectensis*.

V.-C. 33, E. GLOS.

(32) Painswick, *Lady Davy*, 1935 (as *E. lepto.*), 1950! (O, Y). Still extant**. Beech plantation. G.F.: thin ivy, sanicle, *Hieracium*; with *E. Helleborine*. Geol.: Oolitic limestone. Soil: leaf-mould over loam; pH 7.5-8; Ca high. 20-40 cm. About half cleisto. Col.: anther cuneiform or ovoid, sessile or shortly pedunculate, or sometimes (in flowers with sepaloïd labellum) longly pedunculate. Stigma \pm receding. Lab. variable; some perfectly differentiated, with ventricose hypochile, and long-cordate epichile, with 2 bosses; some with median constriction \pm absent; some \pm completely undifferentiated, lanceolate, with slight or no depression at base. Tepals sometimes imperfectly formed, fused together. Var. *vectensis* varying through *degenera* to *phyllanthes*.

(33) Brimpsfield, *C. Thomas*, 1947. Still extant?*. Beech wood. G.F.: thin ivy, sanicle, *Hieracium*; with *E. Helleborine* and *lepto*. Geol.: Oolitic limestone. No specimens seen.

(34) Cowley, Thomas (1941) (K). Not seen recently. Beech wood. G.F.: violet, sanicle, thin ivy; with *E. Helleborine*. Geol.: Oolitic limestone. 20-25 cm. Col.:

anther sessile, ovoid; stigma vertical, rather behind pollinia. Lab. completely differentiated; hypochile ventricose; epichile cordate, as long as hypochile. Var. *vectensis*, approaching *pendula*.

V.-c. 36, HEREFORD.

(35) Walford, W. H. Purchas, ca. 1870? (O). Geol.: Carb. limestone? (or Devonian). 45 cm. Anther apparently sessile. Lab. perfectly differentiated? Var. *vectensis* or *pendula*.

V.-c. 38, WARWICK.

(36) Charlcoate, T. Fleetwood (?), 1857 (B). Geol.: Trias? 20 cm. Not cleisto.? Anther cuneiform, sessile. Lab. perfectly differentiated; hypochile 3 mm. long; epichile cordate, as long as hypochile, with 2 small bosses. Var. *vectensis*, approaching *pendula*.

V.-c. 41, GLAM.

(37) Kenfig, Thomas (1950)! (B, K, W, Y). Still extant**. Sand dunes; no tree cover. G.F.: *Salix repens*, *Rubus caesius*; with *E. Helleborine* and *cam-brensis*. Geol.: maritime sand. Soil: calcareous sand; pH 7.5-8; Ca high. 20-40 cm. Frequently cleisto. Col.: anther sessile, rectangular in profile; stigma vertical. Lab. completely differentiated; hypochile small, embracing stigma; epichile long-deltoid, apple-green with 2 pinkish bosses. Whole plant chlorotic. Var. *vectensis*.

V.-c. 51, FLINT.

(38) Llyn Helig, 1906, Young (1951) (W). Geol.: Carb. limestone. 15 cm. Not cleisto. Flower not examined. Probably var. *pendula*.

(39) Mold (Rural), Jones & Young (1949)! (Y, Hb. E. P. A. Jones). And in another spot, Miss E. P. A. Jones 1948! (K, Y, Hb. ips.). (a) Still extant*. Mixed woods of ash, oak, *Ulmus glabra*. G.F.: thin ivy, violet, sanicle; with *E. Helleborine*. (b) Still extant**. Small copse (ash, oak, birch). G.F.: *Fragaria vesca*, violet, *Rubus Thalictrum collinum*; or thick ivy; also in adjoining ditch in thick ivy, under *Crataegus*, etc. Both spots: Geol., Carb. limestone. 20-30 cm. Less than 10% cleisto. Col.: anther sessile or subsessile, cuneiform, rectangular in profile; stigma receding. Lab. perfect; hypochile ventricose, patent, 4 mm.; epichile cordate, acuminate, as long or slightly longer than hypochile, frequently but not always reflexed. Var. *pendula*.

V.-c. 58, CHESHIRE.

(40) Near Birkenhead, 1925, Jones & Young (1949) (K). Habitat not stated, but sand-dunes implied. 20 cm. Not cleisto. Lab. fully differentiated; flowers not dissected. Cf. var. *pendula*.

V.-c. 59, S. LANCs.

(41) Crosby (incl. Hightown), J. A. Wheldon & W. G. Travis, 1913 (as *H. viridiflora*; mixed with *E. dunensis*) (B, O, W); C. B. Tahourdin, 1925 (as *E. lepto.* var. *dunensis*) (S). Sand dunes; no tree cover. An extension of (42), q.v. Var. *pendula*.

(42) Formby (incl. Freshfield), Thomas (1941)! Earliest record: W. G. Travis, 1914 (as *H. viridiflora*) (B). Other exsicc.: B, K, Y, Carlisle and Leicester museums, E. P. A. Jones, J. Renz. Still extant***. (a) Open dunes. No tree cover. G.F.: *Salix repens*, *Rubus caesius*. Geol.: maritime sand. Soil: calc. sand; pH 7; Ca present. (b) Plantations; under *Pinus nigra* vars., also birch coppice. G.F. nil. Soil: thin pine-needle mould over calc. sand; pH 7-7.5; Ca present. With *E. dunensis* in both habitats. 10-40 cm. Rarely cleisto. Floral structure see Young (1949b). Whole plant chlorotic in (a). Var. *pendula* (type).

(43) Ainsdale, H. Britten, 1924 (B). Other exsicc.: Y, Southport Bot. Mus., F. W. Holder, J. E. Lousley. Still extant***. In open dunes and plantations (*Pinus nigra*, *Acer Pseudoplatanus*); an extension of (42), q.v. Var. *pendula*.

(44) Southport: Hesketh Park, *F. W. Holder*, 1935 (Hb. ips.). Destroyed 1940. Shrubbery; G.F.: grasses. A relic: the park was made over sand-dunes. Soil: sandy; sampled 1951, pH 5; Ca low. 30 cm. Flowers not opening widely; not dissected. Cf. var. *pendula*.

V-c. 69b, N. LANCs.

(45) Dalton-in-Furness, *B.S.B.I. excursion*, 1951 (Y, Carlisle Mus., I. W. Evans, A. W. Westrup). Still extant**. Sand dunes; no tree cover. G.F.: *Salix repens*. Geol.: maritime sand. Soil: sand, not so calc. as at Formby. 20-30 cm. Not cleisto. Lab. fully differentiated. Col. not examined. Cf. var. *pendula*.

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PLATE 6.



Alchemilla subcrenata in Teesdale ($\times \frac{1}{2}$), 24th May 1952.

M. C. F. Proctor.

ALCHEMILLA SUBCRENATA BUSER IN BRITAIN

By S. M. WALTERS.

Alchemilla subcrenata Buser in Magnier, 1893, *Scrinia Fl. Select.*, fasc. 12, 285, is one of several *Alchemilla* micro-species recorded erroneously as British by Jaquet (1928; see also Salmon, 1925); his material was, in fact, the common *A. vestita* (Bus.) Raunk. (see Walters, 1949, 15). The true *A. subcrenata* is, however, a common plant in Switzerland, and also in Scandinavia, with a Continental type of distribution similar to that of *A. monticola* Opiz and *A. acutiloba* Opiz (see map in Samuelson, 1943, 19). It was not therefore surprising to find (1951) that the plant does in fact occur in Upper Teesdale where the other two continental micro-species occur in some abundance.

The description given by Jaquet (1928, 520), though more or less correct, is based on Swiss material of *A. subcrenata* (and manifestly does not fit the plants cited by him—which are *A. vestita* as stated above); it may therefore be useful to give a short description here embodying the distinguishing features of the plant seen growing in Upper Teesdale (May 1952):—

Plant medium-sized (20-50 cms.), with relatively few inflorescences, and well developed cauline leaves. 'Summer' radical leaves \pm circular in outline, *very obviously wavy, with rather broad, deep lobes, and coarse, broad teeth; rather sparsely spreading-hairy on upper surface, more evenly hairy beneath. Petioles and lower part of inflorescence stems obviously spreading-hairy, some hairs usually slightly downwardly-directed.* Inflorescence-branches, pedicels and urceoles \pm glabrous. No pinkish colouring on stipules or at base of stem.

The presence of slightly downwardly-directed hairs, though not mentioned by Buser, Jaquet or Lindberg (1909), seems to be a useful character, as no other British *Alchemilla*, with the possible exception of *A. acutiloba*, ever shows such a tendency. It cannot be said, however, that all plants of *A. subcrenata* show this character, which seems to develop more obviously on petioles and inflorescence-stems later in the season.

Two distinct localities in Upper Teesdale are so far known; in one of these, a hay meadow, the plant was very abundant (24th May 1952) and in some parts of the field was the only *Alchemilla* present. A species-list was made on the margin of this field, a south-facing 5° slope:—*Alchemilla subcrenata* l. ab., *A. acutiloba* occ., *Ranunculus acris* L., *Cerastium vulgatum* L., *Geranium sylvaticum* L., *Trifolium pratense* L., *Canopodium majus* (Gouan) Loret, *Heracleum Sphondylium* L., *Bellis perennis* L., *Hypochoeris radicata* L., *Taraxacum officinale* Weber agg., *Veronica serpyllifolia* L., *Rhinanthus minor* Ehrh., *Plantago lanceolata* L., *Rumex acetosa* L., *Anthoxanthum odoratum* L., *Agrostis stolonifera* L., *Holcus lanatus* L., *Cynosurus cristatus* L., *Dactylis glomerata* L., *Festuca rubra* L., *Lolium perenne* L. Bryophytes:—

Brachythecium glareosum (Bruch) B. & S., *Pseudoscleropodium purum* (Hedw.) Fleisch., *Rhytidiadelphus squarrosus* (Hedw.) Warnst., *Lophocolea* sp.

The presence of this, a third continental *Alchemilla*, in Upper Teesdale makes the problem of the distribution of such plants even more interesting; for although we now know that neither *A. monticola* nor *A. acutiloba* are strictly confined to Teesdale (both occur in Weardale, where *A. acutiloba* is locally common, May 1952, and *A. monticola* occurs also south of Teesdale, in v.-c. 65), nevertheless there seems to be a high concentration of their occurrences in Upper Teesdale, whence, of course, local spread on roadsides would be quite likely. A fourth species, *A. gracilis* Opiz (*A. micans* Buser) has a similar European distribution, but has not yet been found in Britain; it should obviously be sought in Teesdale.

I am greatly indebted to Miss M. E. Bradshaw for the original material of *A. subcrenata* collected in June (and September) 1951, for much information on the occurrence of *Alchemillas* in the vicinity of Teesdale and Weardale, and for assistance in visiting the localities in May 1952, and to Mr. M. C. F. Proctor for the photograph here reproduced.

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A MYSTERIOUS CAREX ON BEN LAWERS

By N. Y. SANDWICH.

On July 18th, 1948, when botanizing on Ben Lawers, I came across a patch of a curious Sedge which I could not recognize and which attracted attention on account of its short stiff culms and simple terminal spikes. It was growing on a steep upper slope of the mountain at 2700-2800 ft., facing east, near the head of a boggy rill close to rocks. At the time it did not, I think, recall the familiar *Carex dioica* L. and, as I could not place it, I collected a considerable number of specimens. The plant seemed to occupy an extremely limited area, and I did not find it again during my week's visit.

On returning to Kew, I found that the specimens were closely related to *C. dioica*, but differed from all the herbarium material in the stiff habit and the relatively long and narrow spikes, while all the fruits, which were quite immature, were still erect-ascending. I saw that there was a resemblance to the Scandinavian species, *C. parallela* (Laest.) Sommerf., but I could not refer my plants to this, because of the scabrous upper margins of their utricles, a differential key character of *C. dioica*.

On August 28th, 1951, on the advice of Mr. E. Nemes, I revisited the locality in the hope of finding ripe fruits. On this occasion I saw fewer of the relatively large, stiff plants in the original spot, which was swampy ground with plenty of herbage of rushes and sedges, but I found quantities of smaller plants a few yards away, occupying a larger area than I had expected and growing on a damp, almost bare, stony surface of mica-schist over which other tiny rills were trickling. I was much disappointed that I could still find no properly developed fruits, even at this late season.

The entire area in which I saw this plant is only a few square yards in extent, and I have not yet found it elsewhere. The accompanying species (noted on the spot) are characteristic of the mica-schist stony rills and bogs of the higher slopes of Ben Lawers, viz., *Thalictrum alpinum*, *Alchemilla glabra* and *A. alpina*, *Epilobium alpinum*, *Saxifraga aizoides*, *S. oppositifolia* and *S. stellaris*, *Euphrasia frigida*, *Pinguicula vulgaris*, the fine dark-flowered form of *Thymus Drucei*, *Oxyria*, *Polygonum viviparum*, *Tofieldia pusilla*, *Juncus triglumis* and *J. castaneus*, *Luzula spicata*, *Carex pulicaris*, *C. capillaris*, *C. lepidocarpa* and *C. saxatilis*, and *Selaginella selaginoides*.

Typical *Carex dioica* was not seen anywhere in the vicinity, nor have I noted it at any high altitude on the upper slopes of Ben Lawers. I wonder if this has been the experience of other botanists. It is plen-

tiful, of course, in the lower bogs below 2000 ft. And it may occur higher than this (as, indeed, is indicated in the new *Flora*), since there are specimens in the Kew Herbarium collected at 2800 ft., etc., on other Scottish mountains, but in these instances the habitat and accompanying species are not mentioned.

Mr. Nelves has now made a thorough examination of my material collected on both dates (no. 3305, 18.vii.1948; no. 3971, 28.viii.1951), and has kindly contributed the following report:

"I have made a careful study of Mr. Sandwith's sedge from Ben Lawers and, as is clearly shown in the table below, it has more characters in common with *C. parallela* (Laest.) Sommerf. than with *C. dioica*. It matches very closely a Scandinavian plant which bears the name *C. dioica* L. var. *paralleloides* Lund ex Anderss. (*C. parallela* var. β Boott). On one of the very few sheets of this plant in the Kew Herbarium it is stated that no male plants were found, and this is true also of Mr. Sandwith's discovery.

"Its structure suggests that this sedge is either a hybrid between *C. dioica* and *C. parallela*, or a variety of the latter species, with the evidence rather more in favour of it being a hybrid. This leads to the supposition that *C. parallela* is or has been a member of the Scottish sedge flora, and this announcement of its Ben Lawers relative may lead to its discovery.

"Dr. E. Asplund, a Scandinavian authority on the sedges, saw Mr. Sandwith's specimens when on a visit to Kew last summer, and he was quite convinced that they were not *C. dioica*."—E. NELMES.

CONTRASTING AND DISTINGUISHING CHARACTERS.

<i>Carex dioica</i> L.	<i>Carex</i> ? sp. (Sandwith 3305, 3971).	<i>Carex parallela</i> (Laest.) Sommerf.
Stems slender.	Stems stouter.	Stems less slender.
Spikes ovoid to oblong-ovoid, dense-flowered, about 1 cm. long.	Spikes oblong or linear-oblong, less dense-flowered, 1-1.5 cm. long.	Spikes oblong or linear-oblong, laxer-flowered, 1-1.5 cm. long.
Utricles broadly ovoid or ellipsoid, strongly nerved, becoming patently spreading, upper margins scaberulous; beak short.	Utricles narrowly ellipsoid, obscurely nerved or nerveless, becoming slightly spreading, upper margins scaberulous; beak shortish.	Utricles narrowly ovoid or ellipsoid, slenderly and fewer-nerved, becoming obliquely spreading, margins smooth; beak longer.
Achene fully developed.	Achene not or scarcely at all developed.	Achene fully developed.

After the above had gone to press, I showed my specimens to my colleague, Mr. R. D. Meikle, who was planning to spend a part of his holidays last July at the Lawers Hotel, with Mr. A. W. Stelfox. He and Mr. Stelfox have now found exactly the same plant, still with immature fruits, not only in a spot which must be close to or identical with my original station, but also in quantity in two widely separated

areas in very high bogs at about 3000 ft. on the other side of the main ridge of the mountain, facing north and north-west towards Glen Lyon. The sedge occurs where patches of snow have lain after the end of winter. Mr. Meikle also collected specimens of typical *C. dioica* in similar ground, proving that this species does grow at high altitudes on Ben Lawers.

It is obvious from these remarks that the status of this puzzling sedge is by no means clear, but I think that a preliminary note was required to call attention to it as an interesting subject for serious investigation.

CAKILE EDENTULA (BIGEL.) HOOK. IN BRITAIN

By D. E. ALLEN.

It has been shown by Hultén (1945) and Löve (1945) that the representative of the genus *Cakile* in Iceland is not *C. maritima* Scop. as previous authors had supposed, but the North American species *C. edentula* (Bigel.) Hook. In a review of Hultén's *Flora of Alaska and Yukon*, Wilmott (1949, 134) suggested the possibility of the occurrence of this species in the British Isles, and mentioned in passing that plants which he had examined in the Outer Hebrides had possessed the fruit characters of *C. edentula* and needed further investigation. In June 1951 the writer detected in the herbarium of the Botany School, Cambridge, three gatherings from the north of Scotland of a plant which was manifestly different from ordinary *C. maritima*. The sheets were sent to Dr. A. Löve of the University of Winnipeg, Canada, and were confirmed by him as *C. edentula*.

The following description of the species is based on that given by Fernald (1950):

CAKILE EDENTULA (Bigel.) Hook., 1830, *Fl. Bor. Am.*, 1, 59. *Bunias edentula* Bigel., 1814, *Fl. Bost.*, 157; *Cakile americana* Nutt., 1818, *Gen. Am.*, 2, 62; *C. maritima* L. var. *integrifolia* Grönl., 1881, *Isl. Fl.*, 48 (? Hornem.); *C. maritima* var. *latifolia* Stefánsson, 1901, *Fl. Isl.*, ed. 1, 111 (non Desf.).

Leaves obovate or oblanceolate, dentate to sinuate-lobed, narrowed to the base. Upper joint of silicula ovoid or rarely ovoid-lanceolate, short-beaked, the articulating summit of the lower joint without processes or with them only barely developed.

C. maritima is characterised by having the leaves linear or dissected more or less to the midrib into distant, oblong or linear segments. The upper joint of the silicula is prolonged and lanceolate or ensiform ("mitre-shaped" is Bentham's term) and the summit of the lower joint is divided into divergent points or teeth. A. & D. Löve (1947) have also found that while *C. maritima* has the diploid chromosome number of $2n=18$, *C. edentula* is a tetraploid with $2n=36$.

The subspecies *edentula* of *C. edentula* is found along the eastern coast of North America from Newfoundland and southernmost Labrador to South Carolina, round much of the coast of Iceland and on Fayal in the Azores. Two other subspecies are recognized by Hultén (1945), inhabiting the Great Lakes region and the western coast of N. America respectively. It is possible that the species also occurs in the Faeroes, since Ostenfeld (1901) records "var. *latifolia* (Poir.)" from there. *C. maritima* is recorded as being found all along the western seaboard of Europe, from Spitsbergen, south to the Canary Islands. It is clear, however, that some of these records will now have to be re-examined.

According to Fernald (1950) this species occurs sporadically on coastal rubbish in North America as an adventive from Europe.

Material has so far been examined only in the herbaria of the British Museum (Natural History) (B) and Cambridge University (C):

- V.-c. 106. E. Ross; coast near Balintore, 1891, *E. S. Marshall* (C), det. *A. Löve*.
108. W. Sutherland; Farr Bay, 1897, *W. A. Shoolbred* (B).
109. Caithness; Dunnet Links, 1886, *E. S. Marshall* (C), det. *A. Löve*: Wester Links, Wick, 1887, *J. Grant* (B).
110. Outer Hebrides; near Daliburgh, S. Uist, 1936; near Newton, N. Uist, 1937; Branahue, Stornoway, Lewis, 1938, *M. S. Campbell*: Scaristaveg, S. Harris, 1938, *U. A. Vincent*: Mealista, Uig, Lewis, 1939, *J. A. Crabbe* (all B).
112. Shetland; Burrafirth, Unst, 1865, *R. Tate* (B, C): Dunrossness, Mainland, 1884, *W. E. & H. Smith* (B): Mid Yell Voe, Yell, 1886, *W. H. Beeby* (B).

The species may also be expected to occur in the Orkneys and in the West of Ireland. After carefully examining the evidence, *A. & D. Löve* (l.c.) have concluded that *C. edentula* must have been transported by the Gulf Stream from America to the shores of Iceland at some time since the close of the last glaciation, the seeds of the closely-related *C. maritima* having been found to stay afloat in sea water for several weeks. The phytogeographical status of *C. edentula* must, in any case, differ somewhat from that of the non-maritime members of the American element in the British Isles such as *Sisyrinchium angustifolium* Mill. sec. Fern. and *Roegneria Doniana* (White) Melderis, which are also represented in Iceland or Greenland and thus appear to have arrived by way of a North Atlantic land-bridge.

It is to be hoped that investigations will be undertaken in the field to ascertain whether the two species differ noticeably in flowering time or ecological requirements, and whether any other significant biological differences exist.

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SHORT NOTE

LEAVES AND FRUITS OF TREES ASSOCIATED WITH SNOW-PATCHES AT HIGH ALTITUDES ON BEN LAWERS, PERTSHIRE

During the summers of 1947 and 1951 snow-patches lay longer on Ben Lawers than is, I believe, usual and during holidays in this district in June 1947 and July 1951 my wife and I met with the following evidence of fruit and leaves of trees having been carried up from the valleys and deposited at remarkable altitudes.

The nearest places these could have come from are the shores of Loch Tay on the south and Glen Lyon on the north, where the trees concerned grow at a height of 600 to 700 feet and are about three miles distant from the places where we found the objects to be referred to.

In 1947 we found "keys" of Ash (*Fraxinus*) lying exposed on snow-patches at 3,000 feet or more on the southern slopes of Ben Lawers. In 1951 we found two isolated seedlings of Sycamore (*Acer*) of a few weeks growth at over 3,000 feet in the north corrie, between the summit and Lochan-nan-Cat. Our most remarkable discovery, however, was a veritable bed of leaves of Beech (*Fagus*), mixed with an odd Oak leaf (*Quercus*), beneath and partly covered by a melting patch of snow at about 3,200 feet in the north corrie, above and due west of Lochan-nan-Cat. These leaves lay in a compact mass as if transported in bulk from a wood and must have numbered more than a hundred, mostly of Beech, but amongst these I saw several of Oak. All the leaves appeared to belong to the 1950 vintage, as they were quite fresh-looking and not rotted. Unfortunately we were hurrying home at the time and had to leave a thorough investigation for a future visit which never materialised. If these fruits and leaves are transported to such heights—presumably by storms—it would appear certain that fragments and seeds of many other low-land plants must also be carried up and deposited on our mountains. The appearance of *Epilobium pedunculare* A. Cunn. in recent years at considerable altitudes in mountainous areas tends to confirm this supposition. I may add that the only connexion between the fruits and leaves and the snow-patches is that all tend to be deposited in the same sheltered hollows and the objects are more easily seen when resting on the snow than amongst vegetation.

A. W. STELFOX.

PLANT NOTES

153/2. *MEDICAGO* × *VARIA* Martyn. The plants with yellow flowers turning dusky green, which occur in Breckland with *M. sativa* and *M. falcata*, were at one time thought to be a distinct species (*M. sylvestris* Fr.), but are now regarded as part of the hybrid swarm between the two first-mentioned. Similar intermediates are widespread on the Continent. When in France in July 1951, I noticed in the courtyard of the Bastille (an old fort on a rocky hilltop, now a restaurant) at Grenoble an abundant growth of *M. sativa* and *falcata*, and various intermediates. Amongst them was an albino *M. sativa*, and a number of the intermediates showed the influence of this. One was an exact replica of "*M. sylvestris*", except that the initially yellow flowers turned creamy-white instead of greenish or purplish. This was probably a simple *sativa* × *falcata* cross. Others bore evidence of more complex parentage, e.g. one with pale lavender flowers and *falcata*-like foliage was probably derived from *falcata* and both albino and normal *sativa*.—D. P. YOUNG.

439/1. *OXYCOCCUS PALUSTRIS* Pers. In 1936, Mr. J. E. Lousley discussed this species in Britain and described a variety, *maculatus* with speckled fruits (*Journ. Bot.*, **74**, 198) noticed at Oakhanger, N. Hampshire, v.-c. 12 (not 11 as printed). The bog where the cranberry occurs most abundantly is that on Shortheath Common near Oakhanger, and when botanising there on March 26th, 1951, I noticed that ripe fruits from the previous season were still present on both forms. Those of a spherical shape and wine-red colour were firm though somewhat watery to taste, and the other brownish speckled ovoid berries were of a more solid texture and tasty; this nearly six months after autumn ripening. On a further visit, May 27th, the berries were beginning to collapse and decay as the new season's flower buds were opening. I do not know if this persistence of fruit over winter is usual, but I have not noticed it before, nor read about it, though I have often searched cranberry bogs in Surrey and Sussex for bryophytes in early spring.—E. C. WALLACE.

506/10. *MYOSOTIS DISCOLOR* Pers. The name *Myosotis versicolor* Sm., 1813, *Engl. Bot.*, sub. t. 2558 (1813) is antedated by *Myosotis discolor* Persoon in L., 1797, *Syst. Veg.*, ed. 15, p. 190, in obs. which must, therefore, be adopted in its place.

The following new combinations are involved:—

M. discolor Pers. var. **Balbisiana** (Jord.) comb. nov.

Myosotis Balbisiana Jord., 1852, *Pug.*, 128.

M. discolor Pers. var. **pallida** (Bréb.) comb. nov.

Myosotis versicolor var. *pallida* Bréb., 1849, *Fl. Norm.*, ed. 2, 170.

- M. discolor* Pers. var. **dubia** (Arrond.) comb. nov.
Myosotis dubia Arrond., 1867, *Cat. pl. Morbihan*, 70.
- M. discolor* Pers. var. **multicaulis** (Bosch) comb. nov.
M. versicolor var. *multicaulis* Bosch, 1850, *Fl. Batavia*, 1, 160.
- M. discolor* Pers. var. **Lloydii** (Corb.) comb. nov.
M. versicolor var. *Lloydii* Corb., 1893, *Fl. Norm.*, 692.
- M. discolor* Pers. var. **longicalyx** (Vestergren) comb. nov.
M. versicolor subsp. *longicalyx* Vestergren, 1930, *Svensk Bot. Tidskr.*, 449.
- M. discolor* Pers. var. **fallacina** (Jord.) comb. nov.
M. fallacina Jord., 1857, in Boreau, *Fl. Cent. Fr.*, ed. 3, 2, 463.

—A. E. WADE.

472. **LIGUSTRUM.** There seems, strangely enough, in British Floras a conspiracy of silence over the fact that the name privet is commonly applied to two distinct species, the common wild privet of our countryside, *Ligustrum vulgare* L., and the broad-leaved Japanese privet, *Ligustrum ovalifolium* Hassk., which is the form widely planted in shrubberies and as a hedging plant. Consequently the two are often confused and it is to be feared that the latter has all too often been recorded under the former name.

Davey (*Flora of Cornwall*) says "*Ligustrum vulgare* Linn. Privet. Skedgwith. Skidgey. Skerrish. Pevit." I think this shows some confusion of the facts. "Skejwith" was the collective plural of the name for the wild privet in the old Cornish tongue, and "skejwethen" the ordinary plural and their variants were, in my experience, used only for *L. vulgare* (the form I knew was "skidgey") while privet, or vulgarly "pivot" was used for *L. ovalifolium*. He goes on to say "Very common" which I think overstates the abundance of the truly wild plant which is, I believe, only locally plentiful in Cornwall though it forms extensive thickets in dunes of shell sand as at Perranporth. It seems probable that Davey was unconsciously merging the two plants under the one name.

The *Flora of Devon* (1938) says "Native. Widely distributed and common but especially so on chalk and limestone. Often a conspicuous feature on the coast, where it will grow in very exposed situations. Inland it frequents limestone rocks and also woods on the red marl and other soils, but it is sometimes planted as cover for game." To this one can make no objection but there is no mention of *L. ovalifolium*.

The *Flora of Gloucestershire* (1948) says "Native and extensively planted." There is no mention of *L. ovalifolium* but "extensively planted" pretty certainly applies to that plant and not to *L. vulgare*, which, so far as I can find, has never been extensively planted, at any rate in recent times.

Thurston (*Trees and Shrubs in Cornwall*) has the correct entry, "*Ligustrum vulgare* Linn. The common British plant of hedges. In

gardens, and near habitations, some of the numerous hardy species, introduced from China and Japan, flourish luxuriantly".

The two commoner plants are very distinct. *L. vulgare* has small leathery leaves, ovate-lanceolate, hardly acuminate, about $1\frac{3}{4}$ inches long and $\frac{1}{2}$ an inch wide, and small dense panicles of white flowers, while *L. ovalifolium* has much larger leaves up to $3\frac{1}{2}$ inches long to nearly $1\frac{1}{2}$ inches wide, of much softer texture (not at all leathery), either elliptic or long-rhombic and usually decidedly acuminate. It has, too, a much larger, looser panicle of white flowers.—F. RILSTONE.

[It may perhaps be added that the 'Golden Privet', commonly used for garden hedges, is a form of *L. ovalifolium*. It is usually a smaller bush with smaller leaves than the green-leaved form.—ED.]

637/2. *URTICA URENS*. In August 1950 I dug up two lots of vegetables in my kitchen garden at Platt, Kent. Soon after *Urtica urens*, which was already plentiful elsewhere in the garden, sprang up thickly in the light sandy soil. Early in the winter every plant in these two patches was knocked flat by frost, while the others around remained unscathed. It would be interesting to know the reason for this variation in behaviour.—D. McCLINTOCK.

870/5b. *LYCOPodium CLAVATUM* L. var. **lagopus** Laest. 88, Mid Perth; by a rough path on the right bank of the Lawers burn, a short distance above the wood, 1951, J. E. Raven and R. A. Graham. Mr. Alston, who named my specimen from Lawers, has added: "Not apparently recorded from Britain. All the plants that I saw in Lapland belonged to this form, but the British material in the Herbarium shows considerable variation". The character for this form is the single spike, as opposed to the double spike of more normal material. Examination of the British material at the British Museum, to which Mr Alston refers, shows that specimens with both single and double spikes have been gathered from a number of vice-counties, and may perhaps be fairly general. One gathering from Dolgelly has triple spikes only, while a few have both double and triple spikes. Forms with only single spikes have also been found in Mull and near Inverey and no doubt elsewhere, and it is probable that this form is widespread though evidently less common than the usual form with double spikes. My specimen from Lawers has only the single spikes, but examples with double spikes occurred with it. Mr Alston is inclined to discount my record of a single-spiked form from Bruar Forest (1947, *Rep. Bot. Soc. & E.C.*, 13, 75) as the single spike in the specimen may be due to an irregularity of growth.—R. A. GRAHAM.

REVIEW

Drawings of British Plants. Part V, *Caryophyllaceae*. STELLA ROSS-CRAIG. London. G. Bell & Sons Ltd., 66 Plates, Price 10/-.

No one could deny that Miss Ross-Craig's drawings have style; it may be questioned, however, whether her style is the best one for the illustration of many of the plants treated in the present volume. The most noticeable feature of her drawings is the beauty and firmness of her line and in illustrating the larger plants and flowers it shows to great advantage. With the smaller subjects, however, such as *Sagina* and *Cerastium*, this firmness of line becomes a disadvantage and tends to obscure detail. As a result the drawings of these smaller plants do not look natural and are not always helpful for purposes of determination. This is particularly noticeable in the illustration of hairs. A conventional representation may not be misleading in larger subjects, but, because of the lesser disparity in size of parts, the same convention used for smaller plants causes confusion.

With regard to accuracy, the illustrations of *Cerastium* show some peculiar anomalies. *C. tetrandrum* Curt. is shown as having heavily veined petals, whilst *C. pumilum* Curt. has no petal veining indicated. Is this intended to emphasise the greater "whiteness" of the petals of *C. pumilum*? Actually, the veins of the petals of *C. pumilum* are usually much more pronounced than those of *C. tetrandrum*. Microscopic examination shows that the veins of *C. pumilum* are usually composed of about four rows of xylem elements, whilst those of *C. tetrandrum* seldom exceed two rows, except in the case of the main vascular supply. The petals, though differing in shape, show approximately the same depth of the cleft in relation to the petal length, whilst actually the petals of *C. pumilum* are usually much more deeply cleft than those of *C. tetrandrum*. It should be mentioned that both the characters referred to above are considered important diagnostically by many continental taxonomists. The illustrations of the tubercles on the seeds of *Cerastium*, more especially the high-power drawings, do not appear to be typical, and certainly are not in agreement with the illustrations and photographs in Wilhelm Möschl's publications on these species.

In the case of *Sagina*, the firmness of line gives an impression of robustness to the leaves which they do not in fact possess.

With the larger plants Miss Ross-Craig's style is much more successful and plates such as that of *Saponaria officinalis* L. are very beautiful examples of floral illustration.

F. H. WHITEHEAD.

THE STUDY OF THE DISTRIBUTION OF BRITISH PLANTS

being the Report of the Conference arranged by the Society in 1950. Edited by J. E. Lousley. Demy 8vo., pp. 128, with about 28 plant distribution maps and other illustrations.

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A report of the Conference held in 1952 is in preparation, and will be published as a separate volume under the above title. It will include the full text of all papers read by the principal speakers, with the discussions which followed, and accounts of the exhibits. The book will be fully illustrated and further details will be sent to members and advertised in *Watsonia* as soon as possible.

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PLANTS OF THE SILURIAN LIMESTONES ON THE WEST OF THE MALVERN HILLS

By F. M. DAY.

Mr. Lousley's recent book *Wild Flowers of the Chalk and Limestone* has emphasised the great wealth of plants in such districts, and it may be of interest to consider the flora of a small area of limestone west of the Malvern Hills and compare it with the general flora of other limestone districts of Britain.

The area to be considered here is now situated entirely within the limits of the administrative county of Herefordshire in the parishes of Eastnor, Colwall and Mathon, on the eastern border of the county. Mathon was still in Worcestershire when H. C. Watson defined his vice-counties, and so must be included in v.-c. 37. Eastnor and Colwall are in v.-c. 36 (Herefordshire).

In the parishes of Mathon and Colwall the Silurian rocks lie along the eastern border, forming a strip about a mile wide, running from north to south, on the western side of the Malvern Hills. In Eastnor, the southermost of the three, they are separated from the granite of the Malvern Hills by a mile or more of Cambrian shales and sandstones; and in Colwall there is an additional Silurian area on the west of the parish, which joins the Eastnor section in the south. There are three parallel ridges, Woolhope limestone abutting on the Malvern granite, Wenlock limestone, and Aymestry limestone on the west. They are separated by valleys of Wenlock Shale, and Lower Ludlow Shale, with Upper Ludlow Shale on the western slope of the Aymestry Limestone ridge. These ridges are usually wooded along the top, and the shale valleys are under plough or pasture. The limestones are not rich, being often of a shaley nature, and the Wenlock Limestone is the only one which has in the past been much quarried for burning, and even that is now worked in only one or two places. The soil of the ridges is not as rich in calcium as it is on the Chalk Downs and Derbyshire hills, and although in some places the slopes have a distinct look of calcareous pasture, many typical calcicoles are absent, and flowers lack the intense blue found on the Chalk and the Cotswolds.

Some plants which might be expected here are absent, but are found within a few miles on other geological formations. *Helleborus viridis* L. was recorded by Mr. R. F. Towndrow at Madresfield on the Keuper about four miles to the east; *Hypericum montanum* L. on the Cambrian Rocks of the Gullet Pass through the Malvern Hills in Eastnor; *Geranium pratense* L. just over the border of Eastnor in West Glos. at Bromsberrow; *Echium vulgare* L., in a very stunted form, on a boss of Ordovician trap intruded into the Cambrian Shale at the head of the Valley of the Whiteleafed Oak at Eastnor, its only station in this neighbourhood; *Verbascum nigrum* L. on the granite or Keuper on the east slope of the Malvern Hills; *Spiranthes spiralis* (L.) Chevall. in small numbers on Castlemorton Common, a little further to the east;

Iris foetidissima L. at Wall Hills, Ledbury, on the Old Red Sandstone, and on an outlier of Lias limestone on Berrow Hill in Worcestershire.

There are a number of plants which might well be expected, but seem to be completely absent from the district. Probably their absence may be explained by lack of sufficient lime due to the depth of the soil. These absentees are:—

<i>Thalictrum minus</i> L.	<i>Linum bienne</i> Mill.
<i>Anemone Pulsatilla</i> L.	<i>Campanula glomerata</i> L.
<i>Arabis hirsuta</i> (L.) Scop.	<i>Atropa Bella-donna</i> L.
<i>Erigeron acris</i> L.	<i>Thesium humifusum</i> L.
<i>Senecio integrifolius</i> (L.) Clairv.	<i>Ophrys insectifera</i> L.
<i>Cerastium arvense</i> L.	<i>Cephalanthera Damasonium</i> (Mill.) Druce
<i>Polygala calcarea</i> F. Schultz	<i>C. longifolia</i> (Huds.) Fritsch
<i>Astragalus danicus</i> Retz.	<i>Convallaria majalis</i> L.
<i>Filipendula vulgaris</i> Moench	<i>Helictotrichon pratense</i> (L.) Pilger
<i>Sorbus Aria</i> (L.) Crantz	
<i>Asperula cynanchica</i> L.	

Campanula glomerata L. has been recorded on the Wenlock Limestone in Eastnor Park once by Towndrow, but not since.

Scabiosa columbaria L., "In a wood at Old Colwall, 1885" (Purchas & Ley, 1889, 169). This sounds an unlikely spot.

Galium tricornis Stokes, "In a field in Cowleigh Park" (Towndrow in Purchas & Ley, 1889, 165); "above Croft Farm, Mathon" (Lees, 1868, 46).

Echium vulgare L., "On the abandoned Croft Wenlock Limestone quarries, Mathon, 1866" (Lees, 1868, 47).

Hippocrepis comosa L., "Vicinity of the Malvern Hills" (Duncumb, 1804).

Pimpinella major (L.) Huds., rare "about Cradley" (Lees, 1868, 52); and "near Cradley," by R. C. Alexander in *New Botanist's Guide* (1835) (Purchas & Ley, 1889, 148). Although Cradley is a neighbouring parish to the north of Mathon, the vagueness of these records might bring them into our area.

The limestone ridges have a gentle slope along most of their length, and in consequence a moderate or good depth of soil, so that it is likely to be less calcareous in content than in districts where the shallowness of the soil brings it all into closer contact with the underlying limestone. While the shale valleys are often used for arable purposes, the slopes, where not clothed with trees, are left as open, fairly dry pasture. Though the flora is not often markedly calcareous in character, it is often possible in these fields roughly to trace the junction of the limestone and shale by the occurrence of certain plants such as *Helianthemum Chamaecistus* Mill., *Poterium Sanguisorba* L. and *Plantago media* L., which seldom grow on the shales, while *Cirsium palustre* (L.) Scop. is only found in the wetter soil of the valleys. *Luzula campestris* (L.) DC. is plentiful on the ridges, and these pastures contain a number of small herbs; *Linum catharticum* L. is general along with

Trifolium dubium Sibth., *T. micranthum* Viv. is very occasional on shallow soil, but occurs more plentifully in short turf on the Malvern granite and on the commons on the east side of the Hills. *Cirsium acaulon* (L.) Scop. sometimes monopolises small areas in the fields, but never to the great extent in which it is found in the Cotswolds. Dry, ungrazed banks are apt to be covered with *Zerna erecta* (Huds.) Panz., *Brachypodium pinnatum* (L.) Beauv. and *Festuca rubra* L. The Thyme of these banks and of the Malvern Hills is presumably *Thymus Drucei* Ronn. emend. Jalas, but has not been critically determined. *Viola hirta* L. with its varieties *propera* Jord. and *Foudrasii* Jord. are abundant in these habitats, especially at Croft Bank in Mathon. *Crepis taraxacifolia* Thuill. is generally found on these banks and along farm tracks and little used roads. Thirty years ago it was rapidly increasing in quantity and in range. It now seems to be stationary or has possibly slightly decreased during the last 15 years. *Carduus nutans* L. is frequent both here and on the granite, being favoured probably by the dryness rather than by the calcareous nature of the soil.

Several of the common Orchids are to be found, *Orchis morio* L. and *O. Fuchsii* Druce being the most plentiful in the meadows. *Coeloglossum viride* (L.) Hartm. is rather local, but occasionally very plentiful. *Gymnadenia conopsea* (L.) R. Br. is not common and is irregular in occurrence, both on and off the Silurian formations. In recent years it has become very rare. The same must be said of *Ophrys apifera* Huds. It has two stations on the Wenlock Limestone and two on the Aymestry, but has been seen in only one of them regularly for the last ten years, and only in small numbers there.

The woods are mostly oak standards with a shrub layer of hazel and brambles, and a ground flora dominated by Dog's Mercury, Bluebells and Garlic (*Allium ursinum* L.), with *Melica uniflora* Retz., *Poa nemoralis* L. and *Zerna ramosa* (Huds.) Lindm. as the principal grasses. The herb layer is one associated rather with damp than with especially calcareous oakwood. Both species of oak, *Quercus robur* L. and *Q. petraea* (Mattuschka) Liebl. occur. The subordinate trees include *Prunus avium* (L.) L., *Euonymus europaeus* L. and Hawthorn, nearly always *Crataegus monogyna* Jacq. Holly and Yew are in every wood, and ash is sometimes nearly as plentiful as oak. *Clematis Vitalba* L. festoons the hedges and bushes, and *Lonicera Periclymenum* L. twines up the trunks of small trees and along their branches.

Most of the woodland plants call for little comment. They include *Ranunculus auricomus* L., *Fragaria vesca* L., *Galium Cruciata* (L.) Scop., *Asperula odorata* L., *Galeobdolon luteum* Huds. and *Euphorbia amygdaloides* L. *Luzula pilosa* (L.) Willd. is more common than *L. Forsteri* (Sm.) DC., and there is one patch of *L. luzuloides* (Lam.) Dandy and Wilmott, which has persisted for over 30 years. *Paris quadrifolia* L. grows in damp woods. *Daphne Laureola* L. gives the first signs of approaching spring, opening its flowers early in February and in mild seasons soon after New Year.

Violets are common both in and out of the woods. *V. odorata* L. is usually in the var. *dumetorum* Jord., and the var. *subcarnea* Jord. in a few stations. In several gardens in Colwall the var. *sulfurea* (Car.) Rouy & Fouc. grows as a weed. It is probably native, as there is no record of its having been planted, and the best living local authority goes back in her memory nearly 90 years. *V. Reichenbachiana* Jord. is so plentiful as to form a carpet in the woods in early April, and in one wood is a small patch of forma *pallida* Neum. with beautiful pale bluish mauve flowers. *V. Riviniana* Reichb. is plentiful in the more open parts. In more shady places it often occurs as forma *nemorosa* Neum., and in exposed places and dry banks the smaller growth of subsp. *minor* (Murbeck) Valentine. Both these species are common in hedgebanks.

There are a few notable calcicoles. *Helleborus foetidus* L. has two stations in Colwall, one on the Aymestry Limestone at Chance's Pitch near the Herefordshire Beacon, the other on the Wenlock in a plantation by the road leading from Colwall to the Wyche Cutting. It has been known in both places for many years and there is every reason to suppose that it is native. *Astragalus glycyphyllos* L. grows in small quantity in Brock Hill Wood on the Aymestry Limestone and in Colwall Coppice on the Wenlock; and in 1922 I found several plants on the Wenlock on Croft Bank, where it remained for only two or three years. *Vicia silvatica* L. occurs in several places often covering the bushes over a large area.

As in the meadows there are few of the rarer Orchids. *Orchis mascula* L. and *O. Fuchsii* Druce are common, and *Platanthera chlorantha* (Cust.) Reichb., especially in Brock Hill Wood. *Listera ovata* (L.) R. Br. is fairly plentiful in shady spots and *Neottia* amongst the decaying leaves of hazel and oak. In late July and August there are scattered patches of *Epipactis Helleborine* (L.) Crantz and occasionally its rarer cousin *E. purpurata* Sm.

The following plants associated with limestone grow on two or more of the limestones, though many are found on other formations also:

<i>Aquilegia vulgaris</i> L.	<i>Hypericum hirsutum</i> L.
<i>Clematis Vitalba</i> L.	<i>H. pulchrum</i> L.
<i>Anemone nemorosa</i> L.	<i>Linum catharticum</i> L.
<i>Ranunculus auricomus</i> L.	<i>Geranium molle</i> L.
<i>Helleborus foetidus</i> L.	<i>G. pusillum</i> L.
<i>Erophila verna</i> (L.) Chevall.	<i>G. dissectum</i> L.
<i>Reseda lutea</i> L.	<i>Euonymus europaeus</i> L.
<i>R. luteola</i> L.	<i>Trifolium striatum</i> L.
<i>Helianthemum Chamaecistus</i> Mill.	<i>T. campestre</i> Schreb.
<i>Viola odorata</i> L.	<i>T. dubium</i> Sibth.
<i>V. hirta</i> L.	<i>Anthyllis Vulneraria</i> L.
<i>V. Reichenbachiana</i> Jord.	<i>Lotus corniculatus</i> L.
<i>V. Riviniana</i> Reichb.	<i>Astragalus glycyphyllos</i> L.
<i>Cerastium viscosum</i> L.	<i>Vicia silvatica</i> L.

- Prunus avium* (L.) L.
Poterium Sanguisorba L.
Daucus Carota L.
Galium Cruciata (L.) Scop.
Asperula odorata L.
Sherardia arvensis L.
Knautia arvensis (L.) Coult.
Inula Conyza DC.
Carlina vulgaris L.
Carduus nutans L.
Cirsium acaulon (L.) Scop.
Centaurea Scabiosa L.
Crepis taraxacifolia Thuill.
Hieracium Pilosella L.
Monotropa Hypopithys L., agg.
Blackstonia perfoliata (L.) Huds.
Centaurium minus Moench
Lithospermum officinale Gilib.
Linaria Cymbalaria (L.) Mill.
Euphrasia spp.
Lathraea Squamaria L.
Origanum vulgare L.
Thymus Drucei Ronn.
Clinopodium vulgare L.
Galeobdolon luteum Huds.
Plantago media L.
Euphorbia amygdaloides L.
Parietaria diffusa Mert. & Koch
Daphne Laureola L.
Neottia Nidus-avis (L.) L. C. Rich.
Listera ovata (L.) R. Br.
Epipactis Helleborine (L.) Crantz
E. purpurata Sm.
- Orchis morio* L.
O. Fuchsii Druce
O. mascula L.
Anacamptis pyramidalis (L.) L.
 C. Rich.
Ophrys apifera Huds.
Gymnadenia conopsea (L.) R. Br.
Coeloglossum viride (L.) Hartm.
Platanthera chlorantha (Cust.)
 Rich.
Paris quadrifolia L.
Galanthus nivalis L.
Luzula pilosa (L.) Willd.
L. Forsteri (Sm.) DC.
Carex lepidocarpa Tausch
Milium effusum L.
Trisetum flavescens (L.) Beauv.
Helictotrichon pubescens (Huds.)
 Pilger
Koeleria gracilis Pers.
Melica uniflora Retz.
Briza media L.
Poa nemoralis L.
Festuca rubra L.
F. ovina L.
Vulpia bromoides (L.) S. F. Gray
V. myuros (L.) C. C. Gmel.
Brachypodium silvaticum (Huds.)
 Beauv.
B. pinnatum (L.) Beauv.
Zerna ramosa (Huds.) Lindm.
Z. erecta (Huds.) Panz.

WOOLHOPE LIMESTONE.

This is the least distinctive of the three limestones, in fact the general appearance of the flora is that of neutral grassland, and in the woods it resembles normal oakwood. The rock is composed mostly of alternate bands of shale and limestone, and the slope is usually gentle with a good depth of soil. There are a few steep, dry pitches, and on these the vegetation is usually composed of *Festuca rubra* L. and *F. ovina* L., *Trifolium dubium* Sibth., *Origanum vulgare* L., *Thymus*, *Clinopodium vulgare* L. and *Plantago media* L. There is only one notable plant peculiar to this formation. *Aquilegia vulgaris* L. is recorded "in a coppice near Brand Lodge", Colwall (Purchas & Ley, 1889, 11), and I have found it in small quantity in Newes Wood, Eastnor, at the S.W. base of the Herefordshire Beacon. But since it also occurs on the Wenlock Limestone in a wood at Ledbury just over the border from

Eastnor, even this is not a good example. Snowdrops have grown for many years near the northern base of the Herefordshire Beacon, probably survivors from the gardens of cottages now demolished.

WENLOCK LIMESTONE.

The vegetation of the Wenlock Limestone is the most distinctly calcareous of all three of these formations. The slope is often steeper and the rock crops out at the surface in many places. The fact that it has been, and still is, quarried, both for burning and as building stone, is a sign of its greater content of lime and less shaley nature. There is still one large quarry in work until recently at Vinesend, on Croft Bank, just outside Mathon, in Cradley. A single look at Croft Bank shows that we are here on limestone, and the colours of the flowers have the characteristic bright hues. These banks are dominated by *Festuca rubra* L., *F. ovina* L., *Brachypodium pinnatum* (L.) Beauv. and *Zerna erecta* (Huds.) Panz. Besides the common species such as *Thymus*, *Origanum*, *Carlina*, *Blackstonia*, etc., there are a few of special interest. *Acinos arvensis* (Lam.) Dandy can sometimes be seen in an old quarry at the foot of the bank, but it is often swamped by the taller grasses. It is here that Towndrow recorded *Platanthera bifolia* (L.) L. C. Rich. in small quantity; not having been found now for 25 years at least, it is feared that it is extinct. *Anthyllis Vulneraria* L. is fairly plentiful, and there is a large area of *Cirsium eriophorum* (L.) Scop., which is found also on the same formation at Evendine in Colwall. Fortunately it survives frequent cutting. This is one of the few stations where *Ophrys apifera* Huds. flowers regularly every year. *Coeloglossum viride* (L.) Hartm. is common and nearly all the other Orchids are plentiful.

Further south, in Colwall, another bank on the Wenlock Limestone, between the Downs School and the Mathon boundary at Purlieu Lane, produces calcareous conditions and typical calcicole plants. Of recent years some of this has been put under the plough, which has reduced the large quantity of *Brachypodium pinnatum* (L.) Beauv., or Badger Grass. Here *Trifolium campestre* Schreb., *Centaureum minus* Moench and *Blackstonia* are common, and there is a small quantity of *Onobrychis*, perhaps a relic of cultivation. A disused quarry provides a home for *Gentiana amarella* L., which occurs near Evendine also, but otherwise is not common. One field has a quantity of *Anacamptis pyramidalis* (L.) L. C. Rich., and used to have many plants of *Ophrys apifera* Huds., but this has seldom appeared for the last 12 years, and then only in small numbers. *Reseda lutea* L. is occasional, especially as a casual in disturbed ground; *Cynoglossum officinale* L. is rare, its only permanent station being near Evendine.

In the wood on the crest of the ridge at Croft Bank is the single station in these parishes for *Melampyrum pratense* L., and in the more open parts a few Bee Orchids appear each year. It is rich in the commoner Orchids, *O. mascula* L., *O. Fuchsii* and *Listera ovata* (L.) R. Br., as well as *Neottia*, and *Platanthera chlorantha* (Cust.) Rich. *Lathyrus Nissolia* L. produces a few plants each year on the outskirts of this wood.

Further south Colwall Coppice has most of these plants and is interesting as containing *Astragalus glycyphyllos* L. and the uncommon grass *Hordelymus europaeus* (L.) Harz. In Park wood just across the boundary in Mathon, a marshy spot on the Wenlock shale is a station for *Carex lepidocarpa* Tausch. The water from the limestone slopes drains into this hollow and probably contains lime in solution, thus accounting for the presence of this plant.

In Eastnor woods we are reaching the well-known daffodil district which extends beyond Ledbury to Newent in W. Glos. The wood along the Ridgeway is largely yew and contains an oak with many clusters of mistletoe. Here both among the trees and in the open ground of Eastnor Park *Helictotrichon pubescens* (Huds.) Pilger was recorded by Lees (Lees, 1868, 106) and is still growing there, accompanied, in the Park, by *Koeleria gracilis* Pers., very rare in the east of v.-c. 36.

The following plants are confined to the Wenlock Limestone:—

<i>Lathyrus Nissolia</i> L.	<i>Melampyrum pratense</i> L.
<i>Onobrychis viciifolia</i> Scop.	<i>Cynoglossum officinale</i> L.
<i>Cirsium eriophorum</i> (L.) Scop.	<i>Platanthera bifolia</i> (L.) L. C. Rich.
<i>Gentiana amarella</i> L.	<i>Hordelymus europaeus</i> (L.) Harz.

AYMESTRY LIMESTONE.

This limestone passes gradually into the overlying Upper Ludlow shale and it is difficult to trace an exact junction. Much of this shale is itself calcareous and contains large nodules of limestone, and the upper strata have been included in this section along with the Aymestry Limestone, as they produce dry and often calcareous conditions. The limestone contains a number of shaley bands and is not so rich as the Wenlock. It has been dug in a few places, and a disused quarry at Evendine is the only station for *Calamintha ascendens* Jord., and contains a few aliens from the garden of the cottage above; *Erigeron speciosus* (Lindl.) DC., and, along with *Sedum acre* L., there is *S. album* L., *S. Telephium* L. and *Cerastium tomentosum* L., all of which seem to be well established.

Brock Hill Wood in Colwall contains *Astragalus glycyphyllos* L., *Cardamine impatiens* L., and *Epipactis purpurata* Sm. *Gagea lutea* (L.) Ker-Gawl. was first recorded on the edge of this wood in 1855 and has been growing on its present site nearby since 1899 (Amphlett and Rea, 1909, 358). About 20 plants or more appear each year, but seldom more than 5 or 6 have flowers. Five years ago another small patch was discovered further in the wood about 100 yards away. These stations are probably not on the limestone, but just below, and the soil is rather heavy humus.

There are two interesting small pieces of real calcareous vegetation, one in Colwall on Chance's Pitch by the road from the Herefordshire Beacon to Ledbury, the other at Upper Mitchell Farm on the Eastnor-Ledbury boundary. The Chance's Pitch station is an outcrop of limestone about 150 yards long where *Erophila verna* (L.) Chevall. flowers in February in the crevices of the rock where they get the full spring sun.

Later in the summer *Helictotrichon pubescens* (Huds.) Pilger and *Koeleria gracilis* Pers. are fairly plentiful. The latter is found in the east of v.-c. 36 only here and in Eastnor Park about a mile away. This station also has *Scleropoa rigida* (L.) Griseb., rare in this neighbourhood, and *Nepeta Cataria* L.; here and on the Upper Ludlow shale is *Geranium lucidum* L., which is only occasional elsewhere, and *Potentilla verna* L. The last used to grow on the western slope of Brock Hill, but seems to be lost through ploughing. *Plantago Coronopus* L. grows on these rocks; elsewhere only in one or two places on the Malvern granite.

On the other side of the road is a south-facing bank rich in Violets, especially *V. odorata* L. var. *subcarnea* Jord., mostly as a beardless form, very occasionally a few spikes of *Ophrys apifera* Huds., and an old established station of *Dianthus Armeria* L., recorded by Duncumb in 1804. At the present time it is uncertain in appearance owing to the growth of bushes and coarse grass, but a few plants can usually be found. Nearby in a plantation *Helleborus foetidus* L. can be seen from the road, this year (1952) in very great quantity.

At Upper Mitchell Farm is a smaller outcrop, which is rather overgrown with *Zerna erecta* (Huds.) Panz., but it also has *Geranium columbinum* L. and *Potentilla argentea* L. The latter is also plentiful in the field just over the wall. Along the roadside are scattered plants of *Nepeta Cataria* L.

In the three parishes there appears to be only one, or possibly two, stations for *Orchis praetermissa* Druce. It grows in great profusion in a marshy field behind Mathon Post Office, fine plants with spikes sometimes six inches or more long. This is not on the Silurian rocks, but the water drains to it from the Aymestry strata further up the slope, and probably contains much lime; an idea supported by the fact that in a neighbouring field *Carex lepidocarpa* is found.

The following plants are found only on the Aymestry Limestone:—

<i>Dianthus Armeria</i> L.	<i>Potentilla argentea</i> L.
<i>Cardamine impatiens</i> L.	<i>Calamintha ascendens</i> L.
<i>Geranium lucidum</i> L.	<i>Nepeta Cataria</i> L.
<i>G. columbinum</i> L.	<i>Plantago Coronopus</i> L.
<i>Potentilla verna</i> L.	<i>Scleropoa rigida</i> (L.) Griseb.

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 DUNCUMB, 1804, *Collections towards the History and Antiquities of the County of Hereford*.
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 —, 1868, *Botany of the Malvern Hills*, ed. 3.
 PURCHAS, W. H., & LEY, A., 1889, *Flora of Herefordshire*.
 TOWNDROW: Mr. R. F. Towndrow's (1845-1937) notes and records for this district. Many of these are included in Purchas & Ley, and Amphlett & Rea.

Where no reference is given the writer has seen the plant himself.

NEW COMBINATIONS IN THE BRITISH FLORA

The following new combinations were established in Clapham, A. R., Tutin, T. G., and Warburg, E. F., 1952, *Flora of the British Isles*. Details are given here in order to make their synonymy clear.

OPHIOGLOSSUM VULGATUM L. subsp. **polyphyllum** (A.Br.) E. F. Warburg, 1952, *F.B.I.*, 54.

Ophioglossum polyphyllum A.Br. in Seub., 1844, *Flora Azorica*, 17.

Ophioglossum vulgatum var. *polyphyllum* (A.Br.) Milde, 1867, *Fil. Eur.*, 188.

PINUS SYLVESTRIS L. subsp. **scotica** (P. K. Schott) E. F. Warburg, 1952, *F.B.I.*, 61.

Pinus sylvestris L. "rasse" *scotica* P. K. Schott, 1907, *Forstwissenschaft. Centralbl.*, 29, 278.

VIOLA HIRTA L. subsp. **calcareea** (Bab.) E. F. Warburg, 1952, *F.B.I.*, 243.

Viola hirta var. *calcareea* Bab., 1847, *Manual Br. Bot.*, ed. 2, 35.

Viola calcarea (Bab.) Gregory, 1904, *J. Bot.*, 42, 68.

SAROTHAMNUS SCOPARIUS subsp. **MARITIMUS** (Rouy) Ulbrich.

Sarothamnus scoparius var. *prostratus* C. Bailey, 1868, *Memoirs Literary & Philosophical Soc. of Manchester*, Ser. 3, 3, 285.

Genista scoparia var. *maritima* Rouy, 1897, *Fl. France*, 4, 204.

Sarothamnus scoparius subsp. *maritimus* (Rouy) Ulbrich, 1921, *Mitt. Deutsch. Dendrol. Gesellsch.*, 135.

Sarothamnus scoparius subsp. *prostratus* (C. Bailey) Tutin in Clapham, Tutin & Warburg, 1952, *Fl. Brit. Isles*, 416.

In the *Flora* I made the combination subsp. *prostratus*, being unaware of Ulbrich's previous treatment of the plant as a subspecies.—T. G. Tutin.

SEDUM FORSTERIANUM Sm., 1807, *Engl. Bot.*, 26, t. 1802, subsp. **elegans** (Lej.) E. F. Warburg, 1952, *F.B.I.*, 566.

Sedum elegans Lej., 1811, *Fl. Spa*, 1, 205.

Sedum rupestre L. subsp. *elegans* (Lej.) Syme, 1865, *Engl. Bot.*, ed. 3, 4, 58.

If *S. rupestre* L. is rejected as a *nomen ambiguum*, following Hylander, 1945, *Nomenklatorische und systematische Studien über Nordische Gefäßpflanzen*, *Uppsala Universitets Arsskrift*, 1945, 7, 192, 328, and *S. Forsterianum* Sm. and *S. elegans* Lej. regarded as conspecific, the former is the earlier name for the species.

BETULA PUBESCENS Ehrh. subsp. **odorata** (Bechst.) E. F. Warburg, 1952, *F.B.I.*, 729.

Betula odorata Bechst., 1815, *Diana*, 1, 74.

Betula alba subsp. *odorata* (Bechst.) Dipp., 1892, *Handb. der Laubholzkunde*, 2, 172.

- PYROLA ROTUNDIFOLIA** L. subsp. **maritima** (Kenyon) E. F. Warburg, 1952, *F.B.I.*, 789.
Pyrola maritima Kenyon, 1846, *Phytologist*, **2**, 747.
Pyrola rotundifolia var. *bracteata* Hook. & Arn., 1850, *Brit. Fl.*, ed. 6, 260.
Pyrola rotundifolia var. *maritima* (Kenyon) Watson & Syme, 1857, *London Cat.*, ed. 5, 7.
- Gentianella germanica** (Willd.) E. F. Warburg, 1952, *F.B.I.*, 824.
Gentiana germanica Willd., 1798, *Sp. Plant.*, ed. 4, **1**, 1346.
- Gentianella anglica** (Pugs.) E. F. Warburg, 1952, *F.B.I.*, 826.
Gentiana Amarella L. var. *praecox* Towns., 1883, *Fl. Hampshire*, 216.
Gentiana lingulata C.A.Ag. var. *praecox* (Towns.) Wettst., 1896, *Denkschr. Math.-Naturwiss. Akad. Wissensch.*, Wien, **64**, 51.
 (This combination is usually attributed to Murbeck, but he placed *G. lingulata* as a subsp. of *G. Amarella*.)
Gentiana anglica Pugs., 1936, *J. Bot.*, **74**, 167.
- Gentianella septentrionalis** (Druce) E. F. Warburg, 1952, *F.B.I.*, 825.
Gentiana Amarella L. f. *multicaulis* Lange ex Beeby, 1887, *Scottish Naturalist*, **1887**, 27.
Gentiana Amarella var. *calycina* Druce, 1914, *Rep. Bot. Soc. & E.C.*, **3**, 329.
Gentiana Amarella "subsp. or race" *G. septentrionalis* Druce, 1922, *Rep. Bot. Soc. & E.C.*, **6**, 505.
Gentiana septentrionalis (Druce) Druce, 1932, *Comital Flora*, 202.
- VERONICA SPICATA** L., 1753, *Sp. Plant.*, **1**, 10, subsp. **hybrida** (L.) E. F. Warburg, 1952, *F.B.I.*, 880.
Veronica hybrida L., 1753, *Sp. Plant.*, **1**, 11.
- ODONTITES VERNA** (Bell.) Dumort. subsp. **serotina** [Lam.] E. F. Warburg, 1952, *F.B.I.*, 912.
Euphrasia Odontites L., 1753, *Sp. Plant.*, **2**, 604.
Euphrasia serotina Lam., 1778, *Fl. Franc.*, **2**, 350, nom. illegit.
Odontites vulgaris Moench, 1794, *Meth. Pl.*, 439.
Odontites serotina Dumort. 1827, *Fl. Belg.*, **32**, nom. illegit.
Odontites Odontites subsp. *serotina* Wettst., 1901, *Denkschr. Akad. Wiss. Wien, Math.-nat. Cl.*, **70**, 321.
Odontites rubra subsp. *serotina* Hayek, 1929, *Fedde, Rep. Sp. Nor.*, Beih. **30** (2), 179.
- Hydrilla lithuanica** (Andrzej. ex Bess.) Dandy, 1952, *F.B.I.*, 1123.
Udora verticillata (non Spreng.) Eichwald, 1830, *Naturhist. Skizze Lithauen*, 127.
Udora lithuanica Andrzej. ex Bess., 1832, *Beibl. Flora*, **1832**, (2), 13.
Udora pomeranica Reichb., 1845, *Ic. Fl. German. & Helvet.*, **7**, 31, t. 59, fig. 104.

Anacharis pomeranica (Reichb.) Peterm., 1849, *Deutsch. Fl.*, 530, t. 82, fig. 650 a, b.

Hydrilla dentata var. *pomeranica* (Reichb.) Casp., 1853, *Bot. Zeit.*, **11**, 805.

ASPARAGUS OFFICINALIS L. subsp. **prostratus** (Dumort.) E. F. Warburg, 1952, *F.B.I.*, 1221.

Asparagus prostratus Dumort., 1827, *Fl. Belg.*, 178.

Asparagus officinalis var. *prostratus* (Dumort.) Aschers. & Graebn., 1906, *Synops. Mitteleur. Fl.*, **3**, 295.

Asparagus officinalis var. *maritimus* auct. angl. non L.

ALLIUM ROSEUM L. subsp. **bulbiferum** (Desf. ex DC.) E. F. Warburg, 1952, *F.B.I.*, 1237.

Allium roseum var. *bulbiferum* Desf. ex DC., 1805, *Fl. France*, ed. 3, 221.

De Candolle cites Desf., *Cat. Hort. Paris*, for the variety, but it does not appear to be mentioned by Desfontaines in that work.

FESTUCA OVINA L. subsp. **tenuifolia** (Sibth.) Tutin, 1952, *F.B.I.*, 1426.

Festuca tenuifolia Sibth., 1794, *Fl. Oxon.*, 44.

Desmazeria rigida (L.) Tutin, 1952, *F.B.I.*, 1434.

Poa rigida L., 1755, *Cent. Pl.*, **1**, 5.

Sclerochloa rigida (L.) Link, 1821, *Enum. Pl. Berol.*, **1**, 90.

Festuca rigida (L.) Rasp., 1825, *Ann. Sci. Nat.*, **5**, 445, non Roth, 1797.

Scleropoa rigida (L.) Griseb., 1844, *Spicil. Fl. Rumel.*, **2**, 431.

POA PRATENSIS L. subsp. **subcaerulea** (Sm.) Tutin, 1952, *F.B.I.*, 1441.

Poa subcaerulea Sm., 1802, *Engl. Bot.*, **14**, t. 1004 [non Sm. sec. Lindm., 1926, *Svensk Fanerogamflora*, ed. 2, 96].

Ceratochloa carinata (Hook. & Arn.) Tutin, 1952, *F.B.I.*, 1458.

Bromus carinatus Hook. & Arn., 1841, *Bot. Beechey Voyage*, 403.

NOTES ON TWO RARE SCOTTISH SEDGES

By ELIZABETH W. DAVIES, University College of Leicester.

It seems worth recording a few notes on two of the rare Scottish Sedges from the Lawers range found in the summer of 1951.

(1) *CAREX MICROGLOCHIN* Wahlenb.

This was found when I had set out to look for *Roegneria Doniana* (F. B. White) Meld. with Mr. J. E. Raven and Dr. S. M. Walters. After scrambling up the rocks above Lochan na Cat, I proceeded towards the summit of Meall Garbh, and then turned south-east, making my way along the shoulder of the mountain. I had hoped eventually to descend by way of Lady Davy's locality for *Carex microglochin*.

There were patches on this shoulder where the runnels opened out into dark bare peaty areas of micaceous bog, and here the vegetation was very sparse and low. The plant that attracted my attention first was *Equisetum variegatum*, but on further investigation I found a great abundance of *Carex microglochin* growing with *Kobresia simpliciuscula*, *Carex capillaris*, and *C. saxatilis*. The following is a list of species associated with this sedge; with the exception of *Carex atrofusca* Schkuhr, which I failed to find, it seems to be very similar to the list Druce (1924) records from Lady Davey's original locality in Coire nam Buidheag (the Yellow Corrie).

Thalictrum alpinum L.

Saxifraga aizoides L.

Tofieldia pusilla (Michx.) Pers.

Juncus articulatus L.

J. triglumis L.

J. biglumis L.

Eleocharis pauciflora (Lightf.) Link.

Kobresia simpliciuscula (Wahlenb.)

Mackenzie.

Carex saxatilis L.

C. capillaris L.

C. demissa Hornem.

C. flacca Schreb.

C. panicea L.

Festuca vivipara (L.) Sm.

Equisetum variegatum Schleich.

I took a soil sample from this bog, and it was clear, on examining it, that this apparently peaty soil contained an abundance of minute particles of micaceous schist, and was probably exceedingly base-rich. On returning to Leicester I did some pH tests on this soil, using Muirhead's Electrochemical pH meter, and found the soil had a pH of 7.05. This is an interesting contrast to the acid bog areas where one normally finds *Carex pauciflora* Lightf. (the species that resembles *C. microglochin* most closely in Britain), which in my limited experience always grows on soils with a pH varying between 4.5 and 5.5.

The micaceous bog on the shoulder of Meall Garbh was at an altitude of between 2,900 ft. and 3,000 ft. and somewhat higher than the Yellow Corrie, but I feel fairly confident that, if the area was explored further, more *C. microglochin* might well be found, since there appear to be other suitable habitats for the sedge in the neighbourhood. My only regret is that I had not time to investigate the area further.

(2) *CAREX RUPESTRIS* All.

This plant was also found accidentally during one of our further searches for *Roegneria Doniana*, on a spur of Meall nan Tarmachan. The habitat, a damp rocky ledge with a north-easterly aspect, did not strike me as a typical one for this sedge, the vegetation being very dense and high and the position too wet. The plant was scarce, and, although there were several fruiting spikes still to be seen, the *Carex rupestris* was certainly only tolerating its conditions. But this and a similar record made by Dr. S. M. Walters from the same area, half a mile distant from my locality, are to my knowledge the only records of *C. rupestris* from this area. There are however two other records for the sedge from the Breadalbane mountains. Firstly one mentioned in White (1886) from Ben Heasgarnich, and secondly a record from the north side of Glen Lyon made by R. Mackechnie and E. C. Wallace (1938).

I saw this sedge on Ben-y-Vrackie in July 1951, and Mr. J. E. Raven kindly sent me a small specimen and a soil sample from Inchnadamph, where I also saw it in 1952. I thought therefore it might be interesting to record a list of associated species from these habitats together with the results of some pH tests I have made on the different soils, for the latter are strikingly similar.

Carex rupestris was at an altitude of between 2,000 and 2,200 ft. on Meall nan Tarmachan and Ben-y-Vrackie, although at Inchnadamph it was at only about 500 ft. In the first two localities the sedge was growing in the turf, or on the rock ledges, and on both mountains the rocks were very base-rich, and probably made up of micaceous schists. But the ecological conditions and aspect of the two habitats were very different, for Ben-y-Vrackie is a particularly dry mountain, and the sedge, which was in fair abundance, was growing on a slope with a south-easterly aspect, and appeared to be well suited ecologically. On Meall nan Tarmachan, however, the habitat was cold and wet and faced north-east, the competition from larger and more vigorous plants was considerable, and the sedge was very scarce. I am including a species list for the two localities, as I think this is indicative of the rather different plant associations on the two mountains which are obviously linked with the different aspect and moisture conditions. There is however no doubt that Ben-y-Vrackie provides the better habitat. I have also added a list for Inchnadamph.

Species.	(1) Meall nan Tarmachan.	(2) Ben-y- Vrackie.	(3) Inch- nadamph.
<i>Viola tricolor</i> L.		+	
<i>Cerastium alpinum</i> L.		+	
<i>Linum catharticum</i> L.	+		+
<i>Astragalus alpinus</i> L.		+	
<i>Oxytropis Halleri</i> Bunge		+	
<i>Dryas octopetala</i> L.			+
<i>Alchemilla alpina</i> L.	+	+	+
<i>Saxifraga aizoides</i> L.	+		+
<i>S. oppositifolia</i> L.	+		
<i>Galium pumilum</i> Murr.	+		+
<i>Calluna vulgaris</i> (L.) Hull		+	
<i>Vaccinium Myrtillus</i> L.		+	
<i>Campanula rotundifolia</i> L.	+	+	
<i>Euphrasia micrantha</i> Reichb.	+		
<i>Pinguicula vulgaris</i> L.	+		
<i>Thymus Drucei</i> Ronn. emend. J alas ...	+	+	+
<i>Plantago maritima</i> L.			+
<i>Polygonum viviparum</i> L.	+		+
<i>Carex lepidocarpa</i> Tausch	+		
<i>C. flacca</i> Schreb.	+		+
<i>Molinia caerulea</i> (L.) Moench			+
<i>Brachypodium pinnatum</i> (L.) Beauv. ..			+
<i>Asplenium viride</i> Huds.		+	
<i>Polystichum Lonchitis</i> (L.) Roth	+	+	
<i>Cystopteris fragilis</i> (L.) Bernh.	+	+	
<i>Rhacomitrium canescens</i> (Hedw.) Brid.		+	

Lastly I give the pH of the three soils, again determined by an electrochemical method. The very great similarity of my results from these three widely separated Scottish localities is exceedingly interesting. In each case the pH of the soils proved to be about neutral, being 7.0 at Ben-y-Vrackie and Meall nan Tarmachan, and 7.2 at Inchnadamph.

Thus it seems that this sedge prefers a neutral or slightly alkaline base-rich soil, a warm, fairly dry rock ledge with a southern aspect, and not too much competition from the surrounding vegetation.

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 WHITE, F. B., 1886, *Flora of Perthshire*.

ADDITIONS TO THE FLORA OF LUNDY

By H. J. M. BOWEN, Magdalen College, Oxford.

Lundy, an island in the Bristol Channel situated twelve miles from North Devon (its Watsonian vice-county), and twenty-four miles from South Wales, is of considerable botanical interest. The most interesting feature for the visiting botanist in July and August will undoubtedly be the endemic Lundy cabbage, *Rhynchosinapis Wrightii*, first recognised as a distinct species by Dr. F. R. Elliston Wright in 1936. This plant is common on cliffs on the east side of the island, and seems to be in no danger of extermination.

The topography of the island merits a brief description. The major portion consists of a granite tableland over a hundred metres high, covered by a layer of boggy peat, with a flora closely similar to that of Dartmoor. Locally dominant plants include *Calluna vulgaris*, *Pteridium aquilinum* and *Salix repens*; *Wahlenbergia hederacea* occurs in one bog. An unusual plant found abundantly on the infertile north end of this region is *Ophioglossum vulgatum* ssp. *polyphyllum*. The western cliffs are precipitous and very exposed: *Armeria maritima*, *Agrostis tenuis* and *Holcus lanatus* are the dominants, while typical western plants like *Erodium maritimum*, *Asplenium marinum* and *Dryopteris aemula* are frequent. In contrast, the eastern cliffs are remarkably sheltered, and have somewhat gentler slopes. These slopes are dominated by *Pteridium aquilinum* and the recently introduced *Rhododendron ponticum*, which forms thick coverts; *Carex paniculata* tussocks make the eastern combs difficult to examine. Under the *Pteridium* grows a fairly rich flora of normally woodland plants: *Primula vulgaris*, *Lysimachia nemorum* and *Endymion non-scriptus* are common plants here, while *Scrophularia Scorodonia*, undoubtedly native, is frequent. *Angelica Archangelica* is an unusual alien which is fully naturalised in several places along the eastern cliffs. Finally, in the south-east corner of the island is an upthrust of Devonian slate which weathers much more quickly than the granite to give a slightly basic topsoil. Here, on the rapidly disintegrating cliffs, are many of the island's rarities, plants like *Trigonella ornithopodioides*, *Lotus hispidus*, *Sarothamnus scoparius* ssp. *maritimus*, *Daucus Gingidium*, *Desmazeria marina* and *Bromus Ferronii*.

The first plant lists for Lundy are contained in primarily non-botanical works by Chanter (1871) and Loyd (1925). These authors, particularly the latter, record a number of plants that are not now to be found, and more than a few which probably never grew on the island at all (e.g. *Ranunculus Lingua* and *Centaurium latifolium*). Moreover, they record neither sedges nor grasses, which are conspicuous features of the vegetation. The first scientific flora of the island was compiled by Wright in 1933, with additions and corrections in 1935 and 1936. It

is the purpose of the present note to report further additions and to suggest some corrections to Wright's list.

My main sources of information are: Martin & Fraser (1939, *The Flora of Devon*), a valuable work which, however, includes several of Loyd's unconfirmed records (these are not included in the list below); an MS. list of plants collected by Miss J. Parsons in 1938; and the reports of the Lundy Field Society from 1947 onwards. I have also added a few records from material collected during a short visit to the island in 1951.

The sequence is that of Druce (1928, *British Plant List*), but the nomenclature is taken from Clapham, Tutin and Warburg (1952, *Flora of the British Isles*). Native plants alien to Lundy are indicated by a † before the record: plants alien to the British Isles are indicated by a † before the *B.P.L.* number.

INITIALS AND ABBREVIATIONS.

E.D.W.—E. D. Wiggins	J.R.C.—J. R. Chanter.
<i>Fl. Dev.</i> — <i>Flora of Devon</i>	L.A.H.—L. A. Harvey
F.R.E.W.—F. R. Elliston Wright.	L.R.W.L.—L. R. W. Loyd
H.G.M.—H. G. Morgan.	M.G.—M. Goddard
H.J.M.B.—H. J. M. Bowen	R.J.—R. Jelley.

- 6/5. RANUNCULUS BULBOSUS L. Recorded L.R.W.L.; South end, H.G.M. and E.D.W.: stated not to occur. F.R.E.W.
- 6/13. R. PARVIFLORUS L. Very sparingly in dry turf under Marisco Castle, 1951, H.J.M.B.
- † R. GRAMINEUS L. A South European plant recorded by R. Etheridge in 1855 (cf. *Phyt.* (N.S.) 1, 120). There is a specimen labelled Lundy in the Stephens' Herbarium at Bristol (see Roper (1925)).
- †21/1. PAPAVER SOMNIFERUM L. Recorded *Fl. Dev.*, and noted by H.J.M.B. as planted in Millcombe.
- †31/4. CORYDALIS LUTEA (L.) DC. A few plants on Millcombe garden wall, 1951, H.J.M.B.
- †34/1. CHEIRANTHUS CHEIRI L. Recorded *Fl. Dev.*; farm walls, not common, H.J.M.B.
- 39/5. CARDAMINE HIRSUTA L. A not uncommon native in Millcombe and in damp places along the East side, generally in the shade of rocks or *Pteridium* fronds, H.J.M.B.
- †45/1. ARMORACIA RUSTICANA Gaertn., Mey. & Scherb. One plant near the farm, 1951, H.J.M.B.
- 54/2. BRASSICA NAPUS L. Recorded L.R.W.L.; uncommon colonist, Tillage field, 1951, H.J.M.B.
- †61/3. CARDARIA DRABA (L.) Desv. Recorded E.D.W., perhaps in error for *Lepidium Smithii*.
- 89/2. POLYGALA VULGARIS L. Recorded J.R.C., L.R.W.L. and *Fl. Dev.*; grazed fields, not common, H.J.M.B.
- 92/3. DIANTHUS ARMERIA L. Recorded *Fl. Dev.*, but not seen for many years and presumed extinct.
- 96/5. †SILENE ANGLICA L. A casual, recorded *Fl. Dev.* and L.R.W.L.
- 98/3. †MELANDRIUM ALBUM (Mill.) Garcke. Recorded *Fl. Dev.* and L.R.W.L., but not seen recently.
- †100/12. CERASTIUM TOMENTOSUM L. A garden escape in Millcombe on the farm walls, 1951, H.J.M.B.

- 101/3b). †*STELLARIA APETALA* Ucria. Paths and bare places at the South end, not common and probably a colonist, H.J.M.B. (det. J. H. Burnett).
- 102/5. *ARENARIA SERPYLLIFOLIA* L. Recorded without a locality, M.G. and R.J., and perhaps in error.
- 103/2. *SAGINA SUBULATA* (Sw.) C. Presl. About fifty plants on bare ground near the North end, looking quite native, H.J.M.B.
- 104/2. †*SPERGULA ARVENSIS* L. var. *SATIVA* (Boenn.) Mert. & Koch. Abundant in the Tillage field, 1951, H.J.M.B. F.R.E.W. records the type, but agreed *in litt.* that his plants may have been this variety.
- 105/2. *SPERGULARIA MARGINATA* Kittel. Recorded *Fl. Dev.*; needs confirmation.
- 105/3. *SPERGULARIA SALINA* J. & C. Presl. Recorded *Fl. Dev.*; needs confirmation.
- 112/15. *HYPERICUM HUMIFUSUM* L. Recorded L.R.W.L.; Tillage field, 1948, H.G.M. and E.D.W.. Perhaps both errors for *H. pulchrum*.
- 116/1. †*LAVATERA ARBorea* L. Planted in several stations near bird traps in 1950, and flourishing.
- 125/3. *LINUM CATHARTICUM* L. S.W. corner, M.G. and R.J.; common and appearing native there, H.J.M.B.
- †
EUONYMUS JAPONICUS L. f. Partly naturalised in Millcombe, H.J.M.B.; Stonycroft, and planted near the Old Light, 1950, L.A.H.
- 147/3. *GENISTA TINCTORIA* L. Recorded *Fl. Dev.*, probably extinct.
- 155/10. *TRIFOLIUM SCAPFRUM* L. Recorded M.G. and R.J., almost certainly in error for *T. striatum*.
- 160/7. *LOTUS HISPIDUS* DC. Not uncommon at Lametry, 1949, L.A.H.; one large plant at the South Light, 1951, H.J.M.B.; rare in v.-c. 4 (N. Devon), but I have seen it at Dale Fort, Pems. (v.-c. 45), H.J.M.B.
- 176/34. †*VICIA HIRSUTA* (L.) S. F. Gray. Near farm, 1948, M.G. and R.J.; still there, 1951, H.J.M.B.
- 185/29. *RUBUS POLYANTHEMOS* Lindb. Recorded by W. P. Hiern in *Fl. Dev.*
- 185/66. *R. PYRAMIDALIS* Kalt. Recorded by W. P. Hiern in *Fl. Dev.*
- 185/153. *R. CAESIUS* L. Recorded by W. P. Hiern in *Fl. Dev.*
- 191/1. *AGRIMONIA EUPATORIA* L. Recorded M.G. and R.J.; needs confirmation.
- 194/6. †*ROSA CANINA* L. Recorded M.G. and R.J., probably in error for the next.
- 194/14. †*R. MICRANTHA* Sm. ? A non-flowering sweetbriar growing in Millcombe path in 1951 is probably this species, but it is not a native plant.
- 195/13. †*SORBUS ARIA* agg. Several moribund young trees planted in Millcombe.
- †204/2. *ESCALLONIA MACRANTHA* Hook. & Arn. Planted in Millcombe and flourishing, H.J.M.B.
- 220/4. *EPILOBIUM PARVIFLORUM* Schreb. Recorded M.G. and R.J., almost certainly in error for *E. montanum* or *E. obscurum*.
- †224/1. *FUCHSIA MAGELLANICA* Lam. var. *RICCARTONII* (Lebas) Bailey. Naturalised in Millcombe, H.J.M.B.; Stonycroft, and planted at the Old Light, L.A.H.
- 295/1. *RUBIA PEREGRINA* L. South end, 1948, E.D.W.; needs confirmation.
- 296/6. *GALIAM ULIGINOSUM* L. Recorded L.R.W.L.; about five plants in a boggy part of St. John's valley, H.J.M.B.
- 301/1. *VALERIANA OFFICINALIS* L. Recorded M.G. and R.J.; needs confirmation.
- †320/3. *ERIGERON CANADENSIS* L. A casual once recorded in *Fl. Dev.*
- 324/3. †*FILAGO GERMANICA* (L.) L. Recorded L.R.W.L.; casual, Tillage field, 1947, H.G.M. (with a query).
- †370/13. *CHRYSANTHEMUM PARTHENIUM* (L.) Bernh. Millcombe, 1951, H.J.M.B.
- 371/2. †*MATRICARIA CHAMOMILLA* L. A casual, recorded L.R.W.L. and *Fl. Dev.*
- 383/6. *SENECIO ERUCIFOLIUS* L. Recorded *Fl. Dev.*; needs refining.
- 393/3. *ARCTIUM MINUS* (Hill) Bernh. The only burdock on the island; F.R.E.W. records the aggregate species, but agrees with this correction in a private communication.

- 396/4. CIRSIUM ACAULON (L.) Scop. Recorded M.G. and R.J., but a most unlikely plant and probably an error for one of the other thistles.
- 441/1. †LAPSANA COMMUNIS L. Recorded L.R.W.L.; several plants under trees in Millcombe, 1951, H.J.M.B.
- 445/1. PICRIS ECHIOIDES L. Recorded *Fl. Dev.*, not seen recently.
- 422/1. LEONTODON HISPIDUS L. Recorded L.R.W.L.; S.W. corner, M.G. and R.J.; not common there, H.J.M.B.
- †452/1. RHODODENDRON PONTICUM L. Dominant on the eastern cliffs, and planted near Middle Pond.
- 457/5. LIMONIUM BINERVOSUM (G. E. Sm.) C. E. Salmon. Recorded J.R.C., L.R.W.L., etc.; Jenny's Cove, L.A.H. (det. A. R. Clapham); about 200 plants of a stunted form of this species, just above the spray zone, H.J.M.B.
- †473/1. VINCA MAJOR L. Planted in Millcombe, H.J.M.B.
- †498/1. BORAGO OFFICINALIS L. Recorded L.R.W.L.; Millcombe, 1951, H.J.M.B.
- 517/2. †SOLANUM NIGRUM L. A casual, recorded L.R.W.L. and *Fl. Dev.*
- 524/1. †HYOSCYAMUS NIGER L. A casual, recorded *Fl. Dev.*
- 543/19. †VERONICA AGRESTIS L. ? Recorded J.R.C. and, with a query, *Fl. Dev.*
- †558/4. MENTHA SPICATA L. emend. Huds. A garden relict in Millcombe and near the old Post Office, H.J.M.B.
- 577/6. †STACHYS ARVENSIS (L.) L. Tillage field, 1947, M.G. and R.J.; not uncommon there, 1951, H.J.M.B.
- 588/9. †PLANTAGO MEDIA L. Recorded L.R.W.L. and *Fl. Dev.*; Landing cove, 1951, H.J.M.B.
- 606/3. †ATRIPLEX PATULA L. Recorded *Fl. Dev.*; near the farm, 1951, H.J.M.B.
- 615/15. POLYGONUM AEGUALE Lindm. This is the common knotgrass; it is recorded as *P. aviculare* by F.R.E.W.
- 618/3b. RUMEX CRISPUS L. var. TRIGRANULATUS Syme. About fifty plants on the driftline, among shingle and boulders, at Landing Cove, H.J.M.B.
- 628/14 †EUPHORBIA PEPLUS L. Recorded L.R.W.L.; a few plants in Millcombe, near the big house, 1951, H.J.M.B.
- 628/17. EUPHORBIA PEPLIS L. Recorded *Fl. Dev.*, now presumed extinct.
- 651/3. †POPULUS NIGRA L. Once planted according to Hiern in *Fl. Dev.*, but no longer to be found.
- 663/1. LISTERA OVATA (L.) R.Br. Recorded, on the evidence of a visitor, by the 1951 warden; a most unlikely native.
- 664/2. SPIRANTHES SPIRALIS (L.) Chevall. About a dozen flourishing plants near the Rocket Pond, first found 1948, L.A.H.
- †683/1. CROCOSMIA × CROCOSMIIFLORA (Lemoine) N.E.Br. Planted in Millcombe, H.J.M.B.
- †697/1. YUCCA GLORIOSA L. Planted in Millcombe, H.J.M.B.
- 727/1. LEMNA MINOR L. Recorded J.R.C. and L.R.W.L.; pools on the East side, H.G.M. and E.D.W., confirmed H.J.M.B.
- 753/61. CAREX PAIRAEI F. Schultz. East side, not uncommon, H.J.M.B. (det. J.H. Burnett); in a private communication F.R.E.W. agrees that his record of *C. spicata* was probably an error for this species.
- 770/1. †ALOPECURUS PRATENSIS L. Several large clumps near the farm, 1951, H.J.M.B.
- †794/7. AVENA SATIVA L. Casual, near the farm, 1951, H.J.M.B.
- 824/2. †POA PRATENSIS L. ssp. PRATENSIS. Near the farm, 1951, H.J.M.B.; ssp. *subcaerulea* (Sm.) Tutin is native and much commoner.
- 826/9. FESTUCA OVINA L. Recorded *Fl. Dev.*; native, but not so common as *F. rubra*, H.J.M.B.
- †827/16. BROMUS SECALINUS L. A few plants near the Hotel, 1951, H.J.M.B.
- 827/20. B. FERRONII Mabilie. Common on the cliffs, South end and perhaps elsewhere, flowering much earlier than *B. mollis* and soon drying up, H.J.M.B.
- †831/1. SECALE CEREALE L. Casual, near farm, 1951, H.J.M.B.
- †841/4. PINUS NIGRA Arnold ssp. NIGRA. Planted in Millcombe with *P. radiata* Don, H.J.M.B.

- 844/. EUISETUM sp. Quarry Bay, at sea-level, 1948, H.G.M.; should be re-found and identified.
- 856/3. DRYOPTERIS AUSTRIACA (Jacq.) Woyнар. Recorded L.R.W.L., and confirmed by H. W. Pugsley in 1934; not reported since.

The author would like to thank Professor L. A. Harvey and Dr. F. R. Elliston Wright for some privately communicated notes and records, and Dr. J. H. Burnett for help with the identification of some critical species.

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ABSTRACTS FROM LITERATURE

Compiled by D. H. KENT.

Thanks are due to D. E. Allen, E. B. Bangerter, K. J. Hodges, and A. E. Wade for their help.

SYSTEMATIC, ETC.

6/33. *RANUNCULUS FICARIA* L. Marsden-Jones, E. M., & Turrill, W. B., 1952, Studies on *Ranunculus Ficaria*, *J. Genetics*, **50**, 522-534. The authors give further statistics obtained from their studies in leaf shape and mottling, and in the colour of the petals. The chromosome number of the non-buliferous forms is stated to be usually $2n=16$, while that of bulbil-producing plants has always been found to be $2n=32$.—[D.H.K.]

7/1. *CALTHA PALUSTRIS* L. Leoncini, M. L., 1951, Biotipi cariologici e sistematici di *Caltha* in Italia, *Caryologia*, **3**, 336-350. Of the three Italian segregates of this species, *C. cornuta* Schott is diploid ($2n=16$), *C. laeta* Schott tetraploid ($2n=32$) and *C. palustris* L. both tetraploid and hexaploid ($2n=48$). *C. laeta* occurs at subalpine and alpine levels in the Apennines and in a few places in the eastern Alps, while *C. cornuta*, which is considered a glacial relict, is found in a few lowland localities in Tuscany, Emilia and Venice. *C. palustris* prefers the lower alpine levels, whence it spreads downwards into the plains. The morphological differences between the three are discussed in detail.—[D.E.A.]

CRUCIFERAE. Murley, M. R., 1951, Seeds of the Cruciferae of North-eastern N. America, *Amer. Midl. Nat.*, **46**, 1-81. Contains a key for the identification of the seeds of 118 species and varieties of Cruciferae, including some which are also found in Britain. Many N. American plants which are found as casuals in this country are given. The account includes a number of drawings of seeds.—[D.H.K.]

35. *NASTURTIUM*. Howard, H. W., & Lyon, A. G., 1951, Effect of Light on the Germination of Watercress Seeds, *Nature*, **168**, 253-254. *N. officinale* seeds germinate both in the light and in the dark. Those of *N. microphyllum* only germinate in the light, though the amount of light required is apparently very small.—[D.H.K.]

35. *NASTURTIUM*. Howard, H. W., & Haskell, G., 1951, The So-called Chromosome-Races of *Cardamine pratensis* and *Nasturtium officinale*, *Nature*, **168**, 477-478. *N. microphyllum* is not cultivated. The brown or so-called Winter Cress is *N. microphyllum* × *officinale*.—[D.H.K.]

35/1. *NASTURTIUM OFFICINALE* R. Br. Howard, H. W., and Lyon, A. G., 1952, *Nasturtium officinale* R. Br., *J. Ecol.*, **40**, 228-238 (Biological Flora).

35/1(2). *NASTURTIIUM MICROPHYLLUM* (Boenn.) Rechb. Howard, H. W., & Lyon, A. G., 1952, *Nasturtium microphyllum* Boenn. ex Rechb., *J. Ecol.*, **40**, 239-245 (Biological Flora).

39/1. *CARDAMINE PRATENSIS* L. See 35. *NASTURTIIUM*.

44/5. *EROPHILA CONFERTA* Wilmott. Campbell, M. S., 1951, *Erophila conferta* Wilmott in Scotland, *Scottish Nat.*, **63**, 49. The plant originally accidentally introduced into a garden near Aberfeldy (cf. *Watsonia*, **1**, 137 (1949)) has now escaped and has spread to a nearby wall top.—[D.H.K.]

49. *SISYMBRIUM*. Bangerter, E. B., & Welch, Mrs. B. W., 1952, The London Rocket and its Allies of the London Area, *Lond. Nat.*, **31**, 13-17. The authors describe the various adventive species of *Sisymbrium* found near London and give a key to their identification. The leaves and siliquae of some of the plants are illustrated by line-drawings.—[D.H.K.]

53/1. *SUBULARIA AQUATICA* L. Woodhead, N., 1951, *Subularia aquatica* L., *J. Ecol.*, **39**, 465-469 (Biological Flora).

54. *BRASSICA*. Gates, R. R., 1950, Genetics and Taxonomy of the Cultivated Brassicas and their Wild Relatives, *Bull. Torr. Bot. Club*, **77**, 19-28. The history of cultivated *Brassicaceae* shows that many new types have appeared through mutation and hybridization at different times during the last two thousand years, and that old types have undergone great transformation. *B. Rapa* ($n=10$) and *B. Napus* ($n=19$) produce vigorous hybrids despite the disparity in chromosome number. Some forty species are found in the Mediterranean region, which has been regarded as the centre of origin of the group. The forms on the coasts of Western Europe consist of populations differing in fruit and seed characters and were ranked by Onno in 1933 as subspecies of *B. sylvestris* (L.) Mill., one of two segregates into which *B. oleracea* was divided. This is regarded as most probably native, chiefly on account of its remarkable uniformity in comparison with the great variety of cultivated forms.—[D.E.A.]

54/14. *SINAPIS ARVENSIS* L. Fogg, G. E., 1950, *Sinapis arvensis* L., *J. Ecol.*, **38**, 415-429 (Biological Flora).

98(2). *MELANDRIUM*. Baker, H. G., 1951, The Inheritance of Certain Characters in Crosses between *Melandrium dioicum* and *M. album*, *Genetica*, **25**, 125-156. The author gives statistics obtained from detailed studies of *M. dioicum* and *M. album* and the hybrid between them. The most convenient character for determination of the hybrid would appear to be the length of the calyx teeth. In almost all cases where the hybrids are intermediate between the parents they tend to resemble their maternal parent to a greater extent.—[D.H.K.]

98(2)/2. *MELANDRIUM DIOICUM* (L.) Coss. & Germ. Baker, H. G., and Jackson, W., 1951, Cytology of the Ecotypes of dioecious *Melandrium dioicum* (L. emend.) Coss. & Germ., *Nature*, **168**, 747-748. The

coastal ecotype in the Shetland Isles is diploid ($2n=24$), no tetraploids being found, despite the fact that this race shows many morphological features normally associated with polyploidy, such as increased flower-, capsule- and seed-size along with thicker and hairier leaves and stems.—[D.H.K.]

98(2)/2. *MELANDRIUM DIOICUM* (L.) Coss. & Germ. Löve, D., 1952, Tetraploid dioecious *Melandrium*, *Nature*, **169**, 591-592.

100. *CERASTIUM*. Möschl, W., 1951, *Cerastia Lusitaniae* Archipelagorumque Açores et Madeira, *Agron. Lusit.*, **13**, 23-66. A key is given of all species of this genus known or likely to occur in the Iberian Peninsula, the Azores and Madeira. Distribution maps of the Portuguese species, a synopsis of all the European members of the genus, and figures to aid identification are also added.—[D.E.A.]

100/5. *CERASTIUM VULGATUM* L. Kotilainen, M. J., & Salmi, V., 1950, Two Serpentinicolous Forms of *Cerastium vulgatum* L. in Finland, *Archiv. Soc. Zool. Bot. Fenn.*, **5**, 64-68. A new variety, var. *kajanense*, is described from serpentine rocks in central Finland. This and var. *serpentina* (Novak) Gartner [antedated by var. *serpentina* (Syme) Druce, which may be the same plant], which differs from the type in having darker leaves, longer (3-6.5 mm.) petals and larger seeds and in flowering about a month later, both come true in cultivation.—[D.E.A.]

100/8. *CERASTIUM SEMIDECANDRUM* L. Möschl, W., 1949, *Cerastium semidecandrum* Linne, sensu latiore, *Mem. Soc. Brot.*, **5**, 5-123. The taxonomy and synonymy of the species and its segregates is discussed at length. The author has seen British material of *C. semidecandrum* L. f. *genuinum* (Rouy & Fouc.) Möschl from Kent, Surrey, Oxfordshire and Norfolk, and f. *stenopetalum* (Beck) Hegi from Cambridge and Glamorgan. The var. *congestum* Gren. is referred to f. *genuinum*, and the vars. *glandulosum* Koch and *pellucidum* (Chaub.) are not kept up. Hybrids with *C. glutinosum* and *C. subtetrandrum* are cited from Europe, and with *C. vulgatum* from Oxfordshire.—[D.H.K.]

185. *RUBUS*. Watson, W. C. R., 1952, *Rubus*, in Kent, D. H., & Lousley, J. E., *A Hand List of the Plants of the London Area*, 74-100. Over 200 species of brambles and the localities in which they are known to occur within a 20 mile radius of St. Paul's Cathedral are listed. Three new species:—*R. Averyanus*, *R. iodnephes*, and *R. spadix*, and one variety, *R. egregius* var. *pliocenicus*, are described. The following new combinations are made:—*R. pustulatus* (P. J. Muell. ex Sudre) W. Wats., *R. derasifolius* (Sudre) W. Wats. and *R. bavaricus* (Focke) W. Wats. *R. squalidus* Genev. antedates *R. Naldretti* (J. W. White) W. Wats., *R. hylophilus* Rip. ex Genev. replaces *R. Brittonii* Bart. & Ridd. *R. taeniarum* Lindeb. replaces *R. spurius* L. M. Neumann, and *R. obtusatus* L. & M. antedates *R. botryeros* (Focke ex Rog.) Focke. An appendix of 31 species additional to the last published list of British Rubi (*J. Ecol.*, **33**, 337-344 (1946)) is also given.—[D.H.K.]

188/2. *FRAGARIA VESCA* L. Cameron, J. I., 1951, Note on the Late Flowering of *Fragaria vesca* Linn., *Glasgow Nat.*, **16**, 67.

195. *MALUS*. Potter, J. M. S., 1952, The History of the Apple, *J. Roy. Hort. Soc.*, **77**, 65-75.

195(2). *SORBUS*. De Poucques, M.-L., 1951, Etude chromosomique des *Sorbus latifolia* Pers. et *Sorbus confusa* Gremlin, *Bull. Soc. Bot. France*, **98**, 89-92. *Sorbus latifolia* and *S. confusa* have often been confused in the past. The latter, found in various localities, has sterile pollen and is usually considered to be a hybrid between *S. torminalis* and *S. Aria*. The former, long known from Fontainebleau, produces fertile pollen and is believed by some authorities to be a fixed hybrid of the same parentage as *S. confusa*. The four species are strikingly alike cytologically and all have $2n=34$. The few differences observed are very slight. Besides being very closely related, the two supposed hybrids are structurally intermediate between the parents and are considered to be the result of reciprocal crossing.—[D.E.A.]

199. *SAXIFRAGA*. Webb, D. A., 1950, *Saxifraga* L. section *Dactyloides* Tausch; *J. Ecol.*, **38**, 185-213 (Biological Flora).

214/1. *HIPPURIS VULGARIS* L. Vries, V. de L., 1950, *Hippuris vulgaris*, *De Levende Natuur*, **53**, 188-191. The fruits of *H. vulgaris* possess a layer of woody cells rich in air. This layer has been said to protect the fruit against rotting while imbedded in the mud, or to allow them to float on the water. Fruits found in the stomachs of wild ducks caught on Vlieland and Terschelling were successfully germinated.—[D.H.K.]

217. *CALLITRICHE*. Fassett, N. C., 1951, *Callitriche* in the New World, *Rhodora*, **53**, 137-155, 161-182, 185-194 and 209-222. The American species, which include several which are also found in Britain, are described in detail. *C. stagnalis* Scop. is believed to have been introduced into eastern N. America. The names *C. verna* L. em. Kuetz. and *C. palustris* L. are rejected, the Linnean descriptions apparently being based only on foliage.—[D.H.K.]

220. *EPILOBIUM*. Andersen, S. 1951, Fremmede Arter af Slaegten *Epilobium* i Danmark, *Bot. Tidssk.*, **48**, 387-400. *E. adenocaulon* Hausskn. has been found in Denmark, where it hybridizes with *E. parviflorum* Schreb. The author claims that this and other North American species and their hybrids with European species can be distinguished by their seeds having a pellucid beak below the plume of hairs. *E. americanum* Hausskn., an alien new to Europe, was found in Denmark in 1943 in a locality where it may have been introduced with *Zizania aquatica* which had been planted to serve as a fish food. It is distinguished from *E. adenocaulon* by its white flowers and narrower, thinner leaves. The presence of five more North American alien *Epilobia* in Denmark has since been detected by the author, who urges that herbarium material of the genus should be re-examined, and the neighbourhood of docks and similar places searched more carefully.—[D.E.A.]

220/17. *EPILOBIUM PEDUNCULARE* Cunn. Lee, J. R., 1952, The New Zealand Willow Herb, *Glasgow Nat.*, **16**, 70-73. The confusion between *E. pedunculare* and *E. nummulariifolium* is discussed, and the differences between the two plants are described. The known records for the Glasgow area are given.—[D.H.K.]

301. *VALERIANA*. Meyer, F. G., 1951, Valeriana in North America and the West Indies, *Ann. Missouri Bot. Gard.*, **38**, 377-503. Two species found in Britain apparently occur in North America. *V. officinalis* L. has been introduced into gardens in the United States and Canada and is established as an escape, while *V. dioica* L. occurs as the subspecies *sylvatica* (Sol. ex Richards) F. G. Meyer.—[D.H.K.]

301. *VALERIANA*. Skalińska, M., 1951, Studies in Cytoecology, Geographic Distribution and Evolution of Valeriana L., *Bull. Acad. Polon. Sci. Lett.*, Ser. B, **1**, 149-175. The section *Officinalis* is represented in Poland by three species, which are sharply delineated both morphologically and cytologically: *V. exaltata* Mikan (*V. officinalis* L., *sensu stricto*), which is almost exclusively diploid ($2n=14$), though in one locality tetraploids ($2n=28$) have been found; *V. tenuifolia* Vahl, a tetraploid; and *V. sambucifolia* Mikan, which is an octoploid ($2n=56$) and evidently of northern origin, with its centre in Scandinavia. The diploid has the widest geographical and ecological range and is prevented from intercrossing with the polyploids by a distinct ecological separation. The occurrence of three distinctly delineated species is in sharp contrast to the state of affairs in the British Isles and Western Europe, where a range of intergrading forms connects the extreme types of the collective species *V. officinalis*. The putative ancestors of this wide range of forms are the two central European species *V. exaltata* and *V. sambucifolia*. Their rather abrupt decrease at the western limit of their range, evidently due to a climatic barrier, coincides with the appearance of *V. procurrens* Wallr., a polyploid complex of hybrid origin, suggesting that in this region the two formerly separate species have merged. The possibilities of their intercrossing in Western Europe were presumably favoured when their normal ecological separation broke down as a result of the more oceanic climate. The products of initial hybridization (which normally occurs only in rare instances) might have continued to cross so as to produce a large polyploid complex. This phylogenetically younger group formed by convergence shows a higher degree of tolerance for oceanic conditions than its putative ancestors and has thus proved capable of an expansion over Western Europe.—[D.E.A.]

COMPOSITAE. Harling, G., 1951, Embryologic Studies in the Compositae, *Acta Hort. Berg.*, **16**, 1-56 and 73-120.

393. *ARCTIUM*. Arènes, J., 1950, Monographie du Genre *Arctium* L., *Bull. Jard. Bot. Brux.*, **20**, 67-156. The history and taxonomy of the group is given, with a discussion on the value of characters used in identification. The confusion of the genus by British botanists is discussed at length. The British species may be keyed as follows:—

Section EGLANDULOSA Arènes

Inflorescences all corymbiform *A. Lappa*.
 Inflorescences either all racemose or partly racemose-subcorymbiform at summit,
 at least those terminating the main axis *A. minus*.

1. *A. Lappa* L.

A. Corymb lax, heads large, solitary on \pm thin elongated (up to 10 cm. and more) peduncles; pericline 18-20 (35-40) mm. in diameter (the second figures give the overall diameter including the tips of the bracts); middle and outer periclinal bracts of the spreading part 0.7-1 mm. wide at base, inner bracts reaching 1.8 mm., shorter than the preceding; achenes 4.6 \times 2.2-5 mm.; pappus 2.2-5 mm. subsp. *majus* (Bernh.) J. Ar. comb. nov.

[AA. Not British.]

2. *A. minus* Bernh.

A. Internal periclinal bracts 14-15 mm. long, much longer than the paleal bracts (9-10 mm.); corollas equalling inner bracts; tube strongly and gradually enlarged towards base subsp. *nemorosum* (Lej.) Syme.

B. Peduncles short or 0; term. heads in twos or clustered 3-5; periclinal bracts 0.5-1 mm. wide; corolla throat tubular; tube longer than limb; term. append. of anther attenuate-apiculate 0.5-0.7 mm. long, basal append. simple or bifid var. *eunemorosum* J. Ar. var. nov.

[BB. Not British.]

AA. Internal periclinal bracts 10-13 mm. long, a little longer than the paleal (7-10 mm.); corolla equalling or overtopping inner bracts; tube gradually and weakly enlarged towards base :

C. Heads small; peric. \pm contracted at top when mature and 12-14 (15-22) mm. diam.; corollas overtopping tops of inner bracts; throat tubular; term. append. of anthers not attenuate, apiculate ... subsp. *eu-minus* Syme.

D. Heads very numerous, forming a long cluster, thick and dense at tops of branches var. *pycnanthum* J. Ar. var. nov.

CC. Heads moderate; pericline \pm open at maturity and 14-22 (20-35) mm. diam.; corollas equalling or overtopping inner bracts; throat \pm enlarged or contracted above; term. appendage of anthers attenuate-apiculate.

E. Peduncles up to 15 cm.; upper heads \pm spaced out; periclinal bracts very narrow, inner 10-11 mm. long, a little exceeding the paleal (by 1.2 mm.); corolla throat \pm narrowed above; term. anther append. attenuate-apiculate 0.3-0.5 mm. long; basal append. 0.7-1.5 mm. simple to bifid or trifid subsp. *pubens* (Bab.) J. Ar. comb. nov.

[EE. Not British.]

—[E.B.B.]

It may be noted that while in most cases the author names both varieties into which a subspecies is divided, this is not done for "subsp. *eu-minus*". The type var., which should be called var. *minus*, is said to be widespread in Britain while var. *pycnanthum* is reported only from Wigtown. It may also be noted that, under the rules, subsp. *majus* should be called subsp. *Lappa*; var. *eunemorosum*, var. *nemorosum*; and subsp. *eu-minus*, subsp. *minus*.—ED.

419. **HIERACIUM.** Omang, S. O. F., 1951, *Descriptiones specierum novarum e stirpe Hieracii alpini*, II, *Nytt Mag. Naturvid.*, **88**, 87-152. 68 new alpine species are described for Norway.—[D.E.A.]

423. **TARAXACUM.** van Soest, J. L., 1951, *Sur Quelques Taraxaca du Portugal, Agron. Lusit.*, **13**, 67-76. Two new species are described and several others are noted as additions to the Portuguese flora. A key to all the species so far recognized in Portugal is supplied.—[D.E.A.]

431/1. *LOBELIA DORTMANNA* L. Woodhead, N., 1951, *Lobelia dortmannia* L., *J. Ecol.*, **39**, 456-464 (Biological Flora).

440/1. *ARBUTUS UNEDO* L. Sealy, J. R. & Webb, D. A., 1950, *Arbutus unedo* L., *J. Ecol.*, **38**, 223-236 (Biological Flora).

446. *ERICA*. Hansen, I., 1950, Die Europäischen Arten der Gattung *Erica* L., *Bot. Jahrb.*, **75**, 1-81. The taxonomy and ecology of all the European species is dealt with, and their distribution is illustrated by maps. The Irish *E. mediterranea* is referred to *E. purpurascens* L.—[D.H.K.]

455(2)/1. *DIAPENSIA LAPPONICA* L. Blakelock, R. A., 1952, *Diapensia lapponica* L.: Its Occurrence in Scotland, *Kew Bull.*, **1951** (3), 325-326. An account of the discovery of the species in Scotland with comments upon its supposed status there.—[D.H.K.]

455(2)/1. *DIAPENSIA LAPPONICA* L. Roger, J. G., 1952, *Diapensia lapponica* L. in Scotland. *Trans. and Proc. Bot. Soc. Edin.*, **36**, 34-36. Records the discovery of the plant in Scotland and discusses its ecology and distribution throughout the world. An excellent figure of the species is given.—[D.H.K.]

460. *PRIMULA*. Valentine, D. H., 1952, Studies in British Primulas III: Hybridisation between *Primula elatior* (L.) Hill and *P. veris* L., *New Phyt.*, **50**, 383-399. 15 offspring have been raised from crosses between *Primula elatior* and *P. veris*, with the latter as the female parent. When *P. elatior* was the female parent, no hybrids were obtained. Two of the offspring were haploid ($2n=11$) and three diploid ($2n=22$). One had $2n=24$, which has not been explained, and three $2n$ =approx. 33. The chromosome numbers of the others have not yet been counted. The diploid hybrids were in many characters intermediate between the parents. Viable offspring have been obtained by back crossing one of the diploid hybrids to both parental species, the diploid hybrid being used as both male and female parent. These results resemble those previously obtained in experiments on hybridisation between *P. elatior* and *P. vulgaris*. It is shown that *P. elatior* and *P. veris* may be classified as gradual ecospecies; attention is drawn to the fact that both species are complex groups consisting of numerous subspecies, and it is considered doubtful whether these groups can be adequately described in any existing terminology. Further experimental studies in seed compatibility, hybrid fertility and meiotic pairing may perhaps point the way to a new and more comprehensive classification.—[K.J.H.]

460/1. *PRIMULA ELATIOR* (L.) Hill. Meyer, H. & D., & Reynolds, J., 1946-47, The Oxlip and its Distribution, *J. Letchworth and Dist. N.H.S.*, **5**, 10-11 and **6**, 18-19. Gives an account of the morphology of the species, its distribution and ecology, and its hybrids with *P. vulgaris* and *P. veris*.—[D.H.K.]

462. *CYCLAMEN*. Doorenbos, J., 1950, Taxonomy and Nomenclature of *Cyclamen*, *Meded. Landb. Wageningen*, **50**, 19-29. A short survey of the genus is given and a few species which have given rise to

taxonomic difficulties are treated in detail. *C. europaeum* L. is probably referable to the Mediterranean *C. neapolitanum* Ten. (*C. hederifolium* Ait.), but the author has not seen the Linnean type and so refrains from making any change.—[D.E.A.]

467. ANAGALLIS. Ondráková, A., 1949, Zajímavý nález mísenice v rodu *Anagallis* L., *Českoslov. Bot. Listy*, **2**, 51-52. The hybrid between *A. arvensis* ssp. *phoenicea* and ssp. *caerulea* is discussed.—[D.E.A.]

532. LINARIA. Dilleman, G., 1951, Notes sur quelques Hybridations dans le genre *Linaria* et remarques sur le hybrides obtenus. *Bull. Mus. Nat. d'Hist. Nat. Paris*, **23**, 140-145. An account of experimental work with various species. The author obtained the following hybrids:—*L. vulgaris* × *repens*, *L. repens* × *vulgaris*, *L. purpurea* × *repens*, *L. repens* × *purpurea*, *L. purpurea* × *vulgaris* and *L. genistiflora* × *purpurea*. *L. vulgaris* × *purpurea* gave seed, but none germinated. The following notes are given:—

Hybrids between *vulgaris* and *repens* are intermediate in most respects particularly as to size and flower colour.

Hybrids between *purpurea* and *repens*: main stem erect like *purpurea* but shorter, lateral branches more numerous and shorter; habit intermediate but nearer *purpurea*; leaves 3 or 4, whorled as in *purpurea*; inflorescence a spike, laxer than *purpurea*; corolla same size as parents, but form and colour nearer *purpurea*; less reddish-purple than *purpurea*, and deeper stripes than *repens*; spur shorter and less curved than *purpurea*.

Hybrid *purpurea* × *vulgaris*: taller than *purpurea*, though habit nearer that species. Flowers in crowded spikes as in parents; corolla intermediate in size with long curved spur, strongly marked with purple to appear more purple than yellow.

Hybrid *genistifolia* × *purpurea* (reciprocal not tried): flowers of doubtful purple mixed with weak proportion of yellow; leaves nearer *genistifolia*.—[E.B.B.]

540/1. SIBTHORPIA EUROPAEA L. Rilstone, F., 1948, Fluctuations of *Sibthorpia* L., *North West. Nat.*, **23**, 130-131.

543. VERONICA. Boivin, B., 1952, Quelques *Veronica* du Canada, *Le Nat. Canadien*, **89**, 173-176. *V. agrestis* L., *V. anagallis-aquatica* L., *V. persica* Poir., *V. polita* Fries, *V. scutellata* L. and *V. serpyllifolia* L. are all found in Canada. *V. scutellata* with white petals is described as f. *alba*, forma nov., and var. *pilosa* Vahl apparently antedates f. *villosa* Schum. A new variety of *V. serpyllifolia* (var. *deci-piens*) is described; it differs from the usual form mainly in its inflorescence being glandular-pubescent.—[D.H.K.]

543/41. VERONICA FILIFORMIS Sm. Muenscher, W. C., 1949, *Veronica filiformis*, a weed of lawns and gardens, *Rhodora*, **51**, 365. In central New York the plant has completely over-run many lawns and presents a difficult control problem. Behaving as a perennial it spreads vegetatively and no mature capsules have been seen. The species is

susceptible to attack by the fungus *Sclerotium Rolfsii* Saccardo which kills it and causes brown patches on infected lawns.—[D.H.K.]

581/6. *LAMIUM AMPLEXICAULE* L. Bernström, P., 1952, Cytogenetic Intraspecific Studies in *Lamium*, I, *Hereditas*, **38**, 163-220. The author gives details of experimental studies on *Lamium amplexicaule*.—[D.H.K.]

606/17. *HALIMIONE PORTULACOIDES* (L.) Aell. Chapman, V. J., 1950, *Halimione portulacoides* (L.) Aell., *J. Ecol.*, **38**, 214-222 (Biological Flora).

611. *SALICORNIA*. Corrillion, R., & Dizerbo, A., 1952, Sur la présence du *Salicornia fruticosa* L. dans le N.W. de la France, *Bull. Soc. Bot. France*, **99**, 58-60. The authors attempt to clear up the distribution of the species which has been obscured by confusion of *S. fruticosa* with *S. radicans* Sm. (*S. perennis* Mill.). They claim that the locality studied by them at Aber is the only certain one for *S. fruticosa* in N.W. France. Some ecological information is also given.—[E.B.B.]

626/1. *VISCUM ALBUM* L. Weevers, T., 1950, *Viscum album* en zijn gastheren, *Ned. Kruidk. Arch.*, **57**, 360-362. It is suggested that as Mistletoe lives only on trees growing on soils containing calcium it is a calciphilous species. Other possibilities are however discussed. Some hosts are given, as well as details of germination and the detrimental effect on the hosts.—[D.H.K.]

626/1. *VISCUM ALBUM* L. Thoday, D., 1951, The Haustorial System of *Viscum album*, *J. Exper. Bot.*, **2**, 1-19.

633. *ULMUS*. Melville, R., 1951, The Elms of the Dumortier Herbarium, *Bull. Jard. Bot. Brux.*, **21**, 347-351. The Dumortier herbarium at Brussels contains types of the elms described in the *Florula Belgica*. Some of the material consists of juvenile foliage, which cannot be identified with certainty. *U. reticulata* Dumort. proves to be *U. stricta* Lindl., the Cornish Elm, the earliest valid name for which is *U. cornubiensis* Weston. *U. reticulata* var. *sepearia* Dumort. is *U. Plotii* Druce; the locality cited is Cornwall, which is evidently an error.—[D.E.A.]

642. *BETULACEAE*. Hall, J. W., 1952, The Comparative Anatomy and Phylogeny of the *Betulaceae*, *Bot. Gaz.*, **113**, 235-270. The wood anatomy of the *Betulaceae* has been studied comparatively in an attempt to use it in establishing the phylogenetic position of the family. Descriptions are given of the wood of six genera, *Alnus*, *Betula*, *Corylus*, *Ostryopsis*, *Carpinus* and *Ostrya* as well as of the two tribes in which these genera occur (*Betuleae* and *Coryleae*) and of the family as a whole. The study indicates that the family is moderately advanced. Evidence from other fields of investigation is considered to support this and the view that *Betulaceae* might have originated from some hamamelidaceous stock.—[K.J.H.]

646. *QUERCUS*. Cahen, E., 1950, The Two British Oaks: Their Occurrence in Devon, *Rep. and Trans. Devonsh. Assocn.*, **82**, 195-204. The history, taxonomy and distribution of the two species is given. The origin of the name Durmast Oak as applied to *Q. petraea* is also discussed.—[D.H.K.]

649/1. *FAGUS SYLVATICA* L. Clowes, F. A. L., 1951, The Structure of Mycorrhizal Roots of *Fagus sylvatica*, *New Phyt.*, **50**, 1-15. The root system of *Fagus sylvatica* is described in detail. Both the long and the short roots may become mycorrhizal, though the extent of infection is not constant. Some of the theories of mycorrhizal nutrition are discussed.—[D.H.K.]

651/8. *POPULUS ALBA* L. Wladyslaw, B., 1951, Kilka nowych odmian i mieszańców *Populus alba* L., *Acta Soc. Bot. Pol.*, **21**, 42-57. The author describes several new varieties of *Populus alba* L. found in Poland in recent years. A possible hybrid between *P. tremula* and *P. alba* is described as *P. × rogalinensis*.—[D.H.K.]

669. *ORCHIS*. Harrison, J. Heslop, 1949, Notes on the Dactylorchids of North-western Donegal, *Irish Nat. Journ.*, **9**, 291-298. Some results are given of statistical population studies of Dactylorchids in Donegal. A race of *O. Fuchsii* occurring on the coast is perhaps identical with var. *hebridensis* (Wilmott) H.-Harr., and a very similar form is to be found in certain coastal districts of Connemara. This variety seems to form one end of a cline in the Outer Hebrides, the plants tending to be progressively more like the type as one traverses the Inner Isles to the Scottish mainland. A race of *O. latifolia* found in W. Mayo, Sligo and W. Donegal is either var. *cambrica* Pugsl. or an endemic Irish race; it is a smaller plant with smaller, dark purple flowers and a faintly-marked labellum. The status of the var. *pulchella* (Druce) Pugsl. of *O. purpurella* is indefinite and needs further study.—[D.E.A.]

669. *ORCHIS*. Harrison, J. Heslop, 1951, A Comparison of some Swedish and British Forms of *Orchis maculata* L. sens. lat., *Svensk. Bot. Tidskr.*, **45**, 608-635. *O. maculata* and other Dactylorchids are characterized by regional variation coupled with intense local variation, phenomena which can only be satisfactorily treated by biometrical analysis. Biometrical comparison of Swedish material reveals that the diploid form of base-rich soils in southern and central Sweden falls within the variation range of *O. Fuchsii*. The widespread tetraploid form found in the same area on more acid soils has, however, no counterpart in the British Isles, and on the basis of Linnaeus's description and specimen is to be interpreted as being *O. maculata* L., *sensu stricto*. A tetraploid race with more slender spurs and narrower leaves, coming within the variation range of *O. ericetorum*, was encountered in great abundance at rather high altitudes in western Jämtland, where it replaces the diploid with the transition from the herb-rich spruce forest to the open birch forest of the higher slopes. The characters of the three races are compared by means of tables showing the statistical differences. *O. Fuchsii* is synonymous with *O. maculata* var. *trilobata* Bréb., var. *Meyeri* Rehb. f., and var. *obscura* Neum. The Swedish populations differ from the British ones to a certain extent, but the creation of separate subspecies is considered premature. The two tetraploids are best ranked as subspecies of *O. maculata*, the British plant thus becoming *O. maculata* ssp. *ericetorum* Linton. The identity of *O. elodes* Griseb. (from North Holland) with the latter is quite possible, but the

matter needs further investigation. Other races of the maculata-complex occur in Scandinavia and await study.—[D.E.A.]

669. ORCHIS. Harrison, J. W. Heslop, 1951, Vascular Plants in the Outer Hebrides in 1950, *Proc. Univ. Durham Phil. Soc.*, **11**, 1-11. The Outer Hebridean plants of *Orchis mascula* constitute a distinct race, which is described as ssp. *ebudium*. It occurs in Lewis, Harris and Berneray, and is characterized by its very small size, leaves almost without blotches, flowers few, widely separated, much less brightly coloured, smaller, and with the notches in the median lobe of the lips much deeper. Wilmott's promotion of *O. latifolia* var. *coccinea* Pugsl. to subspecific rank is considered far too premature, for contrary to his statement the type is quite widely distributed in the Outer Isles. A triple hybrid between *O. purpurella*, *O. latifolia* and *Coeloglossum viride* was detected in Harris. *O. majalis* ssp. *occidentalis* Pugsl. has almost been hybridized out of existence by *O. purpurella* in parts of South Harris. A hybrid between *O. ericetorum* and *Platanthera bifolia* was also found in the same area.—[D.E.A.]

669/8. ORCHIS PRAETERMISSA Druce. Andersen, S., 1951, Orchis praetermissa Druce, en for Norden ny Gøgeurt, fundat i Jylland, *Bot. Tidsk.*, **48**, 439-41. *Orchis praetermissa* has been found in Jutland, and is thus new to the Nordic region.—[D.E.A.]

669/9(3). ORCHIS TRAUENSTEINERIOIDES (Pugsl.) Pugsl. Gough, K., 1952, Orchis traunsteinerioides Pugsl. in Co. Clare, *Irish Nat. Journ.*, **10**, 273. The plant was discovered in 1951 near the borders of Co. Galway and Co. Clare. This represents the most westerly station so far recorded.—[D.H.K.]

669/11. ORCHIS FUCHSII Druce. Harrison, J. Heslop, 1950, Orchis Fuchsii Druce subsp. hebridensis (Wilm.) H.-Harr. in Co. Kerry, *Irish Nat. Journ.*, **10**, 57. The Hebridean race of this species has been collected on the shores of Brandon Bay, Kerry. It will probably be found to be widespread along the western seaboard of Ireland in sandy coastal meadows.—[D.E.A.]

674(1)/1. GYMNADENIA CONOPSEA (L.) R. Br. Meikle, R. D., 1950, *Gymnadenia conopsea* (L.) R. Br. in Ireland, *Irish Nat. Journ.*, **10**, 72-73. The var. *densiflora* (Wahlenb.) Rehb. replaces the type in parts of Northern Ireland, but it is of uncertain status and the author seeks further information about its characters and distribution. Co. Down plants can be distinguished from the type as follows:—

G. conopsea.

var. *densiflora*.

Flowers quite over by end of July.
Seldom over 12 ins. tall.
Leaves $5 \times \frac{1}{2}$ in.
Inflorescence slender, $1\frac{1}{2}$ - $2\frac{1}{2}$ ins. long,
bearing fewer, paler, mauve-pink,
heavy scented flowers.

Flowers fully out in August.
Up to 20 ins.
Leaves $5.6 \times \frac{1}{2}$ -1 in.
Inflorescence stout, 2-4 ins. long, bearing
a large number of closely
packed, rich crimson-pink, carnation-
scented flowers.

Dry hilly pastures and heaths.

Damp banks and swamp margins,
usually on slightly alkaline soils.

[D.E.A.]

675/1. *CYPRIPEDIUM CALCEOLUS* L. Dilleman, G., 1951, La répartition du *Cypripedium Calceolus* L. en France et le problème de sa disparition, *Bull. Soc. Bot. France*, **98**, 145-148. In France this species is a facultative calcicole and likes open woods, preferably of beech. It is still common in the Alps, but in the Massif Central only small colonies are known. Apart from these mountainous regions it is also found in parts of the north-east. The plant has suffered equally from vandalism and deforestation.—[D.E.A.]

709/1. *FRITILLARIA MELEAGRIS* L. Buschmann, A., 1951, Zur Kenntnis von *Fritillaria Meleagris* Linne, *Phyton*, **3**, 276-297. The plant is very rare in Austria, but in 1949 a large population was discovered in East Styria. Variations in the population are described in detail.—[D.H.K.]

709/1. *FRITILLARIA MELEAGRIS* L. Turrill, W. B., 1952, The Snake's Head, *R.H.S. Lily Year Book*, **1951-52**, 108-116. The history and distribution of the species is given. Special mention is also made of the decrease in population in the Oxford district during the last 50 years. From 1941-45 it was difficult to find any flowering specimens in most of the meadows between Oxford and Iffley. The sole exception was Magdalene Meadows where the plant was protected from trampling and uprooting, and where grazing animals were prohibited. Here the plants increased in number. A full account of the various colour forms and their nomenclature and synonymy is also given.—[D.H.K.]

712/1. *LLOYDIA SEROTINA* (L.) Reichb. Woodhead, N., 1951, *Lloydia serotina* (L.) Rehb., *J. Ecol.*, **39**, 198-203 (Biological Flora).

718. *JUNCUS*. Tweed, R. D., & Woodhead, N., 1947, The Taxonomy of *Juncus effusus* L. and *J. conglomeratus* L., *North West. Nat.*, **22**, 216-222.

719. *LUZULA*. Nordenskiöld, H., 1951, Cyto-taxonomical Studies in the Genus *Luzula*: 1. Somatic Chromosomes and Chromosome Numbers, *Hered. Gen. Arkiv.*, **37**, 325-355. The chromosome numbers of species which are found in Britain are given as follows:—*L. silvatica* (Huds.) Gaud. $2n=12$, *L. luzuloides* (Lam.) Dandy & Wilm. $2n=12$, *L. Forsteri* (Sm.) DC. $2n=24$, *L. pilosa* (L.) Willd. $2n=66$, *L. spicata* (L.) DC. $2n=12, 14, 24$, *L. arcuata* (Wg.) Sw. $2n=36, 42$, *L. campestris* (L.) DC. *sensu stricto* $2n=12$, *L. multiflora* (Retz.) Lej. $2n=24, 36$, *L. congesta* (Thuill.) Lej. $2n=36, 48$.—[D.H.K.]

736/1. *SCHUCHZERIA PALUSTRIS* L. Moore, J. J., 1952, The Occurrence of *Scheuchzeria* in Ireland, *Irish Nat. Journ.*, **10**, 248. About nine specimens of this species were found in 1951 in a bog in Co. Offaly. It is new to Ireland.—[D.E.A.]

737/32. *POTAMOGETON EPIHYDRUS* Raf. Harrison, J. W. Heslop, 1952, Occurrence of the American Pondweed, *Potamogeton epihydrus* Raf., in the Hebrides, *Nature*, **169**, 548-549. Records the discovery of the species in South Uist, Outer Hebrides in 1943. Visits made to the locality in 1949 and 1950 showed the plant to be very abundant.—[D.H.K.]

741/2. *NAJAS FLEXILIS* (Willd.) Rostk. & Schmidt. Eriksson, K., Olsen, S. E., & Reenberg, C. E., 1949, *Najas flexilis* (Willd.) Rostk. et Schmidt fundet i Danmark, *Bot. Tidsskr.*, **48**, 223-230. This species has been discovered on sandy mud in one lake in Denmark, whither it may have been brought by migratory birds from Scandinavia. After the last glaciation the species was much more widely distributed than now. In lakes in countries north of the Alps it persisted through the Atlantic period, but later almost died out in the dry and warm Sub-boreal. The causes of its gradual disappearance should perhaps be sought in the increasing covering of the lakes by vegetation rather than in climatic changes.—[D.E.A.]

746/3. *SCIRPUS LACUSTRIS* L. Seidel, K., 1952, Zur Ökologie von *Scirpus lacustris*, *Ber. Deutschen Bot. Ges.*, **64**, 342-352.

753. *CAREX*. Senay, P., 1950-51, Le Groupe des *Carex flava* et *Carex Oederi*, *Bull. Mus. Nat. Hist. Nat.*, Paris, **22**, 618-624 and 790-796 and **23**, 146-152. The taxonomy, and the confusion over the nomenclature of the *flava* group is discussed at length. The distribution of the various species throughout the world is given and some ecological information is also supplied. The following key is provided:—

1. Utricles 4-7 mm. long (incl. beak), the lower at least reflexed (tufts ceasing to grow after flowering).
2. Utricles (4) 5-6 (7) mm., all, except at top, arched or bent outwards (rarely straight) \pm attenuate to a beak of 1.5 \times 2.5 mm. σ spike sessile or nearly so. ϕ spikes (not 1) 2-4 (7) 10-15 \times 10-12 mm. When ripe, usually very close to σ spike, or, sometimes, the lower \pm distant and stalked. Leaves (2) 3-5 (6) mm. wide usually almost as long as the upright, smooth, sometimes scabrous at top, stem (1) 2-4 (8) dm. Antiligule (footnote says that "antiligule" means in contrast to the ligule proper, the upper part of the sheath opposite to the limb) of the lower bract \pm concave straight or truncate
C. flava.
2. Utricle c.4 mm., less markedly bent in *flava* and usually more swollen (only the lower arched and bent outwards), contracted into a beak 1.5-2 mm. long. σ spike (rarely a second rudimentary one) \pm long; stalked, often oblique. ϕ spikes (1) 2-3 (4), 7-15 \times 7-9 mm. when ripe \pm spaced out (rarely more than 3 cm.); usually none at the middle of the stem. Leaves (narrow typically) (1.5) 2-2.5 (4) mm. usually not more than half the length of the upright scabrous at top, often entirely smooth stem (1) 8-5 (7) dm. Antiligule of lower bract \pm convex, straight or emarginate *C. lepidocarpa*.
1. Utricles 2-4 (4-5) mm. long (incl. beak) spreading-divaricate, not, or hardly, reflexed, except the lower. (Stock giving off, uninterruptedly to the Autumn, new fertile and sterile shoots).
3. Antiligule, of lower bract at least, convex \pm prolonged into a small tongue, rarely emarginate. Stem curved at base, even almost decumbent, sometimes \pm upright, (4) 1-3 (5) dm., smooth or scabrous (often in same plant!). Leaves (1.5) 2-4 (6) mm. wide, flat, deep green in spring, more than $\frac{1}{2}$ length of stem. Bracts usually spreading, reflexed at maturity. σ spike \pm long-stalked. ϕ spikes (1) 2-4 (6), 5-15 \times 4-9 mm. when ripe, the 2-3 upper crowded beneath the σ spike, or often separated up to 1.5 cm., the lower \pm stalked usually distant, most often far from the next, often towards the base of the stem. Utricles (3) 4 (4-5) mm. (less swollen than in *lepidocarpa*), deeper green and retaining colour longer than *serotina*, many nerved, contracted into a visibly 2-toothed beak, relatively broad and almost flat, c.1.5 mm. bent or straight, the lower reflexed *C. demissa*.
3. Antiligule concave or truncate.
4. Utricles 2-3 mm., beak straight, indistinctly toothed.

5. Beak usually c. $\frac{1}{2}$ length of body of utr. bracts usually spreading. Stem upright (2) 1-3 (7) dm., smooth. Leaves (1) 2-3 mm. broad, flat or channelled, green in spring, yellowing (as the bracts) later, longer than stem (except in large-sized specimens). Bracts reflexed at maturity, often ♂ spike sessile or shortly stalked (rarely long-stalked on large plants). ♀ spikes 2-4 (8), 4-10×3-6 mm. at maturity, all or most crowded beneath ♂ spike; lower, stalk included, often 1-2 cm. (rarely farther) from next. Utricles 2-3 mm., green, yellowing finally, many-nerved ± abruptly contracted into a beak (rarely 0) of 1 mm. at most. Nut occupying $\frac{2}{3}$ or (rarely less) of utricule *C. serotina*.
5. Beak about $\frac{1}{2}$ length of body. Bracts almost always erect. Nut occupying at least $\frac{2}{3}$ of utricule [not British] *C. viridula*.
4. Utricles c. 2 mm. long, beak c. 5 mm. long. Bracts spreading or reflexed. Nut occupying the whole utricule or nearly [not British] *C. pulchella*.

C. flava L. and *C. lepidocarpa* Tausch are described as plants of wet meadows and marshes with basic soil, above all calcareous. The habitat of *C. demissa* Hornem. is given as peaty bogs, etc., but whilst calcifuge in France, it is calcicolous in its N. American area. *C. serotina* Mérat is native in marshy places, bogs, sandy and siliceous places: very rare on basic soils, etc., and considered as an acidiphile until 1946 when J. P. M. Brenan found it at Port Meadow, Oxford on alluvial soil of the Thames.

The following hybrids are recorded from Europe:—*flava* × *lepidocarpa* (Sweden), *lepidocarpa* × *demissa* (Gt. Britain, etc.), *lepidocarpa* × *serotina* (Gt. Britain, etc.), *demissa* × *serotina* (Gt. Britain, etc.), *Hostiana* × *lepidocarpa* (Gt. Britain, etc.), *Hostiana* × *demissa* (Gt. Britain, etc.), *Hostiana* × *serotina* (Gt. Britain, etc.), *distans* × *flava* (Germany), and *distans* × *lepidocarpa* (Bohemia).—[E.B.B.]

758/3. SPARTINA TOWNSENDII H. & J. Groves. Chater, E. H., & Jones, H., 1951, New Forms of *Spartina townsendii*, *Nature*, **168**, 126. In recent years a number of untypical plants of *S. townsendii* have appeared in the Dovey Estuary. Among these, two very distinct forms have been noticed. One is very dwarf (3-4 ins. above ground), with brownish leaves and sheaths, and flowering only sparsely. The other is variegated and has a leaf-blade with usually a yellow median portion and a band of green tissue along either side; the flowering of this form is also sparse. The dwarf form has also been found in the Severn Estuary near Chepstow. It is suggested that these new forms possibly represent the disintegration of the formerly stable polyploid hybrid.—[D.H.K.]

766/1. ANTHOXANTHUM ODORATUM L. Litardière, R. de, 1949, Observations caryologiques et caryosystématiques sur diverses graminées principalement de la flore méditerranéenne, *Trav. Bot. Déd. René Maire*, 199-208. A diploid form of this species, var. *corsicum* (Briq.) Rouy, has been discovered in the Mediterranean.—[D.E.A.]

780/6. AGROSTIS CANINA L. Jones, K., 1952, Autotetraploidy in *Agrostis canina*, *Nature*, **169**, 159-160. *Agrostis canina* var. *fascicularis* is a diploid ($2n=14$). *A. canina* var. *arida* is an autotetraploid ($2n=28$), possibly the autotetraploid form of var. *fascicularis*.—[D.H.K.]

783. CALAMAGROSTIS. Polakowska, M., 1951, Przegląd systematyczno-anatomiczny krajowych gatunków rodzaju *Calamagrostis* Adans.,

Ann. Univ. Mariae-Curie, 1-6, No. 1. A key is given to all the known Polish species.—[D.H.K.]

813/1. *MOLINIA CAERULEA* (L.) Moench. Guinochet, M. & Lemée, G., 1950, Contribution à la Connaissance des Races Biologiques de *Molinia caerulea* (L.) Moench, *Rev. Gén. Bot.*, 57, 565-593. Cultivation experiments reveal that this species consists of at least four genetically and morphologically distinct ecological races, associated respectively with Molinion, Oxycocco-Ericion, Mesobromion and Quercetalia roburis-sessiliflorae. The descriptions of vars. *genuina*, *arundinacea*, *depauperata* and *litoralis* must be modified in consequence. The distinction between var. *genuina* A. & G., with lower glume oval-obtuse and no more than 3-4 mm. long, and var. *litoralis* (Host) A. & G., with lower glume attenuate, acute, and reaching 6 mm. in length, holds good. Three of the varieties have a chromosome number of $2n=36$, but in var. *litoralis* two gatherings had $2n=90$ and a third $2n=36$. The form with $2n=90$ flowers a month later than those with $2n=36$, is twice as tall, and has a greater leaf surface, cellular volume and transpiration rate. It is characteristic of slopes facing south, on basic soils which are very wet in spring but almost dry in summer. The authors treat it as a new subvariety *gigantea* of var. *litoralis*.—[D.E.A.]

813/1. *MOLINIA CAERULEA* (L.) Moench. Jefferies, T. A., 1952, The Story of a Moorland Grass (*Molinia caerulea*), *Glasgow Nat.*, 16, 68-69. The morphology, and the status of the species in Britain is discussed. The author has made a study of the plant and claims to be able to recognize 16 different varieties.—[D.H.K.]

824/14. *POA ANNUA* L. Tutin, T. G., 1952, The Origin of *Poa annua* L., *Nature*, 169, 160. An account of the experimental crossing of *Poa annua* with *P. infirma*. The author supports Nannfeldt's suggestion that *P. annua* is an allotetraploid ($2n=28$) the diploid parents of which are *P. infirma* and *P. supina*.—[D.H.K.]

825/3(2). *GLYCERIA DECLINATA* Bréb. Störmer, P., 1951, On *Glyceria declinata*, *Blyttia*, 9, 1-15. The species has a wide distribution from southern Norway and Sweden, through north-west Germany, Britain, and western France to Portugal and the south coast of Spain; it also occurs in one place in the mountains of California. The characters of *G. fluitans* and *G. plicata* are listed and figured for comparison. In Norway *G. declinata* prefers damp ground near ponds where cattle have trodden or wet tracks. The species is cited from ninety British vice-counties on the authority of C. E. Hubbard.—[D.H.K.]

827/9. *BROMUS INERMIS* Leyss. Nielsen, E. L., 1951, Cytology and Breeding Behaviour of Twin Plants of *Bromus inermis*, *Bot. Gaz.*, 113, 23-54.

829. *LOLIUM*. Cooper, J. P., 1951, Studies on Growth and Development in *Lolium*, *J. Ecol.*, 39, 228-270.

830. *AGROPYRON*. Godley, E. J., 1951, Two Natural *Agropyron* Hybrids occurring in the British Isles, *Ann. Bot.*, 15, 536-544. The hybrids of *A. junceum* × *A. pungens* and *A. junceum* × *A. repens* are described and compared with the parental species in respect of 14 charac-

ters. A list of all known hybrids in the *Hordeae* is also given.—[D.H.K.]

830/5. ROEGNERIA DONIANA (F. B. White) Meld. Melderis, A., 1950, The Short-awned Species of the Genus *Roegneria* of Scotland, Iceland and Greenland, *Svensk Bot. Tidskr.*, **44**, 132-166. Examination of *Agropyron Donianum* from Ben Lawers shows that it is not closely related to *Elytrigia (Agropyron) repens* but is clearly a member of the genus *Roegneria* and is further conspecific with the North American *Agropyron trachycaulon* (Link) Steud. var. *majus* (Vasey) Fern. (*A. pseudo-repens* Scribn. & Sm.). The author suggests that the species immigrated to Scotland from North America, where it exhibits much greater variability, during the Quaternary period—perhaps in the Mindel-Riss Interglacial period—when a broad land-bridge may have connected the two areas via the Faeroes, Iceland and Greenland. This hypothesis is supported by the fact that separate geographical races occur in Iceland (var. *Stefanssonii*) and Greenland (var. *virescens*); these may have originated after the severance of the land connection, surviving glaciation on ice-free nunataks.—[D.E.A.]

836/1. ELYMUS ARENARIUS L. Bond, T. E. T., 1952, *Elymus arenarius* L., *J. Ecol.*, **40**, 217-227 (Biological Flora).

847/1. PTERIDIUM AQUILINUM (L.) Kuhn. Braid, K. W., 1952, Bracken—A Botanist's Plaything and an Agricultural Pest, *Glasgow Nat.*, **16**, 61-67. Deals with the life-cycle of the species and methods of eradicating it from agricultural land.—[D.H.K.]

849/1. BLECHNUM SPICANT (L.) Roth. Druery, C. T., 1951, *Blechnum Spicant*, *Brit. Fern Gaz.*, **8**, 7-9.

857. CYSTOPTERIS. Larsen, K., 1952, Udbredelsen i Grønland af *Cystopteris fragilis* coll. med piggede og vortede sporer, *Bot. Tidsskr.*, **49**, 39-43. The *C. fragilis* complex in Greenland consists of the Arctic "*C. Dickieana*", with verrucose spores, and the subarctic *C. fragilis*, with spiny spores. In Iceland and the Faroes, the latter is very common, whereas "*C. Dickieana*" has only been found in one locality in Iceland. A few of the Greenland plants had spores of an intermediate type. Three of these were on the north-east coast, far beyond the northern limit of *C. fragilis*. In the transition area between the two species supposed hybrids have been found.—[D.E.A.]

858/1. POLYPODIUM VULGARE L. Martens, P., 1949, Les paraphyses de *Polypodium vulgare* et la sous-espèce *serratum*, *Compt. Rend. Acad. Sci. Paris*, **228**, 502-505. The ssp. *serratum* is best characterised by the presence of glandular, unilaterally branched paraphyses. This was observed on individuals collected in England, France, Switzerland, Portugal, Spain, Macaronesia, and many Mediterranean countries. In Italy the subspecies shows a marked preference for coastal conditions, but in Spain and Portugal this is less noticeable.—[D.E.A.]

876/1. CHARA BRAUNII Gmel. Shaw, S., 1948, *Chara Braunii* Gmelin, *North West. Nat.*, **23**, 166-167. Gives an account of the plant's arrival, and its subsequent history, in the Reddish Canal.—[D.H.K.]

876/15. *CHARA FRAGIFERA* Durieu. Corillion, R., 1952, Sur la présence du *Chara fragifera* Durieu en Afrique intertropicale, *Bull. Soc. Bot. France*, **99**, 45. *Chara fragifera* has been discovered in Togo. The world distribution of the species is given.—[D.H.K.]

TOPOGRAPHICAL

1, W. CORNWALL. Green, H. E., 1951, Wild Plants at the Lizard, *Proc. Liverpool Nat. F.C.*, **1950**, 25-29.

3-4, DEVON. Keble-Martin, W., & Brokenshire, F. A., 1948-51, 40th Annual Report on the Botany of Devon, *Rep. and Trans. Devonsh. Assocn.*, **80**, 39-47. Contains a few new county records. 41st Annual Report etc.; *op. cit.*, **81**, 57-65. Gives many new county records, and also includes a list of first records of Devon plants earlier than the dates given in *Flora of Devon*, by the researches of Dr. J. A. R. Bickford (pp. 63-65). 42nd Annual Report, etc., *op. cit.*, **82**, 49-56. 43rd Annual Report, etc., *op. cit.*, **3**, 43-55. An enumeration of new stational records includes (pp. 47-48) a Report on *Spartina Townsendii* H. & J. Groves in the Lower Torridge, by V. C. Boyle.—[A.E.W. & D.H.K.]

6, N. SOMERSET, and 34, W. GLOS. Sandwith, C. I. & N. Y., 1951, Bristol Botany in 1950, *Proc. Bristol Nat. Soc.*, **28**, 169-175. A report on the more interesting records made. The rediscovery of *Centaureum capitatum* (Willd.) Borbás on Crook Point, N. Somerset, is reported, and the aliens *Ranunculus marginatus* Urv. var. *trachycarpus* (Fisch. & Mey.) Aznavour, *Trifolium Petrisavii* Clementi, and *Anthemis hyalina* DC. from Portway tip, Bristol (W. Glos.) are reported as new to Britain.—[A.E.W.]

7-8, WILTS. Grose, J. D., 1951, Wiltshire Plant Notes, *Rep. Nat. Hist. Sect., Wilts. Arch. and Nat. Hist. Soc.*, **1950**, 75-79.

10, WIGHT. White, E. H., 1951, Botanical Notes, *Proc. Isle of Wight Nat. Hist. and Arch. Soc.*, **4**, 145-148. Gives an account of the state of the rarer plants of the island, and many other interesting records, including an account of the reappearance in 1945 of *Ophrys aranifera* Huds. (last recorded in 1896). The following species are believed to be extinct:—*Thalictrum flavum* L., *Vicia Lathyroides* L., *Lathyrus maritimus* Bigel., *Helleborus foetidus* L., *Senecio integrifolius* (L.) Clairv., *Filipendula vulgaris* Moench, *Oxycochus quadripetalus* Gilib., *Hypopitys Monotropa* Cr., *Gentiana campestris* L., *Parentucellia viscosa* (L.) Caruel, *Orobanche purpurea* Jacq., *Mentha Pulegium* L., *Narcissus biflorus* Curt., *Wahlenbergia hederacea* (L.) Reichb., *Asplenium maritimum* L. and *Osmunda regalis* L.—[D.H.K.]

11, S. HANTS. Read, W. J., 1951, Plant Life in the Hampshire Rivers, *Proc. Bournemouth Nat. Science Soc.*, **41**, 58-60. The distribution of *Potamogeton* and other aquatic species found in the Avon, Itchen, Test and other Hampshire streams is discussed.—[D.H.K.]

11, S. HANTS. Chambers, E., 1951, Bournemouth District Flora: Recent Additions and Records, *Proc. Bournemouth Nat. Science Soc.*, **40**, 72-73.

14, E. SUSSEX. Ward, F. Kingdon, 1952, The Flora of the Crumbles, *Gard. Chron.*, **131**, 7-8.

15, E. KENT. Wilson, L. W., 1949-52, Thanet Flora, *Ann. Rep. Isle of Thanet Field Club*, **1**, 25-38. A systematic, but unlocalized list of phanerogams and vascular cryptogams found in the Isle of Thanet. Notes on Species in Thanet and Fringing Districts, *op. cit.*, **2**, 48-50. Additions to Thanet Flora, *op. cit.*, **3**, 25. Botanical Notes, 1950-51, *op. cit.*, **4**, 36-38.—[D.H.K.]

15, E. KENT. Rose, F., 1950, The East Kent Fens, *J. Ecol.*, **38**, 292-302. A historical and ecological account of the marshy areas near Sandwich and Ham Ponds.—[D.H.K.]

16, W. KENT. Rose, F., 1950, Botanical Records for Metropolitan Kent, 1942-1949, *Lond. Nat.*, **29**, 15-20.

16, W. KENT, 17, SURREY, 18-19, ESSEX, 20, HERTS., 21, MIDDX. and 24, BUCKS. Lousley, J. E., 1947-52, Botanical Records, 1946-51, *Lond. Nat.*, **26**, 73-78, **27**, 38-42, **28**, 26-30, **29**, 8-14, **30**, 4-8, and **31**, 10-13. Gives many records of interesting plants found within a 20-mile radius of St. Paul's Cathedral.—[D.H.K.]

16, W. KENT, 17, SURREY, 18-19, ESSEX, 20, HERTS., 21, MIDDX. and 24, BUCKS. Kent, D. H., & Lousley, J. E., 1951-52, A Hand List of the Plants of the London Area: Flowering Plants, Ferns and Stone-worts, Supplement to *Lond. Nat.*, **30-31**. A systematic account of the plants found in the London area compiled from the records of the London Natural History Society. These are parts 1 and 2, covering families from *Ranunculaceae* to *Rosaceae* (*Mespilus*).—[D.H.K.]

17, SURREY. Ager, J. A. M., 1949, Flora of St. Thomas's Hospital and Bombed Sites, *St. Thomas's Hospital Gazette*, **47**, No. 1. Gives short accounts of the localities, which are areas within the grounds of St. Thomas's and bombed sites within half a mile range of the hospital, followed by a systematic list of vascular plants. (Corrected from 21, MIDDX., in *Watsonia*, **2**, 128).—[E.B.B.]

17, SURREY. Bangerter, E. B., & Castell, C. P., 1951, Further Notes on the Vegetation of Gun-pits in Eastern Plain, Bookham Common, *Lond. Nat.*, **30**, 54-56.

17, SURREY. Whitehouse, Mrs. M., 1952, The Present Flora of Barnes Common, Surrey, *Lond. Nat.*, **31**, 17-19.

19, N. ESSEX and 20, HERTS. Bishops Stortford and District Nat. Hist. Soc., 1952, List of Vascular Plants of Bishops Stortford and District, *Trans. Bishops Stortford and Dist. Nat. Hist. Soc.*, **1** (2). An account of the plants recorded from within a circle having a six mile radius from the Corn Exchange, Bishops Stortford.—[D.H.K.]

21, MIDDX. Wrighton, F., 1951, Plant Ecology at Cripplegate, *Lond. Nat.*, **30**, 73-79.

22, BERKS. and 24, BUCKS. Marler, P., 1950, Plant Records, *Middle-Thames Nat.*, **2**, 15-17.

22, BERKS. and 24, BUCKS. Hyde, M. B., 1951, Plant Records, *Middle-Thames Nat.*, **3**, 8-11.

29, CAMBS. Kassas, M., 1952, Studies in the Ecology of Chippenham Fen, *J. Ecol.*, **40**, 50-73.

31, HUNTS. Walters, S. M., 1949, Flora, *Ann. Rep. Hunts. Fauna and Flora Soc.* for 1949, 13-19. Gives a number of new records for the county.—[D.H.K.]

31, HUNTS. Gilbert, J. L., 1951, Flora, *Ann. Rep. Hunts. Fauna and Flora Soc.* for 1950, 14-22. Gives further new county records, and additional stations for plants.—[D.H.K.]

32, NORTHANTS. Allen, G. H., & Gilbert, J. L., 1951, Botanical Records for 1950, *Journ. Northants Nat. Hist. Soc. and F.C.*, **32**, 81-85. G. H. Allen gives a list of plants noted on the site of the proposed Pitsford reservoir.—[A.E.W.]

33-34, GLOS. Price, W. R., 1951-52, Phanerogams and Vascular Cryptogams, *Proc. Cotteswold Nat. F.C.*, **30**, 170-188 and 244-251. Gives additions to the known flora of the county including a number of adventives.—[D.H.K.]

33-34, GLOS. 1951-52, Flora of Gloucestershire: Corrigenda, *Proc. Cotteswold Nats. F.C.*, **30**, 192-193 and 253.

33-34, GLOS. Price, W. R., 1951, Plant Distribution in Gloucestershire, *Proc. Cotteswold Nat. F.C.*, **30**, 119-147.

33-34, GLOS. Townsend, C. C., 1951-52, Old Records, *Proc. Cotteswold Nat. F.C.*, **30**, 189-190 and 252-253. Comments on the present status of various Gloucestershire rarities.—[D.H.K.]

34, W. GLOS. See 6, N. SOMERSET.

37, WORCS. Day, F. M., 1950, Plant Records from Worcestershire, 1944-49, *Trans. Worcs. Nat. Club*, **10**, 193-195.

37, WORCS. Fincher, F., 1952, Worcestershire Maritime Plants, *Trans. Worcs. Nat. Club*, **10**, 265-269. Maritime plants have been recorded in Worcestershire mainly on three geological formations, Bunter, Keuper Marl and Lower Lias. The last two provide the saline springs which favour the occurrence of halophytes. At Droitwich water from the brine baths is discharged into a derelict canal, which has a salt concentration approximately 15% of full sea-water strength. A list of forty maritime species recorded from the county is appended.—[D.E.A.]

39, STAFFS. Edees, E., 1950, Plant Notes and Records for 1949, *Ann. Report and Trans. North Staffs. F.C.*, **84**, 86-94.

41, GLAM. Sykes, M. H., & Webb, J. A., 1947, The Flora of the Bombed Areas and Slum-Clearance Sites of Swansea, *Proc. Swansea Scient. and Field Nat. Soc.*, **2**, 291-306. The authors list 242 species found on bombed sites; these include such familiar plants as *Senecio squalidus* and *Buddleja Davidii*.—[D.H.K.]

41, GLAM. Vachell, E., 1947, Botanical Notes, 1939-46, *Trans. Cardiff Nat. Soc.*, **72-78**, 23-26.

41, GLAM. Wade, A. E., 1950, Botanical Notes, 1947-48, *Trans. Cardiff Nat. Soc.*, **79**, 52-54.

41, GLAM., 42, BRECON, 43, RADNOR., 44, CARMARTHEN. and 45, PEMBROKE. Webb, J. A., 1944, Plant Records, 1941-44, *Proc. Swansea Scient. and Field Nat. Soc.*, **2**, 188-191. Gives many new county records for Carmarthen and a few for Brecon and Radnor.—[D.H.K.]

43, RADNOR. Wade, A. E., & Webb, J. A., 1945-46, Radnorshire Plant Records, *North West Nat.*, **20**, 158-160. The authors give many new records for the county.—[D.H.K.]

53-54, LINCS. Gibbons, J. E., 1950-51, Botany, *Trans. Linc. Nat. Union*, **3**, 146 and 196-197. Gives a few new records for Lincolnshire.—[D.H.K.]

57, DERBY. Hollick, K. M., 1948-50, Botanical Records for Derbyshire, 1947-49, *Journ. Derby. Arch. and Nat. Hist. Soc.*, **67**, 121-128 and **68**, 82-88.

58, CHESHIRE. Henderson, M., & McMillan, N. F., 1951, Some Botanical Records for Wirral, 1945-50, *Proc. Liverpool Nat. F.C.*, **1950**, 9-11.

59, S. LANCS. Henderson, M., & McMillan, N. F., A Further Note on changes in the Dee Marshes, *Proc. Liverpool Nat. F.C.*, **1950**, 32. Up to 1945 only *Salicornia* had colonised the mud of the recently increased salt-marshes near Parkgate, but by the end of 1947 the area had become a grassy marsh with *Puccinellia maritima* dominant. *Aster Tripolium* has also spread considerably. In 1946 only 2 plants of *Spartina Townsendii* had been noted on the Cheshire side of the estuary; now there are clumps well distributed over the area. The latest plants to establish themselves on this new marsh appear to be *Halimione portulacoides* and *Suaeda maritima*.—[A.E.W.]

58, CHESHIRE. London, M. E., 1951, Flora of a Plot of Waste Ground at Blundellsands, *Proc. Liverpool Nat. F.C.*, **1950**, 12-15. 100 flowering plants and 1 horsetail are recorded from a stretch of waste ground which formerly formed part of the sand dunes. The ground is used for dumping rubbish, but only garden escapes which are really established are included in the list.—[A.E.W.]

59, S. LANCS. Blackie, J. E. H., 1947, The Flora of a Manchester Housing Estate, *North West Nat.*, **22**, 260-268.

70, CUMBERLAND. Puri, G. S., 1948, The Ash-Oak Woods of the English Lake District, *Journ. Ind. Bot. Soc.*, **27**, 211-227.

71, MAN. Paton, C. I., 1950, Introduced Weeds, *Proc. Isle of Man Nat. Hist. and Antiq. Soc.*, **5**, 122-127.

90, FORFAR. Duncan, U. K., 1951, Alien Plant Invaders at Dundee, *Scottish Nat.*, **63**, 183. Gives an account of the adventive plants established on the city rubbish-dump.—[D.H.K.]

95, ELGIN. Ovington, J. D., 1950, The Afforestation of the Culbin Sands, Moray Firth, *J. Ecol.*, **38**, 303-319.

96, EASTERNNESS. Metcalfe, G., 1950, The Ecology of the Cairngorms, *J. Ecol.*, **38**, 46-74.

96, EASTERNNESS. Burges, A., 1951, The Ecology of the Cairngorms, *J. Ecol.*, **39**, 271-284.

97, WESTERNNESS. Pigott, C. D. (with the assistance of Raven, J., & Poore, D.), 1951, Some Notes on the Vegetation and Flora of Knoydart, *Scottish Nat.*, **63**, 50-55.

102-104 and 110, INNER and OUTER HEBRIDES. Harrison, J. W. Heslop, 1950, A Dozen Years' Biogeographical Researches in the Inner and Outer Hebrides, *Proc. Univ. Durham Phil. Soc.*, **10**, 516-524. The Macaronesian element in the Hebrides, exemplified by the moss *Myurium hebridarum*, is regarded as having survived in the area since Tertiary times. Unglaciated areas suitable for survival through the Ice Age are to be found in South Uist, Harris and Rhum. The numerous races of plants and animals endemic to the Hebrides are considered to have evolved in this region through isolation in late glacial or interglacial times. It is, however, inconceivable that every colony of endemics evolved independently on the separate islands on which they are now found. Instead, they may be regarded as having originated on some major Hebridean land mass, probably lying to the far west, and as having emerged over land areas to reach not only their present island habitats, but also, in some cases, the Scottish mainland. To account for the occurrence of the Irish-American element in Tiree and Coll, which must have been all but submerged by the late glacial rise in sea level, the existence of a post-glacial land-bridge must be postulated. This would have been created by the isostatic rise in land level which occurred in the Boreal period. A continuous land mass to the west of Scotland must, in fact, have been developed at that time, affording the endemics opportunities of free movement within the area and permitting the entry of other biota from the south and west, about the same time as the Irish-American element immigrated from northern Ireland. This land mass was eventually largely submerged in the course of the great marine transgression which took place during the Atlantic period as a result of further isostatic recovery in Northern Europe.—[D.E.A.]

102-104 and 110, INNER and OUTER HEBRIDES. Harrison, J. W. Heslop, 1951, Further Observations on the Vascular Plants of the Outer and Inner Hebrides, *Trans. Bot. Soc. Edinb.*, **35**, 415-426. The ecotypes of *Melandrium dioicum* from Rhum, Tiree, Eigg and Muldoanich differ both from the Shetland form and from another distinct form found in South Uist. *Orchis Fuchsii* ssp. *rhoumensis* H.-Harr. f. is transferred to *O. ericetorum* in spite of the difference in chromosome number; forms of this subspecies have also been found on Eigg and Muck, but with much paler flowers than the Rhum plant. A large number of new locality records is also given.—[D.E.A.]

104, N. EBUDES. Spence, D. H. N., 1952, Flora of Eigg; Additions and Notes, *Trans. and Proc. Bot. Soc. Edinb.*, **36**, 74-79. Records plants new to Eigg discovered by a party from Edinburgh University Biological Society in 1949.—[D.H.K.]

IRELAND. Brenan, J. P. M., & Simpson, N. D., 1949, The Results of Two Botanical Journeys in Ireland in 1938-39, *Proc. Roy. Irish Acad.*,

52 B, 57-84. The authors give a large number of new records for Irish Vice-counties.—[D.H.K.]

IRELAND. Carrothers, E. N., and Moon, J. McK., 1952, Notes on the Flora of the North-East of Ireland, *Irish Nat. Journ.*, **10**, 284-286.

IRELAND. Webb, D. A., 1952, *Alchemilla vulgaris* agg. in Ireland: A Preliminary Report. *Irish Nat. Journ.*, **10**, 298-300. A summary of records of the Irish segregates of *Alchemilla* based on specimens at Dublin, Kew and the British Museum (Natural History). The Vice-county distribution is given as follows:—

A. minor Huds. H.29. Known only from O'Rorke's Table, Co. Leitrim.

A. vestita (Bus.) Raunk. H.1, **2**, [3[?]], 5-11, 13-25, [28[?]], 29, 31, 33, 36, 37.

A. xanthochlora Rothm. H.1, 9, 16-18, 22-25, 27-34, 36, 38-40.

A. glabra Neygenf. H.1, 8-10, 16, 18, 21, 26-29, 31, 33, 35, 36, 39, 40. —[D.H.K.]

H.33, FERMANAGH. Carrothers, E. N., Meikle, R. D., & Moon, J. McK., 1950, Co. Fermanagh Plants, *Irish Nat. Journ.*, **10**, 46-50. A large number of new county records is given, including *Cirsium heterophyllum*, which is new to Ireland.—[D.E.A.]

JERSEY. Attenborough, T. W., 1946-51, Botanical Reports, 1940-50, *Soc. Jers. Bull. Ann.*, **14**, 205-206, 275-276 and 356 and **15**, 11 and 296. Gives a brief account of the effects of the German occupation on the rare plants of the Island. The buildings in Beaumont Marsh have destroyed one of the best stations for *Orchis laxiflora*, and a series of bunkers in St. Ouen's Bay have endangered *Orobanche ritro*. *Erigeron canadensis* which became so abundant during the occupation began to disappear in 1948, while sandpit operations in St. Ouen's Bay have practically wiped out the only locality for *Dianthus gallicus*. *Limonium vulgare*, last recorded in 1839, reappeared in St. Catherine's Bay in 1946.—[D.H.K.]

JERSEY. Baal, H. J., 1951, The Indigenous Trees of Jersey, *Soc. Jers. Bull. Ann.*, **15**, 341-346.

HISTORICAL

ARDAGH, J., 1947, W. W. Newbould and his Manuscripts, *North West. Nat.*, **22**, 223-225.

CARDEW, F., 1950, A Note on the Number of Plates in Curtis's 'Flora Londinensis', 1777, and Hooker's Enlarged Edition, 1817-28, *Journ. Soc. Bibl. Nat. Hist.*, **2**, 223-224.

COOMBE, D. E., 1952, The Wordsworths and Botany, *Notes and Queries*, **197**, 298-299. The author has in his possession a copy of Withering's *An Arrangement of British Plants* (Ed. 3) containing a few manuscript notes on localities for plants in the handwriting of William and Dorothy Wordsworth.—[D.H.K.]

DAWSON, W. R., 1950, Sir Joseph Hooker and Dawson Turner, *Journ. Soc. Bibl. Nat. Hist.*, **2**, 218-222.

DONY, J. G., 1950, William Hillhouse, 1850-1910, *Bedfordshire Nat.*, **4**, 40-42.

GRIGSON, G., 1952, John Aubrey's Flowers, *The Countryman*, **45**, 272-274. A popular account of some of the Wiltshire plants observed by John Aubrey, with a discussion on the etymology of some of their local names.—[D.H.K.]

OSBORN, T. G. B. 1951, The Oxford Botanic Garden, *Endeavour*, **10**, 70-77. Deals with the history of the old Oxford Physic Garden from its foundation by Henry, Lord Danvers, in 1621 to 1840.—[D.H.K.]

OSBORN, T. G. B., 1952, Botany in Oxford (G.B.), *Taxon*, **1**, 92-93. Gives an account of the history of the various herbaria contained in the University of Oxford.—[D.H.K.]

NOMENCLATURE

LANJOUW, J., 1951, The Stockholm 1950 Rules of Botanical Nomenclature, *Taxon*, **1**, 7-8. The author reports on the most important changes agreed on at the 1950 Congress.—[D.H.K.]

LANJOUW, J., 1951, The New Rules of Typification, *Taxon*, **1**, 19-21. The author gives further details of changes in the rules of Botanical Nomenclature, decided at the Stockholm Congress.—[D.H.K.]

SPRAGUE, T. A., 1951, Botanical Nomenclature, *Proc. Cotteswold Nat. F.C.*, **30**, 164-169. A popular account of the system and practice used in naming plants.—[D.H.K.]

MISCELLANEOUS

AHLES, H. E., 1951, Interesting Weeds in New York City, *Bull. Torr. Bot. Club*, **78**, 266-269. Between 40 and 50 adventive plants introduced with ballast and rubbish have become more or less established in the south-eastern portion of Bronx County, New York. An analysis of the native homes of 43 of the plants shows 30 of them to be natives of Europe, 7 from Eurasia, 3 from Africa, 2 from S. America and 1 from Asia. The European species include *Senecio viscosus*, *Diploaxis tenuifolia*, *Carduus nutans*, *Galega officinalis* and *Coriandrum sativum*.—[D.H.K.]

ALLISON, J., GODWIN, H., & WARREN, S. H., 1952, Late Glacial Deposits at Nazeing in the Lea Valley, North London, *Phil. Trans. Royal Soc.*, **236**, 169-240. The authors list and describe the seeds of many plants found in glacial deposits in N. Essex.—[D.H.K.]

ANDERSON, E., 1951, Concordant versus Discordant Variation in relation to Introgression, *Evolution*, **5**, 133-141. Introgressive hybridization can be recognized almost immediately by its effect on the variation of entire populations. In populations of a good species the variation may be considerable, but it is usually all on one theme or "concordant". With introgression the variation lacks any harmonious pattern, becoming "discordant". The greater the degree of introgression, the more conspicuous will be the discordance of the population. A fundamental point about introgression is that until it becomes severe it does not suggest hybridization but merely excessive specific variability.—[D.E.A.]

BAKER, H. G., 1951, Hybridization and Natural Gene-flow between Higher Plants, *Biol. Rev.*, **26**, 302-337. It is emphasized that natural hybridization is much more widespread, and has greater influence on populations, than has formerly been supposed. Although many pairs of species can form hybrid swarms in which genes are readily interchanged, this occurrence is often restricted by internal and external factors. Internal factors include physiological unbalance, habitual self-pollination, facultative apomixis, plasmon sensitive genes which are not easily transferred, competition between pollen tubes, multifactorial inheritance and linkages limiting the number of different recombinations, dissimilarity in floral morphology, and phenological differences. External factors include massing to form a pure stand resulting in inbreeding, and ecological isolation. Man also has an effect in disturbing the habitat to create a low selection pressure. In introgressive hybridization between two species genes of importance in ecological adaptation tend to flow less readily than those whose function has no such connection.—[D.E.A.]

BANGERTER, E. B., 1952, Some Alien Flowering Plants, *Countryside*, **16**, 223-226. Describes *Epilobium pedunculare*, *Impatiens glandulifera* and *Galinsoga ciliata*, and gives a short account of their history in Britain. *E. pedunculare* is illustrated by an outline drawing.—[D.H.K.]

BARNES, H., & STANBURY, F. A., 1951, A Statistical Study of Plant Distribution during the Colonization and Early Development of Vegetation on China Clay Residues, *J. Ecol.*, **39**, 171-181.

BASTIN, H., 1952, Plants Beyond Control, *Discovery*, **13**, 161-162. Gives a popular account of the recent spread in Britain of *Chamaenerion angustifolium*, *Claytonia alsinoides*, *C. perfoliata*, *Elodea canadensis*, *Impatiens glandulifera* and *Matricaria matricarioides*.—[D.H.K.]

BERESFORD-PEIRSE, Sir H., 1952, A Century of Forestry, *Nature*, **168**, 130-134. The substance of the Chairman's address read to Section K* (Forestry) on August 9, 1951, at the British Association meeting at Edinburgh and dealing with forestry in the U.K. over the last century.—[K.J.H.]

BLEASDALE, J. K. A., 1952, Atmospheric Pollution and Plant Growth, *Nature*, **169**, 376. Experiments with *Lolium perenne* L. indicate that pollution decreases the growth-rate, even in the absence of visible leaf injury.—[K.J.H.]

COOMBE, D. E., & WHITE, F., 1951, Notes on Calceolous Communities and Peat Formation in Norwegian Lapland, *J. Ecol.*, **39**, 33-62.

DAVIES, E. W., 1952, Preservation of Cytological Material by Storage at or below -10° C., *Nature*, **169**, 714. Anthers and sporangia fixed in 3 : 1 absolute alcohol: glacial acetic acid, and 4 : 3 : 1 chloroform: absolute alcohol: glacial acetic acid, and stored in a deep-freeze "Frigidaire" cabinet maintaining a temperature between -10 and -14° C. produce as good cytological preparations using the acetocarmine squash technique after 6 months as freshly fixed material.—[K.J.H.]

FORESTRY COMMISSION, 1951, *Guide to the National Pinetum and Forest Plots at Bedgebury*. Describes the history, development and present state, with maps and photographs, of the site which occupies 2,431 acres in the High Weald of Kent.—[K.J.H.]

FORESTRY COMMISSION, 1950, *Cannock Chase*. The state forest occupies 6,000 acres, mostly planted with pines, in a region of high open moorlands.—[K.J.H.]

FORESTRY COMMISSION, 1952, *Britain's Forests: Thetford Chase*. Describes the history and development of the area, and gives short references to some of the rarer plants found there.—[D.H.K.]

GIMINGHAM, C. H., 1951, The Use of Life Form and Growth Form in the Analysis of Community Structure, as Illustrated by a Comparison of Two Dune Communities, *J. Ecol.*, **39**, 396-406.

GODWIN, H., & CLAPHAM, A. R., 1951, Peat Deposits on Cross Fell, Cumberland, *New Phyt.*, **50**, 167-171. It was felt desirable to revisit the site reported on by Dr. F. J. Lewis in 1904 to find whether the developments in pollen-analytic technique would enable the deposits to be brought into line with more recently disturbed deposits. No trace could be found of remains of identifiable willow species, but it was possible to identify *Empetrum* as Lewis recorded. It is inadvisable to retain the term "Arctic Bed" for the willow layer at the base of the upper peat, since it was formed in conditions scarcely colder than those of to-day. The authors enter a "caveat" against the view that the "clay" is glacial, or its contained plant layers "interglacial." A few grains closely resembling those of *Pterocarya* were found.—[K.J.H.]

GODWIN, H., & TALLANTIRE, P. A., 1951, Studies in the Post-Glacial History of British Vegetation, XII. Hockham Mere, Norfolk, *J. Ecol.*, **39**, 285-307.

HARRIS, T. M., 1950-52, Notes on the Jurassic Flora of Yorkshire, *Ann. and Mag. Nat. Hist.*, **3**, 1001-1030, **4**, 915-937 and **5**, 614-627.

HARRISON, J. HESLOP, 1951, Fresh Aspects of Irish Vegetational Problems, *Irish Nat. Journ.*, **10**, 125-130 and 145-149. Anomalous ecological behaviour of some Irish plants is not unexpected as a result of the reduced pressure of competition in a flora impoverished through early isolation, coupled with the effect of the prevailing oceanic climate. The various "floristic" elements that have been defined are often simply composed of relicts of ecological associations once important in the Irish scene. *Cirsium heterophyllum*, *Melampyrum sylvaticum* and *Geranium sylvaticum* are species of the boreal forest belt, and their present very limited Irish distribution is due to their being relicts and not, as has been suggested, recent arrivals. Some species which are curiously conservative in their behaviour, such as *Mercurialis perennis* and *Adoxa Moschatellina*, seem to lack spreading power owing to excessive biotype impoverishment. Others appear to consist of different physiological races, the one static, the other much more aggressive. Fragmentation of one large original population has

caused some species, of which *Arabis petraea* is a good example, to develop a different facies in each surviving area. Many Irish groups are marked by a lack of genetical and ecological equilibrium, resulting in the formation of hybrid complexes. This instability is the inevitable result of post-glacial climatic oscillations with the consequent migration and counter-migration of floras and extensive modification of the existing vegetation by man.—[D.E.A.]

JONKER, F. P., 1952, A Plea for the Standardization of Pollen Diagrams, *Taxon*, **1**, 89-91.

HARRISON, J. HESLOP, 1952, Statistical Methods in Plant Taxonomy, *Taxon*, **1**, 53-59 and 73-78. The author surveys the various techniques used in the statistical approach to taxonomic problems.—[D.H.K.]

KENDALL, M. W., 1952, Some Conifers from the Jurassic of England, *Ann. and Mag. Nat. Hist.*, **5**, 583-594.

LÖVE, Å., 1951, Taxonomical Evaluation of Polyploids, *Caryologia*, **3**, 263-284. Reports of "intraspecific chromosome races" by cytologists are criticized. It is pointed out that over 90% of the newly-detected polyploids occurring in northern Europe have been previously described by classical taxonomists, and that polyploid types completely indistinguishable on a morphological basis are unknown, at least in north-western Europe. The author advocates classifying them as distinct species.—[D.E.A.]

LUTHER, H., 1951, Verbreitung und Ökologie der höheren Wasserpflanzen in Brackwasser der Ekenas-Gegend in Südfinnland, *Acta Bot. Fenn.*, **49**, 1-232 and **50**, 1-370.

MEROLA, A., 1949, Osservazioni sul Piante del Napoletana, *Delpinoa*, **2**, 7-38. *Pinguicula vulgaris* var. *hirtiflora* Ten. is considered a glacial relict in the peninsula of Sorrento, near Naples. Curiously enough, however, instead of becoming scarcer, it is expanding its range every year. *Galinsoga parviflora* is now very widespread, especially in Central Europe. Its southern limit up till now has been the river Po in northern Italy. Its discovery in the Naples area represents a great extension of range.—[D.E.A.]

POLUNIN, N., 1950, Botanical Research in Scandinavia: 375 Contemporary Workers and their Special Interests, *Canad. Field Nat.*, **64**, 105-119. A provisional list of Scandinavian botanists is published in the interests of transatlantic collaboration. After the name of each worker an effective postal address is given together with a brief statement indicating his or her main current (or at least recent) research interests.—[D.E.A.]

PRAEGER, R. LL., 1951, Hybrids in the Irish Flora: a Tentative List, *Proc. Roy. Irish Acad.*, **54 B**, 1-14. The occurrence of natural crossing has not received much attention in Ireland. A number of interesting cases are selected for discussion from *Equisetum*, *Senecio*, *Saxifraga*, *Caltha*, *Cochlearia*, *Erica* and *Orchis*. A list is given of all hybrids in the Irish Flora so far recorded with remarks on their frequency.—[D.E.A.]

RAYMOND, M., 1950, Esquisse Phytogéographique du Québec, *Mem. Montreal Bot. Gard.*, No. 5. A floristic survey is made of the flora of the province of Quebec, illustrated by numerous maps and photographs. A large number of the species mentioned are either British or else have transatlantic counterparts. The occurrence of American species in north-west Europe and European ones in north-eastern America is one of the points discussed. *Alisma gramineum*, *Butomus umbellatus* and *Lythrum Salicaria* were apparently introduced at Montreal with ballast from European ships about fifty years ago, since when they have spread along the St. Lawrence river and its tributaries, giving it a totally new character, and have been gradually replacing the indigenous vegetation.—[D.E.A.]

TURRILL, W. B., 1952, Some Taxonomic Aims, Methods and Principles. Their Possible Application to the Algae, *Nature*, **169**, 388-393. Indicates the possibilities of improving the taxonomy of plants by understanding more clearly the principles of classification, and by utilising data on a much wider scale than is at present usual. The many new facts from ecology, genetics, cytology, biochemistry, etc., have to be taken into consideration by the new systematics. There are two aims in plant taxonomy: 1. To make the best possible classification for the most precise and easiest determination of individual plants. 2. To illuminate the problems of range, distribution and evolution of floras. Consideration is given to some theoretical aspects of taxonomy.—[K.J.H.]

WARDLAW, C. W., 1952, The Study of Growth and Form in Plants, *Endeavour*, **11**, 97-106. The author outlines the study of plant anatomy and morphology from Malpighi's *Anatomia Plantarum* published in 1685 to the present time.—[D.H.K.]

WILSON, D. P., & WILSON, M. A., 1952, Plants of the Sea Coast, *Discovery*, **13**, 211-215.

PLANT RECORDS

Compiled by E. C. WALLACE.

Records are for the year 1951 when no date is given.

The following signs are used:—

- § before the *B.P.L.* number: to indicate that the paragraph contains information necessitating a correction in the annotated copy of the *Comital Flora*.
- † before the *B.P.L.* number: to indicate that the plant is not a native species.
- † before the record: to indicate a native species which is not native in the locality recorded.
- * before the record: to indicate new vice-county records, not previously published.
- ‡ before the record: to indicate records additional to the annotated copy of *Comital Flora*, previously published elsewhere.
- [] enclosing a record: to indicate doubt as to the validity of the record, either of identification or locality.

It will be useful if, in future, National Grid Co-ordinates, made as accurate as is thought advisable, are added to all records.

1/1. CLEMATIS VITALBA L. 56, Notts.; railway embankment at Pleasley Vale with *Blackstonia perfoliata* and *Erigeron acris*: 57, Derby; plentiful on the steep crags of Magnesian Limestone and in a wood nearby at Pleasley Vale, F. W. ADAMS. 66, Durham; on magnesian limestone, Aycliffe, J. W. H. HARRISON (1951, *Vasc. Subst.*, 36, 30).

§5/1. MYOSURUS MINIMUS L. *33, E. Glos.; (2a) in a ditch in river-meadows close to the Worc. border near Ripple, in Glos., 1951; it has been known for many years at Uckinghall, just over the county border, which it has never before been known to cross, C. W. BANNISTER (see *Flora Glos.*, 5 (1948).—E.C.W.).

6/10. RANUNCULUS SARDOUS Crantz. 34, W. Glos.; (4) meadow by the Wye at Lancaut, Tidenham, under tidal influence, in large quantity, Rev. R. B. ABELL and C. W. BANNISTER.

§6/31. RANUNCULUS LENORMANDI F. Schultz. ‡101, Cantyre; on mud in stream at north end of Machrihanish links, K. N. G. MACLEAY; see Lee, J. R., 1933, *Fl. Clyde Area*, for earlier record.—Ed.

9/2. HELLEBORUS FOETIDUS L. 33, E. Glos.; (7a) Lidcombe Wood, Stanway, 1 plant, C. W. BANNISTER.

‡13/3. *DELPHINIUM AJACIS* L. sec. Gay. ‡33, E. Glos.; (2a) waste ground on the Gloucester by-pass; waste ground by the Tewkesbury Road, Uckington; Lower Lode sewage works, near Tewkesbury, C. C. TOWNSEND, all det. N. Y. SANDWITH: see *Flora Glos.* for earlier records.—E.C.W.

‡22/1. *MECONOPSIS CAMBRICA* (L.) Vig. †98, Argyll; Dalmally, Ford, Kilmelfort, all probably garden escapes, but quite established, K. N. G. MACLEAY; see Lee, J. R., 1933, *Fl. Clyde Area*, for earlier record.—Ed.

†28/1. *ESCHSCHOLZIA CALIFORNICA* Cham. 23, Oxon.; waste ground, Jackdaw Lane and Port Meadow, Oxford, a number of plants, R. B. ABELL and C. W. BANNISTER.

†30/1. *DICENTRA FORMOSA* (Haw.) Walp. 59, S. Lancs.; in shade and among bricks of remains of recent building on Coal measures, near colliery, south of Denton, 1951, T. R. LAYCOCK.

31/1. *CORYDALIS CLAVICULATA* (L.) DC. 25, E. Suff.; abundant in dry oakwood near Benacre Broad, R. M. PAYNE. 88, Mid Perth; sparingly, crags at summit of Craig Rossie (1349') near Auchterarder, A. W. ROBSON.

‡35/1. *NASTURTIUM OFFICINALE* R.Br. 4, N. Devon; West Pilton, Tutshill, 1948, E. MILNE-REDHEAD: *27, E. Norfolk; stream on east side of Sheringham, 1951, H. W. HOWARD: *38, Warwick; marshy ground by side of pool near Blake Street station north of Sutton Park, E. S. EDEES: *52, Anglesey; marsh near Pentraeth, P. W. RICHARDS: *83, Edinb.; Duddingston Loch, 1850, J. BOSWELL SYME in *Herb. Mus. Brit.*: all det. H. W. HOWARD.

‡35/1(2). *NASTURTIUM MICROPHYLLUM* (Boenn.) Rehb. *1, W. Cornwall; Lizard, Helston, 1887, J. CUNNACK (*Herb. J. B. Syme in Herb. Mus. Brit.*), comm. H. W. HOWARD. 10, Wight; Lashmere Pool, near Godshill: 34, W. Glos.; (4) Broadmoor, Cinderford, C. C. TOWNSEND; both confirmed by H. K. AIRY SHAW.

35/1(2)×1. *NASTURTIUM MICROPHYLLUM* × *OFFICINALE*. H.40, Derry; Old Mill stream at Coleraine, 1950, J. CLARKE, comm. H. W. HOWARD.

†36/1. *BARBAREA STRICTA* Andrz. 34, W. Glos.; (3) Walmore Common, C. W. BANNISTER.

‡43/4. *DRABA MURALIS* L. *†87, [Kinross]; garden weed at Fosso-way, U. K. DUNCAN, conf. J. E. LOUSLEY.

‡44/1. *EROPHILA VERNA* (L.) Chevall. †98, Argyll; plentiful at roadside, Loch Awe; not in *C.F.*, but is quoted (as *vulgaris* DC.) for v.-cc. 97, 98, 101-103 in *Glasgow Cat.*, K. N. G. MACLEAY.

- ‡45/1. *ARMORACIA RUSTICANA* G.M.S. *98, Argyll; in wood at roadside near Carmasserie cross-road, half mile from nearest house, K. N. G. MACLEAY.
- †48/1. *MALCOLMIA MARITIMA* (L.) R.Br. 33, E. Gos.; (2a) Northway, Ashchurch, waste ground, 1 plant, 1951, C. W. BANNISTER, det. N. Y. SANDWITH.
- †50/7. *ERYSIMUM REPANDUM* L. 33, E. Gos.; (2a); Borough Flour Mills, Tewkesbury, 2 or 3 plants, 1948, C. W. BANNISTER, det. at KEW.
- †51/1. *CONRINGIA ORIENTALIS* (L.) Dum. 71, Man; weed in garden, Ramsey, 1947, Mrs. LERMITTE, comm. D. E. ALLEN.
- †52/1. *CAMELINA SATIVA* (L.) Crantz 19, N. Essex; in flax fields at New Hall convent near Chelmsford, quite abundant; 21, Middx.; rubbish ground at Hillend, Harefield, R. A. GRAHAM.
- †54/7. *BRASSICA TOURNEFORTII* Gouan. 33, E. Gos.; (2a) Borough Flour Mills, Tewkesbury, 1 plant 1950, 2 in 1951, C. W. BANNISTER, det. E. B. BANGERTER and N. Y. SANDWITH; 34, W. Gos.; (2b) Sharpness Docks, number of plants, R. B. ABELL and C. W. BANNISTER.
- †54/16. *BRASSICA JUNCEA* (L.) Coss. 22, Berks; (4) Manor Tip, Reading, J. OUNSTED and P. NEWBY.
- §55/2. *DILOTAXIS MURALIS* (L.) DC. *95, Elgin; plentiful at Findhorn and waste sandy places near Forres, M. MCCALLUM WEBSTER.
- †64/5. *THLASPI ALLIACEUM* L. 19, N. Essex; a small colony near Blackwater Canal, Maldon, R. M. PAYNE, det. J. P. M. BRENNAN and D. H. KENT.
- †76/3. *RAPISTRUM RUGOSUM* (L.) All. 34, W. Gos.; (2b) Sharpness Docks, quite plentiful, with glabrous and hairy fruits, R. B. ABELL and C. W. BANNISTER, det. N. Y. SANDWITH.
- †85/2b. *RESEDA LUTEA* Linn. var. *PULCHELLA* J. Muell. 34, W. Gos.; (2b) Sharpness Docks, very abundant, C. C. TOWNSEND.
- 88/32. *VIOLA NANA* (DC.) Godr. 1, W. Cornw.; Scilly, in a rabbit scrape on the s. coast of Tresco (not where recorded by J. E. Raven in *Watsonia*, 1, 356); also on a sandy track on Bryher, J. OUNSTED.
- 92/3. *DIANTHUS ARMERIA* L. 36, Heref.; Tarrington, a weed in the Rectory Garden, F. M. DAY.
- 96/4. *SILENE NOCTIFLORA* L. 37, Worcs.; frequent in cornfields on Bredon Hill, R. B. ABELL and C. W. BANNISTER.

96/5. *SILENE ANGLICA* L. †90, Forfar; Dundee Corporation tip, U. K. DUNCAN, B. M. C. MORGAN and R. A. GRAHAM.

†96/21. *SILENE BEHEN* L. 33, E. Glos.; (2a) Borough Flour Mills, Tewkesbury, 1 plant, 1950, R. B. ABELL and C. W. BANNISTER, det. at Kew.

101/3. *STELLARIA MEDIA* (L.) Vill. 108, W. Suth.; moorland, in damp ditch by a wall, c. 500 yds. from the coast, n. side of Scourie Bay, 1949, D. H. BARRY and B. W. RIBBONS; a rather unusual habitat, such as I have seen in Caithness.—E.C.W.

102/8. *ARENARIA TENUIFOLIA* L. †38, Warwick; occasional on ballast of disused railway track near Wilmcote, V. JACOBS.

103/5. *SAGINA NORMANIANA* Lagenh. 96, Easternness; bank of burn in corrie, nr. Achlean, Glen Feshie, E. C. WALLACE.

103/7. *SAGINA CILIATA* Fr. 33, E. Glos.; (7a) Hornsleasow, Snows-hill, C. C. TOWNSEND, det. F. R. ELLISTON WRIGHT.

112/7. *HYPERICUM MONTANUM* L. 11, S. Hants.; Old Winchester Hill, C. W. MUSGRAVE BURTON.

§115/2. *ALTHAEA HIRSUTA* L. *†7, N. Wilts.; near Sandy Lane, T. G. COLLETT, comm. J. D. GROSE.

117/1. *MALVA MOSCHATA* L. 88, Mid Perth; rock faces, Dunning Glen; railway embankment, Baldinnies, Dunning; Dalreoch Bridge, Dunning, A. W. ROBSON.

†117/9. *MALVA PARVIFLORA* L. 34, W. Glos.; (2b) Sharpness Docks, 1950-51, becoming common in 1951, R. B. ABELL and C. W. BANNISTER, det. at Kew.

†118(2)/1b. *ANODA CRISTATA* (L.) Schlecht. var. *BRACHYANTHERA* (Rechb. f.) Hochr. 34, W. Glos.; (2b) Sharpness Docks, 1 plant, 1951, R. B. ABELL and C. W. BANNISTER, det. J. P. M. BRENNAN.

§123/3. *TILIA CORDATA* Mill. †54, N. Lincs.; Broughton Woods, A. H. G. ALSTON (*Year Book*, 1951, 70).

127/7. *GERANIUM PYRENAICUM* Burm. f. 56, Notts., and 57, Derby; abundant in a field adjoining the county boundary on the Derby side with a few plants in Notts. at Pleasley Vale, F. W. ADAMS.

§127/13. *GERANIUM LUCIDUM* L. *†101, Cartyre; on walls near Bel-lanoch; Crinan; Tarbet; possibly garden escape. K. N. G. MACLEAY.

127/15. *GERANIUM PURPUREUM* Vill. 34, W. Glos.; (4) on an old wall at Sedbury, nr. Tidenham, with *G. Robertianum* L., C. W. BANNISTER, confirmed by J. E. LOUSLEY.

128/3c. *ERODIUM GLUTINOSUM* Dum. *70, Cumb.; sand dunes, Haverigg, D. E. ALLEN and E. A. ROBINSON, comm. CARLISLE MUSEUM.

†142/3. *ACER PLATANOIDES* L. 33, E. Glos.; (2a) small mixed wood near Boddington, 1947, C. C. TOWNSEND, confirmed A. MELDERIS.

149/2. *ULEX GALLII* Planch. 95, Elgin; one bush near Colterne House, Findhorn, M. McCALLUM WEBSTER.

155/11. *TRIFOLIUM STRIATUM* L. 88, Mid Perth; near Dunning, 1951, A. W. ROBSON.

155/15(2). *TRIFOLIUM ELEGANS* Savi. 59, S. Lancs.; pastureland on Trias (Bunter sandstone), Flinton Meadows, c. 50', J. S. ROBERTSON, comm. T. R. LAYCOCK.

155/22. *TRIFOLIUM FILIFORME* L. 37, Worcs.; The Gullet, nr. Castlemorton Common, form with white flowers, growing with normal deep yellow form and intermediates, R. B. ABELL and C. W. BANNISTER. 66, Durham; Pittington, J. W. H. HARRISON (1951, *Vasc. Subst.*, 36, 22).

160/8. *LOTUS ANGUSTISSIMUS* L. †17, Surrey; large patches of huge plants in a rough sandy field N. of Tilford, N. Y. SANDWITH.

†165/1. *COLUTEA ARBORESCENS* L. 23, Oxon.; waste ground, Jackdaw Lane and Port Meadow, Oxford, several plants, R. B. ABELL and C. W. BANNISTER, confirmed by A. MELDERIS.

†176/2. *VICIA TENUIFOLIA* Roth. 33, E. Glos.; (7b) sandpits, Sandy Lane, near Cheltenham, two fine plants in 1950 (gone in 1951), C. C. TOWNSEND, confirmed by A. MELDERIS.

185/129(2). *RUBUS ADENOLOBUS* W. Wats. *33, E. Glos.; (2a) scrub, Benhall Farm, St. Marks, Cheltenham, C. C. TOWNSEND, det. W. C. R. WATSON.

†185/. *RUBUS PROCERUS* P.J.M. *33, E. Glos.; several fine bushes in Sandy Lane sandpits, near Cheltenham, C. C. TOWNSEND, det. W. C. R. WATSON.

187/2×1. *GEUM* × *INTERMEDIUM* Ehrh. 95, Elgin; by the river Findhorn, Darnaway Castle, Forres, with both parents, M. McCALLUM WEBSTER.

190/4. *ALCHEMILLA VESTITA* (Bus.) Raunk. 69, Westm.; roadside, Hoff Wood, between Appleby and Orton, C. W. MUIRHEAD, det. S. M. WALTERS, comm. CARLISLE MUSEUM.

190/19. *ALCHEMILLA ALPINA* L. 70, Cumb.; Scafell, c. 2500 ft., abundantly in flower in early November 1951, B. VERDCOURT.

190(2). *APHANES*. All determined or confirmed by S. M. WALTERS.

§190(2)/1. *APHANES ARVENSIS* L. 33, E. Gos.; (7a) Hornsleasow Rough, near Snowhill: 34, W. Gos.; (3) arable between Eastnor and Bromsberrow: 36, Heref.; wall near Symonds Yat: C. C. TOWNSEND. *90, Forfar; roadside near Rescobie Loch, U. K. DUNCAN.

190(2)/2. *APHANES MICROCARPA* (Boiss. & Reut.) Rothm. 10, Wight; sandy turf near Alverstone: 34, W. Gos.; (4) head of the Whitecroft Valley, near Lydney, C. C. TOWNSEND. *H1, S. Kerry; roadside near Glenbeigh, U. K. DUNCAN.

†192/1. *ACAENA ANSERINIFOLIA* (J. R. & G. Forst.) Druce. 9, Dorset; (G) two patches by a roadside near Studland, J. OUNSTED.

199/17. *SAXIFRAGA GRANULATA* L. 75, Ayr; rocks near pier, Portencross, 1950, B. W. RIBBONS. 95, Elgin; on grassy cliffs between Hope-mah and Burghead, M. McCALLUM WEBSTER.

§199/19. *SAXIFRAGA RIVULARIS* L. *98, Argyll; alpine rocks, parish of Lismore and Appin, 1950, W. A. SLEDGE.

214/1. *HIPPURIS VULGARIS* L. 39, Staffs.; abundant in disused canal bay near Willingsworth Furnaces, Wednesbury, V. JACOBS.

217/7b. *CALLITRICHE TRUNCATA* Guss. var. *occidentalis* (Rouy) Druce. 6, N. Somerset; rhine between Clevedon and Kingston Seymour, Sept. 1951. the second record for the Bristol district, C. I. and N. Y. SANDWITH.

220. *EPILOBIUM*. All records, except where stated and those for *E. pedunculare*, determined or confirmed by G. M. ASH.

§220/6. *EPILOBIUM LAMYI* F. Schultz. *33, E. Gos.; (2a) Voulters Wood, Forthampton, plentiful: Northway, Ashchurch, scarce, C. W. BANNISTER.

220/7. *EPILOBIUM OBSCURUM* Schreb. 33, E. Gos.; (2a) form with white flowers, Voulters Wood, Forthampton, C. W. BANNISTER.

220/7×4. *EPILOBIUM OBSCURUM* Schreb. × *parviflorum* Schreb. 34, W. Gos.; (2b) railway sidings, Sharpness Docks, C. C. TOWNSEND.

†220/7(2). *EPILOBIUM ADENOCALON* Hausskn. *10, Wight; on a wall, St. Lawrence, near Ventnor, C. C. TOWNSEND. ‡33, E. Gos.; (7a) Lidcombe Wood, Stanway, in great abundance; (2a) Tewkesbury, becoming frequent: 34, W. Gos.; (2b) Sharpness Docks, abundant, C. W. BANNISTER: (see *Fl. Gos.* for earlier records.—Ed.).

220/7(2)×4. *EPILOBIUM ADENOCAULON* Hausskn. × *PARVIFLORUM* Schreb. 33, E. Gos.; Lidcombe Wood, Stanway, with parents; Voulters Wood, Forthampton, with parents, C. W. BANNISTER.

220/7(2)×7. *EPILOBIUM ADENOCAULON* Hausskn. × *OBSCURUM* Schreb. 33, E. Gos.; (2a) Voulters Wood, Forthampton, C. W. BANNISTER.

220/7(2)×8. *EPILOBIUM ADENOCAULON* Hausskn. × *ROSEUM* Schreb. 33, E. Gos.; (2a) Station St., Tewkesbury, with parents, C. W. BANNISTER.

220/7(2)×10. *EPILOBIUM ADENOCAULON* Hausskn. × *MONTANUM* L. 33, E. Gos.; (2a) Voulters Wood, Forthampton, with parents, C. W. BANNISTER.

220/9. *EPILOBIUM LANCEOLATUM* Seb. & Mauri. 33, E. Gos.; (2a) Voulters Wood, Forthampton; 34, W. Gos.; (2b) Sharpness Docks, along rail-tracks, etc., 1950-51; (4) on old walls at Sedbury, nr. Tidenham, plentiful; leg. and det. R. B. ABELL and C. W. BANNISTER.

220/10×4. *EPILOBIUM MONTANUM* L. × *PARVIFLORUM* Schreb. 33, E. Gos.; (2a) Voulters Wood, Forthampton, with parents, C. W. BANNISTER.

220/10×7. *EPILOBIUM MONTANUM* L. × *OBSCURUM* Schreb. 33, E. Gos.; (2a) Voulters Wood, Forthampton, with parents, C. W. BANNISTER.

220/10×8. *EPILOBIUM MONTANUM* L. × *ROSEUM* Schreb. 33, E. Gos.; (2a) Post Office Lane, Tewkesbury, with parents, C. W. BANNISTER.

†220/17. *EPILOBIUM PEDUNCULARE* Cunn. 78, Peebles; on shingle in bed of Leithen, 2 m. N. of Innerleithen, J. D. and K. S. Wood, det. and comm. J. OUNSTED. 87, W. Perth; in gravel paths, Callander, D. McCLINTOCK. 95, Elgin; among stones on lower reaches of Findhorn river, also on stones by river Lossie and abundant in old gravel pit, Alves, M. McCALLUM WEBSTER.

‡223/2(2). *OENOTHERA ERYTHROSEPALA* Borbás (*Oe. Lamarckiana* De Vries non Ser.). 23, Oxon.; waste ground, Jackdaw Lane, Oxford, many plants, 1951, R. B. ABELL and C. W. BANNISTER. *33, E. Gos.; (7a) Lidcombe Wood, Stanway, appearing naturalized, R. B. ABELL and C. W. BANNISTER; (2b) Gloucester Docks, R. B. ABELL and C. W. BANNISTER; (7b) several plants in the sandpits, Sandy Lane, Cheltenham, C. C. TOWNSEND: all det. or conf. A. MELDERIS.

†249/2. *AMMI VISNAGA* (L.) Lam. 33, E. Gos.; (2b) Gloucester Docks, one plant, C. C. TOWNSEND, det. A. MELDERIS.

†§250/1. *CARUM CARVI* L. *108, W. Sutherland; Farr Bay, quite naturalised in a meadow, J. M. BATTEN, J. OUNSTED and C. H. B. REYNOLDS.

252/1. *FALCARIA VULGARIS* Bernh. 38, Warwick; two plants on railway bank north of Henley-in-Arden, V. JACOBS.

258/1. *CHAEROPHYLLUM AUREUM* L. 87, W. Perth; Drumvaich, four miles east of Callander, D. McCLINTOCK.

270/1. *MEUM ATHAMANTICUM* Jacq. 98, Argyll; in one field at Achnafandich, Glen Orchy, very local in the county, K. N. G. MACLEAY.

†277/1. *HERACLEUM MANTEGAZZIANUM* Somm. & Lev. 95, Elgin; by river Findhorn near Forres, 1950, A. C. G. GOUGH.

†279/1. *CORIANDRUM SATIVUM* L. 90, Forfar; tip at Dundee, D. McCLINTOCK.

288/2. *VIBURNUM LANTANA* L. 66, Durham; on magnesian limestone, Raisby Woods, J. W. H. HARRISON and J. A. RICHARDSON (1951, *Vasc. Subst.*, 36, 22).

§296/3. *GALIUM ERECTUM* Huds. 23, Oxon.; waste ground, Jackdaw Lane, Oxford, plenty in one patch, R. B. ABELL and C. W. BANNISTER. 57, Derby; on a roadside bank near Calver, F. W. ADAMS. †66, Durham; near Coxhoe, J. W. H. HARRISON (1951, *Vasc. Subst.*, 36, 23).

§296/5. *GALIUM PUMILUM* Murr. *96, Easternness; on shingle in spate bed of river Feshie, and on rocks in gullies, Glen Feshie, R. MACKECHNIE and E. C. WALLACE.

§296/8. *GALIUM DEBILE* Desv. The entry in *Watsonia*, 2, 199, 1952, for 66, Durham, should be corrected to read 67, S. Northumberland; see 1950, *Vasc. Subst.*, 35, 23, where the record is correctly given by J.W.H.H.—E.C.W.

301/1. *VALERIANA OFFICINALIS* L. *sensu lato*. 59, S. Lancs.; a dwarf form with white flowers, dune slacks, Freshfield to Birkdale, D. E. ALLEN.

§304/2. *VALERIANELLA ERIOCARPA* Desv. *55 (Rutland); arable field adjoining Bloody Oaks Quarry, near Empingham, E. K. HORWOOD, det. T. G. TUTIN.

304/4. *VALERIANELLA CARINATA* Loisel. 33, E. Glos.; (7a) on old wall near Guiting Grange, Guiting Power, a few plants, C. W. BANNISTER.

- 304/4b. *VALERIANELLA CARINATA* Loisel. var. *PUBESCENS* Coss. & Germ. 33, E. Gos.; (2b) Sharpness Docks, R. B. ABELL and C. W. BANNISTER, det. N. Y. SANDWICH, who says this is probably the commonest form of the species.
- †312/5. *SOLIDAGO SEROTINA* Ait. non Retz. 88, Mid Perth; waste ground below Dunning, 1950, A. W. ROBSON, det. J. E. LOUSLEY.
- 320/10. *ERIGERON MUCRONATUS* DC. 3, S. Devon; Monk's Bridge, Brixham, F. M. DAY, det. at KEW.
- †339/4b. *AMBROSIA TRIFIDA* L. var. *INTEGRIFOLIA* (Willd.) Torr. & Gray. 34, W. Gos.; (2b) Sharpness Docks, 1 plant, 1951, C. W. BANNISTER, det. J. P. M. BRENNAN.
- †341/3. *XANTHIUM SPINOSUM* L. 34, W. Gos.; (2b) Sharpness Docks, 2 plants, 1951, R. B. ABELL and C. W. BANNISTER, confirmed Dr. A. MELDERIS.
- 353/2. *BIDENS TRIPARTITA* L. 59, S. Lancs.; adventive on newly-laid soil with *Chenopodium* spp., Birkdale dunes, D. E. ALLEN.
- †353/6. *BIDENS FRONDOSA* L. 34, W. Gos.; (2b) bridge over the canal at Purton, near Sharpness, C. C. TOWNSEND.
- †354/2. *GALINSOGA CILIATA* (Raf.) Blake. 6, N. Somerset; Lyncombe Hill, Bath, Miss A. L. MILLER, comm. D. McCLINTOCK. 23, Oxon.; (7) the dominant weed in a field where the crop had failed, near Henley, J. OUNSTED. 56, Notts; one plant in bed at Trent Bridge Hotel, D. McCLINTOCK. 62, N.E. Yorks.; garden weed, Bootham, York, 1951, Mrs. R. WILSON SHARPE, det. J. P. M. BRENNAN, comm. C. M. ROB.
- 368/3. *ANTHEMIS ARVENSIS* L. 38, Warwick; a few plants on the disused railway track near Henley-in-Arden, V. JACOBS.
- ‡371/3. *MATRICARIA MATRICARIOIDES* (Less.) Porter. ‡98, Argyll; 101, Cantyre; very common on roadsides and near farms, K. N. G. MACLEAY; see Lee, J. R., 1933, *Fl. Clyde Area*, 187, for earlier record.—ED.
- ‡378/1. *ARTEMISIA ABSINTHIUM* L. †*88, Mid Perth; on waste land, Mains Farm, Dunning, A. W. ROBSON.
- ‡378/3(2). *ARTEMISIA VERLATORUM* Lamotte. *18, S. Essex; plentiful in one spot on waste ground at Dagenham, N. Y. SANDWICH.
- †380/2. *PETASITES ALBUS* (L.) Gaertn. 51, Flint, Fynnongroew, 1946, L. W. FROST.
- ‡383/1. *SENECIO FLUVIATILIS* Wallr. *87, W. Perth; Kilmahog, D. McCLINTOCK.

‡383/7. *SENECIO SQUALIDUS* L. ‡67, S. Northumberland; waste ground, Shieldfield, Newcastle-upon-Tyne, W. A. WRIGHT (1951, *Vasc. Subst.*, 36, 20).

395/2b×1. *CARDUS CRISPUS* L. × *NUTANS* L. 20, Herts.; field border near Caddington, on a bank with both parents, E. MILNE-REDHEAD and C. C. TOWNSEND, confirmed by W. A. SLEDGE.

396/1. *CIRSIUM ERIOPHORUM* (L.) Scop. 12, N. Hants.; in field near Lasham, C. LANGRIDGE. 66, Durham; Garmondsway, J. W. H. HARRISON, etc. (1951, *Vasc. Subst.*, 36, 22).

396/4×6. *CIRSIUM ACAULON* (L.) Scop. × *TUBEROSUM* (L.) All. 7, N. Wilts.; Play Hill, J. D. GROSE.

‡397/1. *ONOPORDON ACANTHIUM* L. ‡+34, W. Glos.; (3) roadside bank at Over, nr. Gloucester, 1 large plant, R. B. ABELL and C. W. BANNISTER; see *Flora Glos.*, 292 (1948), for other records.—E.C.W.

415/1. *PICRIS ECHIOIDES* L. 38, Warwick; one plant beside the canal between Stratford-on-Avon and Wilmcote, V. JACOBS.

416/3. *CREPIS BIENNIS* L. 33, E. Glos.; (2a) many plants on bank of Avon in Tewkesbury Ham, close to Borough Flour Mills, 1948-51; 37, Wores.; 1 plant in rye-field, Tarn Hill, Bushley, 1950, 1 plant on roadside between Bushley and Tewkesbury, 1950, C. W. BANNISTER.

419. *HIERACIUM*. The order and numbers follow Pugsley, H. W., 1948, A Prodrômus of the British Hieracia, *Journ. Linn. Soc. (Bot.)*, 54. Asterisks refer to vice-counties not cited there.

419/54b. *HIERACIUM ARGENTEUM* Fr. var. *SEPTENTRIONALE* F. J. Hanb. 108, W. Suth.; limestone rocks, Keoldale, Kyle of Durness, C. W. MUIRHEAD, det. C. WEST and P. D. SELL, comm. CARLISLE MUSEUM.

419/62. *HIERACIUM BEEBYANUM* Pugsl. *102, South Ebuades; coastal rocks at Ardskenish and the Strand, Isle of Colonsay, Mrs. J. S. MUIRHEAD, det. C. WEST and P. D. SELL, comm. CARLISLE MUSEUM.

419/64. *HIERACIUM RUBICUNDUM* F. J. Hanb. 108, W. Sutherland; Bettyhill, 1923, R. H. WILLIAMSON, det. C. WEST and P. D. SELL, 1952, comm. CARLISLE MUSEUM.

419/99. *HIERACIUM EXOTERICUM* Jord. *62, N.E. Yorks.; rocks by roadside, Hawaby Bank, C. M. ROB, det. C. WEST.

419/120. *HIERACIUM CREBRIDENTIFORME* Pugsl. *66, Durham; High Force, Teesdale, 1887, J. LEITCH, det. C. WEST and P. D. SELL. 1952, comm. CARLISLE MUSEUM.

419/136b. *HIERACIUM CRAVONIENSE* (F. J. Hanb.) Roffey var. *PSEUDODURICEPS* Pugs. 88, Mid Perth; rocks above Loch na Cat, Ben Lawers. C. W. MUIRHEAD, det. C. WEST and P. D. SELL.

419/140. *HIERACIUM PRAESIGNE* (Zahn) Roffey. *61, S.E. Yorks.; railway bank, Springhead Hull, 1937, A. K. WILSON, det. C. WEST.

419/149c. *HIERACIUM VULGATUM* Fr. emend. Almqvist var. *SUBFASCICULARE* W. R. Linton. 65, N.W. Yorks.; wall near Church, Tanfield, 1950, C. M. ROB, det. C. WEST.

419/152. *HIERACIUM LEPIDULUM* Stenstr. *3, S. Devon; Plym Valley, 1890, J. LEITCH, det. C. WEST and P. D. SELL, 1952, comm. CARLISLE MUSEUM.

419/230. *HIERACIUM PSEUDAMPLIDENTATUM* Pugs. *77, Lanark; Bothwell, 1872, J. LEITCH, det. C. WEST and P. D. SELL, 1952, comm. CARLISLE MUSEUM.

†419/255. *HIERACIUM COLLINIFORME* (N. & P.) Roffey. *80, Roxb.; bank of River Tweed, Kelso, 1938, G. FOGGITT, det. C. WEST, comm. C. M. ROB.

‡419/257. *HIERACIUM BRUNNEOCROCEUM* Pugs. *58, Ches.; waste place near roadside on Trias (Keuper marl and sandstone), east side of road north of Chelford Cross, 1951, T. R. LAYCOCK and B. DICKINSON.

‡425/2. *LACTUCA SERRIOLA* L. †33, E. Glos.; (7b) Sandy Lane sandpits, near Cheltenham, Glos., 1950, C. C. TOWNSEND. †‡54, N. Lincs.; railway sidings, Scunthorpe, D. P. Young (*Year Book*, 1951, 71).

‡425/4. *LACTUCA MURALIS* (L.) Gaertn. †71, Man; Ballakillingan, Lezayre, 1947, confirming only previous record of 1860, G. E. QUAYLE, comm. D. E. ALLEN. *95, Elgin; on walls above Moy House, Forres, M. McCALLUM WEBSTER. H.9, Clare; limestone pavement, Black Head, H. MILNE-REDHEAD.

432/1c. *JASIONE MONTANA* L. var. *LATIFOLIA* Pugs. H.1, S. Kerry; on rocks above Loughs Coomasaharn and Coomeeneragh, Glenbeigh, E. C. WALLACE.

436/1. *LEGOUSIA HYBRIDA* (L.) Delarb. 25, E. Suff.; cliff-top, Dunwich, with *Filago minima*, R. M. PAYNE.

459/4. *ARMERIA MARITIMA* Willd. 108, W. Suth.; summit of Foinaven, 2839 ft., 1949, D. H. BARRY and B. W. RIBBONS.

467/1. *ANAGALLIS TENELLA* (L.) Murr. 57, Derby; boggy ground above Yorkshire Bridge near Ashopton; 63, S.W. Yorks.; damp ground between Maltby Church and Roche Abbey, F. W. ADAMS.

467/2. *ANAGALLIS ARVENSIS* L. 9, Dorset; maritime suberect form with scarlet flowers, frequent on dunes, Littlesea, N. D. SIMPSON and D. E. ALLEN. 59, S. Lancs.; single patch of maritime suberect form with scarlet flowers on dune turf near Birkdale, D. E. ALLEN.

467/3. *ANAGALLIS FOEMINA* Mill. 22, Berks.; (5) garden weed, Reading, J. OUNSTED.

§476/1. *CICENDIA FILIFORMIS* (L.) Delarb. †14, E. Sussex; ride in wood near Turner's Hill, J. COMYN, comm. E. C. WALLACE (see *Flora Sussex*, 293, for early records).

§478/4. *CENTAURIUM PULCHELLUM* (Sw.) Druce. †33, E. Glos.; (2a) edge of Voulters Wood, Forthampton, on barish, sandy ground, C. W. BANNISTER; see *Flora Glos.*, 333, for other records.—E.C.W.

§478/7. *CENTAURIUM CAPITATUM* (Willd.) Borbás. †6, N. Somerset; Crook Peak, 1938, F. K. MAKINS, see Bristol Botany in 1950 (1951, *Proc. Bristol Nat. Soc.*, 28, 172) for full account.

§480/6. *GENTIANA ANGLICA* Pugsl. *12, N. Hants.; Noar Hill, Selborne, becoming more plentiful, C. LANGRIDGE. *33, E. Glos.; (7a) Hornsleasow, Snowhill, 1951, C. C. TOWNSEND, confirmed by J. E. LOUSLEY.

480/8. *GENTIANA GERMANICA* Willd. 22, Berks.; Pit down, E.N.E. of Seven Barrows, near Lambourn, in some quantity over a considerable area, J. W. GOUGH.

†497/4. *SYMPHYTUM PEREGRINUM* Ledeb. 88, Mid Perth; by river Earn near Dunning, A. W. ROBSON.

†507/7. *ANCHUSA ITALICA* Retz. 23, Oxon.; waste ground, Jackdaw Lane, Oxford, R. B. ABELL and C. W. BANNISTER, confirmed by N. Y. SANDWICH. 33, E. Glos.; (7a) roadside between Burford and Stow, 1950, C. W. BANNISTER.

505/1. *MERTENSIA MARITIMA* (L.) Gray. 95, Elgin; on sand above shingle near Burghead, very few plants, M. McCALLUM WEBSTER.

§506/7. *MYOSOTIS SYLVATICA* Hoffm. †34, W. Glos.; (4) Kidnalls Enclosure, near Lydney, looking definitely native (regarded in *Flora Glos.* as an escape in the Forest of Dean), C. C. TOWNSEND, det. A. E. WADE.

§517/1. *SOLANUM DULCAMARA* L. *98, Argyll; on shore between Strone and Blairmore, found by a lady on staff of Glasgow University about ten years ago—teste J. R. LEE; seen in 1951, K. N. G. MACLEAY.

+517/17. *SOLANUM SARRACHOIDES* Sendtn. 34, W. Gos.; (2b) Sharpness Docks, 1 plant, (2a) carrot field at Ashchurch, R. B. ABELL and C. W. BANNISTER, det. J. P. M. BRENNAN.

+527/1. *VERBASCUM PHLOMOIDES* L. 23, Oxon.; waste ground, Jackdaw Lane, Oxford, many fine plants, R. B. ABELL and C. W. BANNISTER, confirmed by A. MELDERIS. 33, E. Gos.; (2a) waste ground by the Gloucester by-pass, 1948, C. C. TOWNSEND, confirmed by J. E. LOUSLEY.

527/4. *VERBASCUM VIRGATUM* Stokes. +23, Oxon.; waste ground, Port Meadow, Oxford, 1 plant, R. B. ABELL and C. W. BANNISTER, confirmed by N. Y. SANDWICH.

§527/6. *VERBASCUM PULVERULENTUM* Vill. *+34, W. Gos.; (4) well established in some quantity at Redbrook, apparently a garden escape, R. B. ABELL and C. W. BANNISTER, confirmed by N. Y. SANDWICH.

§532/3. *LINARIA REPENS* (L.) Mill. *59, S. Lancs.; a small colony of rather dwarf plants on loose dune sand from Millstone grit, Ainsdale, A. G. and F. W. HOLDER, comm. T. R. LAYCOCK.

§532/7. *LINARIA MINOR* (L.) Desf. *+98, Argyll; railway track above Dalmally, several plants, J. M. BATTEN, J. OUNSTED and C. H. B. REYNOLDS.

§+532/26. *LINARIA CYMBALARIA* (L.) Mill. *97, Westernness; on old walls at Fort William, K. N. G. MACLEAY.

+543/22. *VERONICA LONGIFOLIA* L. 33, E. Gos.; (7b) Sandy Lane sandpits, near Cheltenham, Gos., 1950, C. C. TOWNSEND, confirmed A. MELDERIS.

+543/41. *VERONICA FILIFORMIS* Sm. 33, E. Gos.; (7b) Meadow by lane leading from the Dowdeswell Reservoir to Rossleigh Manor: 34, W. Gos.; (4) abundant all along the Wye banks from Symond's Yat station to the track to Braceland: 37, Wores.; in profusion over at least 100 yards outside Birtsmorton Church, C. C. TOWNSEND.

§545/2. *EUPHRASIA BOREALIS* (TOWNS.) Wettst. *20, Herts.; Wilbury, Hitchin, 1911, J. E. LITTLE: *72, Dumfries; near Moffat, 1907, W. R. LINTON and E. S. MARSHALL: both in Herb. Univ. Cantab., det. and comm. P. F. YEO.

545/3. *EUPHRASIA BREVIPILO* Burnat & Greml. 103, Mid Ebudes; meadow beside Loch Cliad, Isle of Coll, C. W. MUIRHEAD, det. E. F. WARBURG, comm. CARLISLE MUSEUM.

545/5d. *EUPHRASIA NEMOROSA* (Pers.) H. Mart. var. *COLLINA* Pugsl. 10, Wight; south side of Blackgang Chine, with *E. occidentalis* Wettst., C. C. TOWNSEND, both det. E. F. WARBURG.

545/10. *EUPHRASIA OCCIDENTALIS* Wettst. 9, Dorset; Badbury Rings, few plants but slightly glandular, P. F. YEO.

§545/10b. *EUPHRASIA OCCIDENTALIS* Wettst. var. *CALVESCENS* Pugsl. *103, Mid Ebudes; Grishipoll Bay, Isle of Coll, C. W. MUIRHEAD, det. E. F. WARBURG, comm. CARLISLE MUSEUM.

545/10×21. *EUPHRASIA OCCIDENTALIS* Wettst. × *PSEUDO-KERNERI* Pugsl. 9, Dorset; Badbury Rings, P. F. YEO.

545/16. *EUPHRASIA SCOTICA* Wettst. 103, Mid Ebudes; moorland above Loch á Mhill Aird, Isle of Coll, C. W. MUIRHEAD, det. E. F. WARBURG, comm. CARLISLE MUSEUM.

§545/18f. *EUPHRASIA CONFUSA* Pugsl. var. *ALBIDA* (Pugsl.) Willm. *37, Worcs.; Castlemorton Common, 1912, S. H. BICKHAM, as *E. curta* var. *glabrescens*, in Herb. Univ. Cantab.; det. and comm. P. F. YEO.

§545/21. *EUPHRASIA PSEUDO-KERNERI* Pugsl. *6, N. Som.; Bath, 1830, in Herb. C. C. Babington as *E. officinalis*, no collector's name, det. and comm. P. F. YEO. *9, Dorset; Badbury Rings, P. F. YEO. *32, Northants; roadside, Bedford Purlieus, 1950, E. K. HORWOOD, det. and comm. P. F. YEO. *53, S. Lincs.; Holywell Mound, 1950, T. G. TUTIN, det. and comm. P. F. YEO.

547/2. *PEDICULARIS SYLVATICA* L. 70, Cumb.; Helvellyn, and Scafell, c. 2500 ft. in flower in early November (this does not refer to an odd plant here and there—the species was generally in flower), 1951, B. VERDCOURT.

548/5. *RHINANTHUS STENOPHYLLUS* (Schur) Druce. 33, E. Glos.; (2a) Bickeridge Common, 1947; (7b) roadside between Withington and Compton Abdale, 1950, C. C. TOWNSEND, confirmed E. F. WARBURG.

§548/5(2). *RHINANTHUS CALCAREUS* Wilmott. *24, Bucks; Missenden, W. WILSON SAUNDERS, 1831, det. and comm. E. F. WARBURG. *34, W. Glos.; hillside above Wotton-under-Edge, 1948, C. C. TOWNSEND, confirmed by E. F. WARBURG.

550/1. *OROBANCHE RAPUM-GENISTAE* Thuill. 71, Man; Primrose Hill, Sulby, 1950, R. HOWARTH, comm. D. E. ALLEN.

550/7. *OROBANCHE HEDERAE* Duby. H.5, E. Cork; on ivy covered limestone wall, in great abundance, Mallow, E. C. WALLACE and E. F. WARBURG.

551/1. *LATHRAEA SQUAMARIA* L. 69, Westm.; beneath a sycamore in damp oak-hazel wood, Skelghyll, 1949, G. C. KING and B. W. RIBBONS.

552/5. *UTRICULARIA MINOR* L. 104, N. Ebudes; stream running over cliffs above Cleadale, c. 600 ft., Isle of Eigg, 1949, D. H. BARRY and B. W. RIBBONS.

§558/3. *MENTHA LONGIFOLIA* (L.) L. †59, S. Lancs.; damp waste ground on Trias (Keuper marl and sandstone), Martin Mere, near Southport, 1926, R. Wagstaffe and F. W. Holder (see Green, C. T., 1933, *The Fl. Liverpool District*, ed. 2, 73); waste ground on Trias (Keuper marl and sandstone), Ainsdale, c. 38', 1951, A. G. and F. W. HOLDER, comm. T. R. LAYCOCK.

558/9b. *MENTHA* × *VERTICILLATA* L. var. *PALUDOSA* Sole. 34, W. Glos.; (3) wood on May Hill, C. W. BANNISTER, det. R. GRAHAM.

558/13b. *MENTHA ARVENSIS* L. var. *OBTUSIFOLIA* Lej. & Court. 36, Hereford; near Old Country Wood, Coddington, F. M. DAY, det. R. GRAHAM.

558/13l. *MENTHA ARVENSIS* L. var. *CUNEIFOLIA* Lej. 36, Hereford; Cummins Farm, Colwall, F. M. DAY, det. R. GRAHAM.

562/8. *ACINOS ARVENSIS* (Lam.) Dandy. 63, S.W. Yorks.; on a bank in a quarry at Lindrickdale, near Lindrick Common, on Magnesian Limestone, with *Geranium columbinum*, F. W. ADAMS.

+569/5. *NEPETA MUSSINII* Henckel. 22, Berks.; Kennington, on an old rubbish tip, 1943, C. E. HUBBARD; apparently the true plant, comm. D. P. YOUNG.

572/1. *SCUTELLARIA GALERICULATA* L. 71, Man; Onchan, 1948, Mrs. HARDY: hitherto only recorded in *Top. Bot.* without authority, comm. D. E. ALLEN.

572/2. *SCUTELLARIA MINOR* Huds. 104, N. Ebudes; streamside, N.E. of An Sgùrr, Isle of Eigg, 1949, D. H. BARRY and B. W. RIBBONS.

577/4. *STACHYS* × *AMBIGUA* Sm. 57, Derby; field side on very damp ground between Dronfield Woodhouse and Holmesfield, F. W. ADAMS.

§581/1. *LAMIUM ALBUM* L. *97, Westernness; Onich: 101, Cantyre; Glenbarr, K. N. G. MACLEAY.

581/4. *LAMIUM HYBRIDUM* Vill. 34, W. Glos.; (2b) Sharpness Docks, several plants, R. B. ABELL and C. W. BANNISTER; confirmed by A. MELDERIS.

587/4. *AJUGA CHAMAEPITYS* (L.) Schreb. 14, E. Sussex; bare chalky patch on Bullock Down, Beachy Head, E. S. EDDES.

588/8h. *PLANTAGO LANCEOLATA* L. var. *ANTHOVIRIDIS* W. Wats. 13, W. Suss.; edge of motor race track, Goodwood, N. D. SIMPSON and D. E. ALLEN. 50, Denbigh; Maeshafn, near Llanferres, D. E. ALLEN. 59, S. Lancs.; in colonies in dune slacks, Birkdale, along with the type and intermediate specimens, D. E. ALLEN.

†596/9. *AMARANTHUS ALBUS* L. 23, Oxon.; waste ground, Port Meadow, Oxford, R. B. ABELL and C. W. BANNISTER, det. J. P. M. BREMAN.

§+600/7. *CHENOPODIUM OPULIFOLIUM* DC. *37, Worcs.; waste ground, Lion Lane, Worcester, F. M. DAY.

600/12. *CHENOPODIUM FICIFOLIUM* Sm. 20, Herts.; garden weed, Moor Park, Rickmansworth, F. M. DAY.

†600/20. *CHENOPODIUM STRICTUM* Roth. 34, W. Glos.; (2b) Sharpness Docks, R. B. ABELL and C. W. BANNISTER, det. J. P. M. BREMAN.

†600/23. *CHENOPODIUM BERLANDIERI* Moq. subsp. *ZSCHACKEI* (J. Muir.) Zobel. 34, W. Glos.; (2b) Sharpness Docks, 1950, R. B. ABELL and C. W. BANNISTER, det. J. P. M. BREMAN.

†613/3. *SALSOLA PESTIFER* A. Nels. 22, Berks.; (4) Manor Tip, Reading, J. OUNSTED and P. NEWBY

615/28. *POLYGONUM AMPLEXICAULE* D. Don. 10, Wight; cliff-top between Sandown and Shanklin, C. C. TOWNSEND, det. A. MELDERIS.

618/1. *RUMEX HYDROLAPATHUM* Huds. 88, Mid Perth; several plants, widely spaced along north bank of River Earn between Dalreoch Bridge and Orchard, A. W. ROBSON.

618/7. *RUMEX SANGUINEUS* L. 23, Oxon.; (7) a single specimen in Shiplake Churchyard, J. OUNSTED, confirmed by J. E. LOUSLEY.

†618/20. *RUMEX PATIENTIA* L. subsp. *ORIENTALIS* (Bernh.) Danser. 34, W. Glos.; (2b) Sharpness Docks, many very large plants, R. B. ABELL and C. W. BANNISTER, det. J. E. LOUSLEY.

§628/11. *EUPHORBIA CYPARISSIAS* L. **98, Argyll; railway bank near Dalmally, probably escape, K. N. G. MACLEAY.

§628/13. *EUPHORBIA PORTLANDICA* L. *13, W. Sussex; Wittering, C. ESPLAN.

§632/2. *MERCURIALIS ANNUA* L. *71, Man; garden weed, Port Erin, since 1945, J. R. BRUCE, comm. D. E. ALLEN.

632/2b. *MERCURIALIS ANNUA* L. var. *AMBIGUA* (L. f.) Duby. 33, E. Glos.; (2a) Tewkesbury, gardens and waste ground; (2b) Gloucester, waste ground: 34, W. Glos.; (2b) Sharpness Docks, R. B. ABELL and C. W. BANNISTER: in both places with the typical form.

†636/1. *FIGUS CARICA* L. 57, Derby; over 1 metre high on the banks of the Chesterfield canal not far from Staveley, F. W. ADAMS.

637/2. *URTICA URENS* L. 104, N. Ebudes; foot of An Sgùrr beneath overhanging rocks where sheep shelter, c. 1000 ft., Isle of Eigg, 1949, D. H. BARRY and B. W. RIBBONS.

§650/1. *SALIX PENTANDRA* L. †*28, West Norfolk; in old fen-woodland east of Blackborough Priory, Middleton, King's Lynn, five female trees; this site is shortly to be cleared, E. L. SWANN.

652/1. *EMPETRUM NIGRUM* L. 72, Dumfries; Hindhill, Moffat, 1889. 76, Renfrew; shore near Wemyss Bay, 1851; Inverkip shore, 1851. 77, Lanark; Thankerton Moor, 1907, D. PATTON. 78, Peebles; Hills, Peebles, 1886, R. KIDSTON. 85, Fife; foot of Dumglow, Cliesh, 1934; Cliesh Hills, 1937. 86, Stirl.; Flanders Moss, 1893, J. S. STIRLING and R. KIDSTON. 87, W. Perth; Flanders Moss, 1951, B. W. RIBBONS. 88, Mid Perth; N.E. slopes of Ben Dubh Chraig, c. 2000 ft. in vacciniatum, 1951, B. W. RIBBONS; Coille Coire Chuile, c. 850 ft. in open pine wood, 1951, B. W. RIBBONS. 92, S. Aberd.; Braemar, 1854, A. CROALL. 95, Elgin; Hopeman, 1913, D. PATTON. 97, Westernness; sand dunes near Cross Farm between Arisaig and Morar, 1932, J. WALTON. 100, Clyde Is.; Isle of Bute, 1903, T. WISE; near shore at Millport, 1950, K. W. BRAID. 104, N. Ebudes; N.E. slope of An Sgùrr, Eigg, 1949, D. H. BARRY and B. W. RIBBONS, det. E. F. WARBURG. All comm. and det. B. W. RIBBONS, confirmed by E. F. WARBURG.

§652/2. *EMPETRUM HERMAPHRODITUM* (Lange) Hagerup. *88, Mid Perth; Creag na Caillich, 1844; Schiehallion, 1881, R. KIDSTON; on Stac a' Chroin Ridge, Beinn Each, c. 2000-2500 ft., 1941, J. WALTON; in vacciniatum on N.E. slopes of Ben Dubh Chraig, c. 2100 ft. and 2500 ft., 1951, B. W. RIBBONS; Perthshire Corrie, Beinn Laoigh, c. 2700 ft., 1951, B. W. RIBBONS. 90, Forfar; Driesh, 1932, J. WALTON; streamside at head of Glen Doll, c. 1500 ft., 1951, B. W. RIBBONS; among boulders in wood below Craig Maud, c. 1700 ft., 1951, B. W. RIBBONS; summit of Craig Maud, c. 2500 ft., 1951, B. W. RIBBONS; Corrie Fee, c. 2000 ft., 1951, B. W. RIBBONS. *98, Argyll; Ben Ime, 1891, R. and T. WILKIE; Beinn Narnain, c. 3000 ft., 1949, B. W. RIBBONS. *100, Clyde Is.; Rothesay, 1836; near Lochranza, Arran, 1883, J. WYLIE. All comm. and det. B. W. RIBBONS, confirmed by E. F. WARBURG.

§653/2. *CERATOPHYLLUM DEMERSUM* L. *95, Elgin; near the boat house on Loch Spynie, Dr. RICHTER and M. McCALLUM WEBSTER, det. J. E. LOUSLEY.

668/1. *EPIPACTIS PALUSTRIS* (L.) Crantz. 70, Cumb.; dune slacks, Haverigg, D. E. ALLEN and E. A. ROBINSON, comm. CARLISLE MUSEUM.

669/11. *ORCHIS FUCHSII* Druce. 38, Warw.; specimen with bifurcate inflorescence, railway bank by Birdingbury Station, 1949, D. E. ALLEN. 59, S. Lancs.; specimen with all the flowers not inverted. Birkdale dunes, D. E. ALLEN.

669/11×10. *ORCHIS ERICETORUM* (E. F. Linton) E. S. Marsh. × *FUCHSII* Druce. 63, S.W. Yorks.; boggy ground in Rivelin Valley near Sheffield with *O. ericetorum*, F. W. ADAMS, confirmed by V. S. SUMMERHAYES.

§669/14. *ORCHIS MASCUA* (L.) L. ‡74, Wigtown; near Port Patrick, 1951, Mrs. ORR-EWING, comm. V. S. SUMMERHAYES; see *Top. Bot., Suppl.* 1, for earlier record.—ED.

§669/18. *HIMANTOGLOSSUM HIRCINUM* (L.) Spreng. *26, W. Suffolk; by the side of the Brandon-Santon Downham road, found by J. M. BRUCE; as the plant was growing within 4 in. of a metalled road about to be widened it has been removed to a spot 5 yards further away, E. L. SWANN.

674/1. *GYMNADENIA CONOPSEA* (L.) R.Br. 50, Denbigh; a specimen with flowers half the normal size and more numerous, but with bracts of normal length, Maeshafn, near Llanferres, D. E. ALLEN, V. GORDON and H. E. GREEN.

674/1b. *GYMNADENIA CONOPSEA* (L.) R.Br. var. *DENSIFLORA* Lindl. 55, Leics.; bog, Botcheston, R. H. HALL and F. A. SOWTER.

§+678/1. *CROCUS NUDIFLORUS* Sm. 57, Derby; a small colony at the edge of marshy ground in Brierley woods near Chesterfield, F. W. ADAMS. ‡64, N.W. Yorks.; near outskirts of Knaresborough, J. Rathwell, 1952, *The Naturalist*, 840, 30.

§680/1. *SISYRINCHIUM ANGUSTIFOLIUM* Mill. †*5, S. Som.; in grass by track on Dunkery Beacon, 1951, Miss E. M. MEDWIN.

§+702/7. *ALLIUM TRIQUETRUM* L. *71, Man; Poolyvash, 1946, Miss LODGE, comm. D. E. ALLEN.

§+702/8. *ALLIUM CARINATUM* L. *80, Roxburgh; small quantity along banks of River Teviot near Mansfield Football Grounds, Hawick, A. W. ROBSON.

†702/19. *ALLIUM PARADOXUM* (Bieb.) Don. 83, Edinburgh; woods, Polton, U. K. DUNCAN, confirmed J. E. LOUSLEY.

706/1. *SCILLA VERNA* Huds. 95, Elgin; on grassy sea cliffs near Burghead, M. McCALLUM WEBSTER.

§707/2. *ORNITHOGALUM UMBELLATUM* L. *+95, Elgin; a few plants in Darnaway Castle woods, M. McCALLUM WEBSTER. *+98, Argyll; oak wood on shore of Loch Awe, probably escape but no house nearer than two miles, K. N. G. MACLEAY.

711/1. *GAGEA LUTEA* (L.) Ker-Gawler. 28, W. Norfolk; Wailing Wood, Watton; this wood, felled about 50 years ago, is now mainly hazel with floor carpet of *Anemone* and *Scilla non-scripta*; seven flowering plants but many barren ones stretching about fifteen feet on either side of the track in the south corner; sub-soil chalk; Miss E. R. NOBLE, comm. E. L. SWANN.

§716/1. *PARIS QUADRIFOLIA* L. *98, Argyll; damp ground in oak wood on east shore of Loch Awe, K. N. G. MACLEAY.

718/12b. *JUNCUS KOCHII* F. Schultz. 9, Dorset; on site of demolished pill-box, Littlesea: 11, S. Hants.; abundant in rides in the New Forest, D. E. ALLEN and N. D. SIMPSON. 51, Flint; track on Nerquis Mountain, V. GORDON, det. and comm. D. E. ALLEN. 58, Ches.; path, Delamere Forest, with *J. bulbosus* L., V. GORDON, det. and comm. D. E. ALLEN.

737/25. *POTAMOGETON PUSILLUS* L. sec. Dandy & Taylor. 37, Worcs.; pond in the Golden Valley, Hollybed, 1951, C. C. TOWNSEND, confirmed J. E. DANDY and G. TAYLOR.

§739/1. *ZANNICHELLIA PALUSTRIS* L. *98, Argyll; Loch Sween, found by the late Mr. Elmhirst of Millport in 1949, J. R. Lee *in litt.* to K. N. G. MACLEAY.

740/1. *ZOSTERA MARINA* L. 10, Wight; very abundant in a concrete dock between Norton and Sconce Point, C. C. TOWNSEND, det. T. G. TUTIN.

745/1B. *ELEOCHARIS PALUSTRIS* (Linn.) Roem. & Schult. ssp. *MICROCARPA* S. M. Walters. 33, E. Glos.; (2a) above the lock, Upper Lode, Tewkesbury, C. C. TOWNSEND, det. S. M. WALTERS.

745/3. *ELEOCHARIS MULTICAULIS* (Sm.) Sm. 34, W. Glos.; (3) Walmore Common, nr. Minsterworth, C. W. BANNISTER.

745/4. *ELEOCHARIS ACICULARIS* (L.) Roem. & Schult. 33, E. Glos.; (2a) on mud on bank of river at Upper Lode, nr. Tewkesbury, with *Limosella aquatica*, C. W. BANNISTER.

§753/1. *CAREX PSEUDOCYPERUS* L. *H.26, E. Mayo; bogland near Lough Carra, H. MILNE-REDHEAD.

§753/3. *CAREX ACUTIFORMIS* Ehrh. *71, Man; The Great Meadow, Malew, 1946, C. I. PATON, comm. D. E. ALLEN.

§753/13. *CAREX LAEVIGATA* Sm. *95, Elgin; Greshop Wood, Forres, 1950, A. C. G. GOUGH and M. HUNTER.

753/20(2). *CAREX DEMISSA* Hornem. 10, Wight; boggy western end of St Helens Green, C. C. TOWNSEND, confirmed by E. NELMES: 50, Denbigh; marshy edge of pool overlying Carboniferous Limestone, Maeshafn, near Llanferres, D. E. ALLEN, det. N. D. SIMPSON. 103, Mid Ebudes; marsh at the western end of Loch Cliad, Isle of Coll, C. W. MUIRHEAD, det. E. NELMES, comm. CARLISLE MUSEUM.

753/21. *CAREX LEPIDOCARPA* Tausch. 103, Mid Ebudes; moorland ditch above Loch à Mhill Aird, Isle of Coll, C. W. MUIRHEAD, det. E. NELMES, comm. CARLISLE MUSEUM.

753/22. *CAREX SEROTINA* Mérat. 103, Mid Ebudes; margin of Loch Cliad; Grishpoll Bay, Isle of Coll, C. W. MUIRHEAD, det. E. NELMES, comm. CARLISLE MUSEUM.

§753/29. *CAREX ERICETORUM* Poll. *60, W. Lancs.; lower slopes of the limestone hills south-west of Hawes Water, Silverdale, 1951, H. E. BUNKER, confirmed E. NELMES.

§753/61. *CAREX PAIRAEI* F. Schultz. *10, Wight; a colony growing with *C. divulsa* by the roadside between Godshill and Bleak Down, C. C. TOWNSEND, det. E. NELMES.

753/62. *CAREX DIVULSA* Stokes. 10, Wight; a colony by the roadside between Godshill and Bleak Down, C. C. TOWNSEND, confirmed by E. NELMES.

753/74. *CAREX PULICARIS* L. 14, E. Sussex; bog by Old Lodge, Ashdown Forest, E. C. WALLACE.

+754/1. *PANICUM MILIACEUM* L. 22, Berks.; (4) plentiful on a rubbish tip at Burghfield, C. J. CADBURY, det. and comm. J. OUNSTED.

+754/8. *ECHINOCHLOA CRUS-GALLI* (L.) Beauv. 33, E. Glos.; (2a) Ashchurch, many plants among carrots, R. B. ABELL and C. W. BANNISTER, confirmed C. E. HUBBARD. 34, W. Glos.; (2b) Sharpness Docks, several plants, R. B. ABELL and C. W. BANNISTER; (3) Hartpury, among carrots, F. MANTHORPE, confirmed C. E. HUBBARD, comm. C. W. BANNISTER.

+754/9. *ECHINOCHLOA FRUMENTACEA* Link. 18, S. Essex; waste ground, Dagenham, N. Y. SANDWITH, confirmed by C. E. HUBBARD.

+756/1. *SETARIA ITALICA* (L.) Beauv. 23, Oxon.; waste ground, Jackdaw Lane and Port Meadow, Oxford, several large plants in both places, R. B. ABELL and C. W. BANNISTER, det. C. E. HUBBARD.

†756/2d. *SETARIA VIRIDIS* (L.) Beauv. var. *BREVISETA* (Doell) Rouy. 73, Kirkcudbright; Corbieton, Castle Douglas, as a garden-weed growing near sugar-beet, Miss E. BIGGAR, comm. U. K. DUNCAN, det. C. E. HUBBARD.

§758/3. *SPARTINA TOWNSENDII* H. & J. Groves. *†25, E. Suff.; Walberswick, R. M. PAYNE, det. C. E. HUBBARD.

†765/6. *PHALARIS BRACHYSTACHYS* Link. 34, W. Glos.; (2b) Sharpness Docks, several plants, 1950, R. B. ABELL and C. W. BANNISTER, det. C. E. HUBBARD.

†765/7. *PHALARIS PARADOXA* L. 62, N.E. Yorks.; siding at Topcliffe Station with other aliens, 1937, C. M. ROB, det. A. MELDERIS.

§770/1. *ALOPECURUS PRATENSIS* L. *97, Westernness; on the east shore of Loch Linnhe near Corran, locally frequent, K. N. G. MACLEAY.

†780/1. *AGROSTIS SEMIVERTICILLATA* (Forsk.) C. Christ. 90, Forfar; Dundee Corporation tip, U. K. DUNCAN, B. M. C. MORGAN and R. A. GRAHAM, det. C. E. HUBBARD.

§782/1. *POLYPOGON MONSPELIENSIS* (L.) Desf. *†90, Forfar; Dundee Corporation tip, U. K. DUNCAN, B. M. C. MORGAN and R. A. GRAHAM

783/1. *CALAMAGROSTIS EPIGEJOS* (L.) Roth. 39, Staffs.; a small patch in a mixed plantation near Moxley sanatorium, 1951, V. JACOBS.

§783/4. *CALAMAGROSTIS NEGLECTA* (Ehrh.) Gaertn., Mey. & Scherb. †61, S.E. Yorks.; abundant by the Leven canal near Beverley, Miss E. Crackles, 1952, *The Naturalist*, **840**, 30.

795/1b. *ARRHENATHERUM ELATIUS* (L.) J. & C. Presl var. *BI-ARISTATUM* Peterm. 20, Herts.; Moor Park, Rickmansworth; 37, Worcs.; roadside near Honeybourne, F. M. DAY.

797/1. *CYNODON DACTYLON* (L.) Pers. †17, Surrey; Babylon Lane, Kingswood, 1949, Miss E. M. C. Isherwood in Lousley, 1950, Bot. Records for 1949, *Lond. Nat.*, **29**, 10.

808/1. *CYNOSURUS ECHINATUS* L. †90, Forfar; waste ground, Dundee, B.S.B.I., comm. U. K. DUNCAN, confirmed A. MELDERIS.

809/1. *KOELERIA GRACILIS* Pers. 36, Heref.; Eastnor Park, on Wenlock Limestone, F. M. DAY.

§†824/1. *POA CHAIXII* Vill. *95, Elgin; in a wood at Newton House, Alves, M. McCALLUM WEBSTER, det. J. E. LOUSLEY.

824/11. *POA ALPINA* L. 96, Easternness; non-viviparous form in rock gully, upper Glen Feshie, E. C. WALLACE.

826/3b. *FESTUCA ARUNDINACEA* Schreb. var. *STRICTIOR* (Hack.) Hegi. 34, W. Glos.; (3) marshy field near Barbers Bridge station, 1950, C. C. TOWNSEND, det. W. O. HOWARTH.

826/7e. *FESTUCA RUBRA* Linn. var. *PRUINOSA* (Hack.) Howarth. 4, N. Devon; cliffs of the Tors, Lynmouth, 1950, C. C. TOWNSEND, det. W. O. HOWARTH.

826(2)/3b. *VULPIA BROMOIDES* (L.) Gray var. *INTERMEDIA* (Hack.). 34, W. Glos.; (4) on a wall. Pleasant Stile, near Newnham, 1949, C. C. TOWNSEND, det. W. O. HOWARTH.

827/5. *BROMUS MADRITENSIS* L. †90, Forfar; waste ground, Dundee, B.S.B.I.. comm. U. K. DUNCAN, confirmed C. E. HUBBARD.

827/6b. *BROMUS BENEKENII* (Lange) Trimen. 62, N.E. Yorks.; roadside, Ashberry near Rievaulx, D. McCLINTOCK and C. M. ROB, det. A. MELDERIS.

827/7. *BROMUS ERECTUS* Huds. 66, Durham; Garmondsway, J. W. H. HARRISON, etc. (1951, *Vasc. Subst.*, 36, 22).

†827/9. *BROMUS INERMIS* Leyss. 90, Forfar; roadside between Dundee and Muirtown. 1950, U. K. DUNCAN and C. M. ROB, det. A. MELDERIS.

†827/9b. *BROMUS INERMIS* Leyss. var. *ARISTATUS* Opiz. 28, W. Norfolk, in open, sandy waste ground on landward side of sea-bank, Snettisham Beach: on the east side of Ten Acre Plantation, East Harling Heath, det. C. E. HUBBARD; E. L. SWANN.

827/16. *BROMUS SECALINUS* L. 65, N.W. Yorks.; Tanfield Mill, 1939, C. M. ROB, det. A. MELDERIS.

827/16d. *BROMUS SECALINUS* L. var. *SUBMUTICUS* Reichb. 62, N.E. Yorks.; railway siding, Topcliffe Station, C. M. ROB, det. A. MELDERIS.

§827/19(2). *BROMUS LEPIDUS* Holmb. *71, Man; roadside near Laxey. 1939, C. M. ROB, det. A. MELDERIS.

827/19(3). *BROMUS THOMINI* Hard. 71, Man; roadside near Laxey. 1939, C. M. ROB, det. A. MELDERIS.

§†827/22. *BROMUS ARVENSIS* L. *62, N.E. Yorks.; railway siding, Topcliffe Station, 1948, C. M. ROB, det. A. MELDERIS.

†827/29. *BROMUS JAPONICUS* Thunb. 62, N.E. Yorks.; railway siding, Topcliffe Station, 1950, C. M. ROB, det. A. MELDERIS

†829/2. *LOLIUM TEMULENTUM* L. ‡33, E. Glos.; (2a) Borough Flour Mills, Tewkesbury, C. W. BANNISTER, det. C. E. HUBBARD; see *Fl. Glos.* for earlier records.—ED.

†829/6. *LOLIUM RIGIDUM* Gaud. 34, W. Glos.; (2b) Sharpness Docks, R. B. ABELL and C. W. BANNISTER, det. C. E. HUBBARD.

†832/11. *AEGILOPS CYLINDRICA* Host. 62, N.E. Yorks.; railway siding, Topcliffe Station, 1950, C. M. ROB, det. A. MELDERIS.

833/3. *PARAPHOLIS INCURVA* (L.) C. E. HUBBARD. 25, E. Suff.; Southwold, R. M. PAYNE.

†835/4. *HORDEUM HYSTRIX* Roth (*H. Gussonianum* Parl.). 33, E. Glos.; (2a) Borough Flour Mills, Tewkesbury, C. W. BANNISTER, det. C. E. HUBBARD.

§839/1. *JUNIPERUS COMMUNIS* L. *71, Man; Dreeym Gill, Glen Aldyn, "probably bird-sown", 1947, G. E. QUAYLE, comm. D. E. ALLEN.

839/2. *JUNIPERUS SIBIRICA* Burgsd. 104, N. Ebudes; cliffs above Cleadale at 1050 ft., Isle of Eigg, 1949, D. H. BARRY and B. W. RIBBONS.

§844/1. *EQUISETUM TELMATEIA* Ehrh. †101, Cantyre; in roadside ditch between Campbeltown and Glen Lusa, plentiful for about two miles; West Loch, Tarbet, local, K. N. G. MACLEAY (see *Top. Bot.* for earlier record.—E.C.W.).

§844/2×5. *EQUISETUM* × *LITORALE* Kuhl. *8, S. Wilts.; bank of canal, Horton Bridge near Devizes, J. D. GROSE and E. C. WALLACE.

844/3b. *EQUISETUM SYLVATICUM* L. var. *CAPILLARE* (Hoffm.). 18, S. Essex; Epping Forest, R. M. PAYNE, det. A. MELDERIS.

§844/8. *EQUISETUM* × *TRACHYODON* A. Braun. *88, Mid Perth; shore of Loch Tummel, 1948, L. W. FROST.

844/9. *EQUISETUM VARIEGATUM* Schleich. 70, Cumb.; sand dunes, Haverigg, D. E. ALLEN and E. A. ROBINSON, comm. CARLISLE MUSEUM.

856/1(2). *DRYOPTERIS BORRERI* Newm. 18, S. Essex; Epping Forest, R. M. PAYNE.

859/1. *CETERACH OFFICINARUM* DC. 18, S. Essex; Maldon, R. M. PAYNE.

869/2. *ISOETES ECHINOSPORA* Durieu. 103, Mid Ebudes; Loch Airidh Meall Bhreide, near Aninagour, Isle of Coll, C. W. MUIRHEAD, det. A. H. G. ALSTON, comm. CARLISLE MUSEUM.

870/5. *LYCOPODIUM CLAVATUM* L. 17, Surrey; beneath conifers, Leith Hill, 1948, B. W. RIBBONS.

870/7. *LYCOPODIUM SELAGO* L. 71, Man; summit of Snaefell, 1946, A. P. CONOLLY, comm. D. E. ALLEN.

874-876. CHAROPHYTA. All determined by G. O. ALLEN.

874/1. NITELLOPSIS OBTUSA (Desv.) Gr. 27, E. Norf.; Hickling Broad, G. H. ROCKE.

†876/1. CHARA BRAUNII Gmel. 59, S. Lancs.; canal on Trias (Bunter sandstone), Reddish, 250', S. SHAW, comm. T. R. LAYCOCK.

876/3c. CHARA VULGARIS L. var. PAPILLATA Wallr. 31, Hunts.; Stibbington, J. L. GILBERT. 33, E. Glos.; (7b) sandpits, Sandy Lane, near Cheltenham, C. C. TOWNSEND.

876/7×5. CHARA CONTRARIA Kuetz. × HISPIDA L. 37, E. Norf.; Hickling Broad, C. WEST.

876/13. CHARA DESMACANTHA Gr. & B.-W. 69, Westm.; Sunbiggin Tarn, near Orton, J. W. G. LUND.

876/14. CHARA CONNIVENS A. Braun. 27, E. Norf.; Hickling Broad, G. H. ROCKE.

876/16b. CHARA GLOBULARIS Thuill. var. GLOBULARIS. 64, Mid W. York.; R. Ribble near Hellifield, 1951, J. N. FRANKLAND.

§876/17. CHARA DELICATULA Ag. *71, Man; Nappie, near Jurby, D. E. ALLEN.

876/17b. CHARA DELICATULA Ag. var. BARBATA (Gant.) Gr. & B.-W. 64, Mid W. York; Halton West, J. N. FRANKLAND.

OBITUARIES

CECIL ROLLO PAYTON ANDREWS (1870-1951). The death of Mr. C. R. P. Andrews at Shorne, Kent, on June 14, 1951, took place just six months after publication of a paper in this journal (*Watsonia*, **1**, 345, 1950) recording the rediscovery in Guernsey of *Milium scabrum* which he had found there half a century earlier. The fact that in 1950 none of those consulted in connection with this paper were aware that Andrews was still available, and might have been able to clear up important points concerning the original discovery, indicates how completely British botanists had lost touch with one who was very well known in his younger days.

He was born in London on February 2, 1870, and educated at Merchant Taylors' School and St. John's College, Oxford. After teaching at Highgate School, Forest School, and St. John's Training College, Battersea, he was appointed principal of the training college at Claremont, Western Australia, in 1901. Two years later he became head of the education department of the state, and at the time of his retirement in 1929 was Pro-Chancellor of the University of Western Australia.

One of his first published notes refers to his discovery of *Draba muralis* in 1899 at Wye in Kent, the county in which he died. (*J. Bot.*, **37**, 275). On June 9, 1900, he was with H. W. Pugsley when *Orchis militaris* was apparently seen for the last time in Middlesex. In the same year he married Bertha Arnold, daughter of Mr. T. H. Agnew of Guernsey. Mrs. Andrews was also keenly interested in plants, and together they did excellent work on the flora of the Channel Islands which receives special acknowledgment from E. D. Marquand in his *Flora of Guernsey*, 1901. It was in 1900 that he made the important discoveries for which he is best known in connection with the British flora. The first to be announced was *Milium scabrum* (*Proc. Linn. Soc. for Feb. 1, 1900*, 5) which was described in his able paper on "Two Grasses New to the Channel Islands" (*J. Bot.*, **38**, 33-37)—the other species was *Phalaris minor*, which it seems strange had not been recognised by earlier workers. A few months later he published "Notes on Channel Islands Plants" (*J. Bot.*, **38**, 483-4) which includes reference to *Limonium (Statice) lychnidifolium* in Alderney (see also *Proc. Linn. Soc. for Nov. 15, 1900*, and C. E. Salmon in *J. Bot.*, **39**, 193-5). In the issue for the previous month the Journal of Botany announced his coming departure for Australia, in terms which made it clear that he was regarded as a worker who could ill be spared from the ranks of British botanists.

Cecil Andrews continued to take an interest in plants and there are numerous specimens gathered by him in Western Australia in the herbarium of the Natural History Museum. Further details of his career will be found in *The Times* for June 18, 1951, to which account we are indebted for some of the information included in this notice.

J. E. LOUSLEY.

DENNIS LUMB (1871-1951) was born on February 6, 1871, and was educated at St. Mark's College, London. Most of his life was spent at Dalton-in-Furness where he became Headmaster of Broughton Road School. He married Miss Edith Bayliff in 1908 and had one daughter.

He joined the Botanical Exchange Club and Society of the British Isles in 1912, and contributed material to the Exchange Section, and notes on aliens and other plants for the Report. By 1921 he had become interested in *Euphrasia* and it is for his work on this genus that he is best known. In this he was encouraged by Dr. G. C. Druce and doubtless by W. H. Pearsall, who was also a schoolmaster and interested in the same genus, and who lived in Broughton-in-Furness a few miles away. With G. C. Druce, Lumb published *Euphrasia septentrionalis* in 1922 (*Rep. Bot. Soc. & E.C.*, 6, 298-300), *E. atroviolacea* in 1925 (*op. cit.*, 7, 49), and *E. variabilis* in 1924 (*op. cit.*, 7, 50). Finding that the last mentioned name had already been used by Freyn, Druce named it for Lumb as *E. Lumbii* in 1931 (*Rep. Bot. Soc. & E.C.*, 9, 277), when the opportunity was taken of publishing Latin diagnoses for all three species. This, no doubt, was a result of the criticism made by Pugsley in his Revision of the British Euphrasiae (*Journ. Linn. Soc.*, 48, 483, 1930) where *E. atroviolacea* was taken up as a variety of *E. confusa*, and the other two names not accounted for.

In 1925 Lumb was made a Corresponding Member of this Society—a class of membership which was later merged with that of the Honorary Members. The services to the Society of which this honour was in recognition took the form of literary and critical assistance, as acknowledged by the Secretary.

Towards the end of his life Lumb's health failed and he was unable to take an active part in botanical work. His friends predeceased him one by one; so that in recent years a generation has grown up of botanists with whom he had few contacts. He died at Dalton-in-Furness on August 26, 1951.

J. E. LOUSLEY.

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A report of the Conference held in 1952 is in preparation, and will be published as a separate volume under the above title. It will include the full text of all papers read by the principal speakers, with the discussions which followed, and accounts of the exhibits. The book will be fully illustrated and further details will be sent to members and advertised in *Watsonia* as soon as possible.

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These should include date of birth and death, summary of life so far as events have a bearing on botanical work, whereabouts of herbarium and any manuscripts, and chief botanical publications. Offers to write obituary notices may be sent either to the Editor or to Mr J. E. Lousley, 7 Penistone Road, Streatham Common, London, S.W.16.

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Edited by
E. F. WARBURG, M.A., Ph.D.



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SPECIMENS FOR IDENTIFICATION

For information on the determination of both critical and non-critical specimens see *Year Book 1952*, 77-80.

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LAMIUM HYBRIDUM VILL.

By the late J. E. LITTLE (written in 1928).

Lamium hybridum Villars, 1786, *Hist. Pl. Dauph.*, 1, 251; De Candolle, 1805, *Fl. Fr.*, 3, 541.

L. purpureum var. c: (*hybridum*), 1787, *ibid.*, 2, 385.

L. dissectum Withering, 1796, *Arr.*, Ed. 3, 3, 527.

L. incisum Willd., 1800, *Sp. Pl.*, 3, 89.

The history of this plant begins with Ray's account here transcribed:—

Lamium rubrum minus foliis profunde incis. Small cut-leaved red Archangel. Ray, 1686, *Hist. Plant*, 1, 560.

“Hæc species primo nobis ostensa a Tho. Willisell in campis S. Jacobi dictis prope Londinium, postea variis in locis solo arenoso aut glareoso observata, *Lamio rubro minore vulgari* plerumque minor est, quamvis in lætiori solo in magnitudinem illius aemulam interdum proficiat. Radix ei simplex tenuis, unde et plantam annuam esse suspicamur. Caulibus et florum et florum situ cum *Lamio rubro vulgari* convenit. Differt ab eo foliorum incisuris. Cum enim in illo folia leviter tantum circa margines crenata sint, in hoc altius incisa et propemodum laciniata sunt, laciniolis seu mavis dentibus in acutos apices terminatis. Differt etiam florum parvitate et eorundem tubis brevioribus, adeo ut flores antequam explicentur vix e vasculis appareant.

Locus. In hortis oleraceis inque arvis requietis non raro invenitur, ut v.g. prope Brantiam in Essexia in calceto Bockingam ducente.”

Fortunately there is in Ray's *Hortus Siccus* (in *Hb. Mus. Brit.*, fasc. VIII, O. 10; middle left, three pieces “*Lamium purpureum parvum foliis magis incis.* N.D.”). Thus we have both description and authentic specimens. When Ray's *Historia* was published, he was living at The Dewlands, Black Notley, “to which he moved in June 1680, and in which he lived for the remainder of his life” (*Dict. Nat. Biogr.*). It is not unlikely that Ray's specimens were gathered at one of the two localities where he first observed it, either in St. James' Fields, Middlesex, or on the road from Braintree to Bocking. The latter (the -ham having been dropped since Ray's time) lies about two miles N. of Braintree, while Black Notley is about the same distance to the south. In any case they are first records for those counties, though G. S. Gibson (1862, *Flora of Essex*) makes no mention under *L. incisum* Willd. of Ray's locality.

The earliest figure is that of Plukenet (1691, *Phytographia*, t. 41, fig. 3), where Ray's name is cited. The figure of *L. incisum* in Reichb., 1858, *Ic. Fl. Germ.*, plate 1204, does not show clearly the character of the upper leaves. There is a good drawing by M. Denise in Coste, 1906, *Fl. Fr.*

In the Sloane Herbarium (Hb. Mus. Brit.) are several gatherings which carry on the history of the plant.

H.S.83.233. Top right corner, with ref. to Ray. Plukenet, European plants.

H.S.96.ii.127. Bottom right corner, with ref. to t. 41, fig. 3, as above. Plukenet.

H.S.121.19. The two bottom left-hand pieces (of which the lower is more doubtful). Buddle, British plants.

H.S.151.205. The bottom left-hand piece, with ref. to Ray's *Hist.*, I, 560. Petiver.

H.S.230.9. No. 4. This is a plant from Chelsea Garden by Philip Miller, circa 1727.

Although Villars names the plant *L. hybridum*, he does not say that he considers it a hybrid. He does however say (*op. cit.*, 2, 385):—“La variété (c.) qui mériteroit peut-être de faire une espece, a le port de celle-ci, et les feuilles petites comme la précédente [*L. amplexicaule*] ses feuilles pointues comme cella-là, et profondement découpées comme celle-ci, tiennent par conséquent de l'une et de l'autre; elle est beaucoup plus rare que les autres.” In Vol. 1 he makes it a species; but in Vol. 2 a variety of *L. purpureum*. Accordingly, Thuillier (1799, *Fl. des Env. de Paris*, 290) quotes in the former sense, while Koch (1843, *Syn. Fl. Germ.*, 269) quotes *L. purpureum* β *hybridum* Vill.

The question whether our plant and *L. intermedium* Fr.* are hybrids has been discussed by various writers. Sonder (1851, *Fl. Hamburgensis*, 326) remarks of *L. intermedium*:—“In Meyer's *Fl. Hannov. excurs.* this species is placed as a hybrid under *L. amplexicaule* as *L. purpureo-amplexicaule*. As against this, it may be remarked, that it produces every year mature seeds capable of germination, and that no specimens either from Sweden or from England, from Oldenburg or from this district, show any evident transition to *L. purpureum* or *L. amplexicaule*.”

Ascherson and Graebner (1899, *Fl. N.O.-deutschen Flachl.*, 600) place both (A) *L. intermedium* Fr. and (B) *L. dissectum* With. under *L. amplexicaule* \times *purpureum*. They remark:—“This plant, which usually sets seed freely, gives us the impression of a hybrid which has become a species. Ritschl and Marsson, despite the contrary opinion of Frier, Sonder and others, make at least (A) [*L. intermedium* Fr.] a hybrid. E. H. L. Krause makes (B) [*L. dissectum* With.] a gynæcious race (?), ‘weibliche Rasse’, of *L. purpureum*.”

More recently, Dr. B. H. Danser (1926, *Ned. Kruidk. Arch.*, 1925, 407) has a paper “Are *Lamium hybridum* Vill. and *L. intermedium* Fr. hybrids?”

Finding three specimens of *L. intermedium* in a potato field at Franeker (Friesland) on Aug. 15, 1922, he was led to enquire whether they must be regarded as hybrids.

*Mr. Little used the name *L. intermedium* throughout and this has been retained, although *L. molucellifolium* Fr. is the correct name.

If these two are really so, what should we have to expect on sowing them?—(1) That they would prove less fertile than the reputed parents. If this were so in fact, then that would of itself be a strong argument.

(2) If they were fairly fertile [in the first generation], we should have to expect variability in the second and later generations.

But their complete fertility, combined with entire constancy, opens up the following possibilities:—

- (1) The hybrid is purely apogamous.
- (2) The so-called hybrid is a good species.
- (3) The so-called hybrid is a variety of one or other of the reputed parents.

The second or third points can be answered by crossing with the species of which it may be a variety. The first point is less easy to establish. Dr. Danser then mentions what he observed before he began to test by sowing, and what expectations his observations aroused.

Lamium hybridum is common on the 'terpenklei'* of Groningen and Friesland, but much rarer elsewhere. Localities: Franeker; on the Zuiderzee-dijk at Amsterdam; Halfweg; Dordrecht. It is abundant at Franeker, where *L. amplexicaule* is pretty uncommon, and in most stations of the former wholly wanting. *L. hybridum* produces as numerous and as well-formed fruits as the reputed parents.

Lamium intermedium is much rarer. He found once only three specimens in a field where *L. purpureum* and *L. hybridum* were common, and *L. amplexicaule* very scarce.

A close examination of the characters of the two *Lamia* under suspicion suggested the same conclusion. *L. hybridum* is much nearer *L. purpureum*, and therefore it is not surprising that it has been regarded as a variety of that species. The corolla-tube is longer [but see below], and the hair-ring more obscure. Dr. Danser found no form which on the whole had no hair-ring. This is evident or not according to the angle from which one views it, and according to the manner in which one opens the tube, and is not equally evident in all the flowers on the same plant. The calyx does not resemble that of *L. amplexicaule*, but agrees with that of *L. purpureum*.

L. intermedium is nearer in corolla- and in leaf-form to *L. amplexicaule*, and therefore a conclusion is not so easy. But the result of sowing seeds from the plants of 1922 was that in the second generation he obtained normal seed-bearing plants, and from this he argues that *L. intermedium* is no hybrid.

Similarly he sowed seeds of *L. hybridum* from Franeker and Dordrecht. The seedlings from each locality were alike, and were like those from the other station.

* 'Terpen' are artificial hills on which houses are raised above the level of the surrounding lands. 'Terpenklei' is a clay from these hills enriched by kitchen-midden refuse and distributed over the land as a fertiliser. (Dr. W. J. Yongmans, Heerlen in Limburg, in *litt.* to W. N. Edwards.)

Lastly, as he has never found intermediates between the four *Lamia* mentioned, he concludes that the two in question are not varieties of *L. purpureum* or of *L. amplexicaule*.

The bold hypothesis that *L. purpureum* and *L. amplexicaule* may hybridise, and thus not be apogamous, while the hybrids resulting may be wholly apogamous, might certainly be entertained if the so-called hybrids were intermediate in their characters between the supposed parents; but this, as has already been said, is not the case.

Dr. Danser adds a postscript. A. Muentzing, 1925, Eine Art-Bastard in der Gattung *Lamium*, *Hereditas*, 7, 215, is of the same opinion about the four *Lamia* herein treated, and has moreover raised a hybrid between *L. amplexicaule* and *L. hybridum* which is wholly barren.

THE RING OF HAIRS IN THE TUBE OF THE COROLLA.

L. purpureum has this ring. The first botanist to raise the question in respect of *L. incisum* was J. de C. Sowerby, who on the original drawing, No. 1933, for *Engl. Bot.*, ed. 1, 27 (publ. Sept. 1, 1808) and reproduced in the 3rd Edition as 1533, sketched the tube of *L. purpureum* with the note, 'observe the hairs in the tube of the corolla', to which J. E. Smith added 'I think this should be engraved on the plate and marked *L. purpureum*'. Accordingly it was engraved on the plate of *L. incisum*; but the note was never incorporated. (See also F. A. N. Garry, 1904, 'Notes on the Drawings for Sowerby's English Botany', *J. Bot.*, 42, 143.)

Bentham (1848, in DC. *Prodromus*, 12, 509) gives for *L. incisum* 'corollæ tubo recto basi intus piloso-annulato'.

Koch (1843, *Syn. Fl. Germ.*, 649) has, for *L. incisum*, 'tubo corollæ recto aequaliter cylindrico intus exannulato'. He adds:—"Anglica planta sec. b. Smith et cl. Babington tubum intus exannulatum habet. An igitur planta cl. Benthamii, quae tubo intus piloso-annulato describitur, ad varietatem decipientem *L. purpurei* pertinet?" Accordingly we find that he adds under *L. purpureum* the var. β *decipiens*, "folia inæqualiter inciso-crenata, fere ut in antecedente, sed longiora ratione latitudinis, et tubus corollæ intus piloso-annulatus ut in illa: *L. purpureum* β *decipiens* Sonder in litt."

But when we turn to Sonder himself (*op. cit.*, 327) we find that under *L. incisum* he gives:—"tubo corollæ recto intus nudo vel annulo piloso prædito", and he merges *L. purpureum* β *decipiens* Sonder in Koch (*l.c.*) as synonymous with his *L. incisum*, and remarks:—"Corolla somewhat smaller than that of the following [*L. purpureum*], purple; the tube straight, having within above the base a delicate hair-ring, which in our local plants is never absent, but in specimens, otherwise agreeing in all respects, from Schleswig, Denmark and Westphalia is not present. Achene not distinguishable from that of the following. The frequent occurrence, and the constancy in development from seed, make extremely improbable the view of Prof. Meyer, according to which this plant is a hybrid: *L. amplexicaule-purpureum*."

Neither Ray, nor Villars, nor Withering, nor Willdenow made the absence of a ring of hairs a critical character. This first appears in *Engl. Bot. (l.c.)*, and is followed by Koch, but has against it the judgment of Sonder, Bentham, Hooker (1884, *Student's Flora*), Babington (1856, *Manual*, ed. 4) and Danser.

DISTRIBUTION.

In H. C. Watson's *Top. Bot.*, ed. 2, by J. G. Baker and W. W. Newbould (1883), *Lamium intermedium* is not shown to occur in any part of Great Britain S. of W. Lancs. (60); a note is added—10 (Wight), 40 (Salop), 49 (Caernarvon) insufficiently vouched.

L. incisum is shown for many vice-counties from Cornwall to Norfolk, and from Kent to Lancashire

Lancashire is thus the meeting-point of a form which with us is mainly northern (and unknown in France) with one which is mainly southern (and widely distributed in France).

Some personal and local observations of a plant which I believe to be identical with Ray's may now be given.

In north Hertfordshire the area round Hitchin constantly produces *L. hybridum*. During the last fifteen years I have noted some twenty distinct stations, and the plant can always be found, though not always in the same station since it is continually being destroyed by cultivation. Gardens, allotments, open fields, and more rarely hedgerbanks all provide it with a congenial home, mostly on lighter land. The order of relative frequency is *L. purpureum*, *L. amplexicaule*, *L. hybridum*, and the three often grow intermixed. *L. hybridum* can be readily distinguished from normal *L. purpureum* in the field by its distinctive leaf-characters; as Bentham justly remarks (*l.c.*) 'Folia ut in *L. bifido incisum*'. This, which applies to the upper more distinctly than to the lower leaves, combined at times in spring with a suffused dark brownish-purple colour and less ascending habit, enables one to pick it out on an arable field at a distance of ten yards. There is one character which does not appear to have been specially noted, and this is, that throughout the winter it continues to produce abundant flowers which are usually cleistogamic and fertile, whereas *L. purpureum* either does not flower in winter or has flowers of the same character as its summer ones, i.e. brightly coloured and entomophilous. This seems to be a valuable and important mark of distinction.

During the last month (I write on Feb. 17) I have seen it in this state in four stations. This cleistogamic state begins in late autumn towards the end of October, and continues (with an exception mentioned below) until April of the following year, when the same plants put forth brightly-coloured entomophilous flowers, continue to ripen seed, and then die off when the hot weather begins. Their place is then taken by plants which have germinated in the spring and begin to flower in July. The length of the tube of the corolla in the cleistogamic state is 2.3 mm., and in this state the tube is in my experience wholly devoid of hairs. One may suggest as a possible reason that the economy of the plant does

not at this stage require the hair-ring. The tube of the entomophilous flowers is 8-10 mm. long, and may, as Dr. Danser says, have a ring of hairs, not however so definite as in *L. purpureum*. Between these two states there is a transition stage about March, in which the pallid short-tubed flowers expand as if open for insect visits; rarely, it is anticipated by an odd flower (Feb. 14, 1928). I have never seen a tube longer than 10 mm., but Bentham (*l.c.*) remarks:—'Variat uti *L. purpureum* corollis nunc breviter, nunc longe exsertis'. Mr. C. E. Salmon told me (16 Nov., 1927) that he had seen a form of *L. hybridum* with the tube of the corolla longer than in normal *L. purpureum*. This may account for some discrepancy in descriptions, and for Dr. Danser's remark that the corolla-tube is longer in *L. hybridum*. The colour of the corolla in the winter state is a washed-out bluish-purple; but sometimes the hood is greenish and only the middle of the tube is coloured. The middle of the tube is narrower than the base. In summer the corolla is not distinguishable by its colour from *L. purpureum*.

I have only recorded two stations for S.E. Bedfordshire (Southill 1912, 1914 and 1928, and Clophill 1914), but there also it will probably be found well distributed.

In Cambridgeshire I saw it in Sept. 1927 in a field of sugar-beet at White Hall Farm, Littleport. The field had been hoed several times in early summer, so that plants must have been summer-germinating seedlings. In this case also an obscure ring of hairs was present in the corolla-tube. Associated plants were *Veronica agrestis* L. (*sensu stricto*), *Galeopsis speciosa* Mill. and *Chenopodium polyspermum* (var. *acutifolium* Gaud. and var. *obtusifolium* Gaud.).

SUMMARY.

The balance of evidence is against the theory of a hybrid origin for *L. hybridum*. Its constancy and a sufficient number of correlated differences make reasonable its separation from *L. purpureum* as a species well enough marked in normal specimens to be distinguished at sight in the field. If the observations here recorded are correct, the hair-ring is not invariably absent. The leaf-cutting is much nearer to *L. bifidum* Cyr. than to *L. purpureum*.

I am much indebted to [the late] Mr. J. Ardagh, of the Department of Botany at the British Museum (Natural History), for assistance in referring to many of the works cited.

The above has been printed as Mr Little left it (with minor editorial changes). It may however be of interest to add a summary of more recent Scandinavian work on the subject. The first two papers, by Müntzing (1926. Ein Art-Bastard in der Gattung *Lamium*, *Hereditas*, 7, 215-228) and by Jörgensen (1927, Cytological and Experimental Studies in the Genus *Lamium*, *Hereditas*, 9, 126-136) were in fact published before Mr. Little's paper was written but were presumably not seen by him, although he quotes Danser as having seen the former.

Müntzing attempted crosses between the four species *L. amplexicaule*, *L. hybridum*, *L. molucellifolium* and *L. purpureum* in all six possible combinations and in both directions (the number of crosses made varying from 10 to 35) and found that only *L. amplexicaule* × *hybridum* succeeded (in both directions). He gives a full description and points out that the hybrid is completely sterile. He concludes that *L. molucellifolium* is not a hybrid between *L. amplexicaule* and *L. hybridum* as had been suggested by Lindman.

Jørgensen counted the chromosomes of various species of *Lamium* and found that *L. amplexicaule* and *L. purpureum* were diploids ($2n=18$) and that *L. hybridum* and *L. molucellifolium* were tetraploids ($2n=36$). This suggested to him that the two tetraploids might have originated from hybridisation between the two diploids. He, therefore, attempted the same hybrids as Müntzing but using far greater numbers of flowers (from 73 for *L. amplexicaule* × *hybridum* to 547 for *L. amplexicaule* × *purpureum*, including the reciprocal cross in each case). His results were the same as Müntzing's (viz. that only *L. amplexicaule* × *hybridum* gave offspring and that these were sterile triploids). He, therefore, suggests that the two tetraploids are unlikely to have arisen from hybridisation and that "the four plants being derived from a common ancestral type in which a spontaneous tetraploidy started the development of *L. dissectum* and *L. intermedium* while *L. purpureum* and *L. amplexicaule* kept the original chromosome number during their differentiation."

Bernström (1941, Polyploidy induced by Colchicine in *Lamium*, *Bot. Notiser*, 1941, 407-408; 1944, Two new hybrids in *Lamium*, *Hereditas*, 30, 257-260) attempted further experiments to see whether the species were phylogenetically related. He obtained tetraploids of both *L. amplexicaule* and *L. purpureum* by using colchicine. He then attempted hybridisations using his induced tetraploids, both with *L. hybridum* and *L. molucellifolium* and with the diploid of the other species, using 2 or more lines of each. He succeeded in obtaining hybrid progeny from *L. amplexicaule* ($4n$) × *molucellifolium* and *L. hybridum* × *purpureum* ($4n$). The other possible combinations all failed including *L. amplexicaule* ($4n$) × *hybridum* which succeeds when the former is diploid and all those between *L. amplexicaule* and *L. purpureum* whether diploid or tetraploid. Of the new hybrids, the former is sterile, and vegetatively poorly developed, the latter more vigorous and partially fertile; a short description of each is given. He draws no conclusions about the origin of the two tetraploid species.

In a later note, Bernström (1949, Cytogenetic studies in the genus *Lamium*, *Proc. 8th International Congress of Genetics*, 39-41) states that he has also produced the hybrids *L. amplexicaule* ($2n$) × *purpureum* ($4n$) and *L. molucellifolium* × *purpureum* ($4n$) and that these are also highly or completely sterile. He further states: "By studies on the chromosome pairing at meiosis of all these hybrids, in connection with genetical studies on the offspring of some of them, it has been possible

to prove that *L. intermedium* is an amphidiploid between *L. purpureum* and *L. amplexicaule*, whereas *L. hybridum* is an amphidiploid between *L. purpureum* and some other species." He believes the last to be *L. bifidum* Cyr. from S.E. Europe. There seems no reason to doubt these conclusions though I cannot find that the evidence on which they are based has yet been published.

From a taxonomic point of view, there can be no doubt that the four plants must be treated as independent species.

E. F. WARBURG.

PLATE 7.



High water zone of *Sagina nodosa*. Other associated plants are *Ammophila arenaria* (depauperate), *Erodium neglectum*, *Leontodon Leysseri*, *Plantago Coronopus*.

**NOTE ON THE DISPERSAL OF SAGINA NODOSA
VAR. MONILIFORMIS LANGE.**

By F. R. ELLISTON WRIGHT.

In most of the flat sandy slacks of Braunton Burrows where they are only sparsely clothed with any vegetation *Sagina nodosa* var. *moniliformis* grows commonly. These slacks, some of which may equal an acre or more in extent, are usually under water to a varying degree in winter. When the water finally disappears in the spring, high water marks are noticeable where drift material has been left by the receding water, producing zonal lines of vegetation, composed of seedlings of such plants as *Plantago Coronopus* L., *Agrostis stolonifera* L., etc. In the particular photograph here reproduced, the demarcated sinuous line is formed by an almost pure growth of minute plants of *Sagina nodosa*.

The ponds in these flat places have no undercurrents but their surfaces are exposed to strong winds, and not always from one direction. The influence of the wavelets caused by wind would only affect the submerged ground at the extreme edge of the pond, and nearly all material carried to 'shore' must be transported on the surface of the water by wind.

The var. *moniliformis* of *Sagina nodosa* does flower and produce good seed, but in a far more restricted way than plants of the ordinary form. The seeds placed in water sink (as do those of *S. procumbens*, *subulata*, *maritima*, *apetala* and *ciliata*) and they remain down underwater, even after germination for several weeks until they die. It may be mentioned that at ordinary room temperatures far fewer seeds of *Sagina nodosa* germinate under water in the late autumn than is the case with the other species of *Sagina*.

In var. *moniliformis* the little buds or shoots, which are produced in every leaf axil, consist of fascicles of small, fleshy, succulent, almost ovoid, modified leaves on a greatly abbreviated stem. These little buds in a less extreme form are found more scantily on all forms of *Sagina nodosa*, even in the paludal form growing on mossy ditch sides, which will attain one foot in height and give the plant its name—Knotted Pearlwort. The structure of the adaptive growth-formation found in the var. *moniliformis* would thus require no drastic evolutionary change.

In var. *moniliformis*, when the parent plant is past its prime, these small vegetative sprouts disarticulate and fall away, though when completely detached from the parent plant by means of their reserve storage material they are capable of living a long time.

These brood bodies, placed in water, all float, and will remain so floating for three months, having before then produced a good rootlet, not from the peg-like basal end but from the axil of one of the lowest modified leaves.



×7.

The seeds, which sink under water, have no chance of dispersal by wind or rain-wash in these flat places. They must remain in close proximity to the parent plant. The detached floating buds, however, are quickly carried by strong winds over the water-surface to its furthest limits and to any destination to which the wind happens to be directed at the particular time. They remain, finally, stranded on the shore to grow there; a very effective means of dispersal.

The metamorphosis of the vegetative shoots is not an adaptation to survive the unfavourable season, for the old plants survive any winter and prolonged submergence under water.

The objective of every living plant is to reproduce its species, and its success in this largely depends on the expediency of the dispersal of its offspring. The dispersal on the water surface by wind of the detached buds of *Sagina nodosa* to some distance is highly successful.

Excluding forms of vivipary affecting the fruiting parts of plants, more frequent in the wetter and colder parts of Britain, and the winter buds of true water-plants, this form of vegetation reproduction is very unusual.

The often quoted cases of *Ranunculus Ficaria*, *Dentaria bulbifera*, etc., are not truly analogous.

Photographic illustrations of *S. nodosa* var. *moniliformis* are well shown in *J. Bot.*, 73, Suppl. 2 (1935).

STUDIES IN ORCHIS L.

II. ORCHIS TRAUNSTEINERI Saut. IN THE BRITISH ISLES

By J. HESLOP-HARRISON.

INTRODUCTION.

Of the various new dactylorhynchid taxa described from the British Isles during the last few decades, one of the most interesting—and taxonomically perplexing—has been Pugsley's *Orchis traunsteinerioides*. This plant was described from material originating in two Irish localities, the coastal marshes near Newcastle and Ballyman Glen, both in Co. Wicklow (Pugsley, 1936). Possibly impelled by a feeling that altogether too many new "species" of *Orchis* were being reported from Ireland at the period, Pugsley originally described the form as a subspecies under *O. majalis* Reichb., although recognising affinities with the Continental *O. Traunsteineri* Saut. ex Reichb., both in his account of the plant and his choice of name. At the time of the first description, Pugsley had not apparently seen the new plant in the field, and it seems not improbable that had he done so he would have refrained from suggesting any close association with the *majalis*-complex, and have accepted without reservation that this was indeed a plant to be connected rather with *O. Traunsteineri*. He did, ultimately, raise the plant to specific rank under the name *O. traunsteinerioides* (Pugsley, 1940) and later (1946) recorded it from Cothill in Berkshire and Odilham, N. Hants. A connection with *O. latifolia* var. *eborensis* Godfrey (1933) had already been suggested by Pugsley (1936), and was affirmed by him after examination of a Yorkshire colony of this form (Pugsley, 1939).

In an account of the ecology of Athlone Bog by Osvald (1949), there appears a record for *O. Traunsteineri* Saut. There can, of course, be no doubt of Osvald's familiarity with the plant given this name in Scandinavia, and further, while the colony in question has not been refound, there seems every reason to believe now that it, also, would be referable to Pugsley's *O. traunsteinerioides*.

A further colony, in Scraw Bog, Co. Westmeath, was discovered by the writer in 1950 and recorded as *O. Traunsteineri* Saut. (Heslop-Harrison, 1950a), and in the same year, verbal intimation was received from Scandinavian and Central European members of the 9th Phytogeographical Excursion in Ireland of the occurrence of a plant, accepted by them as *O. Traunsteineri* Saut., in a fen north of the Curragh in Co. Kildare. This locality was visited in 1951, and the presence there of yet another large colony was confirmed.

Under the name *O. traunsteinerioides*, plants of the same affinity have been recorded from other Irish localities: from Fermanagh and Antrim (Summerhayes, 1951), and from near Lough Bunny, Co. Clare (Mrs. K. Gough, 1952).

Reasons are given below for referring all of the above records to *O. Traunsteineri* Saut. The nomenclature issue is, however, regarded as

secondary to the main purpose of this paper which is to demonstrate that the form in question, although possessing a remarkably discontinuous range in the British Isles, is nevertheless reasonably homogeneous, and as much meriting recognition as a distinct unit as other British marsh orchid "species" such as *O. purpurella* T. & T. A. Steph. and *O. praetermissa* Druce.

During the flowering-seasons (late May and early June) in 1949, 1950, 1951 and 1952, four colonies have been studied intensively, three Irish and one English. Biometrical investigation of these has been carried out by the methods adopted in previous studies of dactylorhynchid variation (Heslop-Harrison, 1948; 1952).

THE POPULATIONS.

The distribution of the Irish and English colonies from which samples have been examined is indicated in fig. 1. The habitats of these quite widely separated colonies are all of the nature of rich fen, strongly affected by calcareous ground-water. Lists of associated plants, made within the actual sample areas at the time of collection of the population samples, are given in Table I. As will be seen, there is rather a close similarity between the plant associations in all of the localities.



Fig. 1. Distribution of the colonies of *O. Traunsteineri* mentioned in the text. Dots: localities from which population samples have been examined; open circles: other colonies known to the author.

TABLE I.
 Habitats of *Orchis Traunsteineri* Saut.

	T1	T2	T3	T4		T1	T2	T3	T4
<i>Ranunculus Flammula</i> L.	o	o	f	—	<i>C. diandra</i> Schrank	—	f	o	—
<i>Caltha palustris</i> L.	—	o	—	—	<i>C. appropinquata</i> Schumacher	—	o	—	—
<i>Cardamine pratensis</i> L.	o	o	o	o	<i>C. paniculata</i> L.	—	—	a	o
<i>Polygala vulgaris</i> L.	—	—	r	—	<i>C. nigra</i> (L.) Reichard	a	f	o	o
<i>Lychnis Flos-cuculi</i> L.	f	o	—	—	<i>C. etala</i> All.	la	—	—	—
<i>Cerastium vulgatum</i> L.	o	—	—	—	<i>C. flacca</i> Schreb.	o	o	o	f
<i>Filipendula Ulmaria</i> (L.) Maxim.	o	f	o	f	<i>C. limosa</i> L.	—	r	—	—
<i>Ceum rivale</i> L.	—	—	—	o	<i>C. panicea</i> L.	f	f	o	f
<i>Potentilla erecta</i> (L.) Räusch.	—	o	o	o	<i>C. Hostiana</i> DC.	r	—	—	—
<i>P. palustris</i> (L.) Scop.	o	f	—	—	<i>C. lepidocarpa</i> Tausch	f	f	f	o
<i>Drosera rotundifolia</i> L.	—	r	—	r	<i>C. lasiocarpa</i> Ehrh.	—	a	—	—
<i>D. anglica</i> Huds.	—	r	—	—	<i>C. acutiformis</i> Ehrh.	f	—	la	—
<i>Epilobium hirsutum</i> L.	—	—	—	o	<i>C. rostrata</i> Stokes	—	o	la	o
<i>Hydrocotyle vulgaris</i> L.	o	o	o	—	<i>Holcus lanatus</i> L.	—	—	o	—
<i>Angelica sylvestris</i> L.	o	o	r	o	<i>Phragmites communis</i> Trin.	a	—	f	la
<i>Oenanthe Lachenalii</i> C. C. Gmel.	—	—	—	o	<i>Molinia caerulea</i> (L.) Moench	—	—	la	—
<i>Galium utiginosum</i> L.	—	f	—	o	<i>Briza media</i> L.	—	—	r	o
<i>Valeriana dioica</i> L.	—	—	—	o	<i>Festuca rubra</i> L.	—	—	o	—
<i>Succisa pratensis</i> Moench	—	—	o	o	<i>Equisetum palustre</i> L.	—	—	f	—
<i>Eupatorium cannabinum</i> L.	—	—	—	f	<i>E. fluviatile</i> L.	—	f	—	—
<i>Cirsium palustre</i> (L.) Scop.	o	—	o	o	<i>Sphagnum palustre</i> L.	—	a	—	—
<i>C. dissectum</i> (L.) Hill	—	o	—	f	<i>S. squarrosum</i> Crome	—	o	—	—
<i>Oxyccoccus palustris</i> Pers.	—	f	o	—	<i>Fissidens adianthoides</i> Hedw.	—	—	—	o
<i>Erica Tetralix</i> L.	—	o	f	—	<i>Mnium affine</i> Bland., s.l.	—	f	—	o
<i>Pyrola rotundifolia</i> L.	—	la	—	—	<i>M. cuspidatum</i> Hedw.	—	—	—	o
<i>Menyanthes trifoliata</i> L.	f	a	la	—	<i>M. undulatum</i> Hedw.	—	—	—	o
<i>Solanum Dulcamara</i> L.	—	—	—	o	<i>Aulacomnium palustre</i> (Hedw.) Schwaegr.	f	—	—	—
<i>Pedicularis palustris</i> L.	—	—	o	o	<i>Climacium dendroïdes</i> (Hedw.) Web. & Mohr	—	f	—	—
<i>Pinguicula vulgaris</i> L.	—	—	—	o	<i>Acrocladium cuspidatum</i> (Hedw.) Lindb.	—	a	a	f
<i>Mentha aquatica</i> L.	o	—	—	o	<i>Drepanocladus revolvens</i> (Sm.) Warnst.	—	a	a	a
<i>Prunella vulgaris</i> L.	o	—	—	o	<i>Scorpidium scorpioides</i> (Hedw.) Limpr.	r	r	—	—
<i>Salix aurita</i> L.	—	o	—	r	<i>Campyllum stellatum</i> (Hedw.) Lange & C. Jens.	—	—	o	a
<i>S. repens</i> L.	—	o	—	—	<i>Cratoneuron commutatum</i> (Hedw.) Roth	—	a	o	o
<i>Listera ovata</i> L.	—	r	r	r	<i>C. filicinum</i> (Hedw.) Roth	—	—	—	o
<i>Ophrys insectifera</i> L.	—	—	r	—	<i>Pseudoscleropodium purum</i> (Limpr.) Fleisch.	—	—	o	o
<i>Epipactis palustris</i> L.	—	—	—	o	<i>Ctenidium molluscum</i> (Hedw.) Mitt.	—	o	la	o
<i>Orchis latifolia</i> L. sec. Pugsf.	o	—	—	r	<i>Rhytidiadelphus squar- rosus</i> (Hedw.) Warnst.	—	a	o	—
<i>Juncus inflexus</i> L.	o	—	—	r	<i>Hylocomium splendens</i> (Hedw.) B. & S.	—	a	o	—
<i>J. subnodulosus</i> Schrank	la	—	ld	a	<i>Aneura pinguis</i> (L.) Dum.	—	—	—	o
<i>Typha latifolia</i> L.	—	—	f	—					
<i>Triglochin maritima</i> L.	o	—	—	—					
<i>Eleocharis palustris</i> (L.) R.Br.	o	—	—	—					
<i>Scirpus maritimus</i> L.	o	—	—	—					
<i>Eriophorum latifolium</i> Hoppe	—	—	f	f					
<i>E. angustifolium</i> Honck.	f	—	—	—					
<i>Schoenus nigricans</i> L.	ld	d	ld	ld					
<i>Cladium Mariscus</i> (L.) Poll	ld	—	a	—					
<i>Carex disticha</i> Huds.	a	o	—	—					

Bryophytes not recorded

T1. Coastal marsh, between Five and Six Mile Point, south of Newcastle, Co. Wicklow. This is the type locality for Pugsley's *O. traunsteinerioides*. The railway embankment runs along the top of the shingle beach for several miles of this part of the Wicklow coast, and on the landward side of it there is a considerable area of fen. Large stretches are dominated by *Cladium* and *Phragmites*, alternating with sedge-meadow and smaller areas where *Schoenus nigricans* is prevalent. A certain maritime influence is revealed by the presence of *Triglochin maritima* and *Scirpus maritimus*. *O. maculata* subsp. *ericetorum* is present on drier banks, but apart from *O. latifolia* L. sec. Pugsl. which is occasional in the sedge meadows. *O. Traunsteineri* is the only dactylorchid in the area of fen. The sample was collected in a fairly uniform stretch of Schoenetum some two hundred yards inland from the railway embankment. The soil-pH here at tuber depth (determined colorimetrically) lay in the range 7.0-7.5.

T2. Scraw Bog, north-west of Mullingar, Co. Westmeath. This stretch of rich fen occupies a depression in the limestone about half a mile from Loch Owel, and is of interest in supporting a number of species many of which are singularly rare elsewhere in Ireland. The most striking is *Pyrola rotundifolia*, in great profusion here in one of its two Irish stations. *O. Fuchsii* occurs around the margin of the bog, and *O. latifolia* is present locally in small quantity. *O. Traunsteineri* is the only orchid growing in the central area, where it is abundant. The sample was taken in a very uniform stretch of scattered, non-tussocky *Schoenus*. The orchids root quite loosely in a thick moss carpet (composition given in Table I), and offer little resistance to plucking, so that they tend to come up complete with the extremely long, divaricate roots. Soil-pH, c. 7.0.

T3. Fen north-east of the Curragh, Co. Kildare. This area of fen has many points of resemblance with Scraw Bog, but is characterised by an extensive central stretch dominated by *Cladium* and *Phragmites*. The sample was drawn from a marginal area where *Cladium* is less frequent and where *Schoenus* assumes local dominance. The orchids were rooted loosely in a moss carpet similar in composition to that in Scraw Bog, with great local prevalence of *Ctenidium molluscum*. No other dactylorchids were encountered in the fen, but *Listera ovata* occurs, and *Ophrys insectifera*, here a typical rich-fen plant, as in many of its Continental stations. The pH of the ground-water was c. 7.2.

T4. Cothill Fen, Berkshire. *O. Traunsteineri* occurs throughout most of this small area of fen, but it is relatively sparse in the areas dominated by *Phragmites* and most abundant where *Schoenus nigricans* prevails. In the fen itself, *O. latifolia* occurs sparsely, and in a clearing in late-stage alder-carr on the south side, a small colony of *O. praetermissa* was encountered, with occasional plants of *O. Fuchsii*. The striking similarity between this habitat and the Irish ones will be clear from the lists of Table I. Here, as in Ireland, the plants of *O. Traunsteineri* root quite loosely in the bryophyte carpet. At the time when the sample was taken, the ground-water pH was c. 7.5.

CYTOLOGY.

Root-tip mitosis has been examined in several plants from each of the above colonies. Material was fixed in the field in Langlet's modification of Navashin's fluid, sectioned at $10\ \mu$ and stained according to the method of Newton. A chromosome number of $2n=80$ has uniformly been observed, which implies that the form is tetraploid in respect to the base number, $x=20$, of the subgenus *Dactylorchis*. This count is in agreement with the majority of Continental determinations for *O. Traunsteineri* Saut., including those made from material from the type locality, Kitzbühl in Austria (*vide* Vermeulen, 1949). Other counts reported from Continental plants referred to *O. Traunsteineri* include one of $2n=40$ for a Swiss individual (Heusser, 1938) and another of $2n=122$ for a plant originating in Esthonia (Vermeulen, 1938, 1947). It is not established whether entire populations exist possessing these chromosome numbers, populations which are morphologically indistinguishable from tetraploid *O. Traunsteineri*, and on the face of it, it would appear improbable that such should be the case. The existence of another diploid form with $2n=40$, apart from the diploid section of the *maculata*-complex and the diploid *Latifoliae*, would have important phylogenetical implications (Heslop-Harrison, 1953, in press). Before accepting the possibility, further assurance would be desirable that the Swiss plant from which the count of $2n=40$ was obtained was not merely an anomalous individual of *O. latifolia*.

In their monographic treatment of *O. Traunsteineri*, Fuchs and Ziegenspeck (1927), impressed no doubt by the wide variety of plants to which the name had been attached, concluded that they were dealing not with a 'pure species', but with a complex of hybrids. With present-day knowledge of the ways in which pure-breeding groups can arise through hybridisation, a conclusion like this requires examination from more than one point of view. As is now well established, constant and pure breeding forms can arise through hybridisation followed by chromosome doubling; they have all the characteristics of Linnean species, and are justifiably recognised as such taxonomically. On the basis of cytological evidence, an origin of this nature has been suggested elsewhere (Heslop-Harrison, 1953, in press) for other tetraploid marsh orchids, namely *O. praetermissa* and *O. purpurella*. The possibility that tetraploid *O. Traunsteineri*, also, has arisen in this manner would appear to be strong. In this sense, the species might indeed be hybridogenous.

However, it is apparent that the statement of Fuchs and Ziegenspeck simply meant that they regarded the series of populations which had been grouped taxonomically as *O. Traunsteineri* as being all of independent, recent, hybrid origin—in other words, that the name "*O. Traunsteineri*" has been employed simply as a reference name for a series of hybrid-swarms. This possibility, too, requires serious consideration, since distinctive hybrid populations do arise not infrequently where dactylorchid taxa occur together. A parallel instance is afforded by *O. pardalina* Pugsl., which has been considered to be indistinguishable from

the hybrid *O. Fuchsii* × *O. praetermissa* (Clapham, 1952). However, as in *O. pardalina* (Heslop-Harrison, 1953, in press), the probability of the recent hybrid origin of the colonies ascribed here to *O. Traunsteineri* can be tested by observations of meiotic behaviour and fertility.

For this purpose, young buds were fixed from two of the populations involved in the present study, T2, Scraw Bog, Westmeath, and T4, Cothill Fen, Berkshire. Meiosis in all of the plants examined proved to be normal, with no suggestion of multivalent formation or of other irregularities such as might be expected to arise from hybridity. Estimation of pollen quality is naturally difficult in the dactylorchids because of the association of the pollen grains in massulae, but an assessment of fertility can be obtained from seed counts from well-pollinated ovaries. The percentage of perfect seeds produced by plants from the two Irish colonies, T2 and T3, observed during the period of seed maturation in the season of 1951, was 95% and 96%, figures of the same order as are commonly found, for example, in *O. Fuchsii*. All of this suggests that at least the Britannic colonies referred here to *O. Traunsteineri* represent fully fertile breeding-units, and not simply hybrid complexes of relatively recent origin. The cytological behaviour of the individuals examined was, in fact, of the typical "diploid" type, which, it may be noted, is suggestive of an allopolyploid rather than of an autopolyploid origin.

Further information on the latter point might be obtainable from observations of meiotic behaviour in hybrids between *O. Traunsteineri* and its possible progenitors, which may well have been the same as those suggested for *O. purpurella* and *O. praetermissa*, namely a diploid *maculata* form and a member of the *Latifoliae*. Hybrids of the putative parentages *O. Fuchsii* × *O. Traunsteineri* and *O. latifolia* × *O. Traunsteineri* have in fact been encountered during the present study, an individual of the former from Scraw Bog, and several of the latter from the Newcastle marshes. Mitotic chromosome counts of each have given the number $2n=60$, a sufficient justification of the diagnosis based upon morphology. Unfortunately, it has not been possible so far to obtain satisfactory evidence of meiotic behaviour in any, so the question whether *O. Fuchsii* or *O. latifolia* (or related forms) have played any part in the origin of *O. Traunsteineri* remains open.

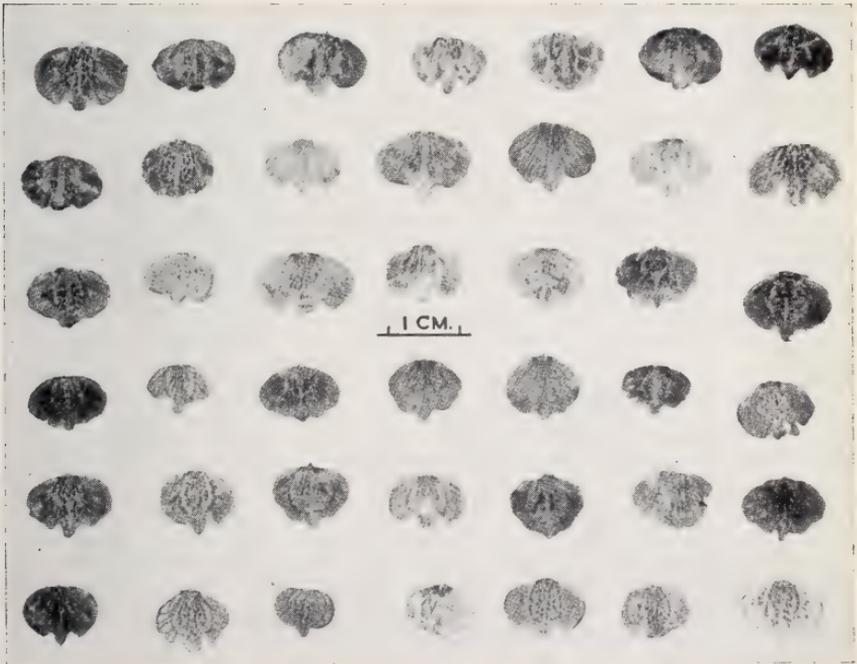
ANALYSIS OF CHARACTERS.

As is well known, the extreme local variability of dactylorchids reduces the value of taxonomic methods based upon the description and comparison of individual plants. Attention must be transferred from the individual to the local population if the pattern of variation is to be interpreted with any degree of objectivity, a change of emphasis which demands some form of statistical treatment. The purpose of biometrical analysis in the present case is two-fold: firstly, to show that the various colonies referred to *O. Traunsteineri* are as homogeneous amongst themselves in respect to the more important taxonomic characters as can be expected of any taxon within this subgenus, and, secondly, to show that,

PLATE 8.



A.



B.

Labellum mounts from homologous flowers.

A, 56 plants of *O. Traunsteineri* from colony T2, Scraw Bog, Co. Westmeath.
B, 42 plants of *O. praetermissa* from the Hampshire colony.

as populations, they are distinct from other tetraploid marsh orchids in the British Isles, namely *O. praetermissa*, *O. purpurella* and *O. majalis*.

The morphological differentiae which are of importance and which lend themselves to biometrical treatment are: (a) stature and leaf number, (b) leaf size and shape, (c) leaf marking, (d) labellum size and shape, and (e) spur size. Following methods described elsewhere (Heslop-Harrison, 1948, 52), statistical data for vegetative characters were recorded in the field as soon as possible after collection of the sample, while those for floral characters were recorded later from mounted dissections of homotypic flowers. The statistics recorded in the Tables are: N, the number of individuals examined; M, the arithmetic mean; σ , the standard deviation; S.E., the standard error of the mean and, in Table I, r , the coefficient of correlation. The graphical presentation of figs. 3, 4 and 5 follows that previously adopted in similar studies on *O. maculata* agg. Distances equivalent to ± 2 (S.E.) are marked off each side of the sample mean values for the variates plotted, and these can be used to give a rough estimate of the significance of the difference between means, since under the conditions in which the test is applied here, a difference between two means greater than twice the sum of their standard errors always indicates $P < .01$.

Comparison with other taxa.

The other British tetraploid marsh orchids, namely *O. praetermissa*, *O. purpurella* and *O. majalis*, are themselves highly polymorphic and show enough ecological and regional variation to have given rise each to a certain amount of taxonomic confusion. Strictly, this variation should be taken into account in making comparisons, since no single local population can be regarded as "typical" of any of these forms. However, it is proposed to provide a more extensive account of the variation of the more widely distributed tetraploid marsh orchids in a further contribution, and since in any case the features in which *O. praetermissa*, *O. purpurella* and *O. majalis* show geographical and ecological variation, are not, for the most part, those which differentiate these species from *O. Traunsteineri*, it is considered sufficient to base comparisons here on three populations which, while not put forward as "typical", may be taken as occupying a roughly central position in the variation range of each. These are:

- O. purpurella*, a large colony near Dunfanaghy, Co. Donegal, growing in sedge-meadow at the south end of Lough Sessiagh. The plants here mostly conform to the Stephenson's "Form A" (T. and T. A. Stephenson, 1920).
- O. praetermissa*, a colony at Brambridge, growing in the water meadows on the west side of the river Itchen near Otterbourne, Hampshire. This colony, like most others of the species in Hampshire, includes a percentage of individuals conforming to the type description of *O. pardalina* Pugsil.

O. majalis, a colony growing near the type locality for the subsp. *occidentalis* Pugsl., Lisdoonvarna, Co. Clare, in open meadowland. In this, as in other Clare colonies, a proportion conforms to the type description of *O. kerryensis* Wilm.

(a) *Stature and leaf number.*

In all cases, plant stature has been measured from the base of the stem, just above the tubers, to the tip of the inflorescence at the time of flowering. In assessing the number of leaves, the lowest expanded green leaf has been taken as the first, and that immediately below the inflorescence as the last, even when scale- or bract-like.

Being quite sensitive to culture conditions, dactylorhynchid stature as a simple linear measure is of little taxonomic value. The data, for this attribute, given in Table II simply give a general impression of what are characteristic habits for the four tetraploid forms: *O. Traunsteineri* and *O. praetermissa*, both fen plants, are generally taller and relatively more slender than the meadow forms of *O. majalis* and *O. purpurella*.

TABLE II
Sample data for stature and number of leaves per plant.

Sample.	N	Stature in cm.			Leaf number.			<i>r</i>	
		M	σ	S.E.	M	σ	S.E.		
<i>O. Traunsteineri</i>									
T1	...	60	35.7	6.6	0.85	3.98	0.78	0.10	-.052 (P>.05)
T2	...	75	32.3	6.2	0.71	4.32	0.75	0.09	+.021 (P>.05)
T3	...	125	29.4	7.4	0.66	4.42	0.71	0.06	+.093 (P>.05)
T4	...	90	32.6	6.3	0.67	3.83	0.70	0.07	+.153 (P>.05)
<i>O. praetermissa</i>									
Pr	...	70	45.2	6.6	0.78	6.17	0.75	0.09	+.351 (P<.05)
<i>O. purpurella</i>									
Pu	...	50	20.2	2.6	0.36	6.56	0.98	0.14	+.472 (P<.05)
<i>O. majalis</i>									
Ma	...	50	25.9	4.4	0.63	6.28	1.02	0.14	+.276 (P<.05)

However, two other attributes for which sample data are given in Table II constitute good differentiae. The more obvious is leaf number. The populations, here referred to *O. Traunsteineri*, are characterised by a mean leaf number in the neighbourhood of 4, an extremely small number for a tetraploid marsh orchid, and fewer even than in the most extreme of the diploid *Latifoliae* in British latitudes. This feature is absolutely diagnostic for *O. Traunsteineri* in comparison with other British tetraploids, which have almost invariably average leaf numbers greater than 6.

A less obvious feature is that in populations of *O. Traunsteineri* there is no significant correlation between leaf number and stature. As will be seen from the data of Table I, in *O. praetermissa*, *O. purpurella* and *O. majalis*, there is a significant positive correlation between stature and leaf number, a correlation to be expected from the simple consideration that variation in over-all height is likely to be linked not only with

internode length but with internode number (see Heslop-Harrison, 1952, for a discussion of this point in relation to *O. maculata sensu lato*). The absence of such a correlation in the populations of *O. Traunsteineri* investigated is connected, no doubt, with the small number of leaves produced per plant; variation in over-all height must be due entirely to variation in internode length.

(b) *Leaf size.*

The sample data given in Table III refer to the dimensions of the longest leaf of each plant. The data were recorded from fresh plants, length being measured from the opening of the sheath to the tip of the lamina, and width at the broadest part of the blade, generally about one-third of the leaf length from the base. In length of leaf, these *O. Traunsteineri* populations do not appear to differ to any marked extent from those of *O. purpurella* and *O. majalis* with which comparison is made in Table II, although the average leaf length in all of these colonies is evidently a good deal less than in the colony of *O. praetermissa* for which sample data are given.

TABLE III
Sample data for leaf length and width

Sample	N	Length in cm.			Width in cm.		
		M	σ	S.E.	M	σ	S.E.
<i>O. Traunsteineri</i>							
T1	60	12.3	2.79	0.36	1.32	0.28	0.040
T2	75	11.7	2.05	0.24	1.16	0.34	0.039
T3	50	10.9	2.69	0.38	1.18	0.39	0.056
T4	90	11.1	2.20	0.23	1.28	0.27	0.028
<i>O. praetermissa</i>							
Pr	70	15.4	2.93	0.35	2.33	0.40	0.048
<i>O. purpurella</i>							
Pu	50	12.5	1.88	0.27	1.99	0.33	0.047
<i>O. majalis</i>							
Ma	50	10.3	2.58	0.37	2.18	0.41	0.058

In leaf width, however, the *O. Traunsteineri* colonies differ significantly from all of the others. The character of very narrow lanceolate, or linear-lanceolate, leaves is, in fact, one of importance in discriminating *O. Traunsteineri* which is stressed in all of the Continental diagnoses of the species, including the two earliest, those of Reichenbach (1830) and Sauter (1837). The characteristic has no doubt encouraged the acceptance of one of the more widely used synonyms, *O. angustifolia* Lois. in Reichenb., the name adopted by Klinge (1898) and E. G. & A. Camus (1928-29).

Taken together, the vegetative characters of leaf number and leaf width serve to separate the four colonies of *O. Traunsteineri* completely from those of the other tetraploid marsh orchids, as is shown graphically in fig. 2.

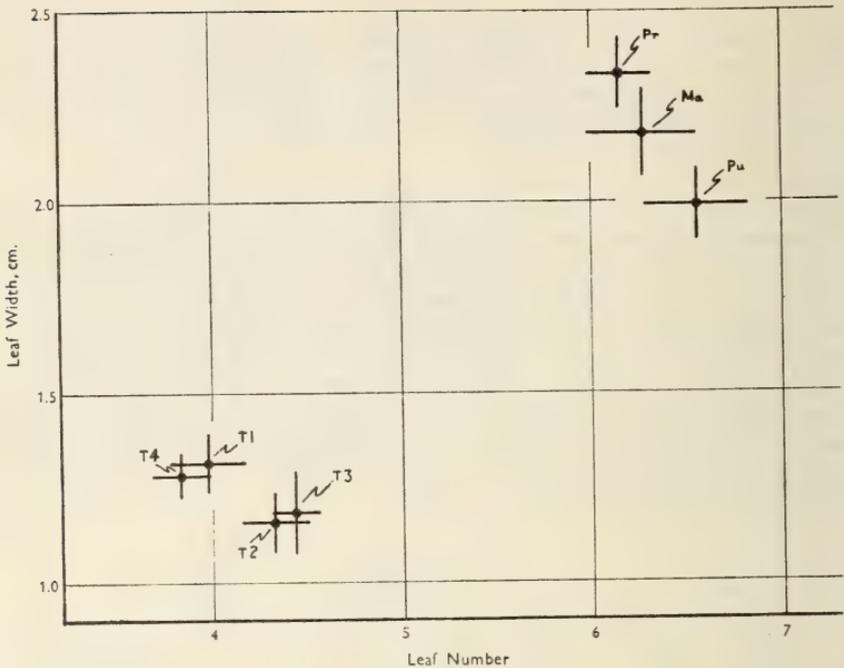


Fig. 2. Discrimination of *O. Traunsteineri* from other British tetraploid marsh orchids on the basis of leaf width and leaf number. The sample means are labelled to correspond with the notation in Tables II-VI.

(c) Leaf marking.

The incidence of leaf marking in the British tetraploid marsh orchids offers an interesting problem in variation. Whereas in the spotted orchids proper, intra-population variation in leaf marking follows more or less orthodox lines, in that frequency distributions of leaf-spot grades conform more or less with normality, in the tetraploid marsh orchids, L-, J-, and even U-shaped distributions are more often encountered. Furthermore, there are often peculiarities in leaf-spot shape not usually found in the *maculata*-complex, ring-spots commonly occurring. Since leaf-marking and flower-colour are often closely correlated, being presumably each reflections of the anthocyanin pigment system of the plant, the two modes in populations where J-shaped distributions prevail are often phenotypically very distinct. The taxonomic consequences that have arisen from this fact are well-known. In the *O. praetermissa* alliance, the original diagnosis of *O. praetermissa* (Druce, 1914) refers to the "anthocyanin-low" mode in a J-shaped distribution, and that of *O. pardalina* (Pugsley, 1935) to the usually smaller "anthocyanin-high" mode. Similarly, the "anthocyanin-low" mode of the *O. majalis* populations of western Ireland has been described as *O. kerryensis* (Wilmott, 1936), and the "anthocyanin-high" mode, as the subsp. *occidentalis* (Pugsley, 1935; the form was

later raised to specific rank as *O. occidentalis*, Wilmott, 1938). A possible explanation for these peculiarities in the incidence of leaf-marking may lie in the fact that probably all of the tetraploid marsh orchids are allopolyploid in origin, having had diploid *maculata*-forms as one progenitor. One may suspect that occasional aberrations in the mechanism of tetrasomic inheritance may well lead to the segregation of individuals in which *maculata*-genes are over-represented.

The incidence of leaf-marking in the *O. Traunsteineri* colonies studied is somewhat similar to that commonly encountered in colonies of *O. praetermissa* in the eastern parts of England, and in *O. majalis* towards the southern end of its western Irish range. The representation in the population samples of four arbitrary leaf-spot grades is shown in Table IV. The Scraw Bog, Wicklow and Cothill populations are evidently much alike in the representation of these grades, resembling somewhat the *O. praetermissa* population, in which the majority of individuals are unmarked. The Kildare population differs in that the bulk of individuals show some sign of leaf-marking. The shape of leaf-spots in *O. Traunsteineri* is unlike that found in *O. praetermissa*, taking usually the form of narrow transverse bars, as in the plant illustrated by Pugsley (1936). In the more deeply marked individuals, the upper part of the stem and the bracts are commonly suffused with pigment.

TABLE IV

Leaf marking. Percentage in four arbitrary grades: 1, unmarked; 2, light; 3, medium; 4 heavy. Shape and distribution of the marking not taken into account.

Sample	1	2	3	4
<i>O. Traunsteineri</i>				
T1	77.5	16	5	1.5
T2	76.5	17	6.5	—
T3	29	44.5	25	1.5
T4	60	31	8	1
<i>O. praetermissa</i>				
Pr	78	18.5	2.5	1
<i>O. purpurella</i>				
Pu	57	43	—	—
<i>O. majalis</i>				
Ma	39	41	17	3

Values in italic type where class contains 30% or more.

(d) *Flower characters: labellum size and shape.*

Sample data for the linear dimensions of the labellum, as illustrated in fig. 3, are given in Table V. The different colonies of *O. Traunsteineri* agree remarkably well in these dimensions, and the sample data for the *O. majalis* colony suggest that this lies also in the same general size range in respect to width and length. The mean values for the *O. praetermissa* sample are significantly greater, and, of course, those for *O. purpurella*, very much less. The relationships of the samples for these two dimensions are illustrated graphically in fig. 4.

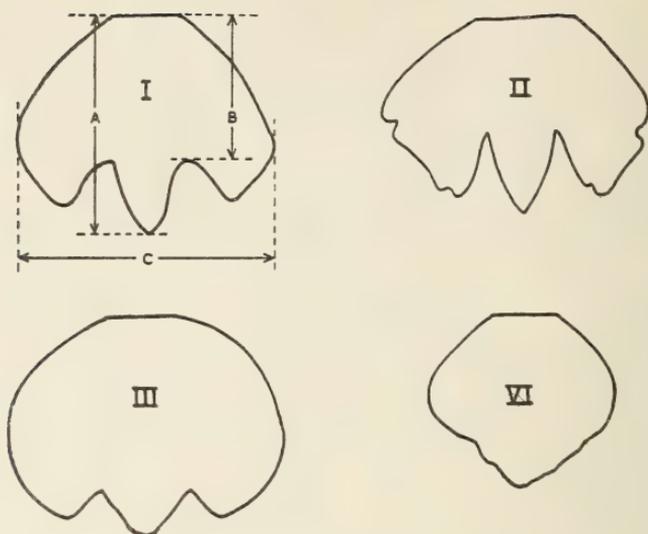


Fig. 3. Labellum shapes in tetraploid British marsh orchids. I, *O. Traunsteineri* Saut.; II, *O. majalis* Reichb. (a characteristic shape occurring in the subsp. *occidentalis* Pugsley); III, *O. praetermissa* Druce; VI, *O. purpurella* Steph. The dimensions marked on the labellum in I are those for which data are given in Table V.

TABLE V

Sample data for labellum dimensions as in fig. 2: length (A), total length less sinus depth (B) and width (C); all in mm.

Sample.	N	(A)			(B)			(C)		
		M	σ	S.E.	M	σ	S.E.	M	σ	S.E.
<i>O. Traunsteineri</i>										
T1	50	8.37	0.77	0.11	6.05	0.68	0.01	10.00	1.12	0.16
T2	100	8.26	0.90	0.09	5.99	0.88	0.09	10.03	1.13	0.11
T3	100	8.62	0.65	0.07	6.07	0.73	0.07	10.11	1.56	0.16
T4	100	8.39	0.89	0.09	6.21	0.70	0.07	10.21	1.05	0.11
<i>O. praetermissa</i>										
Pr.	100	9.28	0.81	0.08	7.74	0.97	0.10	11.48	1.18	0.12
<i>O. purpurella</i>										
Pu	100	6.11	0.55	0.06	Sinus absent			7.93	0.66	0.07
<i>O. majalis</i>										
Ma	100	7.91	0.82	0.08	5.50	0.72	0.07	10.16	1.33	0.13

As indicated in fig. 3, the labella of the four tetraploids differ somewhat in shape, and this is, in the field, a more useful discriminant than size. *O. purpurella*, in its most common form ("Form A", Stephenson, 1920), is, of course, quite distinctive, the small labellum being rhomboidal and practically entire. The variation in *O. purpurella* is on the one hand towards *O. praetermissa* ("Form B," Stephenson, and the var. *pulchella* (Druce) Pugsley), and on the other in the direction of *O. majalis*, particularly in the west of Scotland and north-western Ireland, where the

cause may lie in actual hybridisation with *O. majalis* (Heslop-Harrison, 1952). *O. purpurella*, even in the broad sense, does not transgress the variation range of *O. Traunsteineri* for this character.

There is, however, some overlap in the variation ranges of both *O. majalis* and *O. praetermissa* with that of *O. Traunsteineri* for labellum-shape. This is apparent enough in the case of *O. praetermissa* from the samples illustrated in Plate 8. As emphasised by Pugsley in the original diagnosis of *O. traunsteinerioides*, there is a tendency towards a deltoid or obcordate shape in *O. Traunsteineri*, and the labellum is generally moderately incised so that there is a short, bluntly triangular, central lobe. In *O. praetermissa*, the labellum tends to be practically elliptical, only slightly incised, with a small, often almost obsolete, central lobe. Reference to the dimension "B" of fig. 3, which is a measure of the depths of incision, serves to discriminate the population of *O. praetermissa*, for which sample data are given in Table V, from those of *O. Traunsteineri*.

In *O. majalis*, there is a considerable range of variation in labellum shape both within colonies and between different ones throughout the western Irish range. In general, Pugsley's description of "rotund-rhomboidal" (1936) is fitting. The degree of dissection is rather more marked than in *O. Traunsteineri* (cf. dimension "B" in Table V). A characteristic which readily serves as a discriminant in the field (although not one which lends itself to biometrical treatment) is that

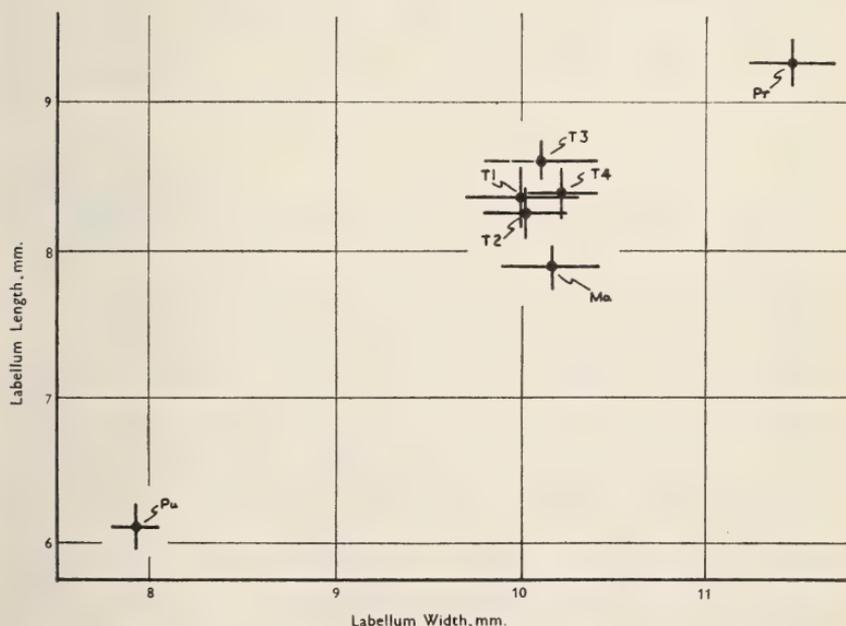


Fig. 4. Relationship of labellum width to labellum length. Labelling as in Tables II-VI.

the lateral lobes of the labellum, smoothly rounded in *O. Traunsteineri* as in *O. praetermissa*, tend to be angular, notched, or even lacinate, in *O. majalis*.

(e) *Spur size and shape.*

The sample data for spur dimensions given in Table VI refer to length from mouth to tip, and width at about a millimetre from the mouth when flattened. The "width" figure represents, therefore, not the diameter, but approximately half the circumference at this point. The samples are compared graphically for these attributes in fig. 5; clearly they serve to separate *O. Traunsteineri* quite satisfactorily from *O. purpurella* and *O. majalis*. The former possesses on the average a broader and much shorter spur, and the latter, one which is both somewhat shorter and a good deal more slender. An additional characteristic of the Irish populations of *O. majalis* is that in most plants the flower spur is rather strongly curved, sometimes quite abruptly, about one third of its length from the tip, a feature which is well shown in the drawings and photographs accompanying Wilmott's description of *O. kerryensis* (Wilmott, 1936). The spur of *O. Traunsteineri* is, in contrast, quite straight. Spur characters do not serve particularly well to discriminate *O. Traunsteineri* from *O. praetermissa*, although the data of Table VI suggest that the mean spur width, in the population of *O. praetermissa* for which data are given, is greater than in any of those referred to *O. Traunsteineri*.

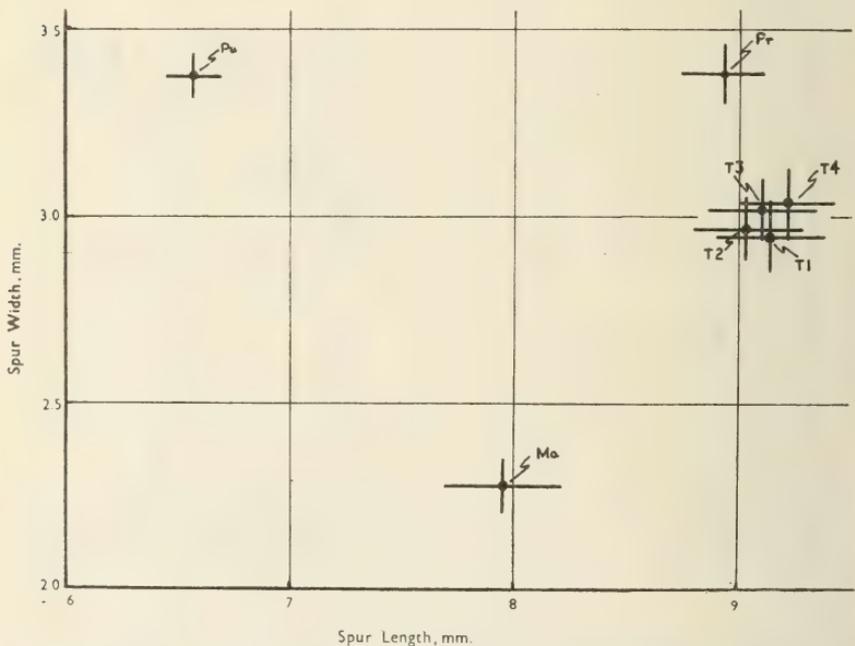


Fig. 5. Relationship of spur length to spur width. Labelling as in Tables II-VI.

TABLE VI
Sample data for spur length and width.

Sample	N	Length.			Width.		
		M	σ	S.E.	M	σ	S.E.
<i>O. Traunsteineri</i>							
T1	70	9.14	1.01	0.10	2.95	0.38	0.046
T2	100	9.03	1.15	0.12	2.97	0.40	0.040
T3	100	9.10	1.19	0.12	3.02	0.41	0.041
T4	100	9.22	1.04	0.10	3.05	0.45	0.045
<i>O. praetermissa</i>							
Pr	100	8.93	0.89	0.09	3.39	0.37	0.037
<i>O. purpurella</i>							
Pu	100	8.93	0.89	0.09	3.39	0.37	0.037
<i>O. majalis</i>							
Ma	100	7.95	1.13	0.11	2.29	0.36	0.036

Other characteristics.

It is useful at this point to consider other characteristics, apart from the more critical ones treated biometrically above, in which these populations of *O. Traunsteineri* show points of difference from those of the other British tetraploid marsh orchids.

Stem: in *O. majalis* and *O. praetermissa*, the stem cavity is usually rather large, equalling or exceeding half of the diameter of the stem just below the inflorescence. In *O. purpurella*, the cavity is generally considerably smaller, rarely exceeding one millimetre in diameter. *O. Traunsteineri*, similarly, possesses a small cavity, and in many plants the cavity is absent altogether throughout much of the length of the stem. The characteristic of stem flexuousness, stressed by Pugsley in the original diagnosis of *O. traunsteinerioides*, is not one which is very striking in the field, and it may have been exaggerated in the plants examined by him as a result of their passage through the post in a cramped container.

Leaves: Particularly in the meadow-land ecodemes of *O. purpurella* and *O. majalis*, the lower internodes are short, so that the sheaths of the lower three or four leaves are almost contiguous. In *O. praetermissa* and *O. Traunsteineri* growing in fen habitats (although not in the chalk down ecodemes of the former) the lower internodes are extended, so that the leaves are more equally spaced along the stem, a feature particularly obvious in the few-leaved *O. Traunsteineri*. In the latter, the upper bract-like leaves, usually found in tetraploid marsh orchids just below the inflorescence, are often entirely wanting, as in the plant illustrated by Pugsley (1936).

Inflorescence: In all of the colonies of *O. Traunsteineri* examined, a proportion of the plants was remarkable in possessing unusually lax, few-flowered inflorescences. This is a characteristic usually emphasised in Continental descriptions of the species. However, it appears to be one in which there is great variation; for in the Scraw Bog colony, the range of flower numbers encountered was from 8 to 29, with a mode between 12 and 14. This range is, nevertheless, low in comparison with the other British tetraploid marsh orchids.

Flower colour and patterning: The colour range of *O. Traunsteineri* flowers is somewhat similar to that of *O. praetermissa*, tending on the whole to rather darker shades, but never reaching the intensity characteristic always of *O. purpurella*, or even of that of the *O. majalis* populations of Clare or Galway. As may be seen from Plate 8, the labellum patterning is of a similar nature to that found in *O. praetermissa*, but is generally more intense and occupies a greater proportionate area. There is no similarity to the pattern of short, intense, broken bars characteristic of the small rhomboidal labellum of *O. purpurella*, nor to that found in the deeper hued *occidentalis*-type plants of the Irish *O. majalis*. Somewhat similar patterns are, however, found in the *kerryensis*-type plants of the latter.

A characteristic of the living plants is obscured in labella mounted flat as in Plate 8, namely a tendency for the lateral lobes of the labellum to be reflexed in *O. Traunsteineri*, somewhat in the manner of *O. latifolia*. This is absent in *O. praetermissa* and *O. purpurella*, but generally shown in Irish *O. majalis*.

TAXONOMIC NOTES.

The facts stated in the foregoing demonstrate that the four colonies which have been investigated may be grouped to form a fairly natural unit which is morphologically separable from other British tetraploid dactylorchid taxa. The justification for referring this to the Continental species, *O. Traunsteineri* Saut., remains to be examined.

Recently, Vermeulen (1949) has given a full account of the nomenclatural problem of *O. Traunsteineri*, and a detailed discussion is not therefore required here. The earliest description of a plant under the name of *O. Traunsteineri*, with Sauter quoted as the authority, is that given by the elder Reichenbach (1830, *Flora Germanica Excursoria*). The description by Sauter himself appeared seven years later (Sauter, 1837), and contains a reference to the earlier one of Reichenbach which is clearly accepted as referring to the same plant. The circumstances of the first description are, therefore, somewhat unusual, but it seems that there is justification in accepting Vermeulen's conclusion that Reichenbach's description of 1830 must be taken as the authoritative one, and Kitzbühl in Austria, whence came the material upon which it was based, as the type locality. Plants from Kitzbühl and Zell am See were originally distributed by Traunsteiner, and were known to Sauter, whose own description (1837), however, is based upon material from Bregenz (rather more than a hundred miles from Kitzbühl) which he accepted as being conspecific. Characters which are diagnostic in the earlier descriptions are (a) the sparse, very narrow leaves, and (b) the large flowers, with bluntly three-lobed labellum, the lateral lobes of which are reflexed. The former characters serve to differentiate the plant from any form of *O. majalis* Reichb. (= *O. latifolia* auct. mult.), and the larger flowers from the forms of *O. latifolia* L. sec. Pugsl. (= *O. incarnata* auct. mult.).

Later treatments of *O. Traunsteineri* suggest that the "species" quickly became a repository for forms not readily placed elsewhere in the subgenus. Klinge (1899) regarded *O. Traunsteineri* Saut. as synonymous with "*O. angustifolia* Lois.", of Reichenbach, 1830, and adopting the latter name, grouped under it numerous minor varieties and geographical races from well outside of the original Alpine area of *O. Traunsteineri*. Later, Fuchs and Ziegenspeck, in their monograph of *O. Traunsteineri* (1924, 1927) extended the use of the name to cover a polymorphic mass of hybrids and other dubious forms, declaring that "*Orchis Traunsteineri* non est species, sed forma ex gregibus *Dactylorchideis* hybridis vel 2, vel 3, vel 4 speciebus vel hybridis specierum ipsa composita, quam legit olim Traunsteiner et Sauter descripsit." Von Soó (in Keller & Schlechter, 1930-40) accepts the possibility of *O. Traunsteineri* being "eine hybridogene Art," but declines to follow Fuchs and Ziegenspeck in placing under it almost every type of dactylorchis hybrid. His subdivision of the species owes much to Klinge, the two major types recognised being an "alpine" one, subsp. *Traunsteineri*, and a "Baltic-northern" one, subsp. *Russowii*. Under each of these are placed several varieties and forms, mostly of somewhat dubious taxonomic significance. Collectively, the subsp. *Russowii* (Klinge) Aschers. & Graebn. is said to differ from the subsp. *Traunsteineri* in being more robust, and in possessing a greater number of leaves, a denser inflorescence and a labellum usually broadest at the centre rather than at the apex. It is doubtful whether distinctions of this nature can have much meaning, when applied in so general a manner to such extensive population systems, and certainly the characteristics referred to were not well developed in the Scandinavian *O. Traunsteineri* seen by me in 1950. Both in habit, and in the variation range of most of the critical taxonomic features, this appeared somewhat similar to the Irish plant, although material for more precise statistical comparison was unfortunately not obtained.

Vermeulen (1949) provides a careful and detailed "general description" of *O. Traunsteineri*, based apparently upon first-hand study of plants from the type area rather than upon literary research. This description gives some indication of the range of variation to be expected in various characters, and for most of these it may be said that the ranges indicated would include the bulk of the plants in the Britannic colonies described above.

With this group of dactylorchids, however, the fitting of plants to descriptions is a singularly unsatisfactory procedure, and ideally, before assuming the complete identity of the Britannic and Austrian forms, it would be desirable to conduct a biometrical comparison along the lines developed above. Nevertheless, as there is at the moment no evidence of morphological or other differences, it is necessary to accept the conspecificity of the two, recognising that more critical evidence may eventually suggest the desirability of segregating the British forms as a subspecies, for which the appropriate name would be subsp. *traunsteinerioides*.

DISTRIBUTION.

Stations for *O. Traunsteineri* in the British Isles known to the writer are listed in full below. These have been entered on the map, fig. 1, which replaces that published for "*O. majalis* subsp. *traunsteinerioides*" (Heslop-Harrison, 1949). The latter was prepared when the plant was imperfectly understood, and omits some Irish and southern English records, and includes some northern ones which now require re-examination. These northern records refer to Godfery's *O. eborensis* (Godfery, 1933), considered by Pugsley (1939) to be conspecific with *O. traunsteinerioides*. Judging from herbarium material, the possibility remains that some of these are, in fact, localities for *O. Traunsteineri*, but the matter requires investigation in the field.

- V.-c. 22, Berkshire. Cothill Fen (Colony T2 in this paper).
- V.-c. 28, West Norfolk. (1) Foulden Common; (2) water-meadows near Snetterton. Herbarium specimens collected on Foulden Common by J. E. Little in 1922 exist in the Cambridge University Herbarium, and a search made in June 1952 after inspection of this material revealed the presence there of a number of small colonies growing with *Schoenus* and *Cladium* in several small patches of fen over an area of about 1 sq. mile. Another Norfolk locality from which plants, probably of *O. Traunsteineri*, collected by J. E. Little, exist in the Cambridge herbarium is Marham Fen, but this has apparently suffered much drainage recently, and the plant was not observed there in 1952. *O. Traunsteineri* was, however, seen during this season near Snetterton, growing in small quantity in company with *O. Fuchsii*. It seems likely that the plant will be found elsewhere in Norfolk, for certainly many highly suitable localities exist in the county.
- V.-c. H9, Clare. Fen near Lough Bunny, the locality from which it was reported by Mrs. K. Gough (1952) under the name *O. traunsteinerioides*. This colony was visited after its discovery by Mrs. Gough. *O. Traunsteineri* occurs sparsely in *Schoenus*- and *Cladium*-dominated fen at the north-east corner of the lake, and also at other points around it. There are many similar habitats in Co. Clare, and there is a strong likelihood of the plant occurring elsewhere.
- V.-c. H19, Kildare. Fen north of the Curragh (T3 above).
- V.-c. H20, Wicklow. Coastal marshes near Newcastle (T1 above). The Ballyman Glen colony, also in this vice-county, which was included by Pugsley in *O. traunsteinerioides*, has not been seen by the writer.
- V.-c. H23, Westmeath. Scraw Bog (T2 above).

Mention has already been made of other Irish records for what is probably *O. Traunsteineri*, for v.-c. H25 (Roscommon) by Osvald (1949), and for v.-cs. H33 (Fermanagh) and H39 (Antrim) by Summerhayes (1951).

In England, the dactylorchids of Greywell Fen, near Odiham, Hants., have been investigated, following up Pugsley's report of *O. traunsteinerioides* from this locality (1946). In the highly polymorphic *O. praetermissa* population of this fen there are individuals which approach the *O. Traunsteineri* variation range in sparsity and narrowness of leaves, and in labellum shape and pattern, but nothing has been found in this locality comparable, for example, with the very distinctive Cot-hill Fen colony.

The taxonomic confusion which has surrounded *O. Traunsteineri* practically since its first description makes it difficult to formulate any picture of the extra-British distribution except in the broadest possible terms. The following points, however, seem reasonably clear:

(1). The "typical" form of the species (*O. Traunsteineri* subsp. *Traunsteineri* [von Soó]; var. *eu-Traunsteineri* Asch. & Graebn.; *O. angustifolia* var. vel ssp. *Traunsteineri* Klinge; *Dactylorchis Traunsteineri* subsp. *typica* Vermeulen etc.) occurs in the Alps and throughout the associated mountain systems, where according to Keller (quoted by von Soó, 1930-40) "ist die Art eine Charakterpflanze der mineralstoffreichen Flachmoore, besonders der subalpinen Gehängemoore."

(2). Associated forms occur in southern and central Germany, probably westwards into lowland France (where, however, the species is either rare or generally overlooked), and, sparsely, even in Holland (Vermeulen, 1949).

(3). A second series of populations, placed by Ascherson and Graebner (1907) under subsp. *Russowii* (Klinge), but treated in standard Scandinavian floras simply as *O. Traunsteineri* Saut. or *O. angustifolia* Lois. in Reichb. (non Wimm.), occurs in northern Germany and the Baltic countries, throughout most of Scandinavia to a latitude of c. 65° N, and eastwards, in Russia, into western Siberia.

Hultén (1950) refers *O. Traunsteineri* to his distributional-type 26, "West-European — Middle-Siberian Plants", in the subgroup, "Present in Caucasus, absent east of the Urals." As is clear from the distributional map given by Hultén for *O. Traunsteineri*, this is based upon an interpretation of the species in the widest possible sense, including even *O. pseudocordigera* Neum., *O. lapponica* Laest. and *O. Blyttii* Soó. Accepting a rather less wide interpretation of the species than this, and assuming that the above summary of distribution is at least approximately corrected, it would appear that the species would be better placed in Hultén's group 35, "East-European continental species with connections to Scandinavia through the Baltic countries".

Throughout its European range, *O. Traunsteineri* appears to retain a predilection for rich fen habitats, and many authors comment upon the strongly calcareous nature of the ground water in localities in which it occurs. This characteristic is certainly apparent in the British

Isles, and it would possibly be more appropriate to seek for an explanation of the present highly disjunct distribution of the species in relative rareness of suitable habitats rather than to invoke historical explanations. Nevertheless, it is clear that, like *O. cruenta* (Heslop-Harrison, 1951), *O. Traunsteineri* may have been much more common in the British Isles at a time when fen habitats were available more widely—in Ireland, particularly, before the growth of ombrogenous bog over the central limestone plain.

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ACANTHUS MOLLIS L. IN ST AGNES, ISLES OF SCILLY

By B. W. RIBBONS.

Acanthus mollis L. (for a description; see Warburg (1952)), a species of southern Europe, was first recorded for St Agnes in 1851 (Babington, 1851), when the Rev. J. P. Mayne sent flowers to Babington for naming. Local inhabitants at that time said they remembered the plant growing wild 40 to 50 years earlier. According to Mayne, it was not known in any other of the Scilly Islands or elsewhere in St Agnes. He suspected that birds had brought the seeds from the continent. Babington wrote that it could hardly have been introduced into gardens at the beginning of the 19th century, for Mr. Mayne had ascertained that there were no gardens in the Island even as late as 1830; only potatoes, rye, and cabbages being grown by the islanders who lived almost wholly by the sea. In 1851 the plant occupied an area of about 20 feet by 5 or 6 feet, on the south side of a hedge and separated from some houses by a narrow field. It grew upon some heaps of stones which collected there upon the destruction of an old lane that formerly passed the spot.

The station is noted by Watson (1852) and in the 4th to the 10th editions of Babington's *Manual* (1856-1922), by Key (1868), and by Hooker (1884). Sowerby (1866) says the plant was "formerly found in the island of St Agnes; no doubt introduced." "Mr. F. Townsend, in 1863, was unable to see or hear that it was still in existence, so that it is probably extinct." Townsend (1864) "did not observe it" in 1862 and Smith (1912) in 1906 failed to find it, "but saw two plants in St Mary's, where in all probability they were escapes from cultivation." A note in a copy made by E. D. Marquand (Marquand, 1893) of J. Ralfs's unpublished manuscript of a Flora of Scilly indicates that Ralfs searched in vain for the *Acanthus*. The *Acanthus* is given, on the authority of Tellam, for 'Scilly Isles' in Davey (1909) but I do not know whether this refers to St Agnes, since Tellam's herbarium is not at present accessible. The Misses Millett's (1853) record of 1852 may have referred to St Agnes but the plant is cited merely for 'Isles of Scilly'. Thurston's (1936) record presumably refers to the Babington note of 1851.

In July 1950 I found a patch (20 feet by 12 feet) of *Acanthus mollis** in St Agnes growing on some waste ground on the south side of a wall. It was in a farm enclosure, separated from the house by a narrow field, and could not be seen from a road or any other public place. The plants were well established and had obviously been there for several years at least. The tenants of the farm have known the plant always in the one place, and the former tenants say the plant was there in 1912 when they took the farm and it continued to increase "although it was cut

*Specimen in Herb. University of Glasgow.

down and burnt as well'. Thus the plant may well have existed on the same site for a century and possibly since *c.* 1800. I have not been able to trace the present patch back beyond 1912 and the only possibility of doing so would seem to be the elucidation of Tellam's record. Major A. A. Dorrien-Smith tells me that he is of the opinion that it was introduced from Tresco Gardens some time after 1834 by Augustus Smith, the then Lord Proprietor, probably into the St Agnes parsonage garden where he lived occasionally. This may be the explanation of its presence, although the possibility of a small piece having been introduced by some cottager or visitor, long before 1834, cannot entirely be discounted; especially since there is no mention in the 1851 note of the parsonage garden and the present station is about one-sixth of a mile from the parsonage.

Acanthus mollis does not occur anywhere else in St Agnes (the present occupants say there is none in the parsonage garden) and the existing patch seems to be increasing only by rhizome growth. It is, for this reason, regarded as a pest and is cut down every year. There is apparently no spreading by means of seed and the present tenant reported that no seeds could be found in the dried capsules in the autumn of 1950. The plant has been known as a garden escape in various places on the Cornish mainland since 1820 (Jones, 1820) and it appears to be increasing. It is also known (Lousley, *in lit.*) in a cottage garden in St Martin's, Scilly, and was reported by Grose in 1939 from Rocky Hill, St Mary's.

I wish to express my thanks to Mr. J. E. Lousley, Mr. R. Mackechnie, and Miss A. D. Tiddy for their kind assistance.

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RUMEX CUNEIFOLIUS AND A NEW HYBRID

By J. E. LOUSLEY.

In August 1952 I received from Dr. F. R. Elliston Wright specimens of a *Rumex* which he had collected from Braunton Burrows, N. Devon., v.-c. 4, where it grew in the colonies of *R. cuneifolius* Campd. The material was clearly of hybrid origin, with the species mentioned as one of the parents.

R. cuneifolius is a native of Peru, Bolivia, Chile, Argentine and Uruguay. It thus occurs over a wide area in South America and under a considerable range of climatic conditions. The varied habitats include dunes on both the east and west coasts. Plants which differ in being smaller and more slender in all their parts, and with the leaves often acuminate, are common on the coastal dunes of Chile and have been separated as var. *maricola* (Remy) Rech. f. (Rechinger, 1933).

In Britain *R. cuneifolius* has been established on maritime dunes at Phillack Towans, Cornwall; Braunton Burrows, N. Devon and at Kenfig, Glamorgan, since at least 1921, 1929 and 1925 respectively. In all three localities it persists, and in the last two it is still extending its range (Lousley, 1953). In 1913 there was a patch of about 20 square feet on dunes at Wallasey, Cheshire, but this appears to be now lost. It has also been found at various places near docks and to the list published in 1944 (Lousley, 1944, 580) should be added:—6, N. Somerset: Portishead Dock, 1933, H. J. Gibbons (Hb. Mus. Brit.). It has been found as an alien in U.S.A. and in Europe in Denmark (Rechinger, 1933, 23), and Holland (Heukels, 1933, 281). The British material shows some approach to var. *maricola* in having leaves often less obtuse than in the typical var. *cuneifolius* (cf. Rechinger, 1933, tab. 5) but I have seen none which agreed with Chilean specimens.

R. cuneifolius is well adapted to dune conditions. The woody rhizome extends at an average depth of 35 cm. and, at intervals, branches and produces aerial shoots. Lengths of rhizome of over a metre in length have been excavated. (Kenfig observations.) The plant is exposed above ground to a height of only 20-25 cm., and produces coriaceous leaves of a xeromorphic type. It can grow upwards through a considerable depth of blown sand. Its ecological requirements appear to be very similar to those of *Carex arenaria*, with which it is frequently associated. Although it sometimes grows with *Rumex crispus* L. var. *littoreus* Hardy, *R. rupestris* Le Gall, or *R. conglomeratus* Murray, it is less dependent on water available in the sand than these species. It differs from all native British docks in possessing a rhizome, and in the curious method of producing lower branches which overtop the earlier fruiting branches which is characteristic of the Section *Axillares*, to which it belongs.

The more important characters of *R. cuneifolius* are as follows:— Perennial, with a long creeping woody rhizome. Stems short (15-30 cm.), ascending or suberect, with coarse, leathery obovate leaves, which are crisped and finely crenate on the margins, and cuneate at the base. Panicles stout, very congested and almost without bracts, with a few short simple branches. Inner tepals 4.5×2.5 -3 mm., ovate-deltoid, entire, all bearing a large elongated rather warty tubercle; pedicels short, thickened at the base of the perianth.

The hybrid found by Dr. F. R. Elliston Wright at Braunton, in colonies of this species, was immediately distinguished by its greater height (c. 35 cm.), more erect habit with much branched looser panicle, and general sterility. It grew "usually in a little clump of what looks like a dozen plants" which have increased from the parent by vegetative spread—thus resembling *R. cuneifolius* in the possession of a rhizome. *R. crispus* var. *littoreus* grew near in small quantity and Dr. Wright stated that *R. conglomeratus* was formerly growing in the same place.

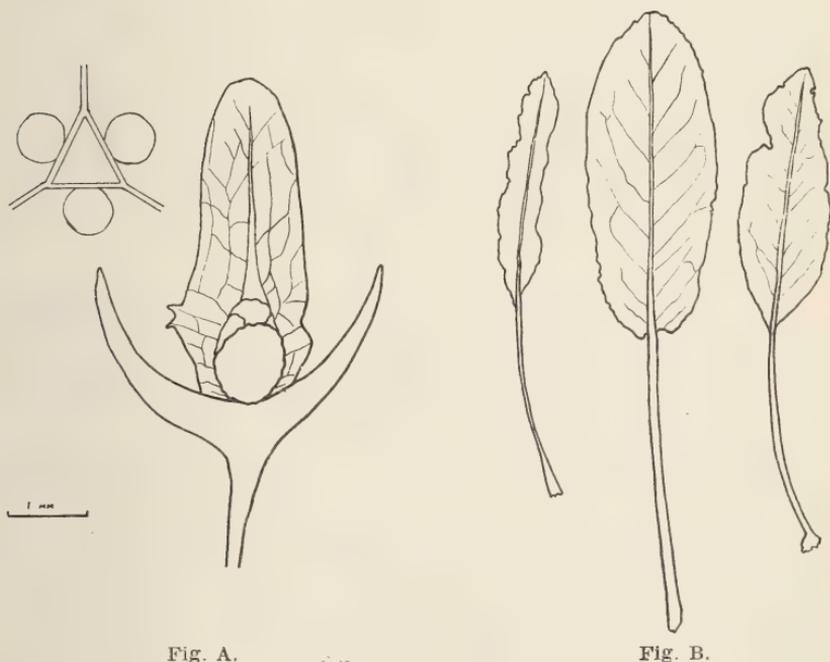


Fig. A.

Fig. B.

Fig. A. *R. x Wrightii*. Fruiting perianth from Braunton Burrows, Aug. 25, 1952, with diagrammatic transverse section through the tubercles. $\times 10$.

Fig. B. *R. x Wrightii*. Lower leaves from plants grown from rhizome of gathering of Aug. 4, 1952; the middle leaf characteristic, the others selected to show variation. Drawn from living material, November 29, 1952. $\times \frac{1}{2}$.

When I received the first specimens gathered on August 4, I thought they might be the hybrid with *R. crispus*. This hybrid has been described by Rechinger from Bolivia and Argentina under the name *R. × mirabilis* (Rechinger, 1933, 48). In those countries *R. cuneifolius* is native, while *R. crispus* is an introduction from Eurasia. The Braunton material agreed with much of Rechinger's description, but I was puzzled by the long panicle branches and the shape of the bases of the leaf-blades, which could hardly have come from either parent. On August 25, Dr. Wright sent more mature material. In this, as in the earlier gathering, most of the tepals had shrivelled with little or no enlargement but a few, here and there, had developed sufficiently. These were oblong in outline and showed that the broader fruited *crispus* could hardly have entered into the hybrid. The characters of the fruit, and those already mentioned, were entirely consistent with a cross between *R. conglomeratus* and *R. cuneifolius*. This hybrid is apparently new to science, but it is not unlikely to occur in South America, where *R. conglomeratus*, like *R. crispus*, is a common alien. The new hybrid, like *R. × mirabilis*, has arisen between species which have long been in geographical isolation. I propose to name it for Dr. F. R. Elliston Wright who has devoted so many years to the study of the flora of Braunton Burrows.

The following description is from material sent from Braunton on August 4, 1952. The lower leaves are described from two plants struck from small pieces of the rhizome of this gathering and grown in my garden (Fig. B). The characters of the fruit are added from additional material sent by Dr. Wright on August 25, 1952 (Fig. A).

Rumex × Wrightii (*R. conglomeratus* Murray × *R. cuneifolius* Campd.) *hybr. nov.*

Plant perennial with a woody rhizome. Stem 35-40 cm., arcuate-ascending, sulcate. Lower leaves very variable, somewhat coriaceous, lanceolate to oblong, subobtusate, lamina 10-15 × 2-6.5 cm., crisped and finely crenate on margins, about equalling the petioles, subcordate, truncate or cuneate at the base. Cauline leaves narrower, lanceolate to ovate-lanceolate, 7-11.5 × 1.5-4 cm., often subacute at apex, truncate or tapering at base, crisped and finely crenate on margins—merging into linear bracts above. Panicle much branched with ascending branches arising at an angle of about 45°, whorls mostly remote (occasionally congested), the lower ones subtended by bracts, pedicels filiform, c. 2 mm., thickened at the base of the perianth. Tepals (when enlarged) lingulate, c. 3.75 × 1.5-1.75 mm., subobtusate, margins entire, or rarely with one or two small teeth near the base, all with an elongated, 1.25-1.50 × 0.75-1 mm., very swollen and somewhat verrucose tubercle. Nuts abortive.

Type in Herb. Lousley, Ref. 520804. Braunton Burrows, N. Devon, Aug. 4, 1952, *F. R. Elliston Wright*.

Planta perennis, rhizomate lignoso. Caulis arcuato-adscendens, sulcatus. Folia inferiora valde variabilia, aliquid coriacea, lanceolata vel oblonga, subobtusata; lamina 10-15 cm. longa et 2-6.5 cm. lata, petiol-

um subaequans, margine crispata necnon leviter crenata, basi subcordata, truncata vel cuneata; folia caulina angustiora, lanceolata vel ovato-lanceolata, 7-11.5 cm. longa, 1.5-4 cm. lata, apice saepe subacuta, basi truncata vel angustata, margine crispata et leviter crenata, in bracteas lineares superne transeuntia. Panicula ramosissima, ramulis ascendentibus sub angulo c. 45° exorientibus, verticillis plerumque remotis (nonnunquam congestis), inferioribus bracteatis; pedicelli filiformes, c. 2 mm. longi, basi perianthii incrassati. Tepala (accreta) linguata, 3.75 mm. longa et 1.5-1.75 mm. lata, subobtusa, margine integra vel raro basin versus 1-2-denticulata; omnia tuberculo elongato 1.25-1.5 mm. longo et 0.75-1 mm. lato tumidissimo aliquid verrucoso, praedita. Nuculi abortivi.

The influence of *R. cuneifolius* is clear from the presence of a rhizome and the coriaceous leaves, and that of *R. conglomeratus* in the base of the leaves being often subcordate or truncate and frequently asymmetrical, in the panicle having long branches with remote whorls subtended by bracts below, and in the linguulate outline of the fruiting tepals.

Material has been deposited at the British Museum (Natural History) and the Royal Botanic Gardens, Kew. I would like to record my thanks to Mr. J. P. M. Brenan for kindly preparing the Latin translation of the diagnosis and to Dr. K. H. Rechinger for confirming that he is not aware of publication of a hybrid of the parentage stated and that he has not seen herbarium specimens of this hybrid. The living and dried material on which this account is based was exhibited at the Society's Exhibition Meeting of 29th November 1952.

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**ADDITIONS AND EMENDATIONS TO THE COMITAL FLORA FOR
FIFE AND KINROSS (v.-c. 85)**

By K. N. G. MACLEAY.

The publication of W. Young's list (1936) has emphasized the need for a number of corrections and additions to the "Comital Flora" for vice-county 85.

Examination of the herbaria listed below, observations by the staff and students of the Department of Botany in the University of St. Andrews and some records of my own have further enlarged the list of necessary emendations.

In most cases Young records localities other than the under-mentioned; the examples selected are those which seem to be the most reliable or which can readily be substantiated. A number of the plants mentioned are merely casual; others are doubtful and these are shown in square brackets; while some, well known to have occurred in the vice-county in the past, are now presumed to be extinct and are shown in pointed brackets. Aliens and other plants not native to the vice-county are marked with a dagger. The records for aliens are written (85) unless they are alien in the whole country.

- 2/4. THALICTRUM MAJUS Crantz. North Queensferry, A. C. Christie, J. H. Balfour, 1902; W. E. Evans, 1905; in Herb. R.B.G.; add 85 to C.F.; see also *Rep. Bot. Soc. & E.C.*, 10, 802 (1935).
- 6/9. RANUNCULUS ARVENSIS L. Cupar, H. Matthews, 1890; Crail, G. Sim, in Herb. St.A.; remove brackets from record in C.F.
- †6/13. RANUNCULUS PARVIFLORUS L. Charlestown, A. C. Christie, 1871, in Herb. R.B.G.; sole record; add (85) to C.F.
- 6/22. RANUNCULUS TRICHOPHYLLUS Chaix. Dunfermline, J. H. Balfour & J. Sadler, 1863; Kinghorn Loch, J. Sadler, 1865, in Herb. R.B.G.; add 85 to C.F.
- 6/23. RANUNCULUS DROUETHI Godr. Craill's Muir, G. Sim, 1889; Morton Lochs, Kinghorn Loch, G. West, 1910; still there 1946, K. N. G. MacLeay, in Herb. St.A.; add 85 to C.F.; but see *Top. Bot., Suppl.*, 2, 2.
- 6/25. RANUNCULUS PELTATUS Schrank. Lindores, Lochmill, Morton, Kinghorn Lochs, G. West, 1910; still present 1946, K. N. G. MacLeay in Herb. St.A.; add 85 to C.F., but see *Top. Bot.*, ed. 2, p. 6 (1883).
- +13/3. DELPHINIUM AJACIS L. Ladybank station, J. Sadler, 1876, in Herb. R.B.G.; sole record and probable garden escape, add 85 to C.F.
- +21/6. PAPAVER HYBRIDUM L. St. David's, A. C. Christie, 1880, in Herb. R.B.G.; sole record; add (85) to C.F.

- 23/1. *GLAUCIUM FLAVUM* Crantz (*G. Glaucium* (L.) Karst.). Many old records for the v.-c.; now almost certainly extinct there; write <85> in *C.F.*
- †36/2. *BARBAREA VERNA* (Mill.) Aschers. Crail, *G. Sim*, in Herb. St.A.; Inverkeithing, *A. Robertson*, 1892; add 85 to *C.F.*
- †36/5. *BARBAREA INTERMEDIA* Bor. Ceres, *C. Howie*, 1894; in Herb. R.B.G.; add 85 to *C.F.*
- †43/4. *DRABA MURALIS* L. Crail, *G. Sim*, 1889, in Herb. St.A.; Raith, *J. H. Balfour*, 1902; add (85) to *C.F.*, but see *Watsonia*, 2, 336 (1952).
- 44/1. *EROPHILA VERNA* (L.) Chevall. North Queensferry, 1835, in Herb. R.B.G.; Crail, Elie, St. Andrews Links, common, *K. N. G. MacLeay*, 1938, in Herb. St.A.; add 85 to *C.F.*
- 45/5. *COCHLEARIA ANGLICA* L. Kincaig, *W. Wood*, 1862; Kinghorn, Inchcolm, North Queensferry, in Herb. Somerville; add 85 to *C.F.*
- †49/5. *SISYMBRIUM IRIO* L. Charlestown, *A. C. Christie*, 1870; Elie Harbour, *W. Wood*, 1862; add 85 to *C.F.*
- 53/1. *SUBULARIA AQUATICA* L. Loch Leven, 1894, in Herb. Somerville; add 85 to *C.F.*
- †61/2. *LEPIDIUM LATIFOLIUM* L. Wemyss Castle, *A. H. Gibson*, 1882, in Herb. R.B.G.; several other good records; write (85) in *C.F.*
- †61/3. *CARDARIA DRABA* (L.) Desv. (*Lepidium Draba* L.). Crail, Thornton, *G. Sim*; Kirkcaldy, *W. Young*; both in Herb. St.A.; well established but not naturalised; add 85 to *C.F.*
- 75/1. *CRAMBE MARITIMA* L. Elie, *W. E. Evans*, 1907, is the latest record from Fife; almost certainly now extinct; write <85> in *C.F.*
- 88/3. *VIOLA REICHENBACHIANA* Bor. (*V. sylvestris* Lam. p.p.). Burntisland, *J. H. Balfour*, 1856; Pitscottie, *K. N. G. MacLeay*, 1939, in Herb. St.A.; add 85 to *C.F.*
- 88/22-30. *VIOLA ARVENSIS* Muir. Kinross, *J. R. Matthews*, 1922, as *V. agrestis* Jord.; add 85 to *C.F.*
- 88/34. *VIOLA CURTISII* E. Forst. Leslie, *G. Sim*, 1907; this specimen is not in his herbarium and was almost certainly *V. lutea*; the locality is most unlikely for *V. Curtisii*; delete 85 from *C.F.*
- 89/2. *POLYGALA VULGARIS* L. North Queensferry, 1831, in Herb. R.B.G.; Pitscottie, Tents Muir, *K. N. G. MacLeay*, in Herb. St.A.; add 85 to *C.F.*
- †96/3. *SILENE CONICA* L. Elie, *A. C. Christie*, 1882; casual; add (85) to *C.F.*
- †96/6. *SILENE ANGLICA* var. *QUINQUEVULNERA* (L.) Mert. & Koch (*S. quinquevulnera* L.). Shore of Lindores Loch, *Col. Drummond-Hay*, 1878; casual; add (85) to *C.F.*

- 104/1. SPERGULA ARVENSIS L. Very common in cultivated fields throughout the v.-c.; add 85 to *C.F.*
- †106/1. POLYCARPON TETRAPHYLLUM (L.) L. Charlestown, A. C. Christie, 1870, in Herb. R.B.G.; sole record; add (85) to *C.F.*
- 112/1. HYPERICUM ANDROSAEMUM L. "Fife", Maughan, 1836; Culross, A. Robertson, 1834; no later records; write <85> in *C.F.*
- 116/1. LAVATERA ARBOREA L. Isle of May, R. Sibbald, 1710, N.S.A., 1845; still there 1939, K. N. G. MacLeay; Largo, W. Young, 1919, in Herb. St.A.; remove brackets from record in *C.F.*
- †128/1. ERODIUM MARITIMUM (L.) L'Hérit. Crail, G. Sim & C. C. Babington, 1885; add (85) to *C.F.*
- †128/2. ERODIUM MOSCHATUM (L.) L'Hérit. Balcomie Links, G. Sim, 1885, certified by C. C. Babington; add (85) to *C.F.*
- †137/1. EUONYMUS EUROPAEUS L. Kilconquhar, Burntisland, J. H. Balfour, 1859; almost certainly planted; still at Kilconquhar 1946, K. N. G. MacLeay; add (85) to *C.F.*
- 149/3. ULEX MINOR Roth. Newport, W. G. Smith, 1886; probably a misidentification; not there 1946, K. N. G. MacLeay; delete from *C.F.*
- 153/4. MEDICAGO HISPIDA Gaertn. (*M. denticulata* Willd.). Recorded by Trail from "Fife" without further data; no localities or specimens known to Young; very doubtful; delete 85 from *C.F.*
- 155/13. TRIFOLIUM FRAGIFERUM L. Guardbridge, 1794, in Herb. Brodie in R.B.G.; not seen since, write <85> in *C.F.*
- †155/19. TRIFOLIUM AUREUM Poll. (*T. agrarium* auct.). Not known to, or recorded by Young but not unlikely to occur; write [85] in *C.F.* pending further evidence.
- 167/1. OXYTROPIS HALLERI Bunge (*O. uralensis* DC. p.p.). Now almost certainly extinct in Fife; the North Queensferry station was destroyed by the building of the Forth Bridge; no specimens have been seen at Bishop Hill for many years; write <85> in *C.F.*
- †176/7. VICIA BITHYNICA (L.) L. Kinghorn, W. E. Evans, 1903; Prof. Trail, 1905, casual; add (85) to *C.F.*
- 176/9. VICIA LUTEA L. Last recorded from North Queensferry in 1904; Young considered it as extinct in Fife; write <85> in *C.F.*
- 178/2. LATHYRUS SYLVESTRIS L. Cauldron Linn, J. H. Balfour & J. Sadler, 1871; now almost certainly extinct in Fife; add <85> to *C.F.*
- †178/9. LATHYRUS APHEACA L. Burntisland docks, F. M. Webb, 1878; a ballast plant not recently seen; add (85) to *C.F.*

- †184/10. SPIRAEA SALICIFOLIA L. St. Fort, *W. G. Smith*, 1886; Ladybank, Cameron Bridge, *W. Young*; Kilconquhar, *K. N. G. MacLeay*, 1945, in Herb. St.A.; add 85 to *C.F.*
- †188/1. FRAGARIA MOSCHATA Duchesne. Kinghorn, *J. H. Balfour*, 1902; Aberdour, *A. H. Gibson*, in Herb. R.B.G.; add 85 to *C.F.*
- 194/2. ROSA ARVENSIS Huds. St. Andrews, *K. N. G. MacLeay*, 1941, det. *R. Melville*; see *Rep. Bot. Soc. & E.C.*, **10**, 164 (1933) for earlier record.
- 194/6-11. ROSA CANINA L. (incl. *R. lutetiana* Léman, *R. dumetorum* Thuill., etc.). Near Kirkcaldy, *A. H. Gibson*, 1882, in Herb. R.B.G.; Blairadam, *J. R. Matthews*, 1926; Burntisland, *F. M. Webb*, 1876, in Herb. R.B.G.; see *Rep. Bot. Soc. & E.C.*, **8**, 113 (1927) and **10**, 164 (1933) for other records.
- 194/12. ROSA CAESIA Sm. (*R. glauca* Vill. ex Lois., non Pourr.; *R. coriifolia* Fr.). Orrock Hill, *J. Boswell Syme*, 1876, in Herb. R.B.G.; see *Rep. Bot. Soc. & E.C.*, **8**, 113 (1927) for other records.
- 194/19p.p. ROSA SHERARDI Davies. Milnathort, *J. R. Matthews*, 1926; St. Andrews, *K. N. G. MacLeay*, 1941, det. *R. Melville*, in Herb. St.A.; included in *C.F.* in *R. tomentosa* for which there is no record for the v.-c.; see *Rep. Bot. Soc. & E.C.*, **8**, 114 (1927) for other records.
- 195/1. MALUS SYLVESTRIS Mill. (*Pyrus Malus* L.). St. Andrews, *J. H. Wilson*; Lindores, *K. N. G. MacLeay*, 1938, in Herb. St.A.; delete 85 from exceptions in *C.F.*
- 199/1. SAXIFRAGA AIZOIDES L. Lomond Hills, *A. H. Millar*, 1895; no recent records but quite a possible station; confirmation required; add [85] to *C.F.*
- 203/1. CHRYSOSPLENIUM ALTERNIFOLIUM L. Lomond Hills, Saline, *J. H. Balfour*; 1902; Dunino, *K. N. G. MacLeay*, 1938; add 85 to *C.F.*
- †207/5. RIBES ALPINUM L. Cambo, *G. Sim*, 1900, in Herb. St.A.; Raith, *J. H. Balfour*, 1902; add (85) to *C.F.*
- †211/10. SEDUM DASYPHYLLUM L. Fife Ness, *Leighton & Swann*, 1840; not seen for many years, presumably extinct; add <85> to *C.F.*
- 217/3. CALLITRICHE PALUSTRIS L. (*C. verna* L.). Isle of May, *G. West*, 1910; Kenly Burn, *G. Sim*; Tents Muir, *K. N. G. MacLeay*, 1942, in Herb. St.A.; add 85 to *C.F.*
- 220/5. EPILOBIUM ADNATUM Griseb. (*E. tetragonum* L. p.p.). Lindores and Kilconquhar Lochs, *G. West*, 1910; still present in 1946, *K. N. G. MacLeay* in Herb. St.A.; add 85 to *C.F.*
- 220/8. EPILOBIUM ROSEUM Schreb. Inverkeithing, *W. E. Evans*, 1907; add 85 to *C.F.*

- 220/13. *EPILOBIUM ANAGALLIDIFOLIUM* Lam. (*E. alpinum* L. p.p.). West Lomond Hill, Glen Queich, *J. H. Balfour & J. Sadler*, 1862; add 85 to *C.F.*
- +223/1. *OENOTHERA BIENNIS* L. Pettycur, *W. E. Evans*, 1907; Dairsie, 1939, Dunbog, 1944, *K. N. G. MacLeay*, in *Herb. St.A.*; add 85 to *C.F.*
- 239/2. *ERYNGIUM MARITIMUM* L. Latest record is that from Burntisland in 1871, now presumably extinct; write <85> in *C.F.*
- +258/1. *CHAEROPHYLLUM AUREUM* L. St. Andrews, *J. A. Macdonald*, 1938, in *Herb. St.A.* A landslide in the winter of 1939 caused all the plants to fall into the sea and no others have since appeared. Write <85> in *C.F.*
- +261/3. *ANTHRISCUS CEREFOLIUM* (L.) Hoffm. (*Cerefolium Cerefolium* (L.) Schinz & Thell.). Kirkcaldy, *W. Young* in *Herb. St.A.*; add 85 to *C.F.*
- +263/1. *FOENICULUM VULGARE* Mill. (*F. Foeniculum* (L.) Karst.). Kilconquhar, *J. H. Balfour*, 1902; Charlestown, *A. C. Christie*; St. David's, *W. Young* in *Herb. St.A.*; add (85) to *C.F.*
- 264/1. *CRITHMUM MARITIMUM* L. Not recorded since 1824 in Fife; add <85> to *C.F.*
- 265/1. *OENANTHE AQUATICA* (L.) Poir. Ladybank, *J. Sadler*, 1876, in *Herb. R.B.G.*; Charlestown, *A. C. Christie*, 1873; add 85 to *C.F.*
- +276/3. *PASTINACA SATIVA* L. (*Peucedanum sativum* (L.) Benth. ex Hook. f.). St. David's, *W. E. Evans*, 1902; Crail, *W. Young* in *Herb. St.A.*; St. Andrews, *K. N. G. MacLeay*, 1943; casual; add (85) to *C.F.*
- +283/4. *TORILIS ARVENSIS* (Huds.) Link (*Caucalis arvensis* Huds.). East Neuk, *W. Wood*, 1862; Balcarres, *C. Galloway*, 1842, in *Herb. R.B.G.*; much further north than previously recorded; add (85) to *C.F.*
- +291/1. *LONICERA CAPRIFOLIUM* L. Buddo rocks, *G. Sim* in *Herb. St.A.*; Dysart Woods, *J. H. Balfour*, 1902; add 85 to *C.F.*
- +291/5. *LONICERA XYLOSTEUM* L. Inverkeithing, *J. H. Balfour*, 1902; Dunfermline, *Dr. Dewar*, introduced; add (85) to *C.F.* but see also *Rep. Bot. Soc. & E.C.*, 5, 657 (1920).
- 296/3. *GALIUM ERECTUM* Huds. Only record is from Cults, probably in error for *Galium Mollugo* which occurs there; certainly not now present; delete 85 from *C.F.*
- 296/5. *GALIUM PUMILUM* Murr. Balmerino, *R. Sibbald*, 1710; St. Monance and Dunbarnie Links, *W. Wood*, 1862; Lomond Hills, *J. H. Balfour*, 1902; add 85 to *C.F.*
- 304/4. *VALERIANELLA CARINATA* Lois. Aberdour, *J. R. Reid*, 1877, in *Herb. R.B.G.*; add 85 to *C.F.*

- †306/2. *DIPSACUS PILOSUS* L. Flisk, no data, in Herb. R.B.G.; Newburgh, *Leighton & Swann*, 1840; introduced; add (85) to *C.F.*
- †320/3. *ERIGERON CANADENSIS* L. Tayport, *G. Law*, 1858; Balcomie, *G. Sim* in Herb. St.A.; St. David's and Charlestown, *A. C. Christie*, 1870-1; casual; add 85 to *C.F.*
- †333/1. *INULA HELENIUM* L. Burntisland, *N.S.A.*, 1845; Lindores, *K. N. G. MacLeay*, 1946, in Herb. St.A.; add 85 to *C.F.*
- †334/1. *PULICARIA DYSENTERICA* (L.) Bernh. Near Elie, *H. Cleghorn*, 1837, in Herb. R.B.G., only record; add (85) to *C.F.*
- †381/2. *DORONICUM PLANTAGINEUM* L. Kincardine-on-Forth, *J. H. Balfour*, 1902; Dysart Woods, *W. Young*, 1936; near St. Andrews appearing thoroughly established, *K. N. G. MacLeay*, 1944, in Herb. St.A.; possibly a garden escape; add 85 to *C.F.*
- 395/1. *CARDUUS NUTANS* L. North Queensferry, Limekilns, *A. Robertson*, 1836; Kincaig, *C. Galloway*, 1842; not seen for many years and now presumably extinct in Fife; add <85> to *C.F.*
- †409/1. *CICHORIUM INTYBUS* L. Inchcolm, *R. Sibbald*, 1710; many other subsequent records, generally as an escape from cultivation; write (85) in *C.F.*
- †410/1. *ARNOSERIS MINIMA* (L.) Schweigg. & Koerte. Pettycur, *W. E. Evans*, 1906; casual; add (85) to *C.F.*
- 416/3. *CREPIS BIENNIS* L. Aberdour, *A. C. Christie*, 1883; St. David's, *W. E. Evans*, 1902; add 85 to *C.F.*
- †416/10. *CREPIS TARAXACIFOLIA* Thuill. St. David's, *A. C. Christie*, 1868, 1890; casual; add 85 to *C.F.*
- †419/186. *HIERACIUM AMPLEXICAULE* L. Naturalized on the walls of Cleish Castle, *A. Robertson*, 1894; *J. Fraser*, 1935, in Herb. R.B.G.; add 85 to *C.F.* [Long known in this locality where Hooker collected it; 83 in *C.F.* is perhaps a misprint for 85; Pugsley in his *Prodrromus* erroneously attributes the locality to 87.—ED.]
- 421/3. *HYPCHOERIS GLABRA* L. Culross, *C. O. Sonntag*, 1894; Tents Muir, *Malcolm Wilson*, 1934; *K. N. G. MacLeay*, 1943; add 85 to *C.F.*
- †425/4. *MYCELIS MURALIS* (L.) Reichb. (*Lactuca muralis* (L.) Gaertn.). Between Anstruther and Elie, *J. H. Balfour*, 1864; near St. Fort, *K. N. G. MacLeay*, 1945; add (85) to *C.F.* but see *Rep. Bot. Soc. & E.C.*, 6, 388 (1922) for another record.
- 432/1. *JASIONE MONTANA* L. St. David's, *A. C. Christie*, 1873; Largoward, Kilrenny, Kincaig, *W. Wood*, 1862; delete 85 from exceptions in *C.F.*
- 457/1. *LIMONIUM VULGARE* Mill. (*L. Limonium* (L.) Lyons). Several old records, all of which are doubtful; the plant is no longer present; write [85] in *C.F.*

- +467/3. ANAGALLIS FOEMINA Mill. Inverkeithing, A. H. Millar, 1895; St. Andrews, K. N. G. MacLeay, 1938, probably garden escapes; add (85) to *C.F.*
- +482/1. NYMPHOIDES PELTATA (S. G. Gmel.) Kuntze (*N. Nymphoides* (L.) Druce). Kilconquhar Loch, W. Ballingall, 1872; introduced; had disappeared by 1946, K. N. G. MacLeay; add <(85)> to *C.F.*
- 505/1. MERTENSIA MARITIMA (L.) Gray (*Pneumaria maritima* (L.) Hill). Several records prior to 1912 when Young last saw it at Kincaig; now extinct in Fife; write <85> in *C.F.*
- 506/7. MYOSOTIS SYLVATICA Hoffm. Cambo, G. Sim in Herb. St.A.; Kirkcaldy, W. Young, 1936; add 85 to *C.F.* but see *Rep. Bot. Soc. & E.C.*, 5, 668 (1920).
- 517/2. SOLANUM NIGRUM L. Burntisland, J. Boswell Syme, 1871; St. Andrews, J. H. Balfour, 1861; K. N. G. MacLeay, 1946; an erratic weed; remove brackets from entry in *C.F.*
- +527/4. VERBASCUM VIRGATUM Stokes. Logie, J. Dewar, 1835; St. David's, Dr. Dewar, 1879; Otterston in Herb. R.B.G.; add (85) to *C.F.*
- +527/8. VERBASCUM NIGRUM L. Dunfermline, N.S.A., 1845; Elie, J. Knapp, 1843, in Herb. R.B.G.; introduced; add (85) to *C.F.*, but see *Top. Bot.* ed. 1, 276, (1878).
- +534/2. ANTIRRHINUM ORONTIUM L. Charlestown, P. B. Gibb, no date, in Herb. R.B.G.; introduced; add (85) to *C.F.*
- 543/5. VERONICA MONTANA L. Birkhill Woods, Cleish Hills, R. Smith, 1900; Kirkcaldy, A. H. Gibson in Herb. R.B.G.; add 85 to *C.F.*
- 551/1. LATHRAEA SQUMARIA L. Melville Castle Woods, J. Henderson, 1842, in Herb. R.B.G.; add 85 to *C.F.*
- 600/2. CHENOPODIUM BOTRYODES Sm. (*C. crassifolium* Hornem.). Recorded from St. David's, 1868; no voucher specimen available; probable misidentification.
- 615/15. POLYGONUM AEQUALE Lindm. Kinross, G. C. Druce, 1912; see *Trans. Bot. Soc. Ed.*, 26, 150; add 85 to *C.F.*
- 617/1. OXYRIA DIGYNA (L.) Hill. Lomond Hills, C. O. Sonntag, 1894; the only record, but possible; add [85] to *C.F.*
- 618/12. RUMEX PALUSTRIS Sm. Kinghorn, Pettycur, Burntisland, J. H. Balfour, 1902; Young is very doubtful of these records; add [85] to *C.F.*
- 628/8. EUPHORBIA AMYGDALOIDES L. St. David's, A. C. Christie, 1889; Young is very doubtful of this record; add [85] to *C.F.*
- +628/9. EUPHORBIA VIRGATA Waldst. & Kit., non Desf. St. Andrews, A. H. Millar, 1895; Tents Muir, J. H. Balfour, 1902; Burntisland, W. Young, 1935, in Herb. St.A. These are all given by Young as *E. Esula* L., but his own

- specimen is the plant known as *E. virgata* and the other records are most likely also this. Add 85 to *C.F.*
- 632/2. *MERCURIALIS ANNUA* L. Burntisland, *A. Dewar*, 1836; *Fraser*, 1902; Aberdour and St. David's, *J. H. Balfour*, 1902; St. David's, *P. Ewing*, 1885, in Herb. R.B.G.; add 85 to *C.F.* but see *Rep. Bot. Soc. & E.C.*, 5, 679 (1920).
- 642/2. *BETULA PUBESCENS* Ehrh. Frequent in woods, *W. Young*, 1936; Stravithie, Tents Muir, *K. N. G. MacLeay* in Herb. St.A.; add 85 to *C.F.*
- 650/5. *SALIX PURPUREA* L. Raith, *J. H. Balfour*, 1867; delete 85 from exceptions in *C.F.*
- 650/18. *SALIX HERBACEA* L. Kinross-shire, no other data, in Herb. R.B.G.; no other records and doubtful if still present. A possible plant for Lomond or Ochil Hills and probably present in the past; add [85] to *C.F.*
- †651/8. *POPULUS ALBA* L. Introduced to plantations, e.g., St. Andrews Links, *K. N. G. MacLeay*, 1937; add 85 to *C.F.*
- 653/1. *CERATOPHYLLUM SUBMERSUM* L. Loch Leven, *C. O. Sonntag*, 1894; this is the sole record and may be an error for *C. demersum* L.; add [85] to *C.F.*
- 653/2. *CERATOPHYLLUM DEMERSUM* L. Otterston Loch, *W. Young*; Lindores, Cameron, Kilconquhar and Morton Lochs, *K. N. G. MacLeay*, 1943, in Herb. St.A.; this plant has spread very rapidly during the last forty years in Fife; add 85 to *C.F.* but see *Top. Bot. Suppl.*, 2, 26.
- †656/1. *ELODEA CANADENSIS* Michx. In most lochs and some rivers in Fife and Kinross, *K. N. G. MacLeay*, 1945; add 85 to *C.F.*
- †685/1. *GALANTHUS NIVALIS* L. Cambo, *G. Sim*; Kemback, *K. N. G. MacLeay*, 1937; introduced and garden escape; add (85) to *C.F.*
- †702/8. *ALLIUM CARINATUM* L. Latest record is St. David's, *A. Robertson*, 1837; add <85> to *C.F.*
- †707/2. *ORNITHOGALUM UMBELLATUM* L. Kirkcaldy, *W. Young*; St. Andrews Links, *K. N. G. MacLeay*, 1939, in Herb. St.A.; introduced and probable garden escape; add (85) to *C.F.*
- 718/7. *JUNCUS FILIFORMIS* L. Recorded from Buddo rocks near St. Andrews, by *J. H. Wilson*; no specimen is present in his herbarium and the plant was not to be found in the locality from 1937-46; a probable misidentification; delete 85 from *C.F.*
- 718/14. *JUNCUS COMPRESSUS* Jacq. Crail, *G. Sim* in Herb. St.A.; several other old records quoted by *Young*; add 85 to *C.F.*

- 722/2. SPARGANIUM ERECTUM L. (*S. ramosum* Huds.). Several records by *W. Young & G. West*; Lindores and Kilconquhar Lochs, *K. N. G. MacLeay*, 1945, in Herb. St.A.; add 85 to *C.F.*, but see *Top. Bot. Suppl.*, 1.
- 727/4. LEMNA GIBBA L. Young records a doubtful occurrence from Loch Leven, unconfirmed; write [85] in *C.F.*
- 737/4. POTAMOGETON COLORATUS Hornem. Lindores Loch, 1876; this is the sole record and has not been verified; it must be regarded as extremely doubtful; add [85] to *C.F.*
- 738/2. RUPPIA MARITIMA L. (*R. rostellata* Koch). Burton Point, *G. Sim* in Herb. St.A.; add 85 to *C.F.*
- 746/14. BLYSMUS COMPRESSUS (L.) Link (*Scirpus compressus* (L.) Pers.; non Moench). Crail, *W. Young*; Largo Links, *J. H. Wilson* in Herb. St.A.; add 85 to *C.F.*
- 748/2. RHYNCHOSPORA ALBA (L.) Vahl. Sole record, "Fife" in Herb. R.B.G., leg. *W. Croze*; add [85] to *C.F.*
- 750/1. CLADIUM MARISCUS (L.) Pohl (*Mariscus Mariscus* (L.) Borbás). Only record is from Tents Muir, *A. Ballingall*, 1872; doubtful; add [85] to *C.F.*
- 753/2. CAREX RIPARIA Curt. Kilconquhar Loch, *W. Wood*, 1862; Lethan's Den, K.N.S., 1844; not seen since and now probably extinct; write <85> in *C.F.*
- 753/10. CAREX PENDULA Huds. Two old records in Young, both doubtful; add [85] to *C.F.*
- 753/17. CAREX DISTANS L. Young gives it as "frequent" without locality; St. Andrews Links, Tents Muir, *K. N. G. MacLeay*, 1943, in Herb. St.A.; add 85 to *C.F.*
- 753/23. CAREX EXTENSA Gooden. Aberdour, 1834, in Herb. R.B.G.; Rankeillour, *W. Young*, 1889, in Herb. St.A.; add 85 to *C.F.*, but see *Top. Bot.*, ed. 1, 442 (1874).
- 753/46. CAREX ACUTA L. (*C. gracilis* Curt.). North Queensferry, *G. Don* ex Greville, 1824; Lochgelly, K.N.S., 1840; Kilconquhar Loch, *W. Wood*, 1864; add 85 to *C.F.*
- 753/62. CAREX DIVULSA Stokes. Fordel, *A. Ballingall*, 1872; sole record; perhaps wrongly identified; add [85] to *C.F.*
- †754/8. ECHINOCHLOA CRUSGALLI (L.) Beauv. (*Panicum crusgalli* L.). Charlestown, *T. Drummond*, 1871, in Herb. R.B.G.; St. David's, *A. C. Christie*, 1869; add 85 to *C.F.*
- †756/2. SETARIA VIRIDIS (L.) Beauv. Burntisland, *F. M. Webb*, 1878, in Herb. R.B.G.; Charlestown, *T. Drummond*, 1871, in Herb. R.B.G.; add 85 to *C.F.*
- †758/3. SPARTINA TOWNSENDII H. & J. Groves. Kincardine-on-Forth, planted, *W. G. Smith*, 1914; add (85) to *C.F.*
- †766/2. ANTHOXANTHUM PUELI Lecoq & Lamotte (*A. aristatum* auct.). Inchkeith, *A. C. Christie*, 1885; add (85) to *C.F.*

- 770/4. *ALOPECURUS BULBOSUS* Gouan. Balmerino, *J. Campbell*, 1867; not since recorded and may be an error; add [85] to *C.F.*
- +770/6. *ALOPECURUS AEQUALIS* Sobol. Balmerino, *J. Campbell*, 1867; Elie harbour, *W. Wood*, 1864; not since recorded; add (85) to *C.F.*
- 785/1. *APERA SPICA-VENTI* (L.) Beauv. Charlestown, *A. C. Christie*, 1871; Burntisland, *A. H. Gibson*, 1883; add 85 to *C.F.*
- 791/3. *DESCHAMPSIA SETACEA* (Huds.) Hack. Cleish Hills, *R. Smith*, 1900; add 85 to *C.F.*
- 804/1. *SESLERIA CAERULEA* (L.) Ard. Recorded from Wormit and Tents Muir by *R. Smith*, 1894; doubtful and unverified; add [85] to *C.F.*
- 818/1. *MELICA NUTANS* L. Lethan's Den; Kincardine-on-Forth, *J. H. Balfour*, 1902; add 85 to *C.F.*
- +822/2. *BRIZA MINOR* L. Burntisland docks, *F. M. Webb*, 1878; casual; add (85) to *C.F.*
- +824/1. *POA CHAIXII* Vill. Not recorded by Young; write [85] in *C.F.*
- 824/8. *POA BALFOURI* Parnell. Lomond Hills, *J. H. Balfour*, 1855; add 85 to *C.F.*
- 825/7. *PUCCINELLIA FASCICULATA* (TOTT.) Bicknell (*Glyceria Borreri* (Bab.) Bab.). Elie, *J. W. Brown*, 1862, in Herb. R.B.G.; add 85 to *C.F.*
- 825/8. *PUCCINELLIA RUPESTRIS* (With.) Fernald & Weatherby (*Glyceria procumbens* (Curt.) Dumort.). Elie, *J. H. Balfour*, 1864; St. David's, *A. C. Christie*; add 85 to *C.F.*
- 826/5. *FESTUCA ALTISSIMA* All. (*F. silvatica* Vill., non Huds.). Kin-craig Braes, *W. Wood*, 1862; Kinross-shire, *R. Parnell*; add 85 to *C.F.*
- 826/18. *VULPIA MYUROS* (L.) C. C. Gmel. (*Festuca myuros* L.). In-verkeithing, K.N.S., 1837; near North Queensferry, *J. H. Balfour* & *J. Sadler*, 1863; remove brackets from record in *C.F.*
- 828/2. *BRACHYPODIUM PINNATUM* (L.) Beauv. Near Queensferry, *R. K. Greville*, 1824; sole record; add [85] to *C.F.*
- +829/2. *LOLIUM TEMULENTUM* L. "Fife", *J. Knapp*, 1836, in Herb. R.B.G.; Collessie, N.S.A.; Kilrenny, *W. Wood*, 1862; add 85 to *C.F.*
- 833/1. *PARAPHOLIS STRIGOSA* (Dumort.) C. E. Hubbard (*Lepturus filiformis* auct.). Inverkeithing, *T. Drummond*, 1871, in Herb. R.B.G.; add 85 to *C.F.*
- 835/1. *HORDEUM SECALINUM* Schreb. (*H. nodosum* L. p.p.). St. Andrews; Torreyburn, Kincardine-on-Forth, *J. H. Balfour*, 1861; remove brackets from record in *C.F.*

- 839/1. JUNIPERUS COMMUNIS L. Cardenden, *A. H. Gibson*, 1883, in *Herb. R.B.G.*; East Neuk, *G. Sim* in *Herb. St.A.*; add 85 to *C.F.*
- †841/1. PINUS SYLVESTRIS L. Common in the v.-c., though often planted; add (85) to *C.F.*
- 844/7. EQUISETUM HYEMALE L. Black Devon, in *Herb. R.B.G.*; Cleish Hills, Blairadam, *A. Robertson*; add 85 to *C.F.*
- 851/9. ASPLENIUM SEPTENTRIONALE (L.) Hoffm. Balmerino, *J. Campbell*, 1867; doubtful; add [85] to *C.F.*
- 856/5. DRYOPTERIS AEMULA (Ait.) Kuntze. Dunnikier, *A. H. Gibson*, 1883, in *Herb. R.B.G.*; Balmutto, *J. B. Syme*, 1875; add 85 to *C.F.*
- 859/1. CETERACH OFFICINARUM DC. (*C. Ceterach* (L.) Newman). Leslie, *J. Archibald*; wall near Trafalgar, *K. N. G. MacLeay*, 1941; add 85 to *C.F.*
- 863/1. HYMENOPHYLLUM TUNBRIGENSE (L.) Sm. Lomond Hills, *Dr. Lyell*, 1856, in *Herb. R.B.G.*; Young was very doubtful of this unconfirmed record; add [85] to *C.F.*
- 864/1. OSMUNDA REGALIS L. Last known record at Rankeillour, *W. Young*, 1889; now presumably extinct in the v.-c.; add 85 to list of extinctions in *C.F.*
- 870/1. LYCOPODIUM ALPINUM L. Near Cupar, *J. H. Balfour*, 1902; Bishop Hill, *A. C. Christie*; add 85 to *C.F.*
- 872/3. NITELLA FLEXILIS (L.) Ag. Loch Leven, *J. H. Balfour & J. Sadler*, 1862; Cairnsmill Reservoir, St. Andrews, *K. N. G. MacLeay*, 1941, in *Herb. St.A.*; add 85 to *C.F.*
- 873/3. TOLYPELLA GLOMERATA (Desv.) Leonh. Loch Leven, *G. West*, 1910; add 85 to *C.F.*
- 876/5. CHARA HISPIDA L. Lochmill, *G. West*, 1910; still there 1946, in *Herb. St.A.*; add 85 to *C.F.*
- 876/13. CHARA DESMACANTHA (H. & J. Gr.) G. & B.-W. Recorded from Fife without locality by *Groves*; add [85] to *C.F.*

A number of alien plants, which are not mentioned in *The Comital Flora* are now well established in v.-c. 85. As these may not be recorded elsewhere a list is appended, numbered according to Druce, 1928, *British Plant List*, ed. 2.

- 18/1. EPIMEDIUM ALPINUM L. Inverkeithing, *A. Robertson*, 1936; first record; supported by several subsequent records from this and other localities.
- 21/1. PAPAVER SOMNIFERUM L. Anstruther, *Dr. Knapp*, 1836; first record supported by a considerable number of subsequent appearances; probably only a casual.
- 31/4. CORYDALIS LUTEA (L.) DC. First record by *W. Ballingall*, Inverkeithing, 1830; now commonly occurs near villages on walls, probably often as a garden escape.

- 51/1. *CONRINGIA ORIENTALIS* (L.) Dumort. First record, North Queensferry, *J. H. Balfour*, 1860; a casual which has been found frequently on the south coast of Fife.
- 85/1. *RESEDA ALBA* L. First record, Crail, *G. Sim*, 1889; a casual in sandy places near sea, probably always a garden escape.
- 277/1. *HERACLEUM MANTEGAZZIANUM* Somm. & Levier. Not mentioned by Young but occurs as a well established plant at Earlshall, *K. N. G. MacLeay*, 1937; and in several other places in Fife.
- 287/1. *SAMBUCUS RACEMOSA* L. Hillside above Strathmiglo, *K. N. G. MacLeay*, 1939; appears to be well established in several places in the Ochil Hills.
- 301/4. *VALERIANA PYRENAICA* L. First record, Blairadam, no collector, 1782, in Herb. R.B.G. Has been well established at Claremont Den, near St. Andrews, for over a hundred years.
- 302/1. *CENTRANTHUS RUBER* (L.) DC. First record, St. David's, *A. Robertson*, 1835, in Herb. R.B.G.; now well established in many places particularly along the south coast of Fife.
- 498/1. *BORAGO OFFICINALIS* L. First record, Incheolm, *R. Sibbald*, 1710; well established and frequent in many parts of the v.-c., but often merely a garden escape.
- 520/1. *LYCIUM CHINESE* Mill. First record, Limekilns, *J. H. Balfour*, 1866; now established in several places especially along the south coast of Fife.
- 534/1. *ANTIRRHINUM MAJUS* L. First record, Aberdour, *J. H. Balfour*, 1855; where it still occurs thoroughly naturalized.
- 618/5. *RUMEX ALPINUS* L. First record, "Fife", 1844, in Herb. R.B.G., leg. *W. Brand*; a number of subsequent records, all well authenticated.
- 765/5. *PHALARIS CANARIENSIS* L. Young considers this introduced plant is frequent throughout the v.-c.

HERBARIA.

Most of the plants mentioned in this paper are now in one or other of the Herbaria listed below.

Royal Botanic Gardens, Edinburgh. [Herb. R.B.G.] Includes the herbarium of *A. Somerville*, Glasgow.

University of St. Andrews. [Herb. St.A.]. Includes the herbaria of *R. & M. Corstorphine*, Arbroath; *C. Howie*, St. Andrews; *K. N. G. MacLeay*, St. Andrews; *R. A. Robertson*, St. Andrews; *J. H. Wilson*, St. Andrews; *G. Sim*, Crail; *W. Young*, Kirkcaldy.

Kirkcaldy Naturalists' Society. [K.N.S.].

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PLANT NOTES

45/7. *COCHLEARIA DANICA* L. Since the first appearance of the note by V. Jacobs (1951, *Watsonia* 2, 104) further details of the inland occurrence of this maritime species have come to light. The known distribution on the permanent way of railways (or sometimes also on ballast heaps beside the track) appears to be as follows:

- V.-c. 20, Herts.; Harpenden, 1947, *J. G. Dony*.
 21, Middx.; by Scratch Wood sidings, 1951, *J. G. Dony*.
 29, Cambs.; west of entrance to Hayley Wood, 1946, *E. G. Jeffreys*.
 30, Beds.; East Hyde, 1947-51, *J. G. Dony*: Willington, 1947, *J. G. Dony*: south of Luton, for about 400 yards, 1950, *J. G. Dony*: Flitwick, 1952, *J. Ounsted*.
 32, Northants.; north of Kettering, abundant, 1951, *J. G. Dony*.
 33, E. Glos.; locally frequent between Andoversford Tunnel and Dowdeswell Viaduct, 1949, *E. Milne-Redhead*.
 38, Warw.; Brandon station, westwards for about a mile, 1946-50, *P. Falk* and *D. E. Allen*: Birmingham line, west of Rugby station, 1947, *M. J. D'Oyly* and *D. E. Allen*: Lower Hillmorton, east of Rugby, probably continuing into Northants., 1947, *D. E. Allen*.
 39, Staffs.; Hamstead, West Bromwich, 1948, *V. Jacobs*.

The earliest record is the Cambridgeshire one, and its discovery in so many places immediately after the war suggests that it may be of recent origin. Its subsequent spread along the Midland railways, together with *Cerastium tetrandrum* Curt., *Linaria minor* (L.) Desf., and *Diplotaxis muralis* (L.) DC., was evidently made possible by the cessation of the spraying of weed-killer on the tracks during the war. Dr. Dony finds that the species, along with *Cerastium tetrandrum* (which accompanies it in nearly every locality), disappears for one or two years when the permanent way is relaid but reappears in the third or fourth year.

Spraying recommenced in 1947 and numbers were consequently reduced; but at Brandon, in Warwickshire, it had by then become established on a wall-top at the foot of the railway embankment, just as in Staffordshire it has colonised rocks beside the railway. It thus seems to have found edaphic conditions suitable for its permanent existence inland.

The most likely origin is either that it spread up from the coast along railway tracks into the south-eastern Midlands before or during the War, escaping notice till 1946, or that it has originated in one or more places, later to spread, by seeds dropping from trucks of sand brought from the coast. The former alternative seems the more likely, but its distribution down to the coast has yet to be traced.—D. E. ALLEN.

†87(2)/2. **Cistus incanus** L., 1753, *Sp. Pl.* 1, 524. *C. villosus* auct. plur. vix L., 1762, *Sp. Pl.*, ed. 2, 736 (per errorem 'pilosus'), *nomen confusum*.

14, E. Sussex; below Mount Caburn, a fine plant in full flower high on the bare side of a chalk pit, 25 May 1952, *D. McClintock*, confirmed by *E. F. Warburg*.

Native of the Mediterranean Region though absent from S. France and the Iberian Peninsula. A shrub up to 1 m. high with pink flowers c. 5 cm. across. It belongs to the Section *Eucistus* Spach characterised by pink flowers, 5 subequal sepals and long straight filiform style with hemispherical stigma. From the other species of the section, it may be distinguished by its short-petioled (not sessile) leaves which are not 3-nerved, and are dull green and rather sparsely clothed on both surfaces with stellate hairs. It is a variable species and several geographical sub-species or varieties have been recognised.—*D. McCLINTOCK* and *E. F. WARBURG*.

116/1. **LAVATERA ARBOREA** L. When, in 1889, I first came to live in my present home a corner of the garden was occupied by a fine clump of *Lavatera arborea*. A few years later my mother planted in the corner a silver poplar, and as the poplar grew the *Lavatera* disappeared. The poplar flourished for about thirty years and then was blown down by a gale, when the trunk was sawn up and removed, but upon the disturbed ground thus exposed there appeared the following season seedlings of the *Lavatera*.—*F. RILSTONE*.

220. **EPILOBIUM**.—In July 1951 Mr. C. W. Bannister wrote me regarding a remarkable colony of willowherbs which he had found at Voulters Wood, near Forthampton, Glos. Gatherings were submitted to Mr. G. M. Ash, who came up to see the colony. He determined the following species and hybrids on the spot:

E. hirsutum, *E. parviflorum*, *E. montanum* with a white-flowered form, *E. adenocaulon*, *E. obscurum* with a white-flowered form, *E. tetragonum*, *E. Lamyi*. *E. adenocaulon* × *montanum*, *E. adenocaulon* × *parviflorum*, *E. montanum* × *parviflorum*, *E. montanum* × *obscurum*, *E. obscurum* × *tetragonum*. Earlier Mr. Bannister had also gathered *E. lanceolatum*.

Later (on the 7th of August) I visited the spot and submitted further material to Mr. Ash. Two further hybrids were added to the above list, viz.:

E. Lamyi × *parviflorum*, *E. Lamyi* × *tetragonum*.*

Surely there are few such willowherb paradises in the country? It seems strange that *E. hirsutum* should be present and yet apparently not hybridising, and a further search will be made next year in order to confirm this.—*C. C. TOWNSEND*.

*Mr. Ash comments on the latter—"though I am always diffident about naming this hybrid".

†296/13. *Galium parisiense* L., 1753, *Sp. Pl.* 108. 90, Angus; Dundee Corporation tip, 1951, U. K. DUNCAN, B. M. C. MORGAN, and R. A. GRAHAM, confirmed by J. P. M. BRENAN. *G. parisiense* is the bristly-fruited counterpart of the glabrous-fruited *Galium anglicum* Huds., which, following the apparently reasonable treatment of modern Continental authors, is better considered to be no more than a variant of *G. parisiense*. The two are treated as conspecific by e.g. Burnat, 1915, *Fl. Alpes Marit.*, 5, 162-3; Fiori, 1927, *Nuov. Fl. Anal. d'Italia*, 2, 496-7; Fournier, 1946, *Quatre Fl. Fr.*, 878; Hegi, 1915, *Ill. Fl. Mitteleur.*, 6(1), 229-30; and by Rouy, 1903, *Fl. Fr.*, 8, 45-7; among others.

Our *Galium anglicum* Huds. would thus become *G. parisiense* L. var. *leiocarpum* Tausch, 1835, in *Flora*, 18, 354 (*G. parisiense* L. var. *anglicum* (Huds.) Beck, 1893, *Fl. Nieder-Oesterr.*, 1122).

"*Galium anglicum* Huds. var. *leiocarpum* Tausch" of *B.P.L.*, ed. 2, is thus both incorrect and meaningless.

Typical *G. parisiense*, though apparently not previously recorded from Britain, has a wide distribution in Europe and the Mediterranean Region, extending to the Middle East.—J. P. M. BRENAN.

308/4. *SUCCISA PRATENSIS* Moench. This species has recently been monographed by L. Baksay (1952, *Ann. Hist.-Nat. Mus. Nat. Hungar.*, 2, 237-259), who recognises three varieties in addition to a number of forms. The first of these varieties, var. *glabrata* (Schott) Peterm., is apparently not British, but the other two occur in this country.

Var. *scotiaca* [sic] Baksay, var. nov. (p. 254). Stem 20-40 cm., slender and graceful, little-branched, bearing 1-3 heads. Flowering head 1-2 cm. diam., with fewer flowers. Involucral bracts much shorter than head. Radical leaves obovate or lanceolate, small; all leaves entire, subtire or slightly dentate, thin, sparsely pilose on both sides.

Endemic to the Scottish mountains. Specimens seen by Baksay from Ben Nevis (v.-c. 97), The Trossachs (87) and the Isle of Arran (100). Type in Museum of Natural History, Vienna, leg. Degen.

Var. *nana* Bolle, 1865, *Verh. Bot. Ver. Brand.*, 7, 21; var. *pumilior* Weiss, 1873, *Jahresb. Preuss. Bot. Ver.*; *Scabiosa subacaulis* Bernardin in Cariot, *El. Fl.*, ed. 9, 2, 301. Plant low, 10-15 cm., mostly single-headed. Radical leaves ovate, rounded, acute, strigose-pilose, ± suddenly attenuate into petiole; stem leaves small. Flowers in small heads.

Damp places on clay soil. Turesson has shown this to be an ecotype, constant in cultivation. Specimens seen from hilly areas in Central Europe and from the shores of the Baltic.

Baksay does not mention that this variety has been recorded in Britain—on exposed grassy cliff-tops on Holyhead Island, Anglesey—under the name of "var. *subacaulis* Bernardin" by C. E. Salmon and W. G. Travis (1917, *J. Bot.*, 55, 321). A dwarf plant recorded on Nisabost Point in South Harris, Outer Hebrides, by J. W. & J. Heslop-Harrison (1950, *Trans. Bot. Soc. Edinb.*, 35, 141) and in Shetland by W. West (1912, *J. Bot.*, 50, 266) is, perhaps, the same variety.—D. E. ALLEN.

543/20. *VERONICA POLITA* Fr. Whilst examining material in the Herbarium of the Royal Botanic Gardens, Kew, I found four plants from Chew Magna, N. Somerset (v.-c. 6) and one from Calke Abbey, Derbyshire (v.-c. 57) with vegetative and calyx characters suggesting *V. polita* but with the capsules completely glabrous and keeled. They are labelled *V. polita*. I can find no reference to such capsules. I would like information from any collector who has found similar plants and especially the opportunity to examine fresh material.—J. A. RANDLE, 106 Endlebury Road, Chingford, London, E.4.

†596/6c. *AMARANTHUS RETROFLEXUS* L. var. *rubricaulis* Thell. in Asch. & Graebn., 1914, *Syn. Fl. Mitteleur.*, 5, 260. 18, S. Essex; waste ground, Dagenham, N. Y. SANDWITH. Characterised by the stems and inflorescence being more or less tinged with reddish-purple. Thellung place it under his race *genuinus*, which presumably should now be known as race *retroflexus*.—N. Y. SANDWITH.

615/25. *POLYGONUM COGNATUM* Meisner. In *Watsonia*, 1, 319-320, 1950, I drew attention to the two extreme variants of this species which persist as aliens in Britain, and suggested that they should be referred to a. *alpestre* (C. A. Mey.) Meisn. and b. *ammanioides* (Jaub. & Spach) Meisn. I mentioned the locality at Hythe Quay, Colchester, where the plant I called *alpestre* appeared to have shown little variation since its discovery in 1925. I had visited it on four occasions from 1936 and regarded it as constant. On July 31, 1952, I again visited the Colchester colony, previously known to me, which grows in grass on a small green, but on this occasion extended my search farther afield. On almost bare sandy soil in front of a garage, and also by the road, I found plants which were practically identical with those I had referred to var. *ammanioides* from elsewhere. Subsequent investigation showed that under varying habitat conditions it was possible to collect almost every intermediate to show a graduated series between the two plants. It therefore seems unlikely that there is a genetic basis for the remarkable difference between the two extremes. In this country, at least, they appear to be habitat variations of a very plastic species.—J. E. LOUSLEY.

641/1. *MYRICA GALE* L. In *Devon and Cornwall Notes and Queries* for April 1952 appears an interesting account of an ancient mill in Offwell Woods, Devon, for the grinding of bark of Bog Myrtle for use in tanning. The neighbouring fields are thickly covered with the plant and one of them is known as "Shoemaker's How," evidently derived from Shumach or Sumach. The Myrica was, it is stated, often called Shumach because it was used as a substitute for the more expensive Spanish Shumach (*Rhus coriaria*) for the treatment of skins. Withering (1830, *An Arrangement of British Plants*, Ed. 7) states that *Myrica Gale* was used for the tanning of calf skins.—F. RILSTONE.

OBITUARY

ABRAHAM WILLEM KLOOS (1880-1952) was born at Wormerveer in Holland in 1880. He studied at the University of Delft, and qualified as an engineer. Later, he taught mathematics and mechanics at the Technical High School at Dordrecht where he became famous for his teaching ability. As a pioneer of technical instruction he wrote a number of handbooks which are still much in use.

He joined the Dutch Botanical Society in 1912 and from the first he was a field-botanist, chiefly interested in floristic and systematic botany. By means of numerous excursions and much study he acquired an extensive knowledge of the Dutch flora. His house became a botanical centre, where he cultivated every rare and critical plant he found. From 1924, he organised and led the annual excursions of the Society, and became Chairman of the floristic section. One of his hobbies was the study of adventive plants. He became a world-known authority and identified thousands of specimens for botanists and institutions all over the world and he amassed an enormous herbarium. In the meanwhile he was one of the principal collaborators of IVON, the institution for cartography of the Dutch flora, and at the 1950 Conference of the Botanical Society of the British Isles he gave a concise exposition of the Dutch method.

Kloos wrote numerous articles on critical genera and these appeared especially in *Nederlandsch Kruidkundig Archief*. His "Aanwinsten", in which he described and discussed hundreds of "new" plants and forms from 1914 to 1950 form a book of more than 600 pages when bound together with the index. A few days before his death he was still engaged in writing his "Aanwinsten" for 1951. He was a member of the editorial staff of the *Flora Neerlandica* and a collaborator in the *Illustrated Flora* of Heimans and Thyse.

He was an Honorary Member of the Royal Dutch Botanical Society and Doctor honoris causa (Dr.Ir.) of the University of Leiden.

After he had retired on pension he commenced the preparation of a monograph of the genus *Amaranthus* but, although he had identified the material of most of the herbaria of the world, and published some of the results, the work remained unfinished. He was an alert, kind-hearted man, always ready to assist others and gifted with a sharp eye for plants and with an extraordinary teaching-power. He was my friend and collaborator for more than forty years.

P. JANSSEN.

British botanists who had the pleasure of meeting Dr. Ir. A. W. Kloos, Jr., at our 1950 Conference will remember with gratitude his outstanding ability in imparting his knowledge to others. Both when expounding in the lecture hall the methods adopted in Holland for the

preparation of distribution maps, and when demonstrating the use of the recording cards at the Quendon field meeting, he succeeded in making every detail so clear that any language difficulties were completely overcome. His skill in finding, and determining without hesitation, the immature plants of the English countryside in early April made it obvious that his eye for plants was exceptionally keen.

In this country he was best known for his work on *Amaranthus* and on wool aliens. During his visit in 1950 he determined the *Amaranthus* material in various public and private herbaria, including confirmation of English identifications of *A. quitensis* Kunth which he had recently written up for the Low Countries. The pages of Probst's *Wolladventivflora Mitteleuropas* owe much to the records contributed by Kloos.

He was elected an Honorary Member of the Botanical Society of the British Isles at the Annual General Meeting on April 14, 1951, in recognition of his services to the Society and to the study of the European flora.

Kloos died at his home at Dordrecht on June 3, 1952, at the age of 72. To his widow, children and grandchildren, we send our deepest sympathy in their bereavement.

Other appreciations will be found in:—1952, *Acta Bot. Neerl.*, **1**, 484-488; 1952, *De Levende Natur.* **55**, 138-139; 1952, *Blumea*, **7**, 303-304.

J. E. LOUSLEY.

REVIEWS

Flora of the British Isles. A. R. CLAPHAM, T. G. TUTIN, and E. F. WARBURG. Pp. li + 1591, 79 line-blocks. Cambridge University Press, 1952; 50/-.

The publication of a competent and original descriptive Flora is an event of the utmost importance in the study of the field botany of a country. It provides an opportunity for codifying scattered information accumulated since the issue of the last account, and by making this generally available it facilitates the training of new recruits to the study. An equally important function is to stimulate research by indicating where further study is most needed. Adequate Floras of the British Isles which could be described as original have appeared only at long intervals, and their influence has been such that they have proved to be milestones on the road of the study of our plants. The new work by Clapham, Tutin and Warburg is likely to prove another milestone and it deserves more detailed consideration than is ordinarily given to books sent for review.

The need for such a book at the present time hardly requires emphasis. Young botanists have been using Bentham & Hooker's *Handbook of the British Flora* and graduating to J. D. Hooker's scholarly *Student's Flora of the British Islands* and Babington's *Manual of British Botany*. The last was revised by A. J. Wilmott in 1922, but circumstances prevented him from making more than limited alterations. The others had been tinkered with a little from time to time, but, in general, it is true to say that all our descriptive floras were more than half a century out of date. As a result our more advanced workers have been compelled to identify much of their material from foreign Floras and papers published in scientific journals. A library was required for the identification of ordinary British plants, and the condensation of the essential information within the covers of a single work had become the outstanding need of British botanists.

The difficulty of producing a new Flora increased with every year that passed. It increased at an even faster rate than before as renewed interest in taxonomy—and taxonomy of a different kind—became noticeable about twenty years ago. By about 1935 the task of compiling a full new Flora was generally recognised as beyond the capacity of any one individual, and an attempt was made to organise one to be written by a large team of collaborators. The war, and the difficulty of collecting the various accounts from so many people in a reasonable time, brought this scheme to an end. The preliminary work devoted to it, including the issue of specimen pages, was of value in indicating the form a new Flora should take. Clapham, Tutin and Warburg in their undertaking faced a task of herculean proportions and in its execution they have not been content to give the bare minimum of facts expected

in such books. The information is fuller and covers a wider field than anything we have had before. To scan through each page, as your reviewer has done just before writing this, is a substantial undertaking: to have written these pages and checked the proof is a literary achievement which deserves the greatest admiration. Such criticism of detail as appears later in this review is intended only to indicate ways of improving later editions and to warn the reader against the tendency to accept every statement. It is not intended to detract in any way from an acknowledgment of the great debt which a season's use of the Flora has already shown that we owe to the authors.

The body of the work covers dichotomous keys to, descriptions of, and notes on, the families, genera and species. These are arranged in a new sequence, with the doctrine of evolution in mind, so that the groups which appear to be the most primitive appear first. This arrangement no doubt has very considerable advantages for teaching purposes, and, since the flora is intended to serve this purpose as well as those of the field botanist, the authors were probably wise to adopt it. Nevertheless, it must be remembered that experience has shown that such supposed evolutionary systems are usually soon replaced by others believed to be improvements. For a systematic work their transitory nature increases the difficulty of reference, and of use in connection with herbaria, and comparison with works arranged on the system of Bentham and Hooker which has held sway in this country for so long. It is to be feared that the current fashion of inventing new evolutionary sequences makes it likely that we still have a long way to go before the advantages of a new system can be regarded as outweighing the practical disadvantages in a reference book of this kind.

The dichotomous keys are a valuable feature of the book and are calculated to save the user a great deal of time. They are intended to make it possible to trace an unknown plant through family and genus to species, and the use can be taken up at any level. Care has obviously been taken in their construction, but only use can show to what extent individual keys are susceptible to improvement. Some difficult genera—such as *Fumaria*—are by no means easy to identify from the clavis provided. In *Barbarea* the use of upper stem leaves for the primary division will soon lead the reader into trouble, and in *Lysimachia terrestris* the frequent absence of the bulbils in the axils of the leaves and the presence of flowers will cause difficulty with the third stage of the key. In *Myosotis* one species is called *M. laxa* in the key and *M. caespitosa* in the text. Details such as these, and in the numbering, can be corrected in later editions, when consideration might also be given to breaking down some of the longer ones into sections. The key to *Carex* has no less than 75 stages and is likely to discourage the beginner unnecessarily. A most commendable point is the provision of alternative keys in a few cases, such as the separate ones to male flowers, female flowers, and leaves in *Salix*. For the larger families a synopsis is provided as well as an artificial clavis.

The descriptions throughout are very full and on a uniform plan to facilitate comparison. The more important diagnostic characters are printed in italics, which is another valuable feature. In the case of families and genera, there is a statement of the approximate number of species known.

For each species the information includes the following:—scientific name, references to the most easily available illustrations, English name, and synonyms of the scientific name selected. Then follows the description, flowering and/or fruiting times, pollination mechanism and insect visitors, chromosome number, and life-form. Finally, there is a statement of status, distribution, habitat, and vice-comital frequency, and distribution abroad.

A large proportion of the scientific names given will be new to most British botanists. In some cases the changes are due to reasons of nomenclature, but perhaps even more are attributable to altered views on taxonomy. Into the latter class come the numerous instances where long accepted genera have been split. Thus *Scirpus* is given as now including only two British species, while the others included in the genus as recently as Clapham's *Check List* are distributed between *Eleocharis*, *Trichophorum*, *Eleogiton*, *Isolepis*, *Holoschoenus* and *Schoenoplectus*. Many other examples might be given. Such changes are very much a matter of personal opinion, which is likely to be influenced according to whether the individual is studying the group on a world-wide or local basis. Changes made for nomenclatural reasons follow closely those advocated by Scandinavian workers. The unfamiliar names chosen represent an advance on those previously in use in this country, and they approximate more closely to the lists employed in recent European works. But let no reader be deluded into thinking that there is yet any sign of finality in this vexatious matter. The new names will have to be learned, since the authority of the new *Flora* will stand so high, and its use will be so widespread, that those with different views will be unable to prevent the name in the *Flora* from passing into general currency. Unfortunately not all the changes now made are likely to persist.

The new taxa introduced in the account of *Sorbus* should have been properly published in advance with Latin diagnoses. The *Flora* also includes new combinations—especially in the grade of subspecies which the authors have employed somewhat widely. It is used to cover plants which differ cytologically, or in geographical or ecological preferences. To this grade they have reduced some of our former species, or raised plants which we have known as varieties. A reasonable compromise has been adopted in the controversial question of whether all specific epithets should be spelled with a small initial letter; in the cases where it has been customary to use capitals they have shown them thus in the synonymy.

The choice of English names to be employed falls below the standard set by the scientific work in the *Flora*. From the introduction it is clear

that the authors scorn their use—it would perhaps have been better if they had omitted all but the most obvious ones. Their practice of using quotation marks for those they regard as “invented” is often irritating, and many examples seem to ignore the general practice of regarding a word or phrase which has been in use long enough as part of the English language. Such names as Starry Saxifrage or Meadow Saxifrage (a translation of the scientific name in the first case but not in the second) have surely been in use so long that they have ceased to demand recognition as “invented”. As for “Brook Saxifrage” for *Saxifraga rivularis*, which occurs with us only in Scotland, it will surely demand reproach from those who call a burn a “burn”! Writers of more than a century ago managed to do a little better than that. Such names as Greater Stitchwort and Winter Cress, to give only two more examples, have been freely used for so many years that it seems unnecessary to regard them as “invented”. At the other extreme, names have been “invented” for rarities which seem to have lacked them in the past—such as “Lesser Shepherd’s Cress” for *Teesdalia coronopifolia*. A few genuine new ones have been added but “Welcome home husband, however drunk you be” for *Sempervivum tectorum* seems rather too long for practical use! It is to be hoped that those who must use common names will not adopt this list as a standard.

The descriptions of species are extremely good. Vague terms, such as have often been employed in the past, have been replaced by measurements. The diagnoses follow an orderly plan working from the root upwards, and ending with the flower, fruit and seed. The authors have not hesitated to employ unorthodox terms where they are likely to convey a clearer picture of the organ described—though not every reader will know the shape of a bicycle spanner (p. 619) in these days of motoring. Only in a few instances is there failure to stress or mention characters which one would have thought important. The characteristic clothing of the lower stem of *Sisymbrium Loeseli* is not referred to, the characters of *Vicia laevigata* seem quite inadequate, the account of *Littorella uniflora* does not stress sufficiently the great difference between submerged and littoral states, there is not enough emphasis on the marked contrast in duration between *Lactuca Serriola* and *L. virosa* and one would have thought that the anther size in the two species of *Parapholis* at least deserved italics. In some cases the reader’s attention might have been directed to characters of colour which assist in detection in the field. Thus there is no hint of the ease with which the three species of *Spartina* can be detected by the colour of their leaves when two of them are growing together, and insufficient attention is drawn to the colour differences of the petals in *Spergularia*. The extreme whiteness of the flowers of *Pimpinella major* by which it can often be picked out from other Umbelliferae even from a fast moving car is unnoticed. Sometimes a sentence has been added drawing attention to characters of exceptional importance—the Umbelliferae have good examples of these—and this is a feature which might well be expanded in later editions.

Chromosome numbers and Life Forms are introduced into a British Flora for the first time, and the authors have very helpfully marked counts of the former from British material with an asterisk. Raunkiaer's Life Forms are explained on pages 1509 and 1510 but the definitions are brief and it would have been easy to add a reference to a fuller illustrated account for the benefit of readers not already acquainted with this important classification.

The paragraph dealing with status, habitats, frequency and distribution is very much more detailed than we have had before. The assessments of status have evidently been the subject of much thought and deserve careful consideration. Habitats are given in detail, and generally include an excellent indication of the plant's ecological requirements. The entries, however, are very clearly limited in the main to the three authors' personal observations and a great many habitats might be added to those cited. Thus I have more often seen *Myosurus minimus* on sea-dykes or in ditches than in the places printed and *Iberis amara* is not uncommon in open woods. *Draba aizoides* occurs in quantity on maritime limestone cliffs along miles of the Gower coast and it is misleading to make mention of Pennard Castle in the terms given. The reader who finds *Cardamine impatiens* in Kent will be puzzled at finding it on river banks, and *Cardaminopsis petraea* is in various places on river shingle as well as alpine rocks. *Halimione pedunculata* grows in the drier, not the wetter, parts of salt-marshes. *Centaurium pulchellum* is often found in rides in clayey woods. *Mentha Pulegium* grows on peat in places as far apart as Norfolk and Glamorgan. *Plantanthera bifolia* is more characteristic of heaths, though it also occurs on base-rich and calcareous soils as stated. One wonders where *Orchis purpurea* has been found on a limestone other than chalk. "Wet sandy places" may do for the Dorset locality for *Eleocharis parvula* but not for those in Wales. For *Carex montana* there is no mention of woodland rides and of all the many times I have seen *Puccinellia rupestris* in various types of habitat it has never been on a muddy seashore. *Agrostis setacea* seems a surprising plant to find on a chalk down. There is no mention of the frequent association of *Marrubium vulgare* with rabbit burrows, or of the effect of trampling on the distribution of *Plantago major* and its all too frequent occurrence in lawns. The habitats described for *Tordylium maximum* do not cover either of the two very different localities where I know it. *Euphorbia Peplis* grows on shingle rather than sandy shores. There is no observation of the greater frequency of *Viscum album* on calcareous soils, with interesting implications.

Similarly, there are a good many points which could be raised about the statements on distribution. The main criticism which must be made is that the authors often fail to indicate that a species is more frequent in some parts of the country than in others. For example, there is no hint that *Spergularia rupicola* and *Cerastium pumilum* occur in the quantity they do in the south-west, or that *Carum Carvi* and *Trifolium aureum* are more likely to be found in Scotland than in

England. Extinctions are recorded in some cases but not in others. Thus *Polygala austriaca*, *Holosteum umbellatum* and *Bupleurum falcatum* have gone from Surrey—none of them was known for long. *Corrigiola littoralis* has not been seen at Looe during this century, and where is it to be found in the Channel Isles? *Herniaria hirsuta* has not been seen at Christchurch for nearly 70 years. It is 99 years since *Cucubalus baccifer* was seen in the Isle of Dogs, which is in Middlesex and not Kent, and most people now look for it in Norfolk.

Mercurialis annua may be local in southern England, but it is certainly not uncommon on the coast or in many inland areas. In some cases statements are misleading on account of omissions—thus it is implied that *Ornithopus pinnatus* in Scilly is found only on Tresco but the chances of seeing it on Bryher, St. Agnes and St. Martin's are at least as good and it is recorded from St. Mary's. *Isatis tinctoria* is given for "cliffs of the Severn Valley and in cornfields in various localities in S. and C. England" but there is no mention of the Guildford station on chalky cliffs which dates back to 1683.

A large number of introduced plants have been included in the Flora "either because they are naturalised or because they are of frequent occurrence". Unfortunately these qualifications appear to have been sadly overlooked in the selection of species for inclusion. Whatever standard the authors attempted to adopt varied widely from family to family. We find, for example, that in Cruciferae aliens which even the most enthusiastic student of these plants is most unlikely to see are described in detail. In other families, like Papilionaceae and Gramineae, even common and sometimes thoroughly established aliens are omitted. The reader will get little help in naming the numerous species of *Medicago*, *Trifolium*, *Vicia*, *Amaranthus* and *Bidens* (to mention only a few obvious genera) which he finds, while much valuable space is taken up with full descriptions of species which he is most unlikely to see in this country. Some of the omissions which are well established like *Bidens frondosa*, *Ficus Carica*, and *Echinops sphaerocephalus* have been fully recorded and discussed. In the case of *Rumex* the explanation of the selection appears to be that the species included are those which the reviewer has written up. Hence *R. dentatus* and *R. obovatus* are not mentioned, while the much rarer *R. stenophyllus* is set in the type adopted as standard for the Flora. *Crepis setosa* and *C. niceaensis* are other examples of species which might have been set in smaller type.

The word "casual" is repeatedly used in a way which is misleading. On page 1516 it is defined as "An introduced plant which has not become established though it occurs in places where it is not cultivated". The authors do not say what they intend by "established", but some species described as casuals have been known regularly in the same localities for over half a century. Well known stations for aliens are sometimes omitted—to give an example from early in the book, there is no mention of Ireland in the distribution of *Selaginella Kraussiana*. It would have been useful to have given some indication of the periods during which such species as *Impatiens capensis*, *Cardaria Draba*, and

Matricaria matricarioides have been known in Britain. The accounts give quite a false impression of *Hirschfeldia incana* and *Centaurea Calcitrapa* as they occur in Sussex and Kent. The work on aliens should be carefully revised before a new edition is issued.

In their treatment of critical native plants the authors have taken the opportunity of cutting away much of the dead wood which in recent years has impeded the path of workers at British botany. The segregates of *Viola* subgenus *Melanium* and *Centaurea nigra* and *C. Jacea*, which have proved completely unsatisfactory for reasons explained by genetical research, have been dropped. Similarly the splits of *Armeria maritima* are dealt with on their merits, and those of *Thlaspi alpestre* are treated very fairly pending further research. It is clear throughout the *Flora* that the authors have not been afraid to break with tradition and the stimulus to new work should be invaluable. Of the larger critical groups, it may be doubted whether the shortened accounts given for *Rubus* and *Hieracium* are of much value in the present state of our knowledge. For the latter, the reviewer would very much have preferred a conspectus giving the characters of the sections with an annotated list of species. The treatment given has the effect of excluding hawkweeds which users of the *Flora* are likely to find, while it includes *H. lactucella* and *H. Spraguei* which seem to be extinct. The accounts of *Euphrasia* and *Alchemilla* are outstanding in their competent treatment.

Hybrids are described where they are common, and particularly where they increase vegetatively; otherwise they are mentioned "as far as possible". In this, treatment is far from uniform. Sometimes the hybrids are listed at the end of the description of the genus (e.g. *Polygonum*) or after the key (e.g. *Carex*), sometimes after one of the species involved (e.g. *Potamogeton*), and sometimes at the end of the account of all the species (e.g. *Centaureium*). It would facilitate reference if all genera could be treated in the same way in this respect. There is no mention of *Scirpus* × *arunensis*, which now occurs in much greater quantity than the much decreased *S.* × *carinatus*, of *Primula elatior* × *veris*, or of *Limonium humile* × *vulgare*.

"No attempt has been made to describe all the numerous named varieties of British plants", but many are mentioned in the descriptions or raised to the rank of subspecies. The first method has its dangers as many varieties were described on the characters of more than one organ: to cite them in brackets after an alternative character in a description may lead to other characters being overlooked. The omission of varieties generally is justified on the grounds that the grade is difficult to interpret as a taxonomic unit, and also that their inclusion would have enormously increased the authors' work. Leaving them out, however, sets other problems which must not be overlooked. Attention is no longer drawn to the wide range of variation in certain species which it has long been the function of described varieties to portray. Thus from the description given of *Molinia caerulea*, the reader will receive no indication of the wide variability of this plant as compared

with *Sieglingia decumbens*, by which it is followed. Variation is indicated in the account of *Jasione montana* but it would have been much more evident if varieties had been given. Those who follow the nomenclature in the new *Flora* will have to do a considerable amount of research in large libraries before they can make use of varietal names published under specific epithets other than those given.

The work is illustrated with 79 figures selected to show characters which contrast in allied species. In the one showing fruits of *Valerianella*, that of *V. dentata* does not agree with the key. In those of *Sisymbrium* and *Ulmus* there appears to have been some confusion, but the figures generally add considerably to the value of the book.

References to important literature are included very sparingly and additions to these would be very helpful to students. In other cases a hint of the reasons which have prompted the authors to take views contrary to those expressed elsewhere would be welcome. One wonders, for instance, why the Mediterranean *Picris spinulosa* is included, having regard to the views expressed in *Rep. Bot. Soc. & E.C.*, 11, 178-9, and 404. Misprints are commendably few having regard to the size of the work. The most misleading are those in names of families (e.g. "*Artis-tolochiaceae*", p. xxv) or of botanists (e.g. "W. H. Pugsley", p. xvii, and "Davy", p. 911). But it is pleasing to imagine the authors living in a Utopia where *Anthemis nobilis* has "Heads 18-25 cm. diam." (p. 1074) and the Gooseberry has fruits "10-20 cm. (more in cultivated forms)"! There seems to be confusion in the spelling of the names of drugs, where alkaloids are sometimes not given a final "e" (e.g. "aconitin", p. 76), and *Solanaceae* drugs are not cited for species in which they are exceptionally important.

The production of the book conforms to the high standard which can be relied on in the publications of the Cambridge University Press. If so much information is to be given in a single volume, it would hardly be possible to improve on the format. Nevertheless it must be admitted that a book weighing 1 lb. 15 oz. is a heavy burden in a ruck-sack or suit-case, and experience during the summer has shown that even when it is taken about the country in a car, the thinness of the pages makes it a difficult book to use when examining plants in even a moderate wind. For a volume of about 822 leaves the pages lie reasonably flat, but even so they curve somewhat, and this proves aggravating when the book is in use in the herbarium and plant fragments drop into the binding where they are difficult to remove. Ideally, a shortened and slimmer volume is required for use in the field, and a separate work of two or more volumes for convenient handling indoors. The price places the book beyond the reach of some who would otherwise own it, and the technical detail is too advanced for many without University training in botany. The authors would be well advised to consider issuing an abridged version to meet the needs of this public and for use in the field.

The criticism offered in this review is directed mainly to the treatment of aliens and English names and to details in other aspects of the work. Lack of uniformity in secondary matters has already been in-

licated and this applies also to the length of the accounts of species (e.g. compare the descriptions given for the *Hypericaceae* with those of the *Orchidaceae*). These criticisms become of minor importance in comparison with the great achievement of producing an original descriptive *Flora* of such a high standard of general accuracy. Clapham, Tutin and Warburg's *Flora of the British Isles* is the most important publication in British botany for a generation. It should be bought—and used—by every botanist in the country.

J. E. LOUSLEY.

(Since the above was written, the publishers have issued an errata sheet covering the more important corrections which have been detected. Readers who have already obtained their copies of the *Flora* are advised to write to the Cambridge University Presses, 200 Euston Road, London, N.W.1, for a copy of the errata sheet and to transfer the corrections to the text.—J. E. L.)

Drawings of British Plants. STELLA ROSS-CRAIG. Part VI: Portulacaceae-Aceraceae; 56 plates. 1952. London: G. Bell & Sons, Ltd.; 10/- net.

Part six of Miss Ross-Craig's *Drawings of British Plants* is devoted to thirteen families, most of which, with the exception of the *Hypericaceae* and *Geraniaceae*, have very few representatives in the British flora. The method and arrangement of the series has already been described by the reviewers of earlier parts of the work; and it remains only to mention that most of the drawings in this part maintain the same high standard as their predecessors. The drawings which are not quite so pleasing are few, but in plate 16, *Hypericum Elodes* L., the plant appears to be shown far too strict and robust, at least in comparison with the species as I know it in the south of England. Plate 40, *Geranium Robertianum* L., shows the flowers at almost twice their natural size, though possibly this is the result of an attempt to over-stress the difference in size between the flowers of this species and its close ally, *G. purpureum* Vill. (plate 41). The main drawing of *Ilex Aquifolium* L. (plate 51) appears unnaturally harsh, though the smaller illustration (figure B) appears more typical.

The problem of selecting the plants to be illustrated must necessarily be a difficult one, though the author has stated in the introduction to part 1 that it is proposed to illustrate all the clearly defined species native in the British Isles, and aliens, if they have become established, or are becoming established over a wide area. It seems a pity therefore that *Tamarix anglica* Webb, *T. gallica* L., *Lavatera cretica* L. and *Oxalis corniculata* L. are omitted, as the first two are well naturalised round the coasts of Britain, while the third is almost certainly native in West Cornwall and the Scillies, and the fourth well established, and a persistent garden weed, in many parts of England. The exclusion of the alien small-flowered mallows is also rather disappointing. It would I think have been helpful if naturalised alien species had been marked with an asterisk so as to distinguish them from native plants.

English names of plants have long been a subject of much controversy, and among those given in this part appear some peculiar anomalies. In the *Hypericaceae* only *Hypericum Androsaemum*, *H. perforatum* and *H. Elodes* are given full common names, while the rest of the species appear merely as St. John's Wort. In the *Geraniaceae* all the species of *Geranium* are treated fully except *G. pusillum*, which is referred to as Crane's-bill; surely the names Soft or Small-flowered Crane's-bill are applicable.

D. H. KENT.

Flowers of the Coast. IAN HEPBURN. Pp. xiv + 236 with 17 colour photographs, 43 monochrome photographs and 14 line drawings and maps. New Naturalist series, Vol. 24. London: Collins; 25/-.

In this volume of the New Naturalist series we have one that will appeal to the general reader, more than to the expert. It is a description of the wild flowers of the various types of habitat found around the coast of Britain, and is written in a simple straightforward manner which will be understood and enjoyed by all who read it.

The seaside has a special attraction for many people who, while making no claim to the rank of botanist, have a real appreciation of wild flowers and who are anxious to find out more about them. This book will enable them to find new enjoyment in their visits to the coast and will add to their knowledge of its flora.

The author calls himself an amateur, but his approach to his subject hardly bears this out, and there is no suggestion of writing down or popularisation of facts. The charm of the book lies in its being easy to read and understand, as there is a commendable restraint in the use of technical terms, the ones used being clearly defined, and an adequate glossary being included.

The treatment of the subject is ecological. The first part of the book is devoted to a brief explanation of the main principles of plant ecology and its specialised terms, the form and habit of coastal plants and their adaptations to the extreme hazards of their environment, with a summary of the main types of habitat to be found near the coast.

The chapter on the physiographical background by Professor J. A. Steers will be appreciated by all who are interested in the scenery of the coast; here the instability of all the various habitats is stressed as is the particular suitability of ever-changing ground for the study of plant ecology.

Seven types of maritime habitat are recognised: Saltmarsh, Dunes, Foreshore and Strand, Shingle Bars and Beaches, Cliffs, Cliff Tops, and Brackish Water. Each has a chapter on its special features, plant succession and its characteristic plants, only those which are restricted to maritime habitats being discussed, but lists of the commoner inland plants of each are given. Dunes are given a lot of attention, but the dune slack because of the predominance of inland plants is dismissed quite briefly.

The chapter on Saltmarshes takes on a new interest, as much of the area described has suffered in the recent disastrous floods as indeed have many of the Dunes. The somewhat uninspiring plants of the foreshore are given a very fair deal and the account of Rocky Cliffs is interesting and instructive. The lists of plants for each habitat show the overlapping of species therein and the effects of open and closed habitats are well brought out. The descriptive guide to the principal species of coastal plants is an attractive and readable part of a well-written book, which, however, hardly fulfills the promise made on the dust cover, "that it will serve as a handbook for the identification of the plants themselves". The author himself, however, does not pretend that this is the case, and stresses the importance of having a good Flora for this purpose, his object being to indicate the relative importance of the plants described, and give a general idea of what they look like and the uses to which they have been put.

Experts may quibble over the limitation of the number of species. There is only one *Salicornia* and two species of *Atriplex*, and *Carex*, apart from *C. arenaria*, is scarcely noticed, but the general maritime flora is given, and non-experts will find much here of interest.

There are some fine illustrations both in colour and monochrome, the majority by John Markham; these show both the types of habitat and individual plants.

Though this is a book for the layman, there is much for the expert to enjoy, though little that is new. It is a book to take on a seaside holiday, and will stimulate the interest in well known places, and inspire budding ecologists to seek new ground.

C. M. ROB.

John Ray. A Bibliography. GEOFFREY KEYNES. 8vo., pp. xvi + 163, with 4 colotype illustrations and 16 reproductions of title pages. London: Faber & Faber, 1951; 50/-.

Any writer of the stature of John Ray can justifiably claim neglect until posterity has produced for him an adequate biography and an adequate bibliography. Canon Raven's *Life* was very much more than adequate, and Mr. Geoffrey Keynes has now discharged the other half of our debt to the greatest British naturalist with a Bibliography of equal merit. No bibliographer has shown wider interests than Mr. Keynes, the only unity in the diversity of such figures as John Donne, John Evelyn and William Hazlitt (to name only three of his previous subjects) being his own feeling for genius in any field that appeals to him.

John Ray's writings embraced such a wide range of subjects that a study of them could be worthily undertaken only by a bibliographer of Mr. Keynes's catholic tastes. All Ray's separate volumes, his communications to the Royal Society, and the full canon of his 'lives and letters' are enumerated with meticulous bibliographical descriptions, historical notes, and location of copies; there is an appendix on por-

traits, together with indexes of copies cited, and of printers, booksellers and publishers, and a general index. Three portraits are reproduced, and sixteen title pages.

Most field botanists will turn first to the eleven pages devoted to the 'Cambridge Catalogue' of 1660-85—one of the most important works on British botany ever published. The intriguing story of the two title-pages and of the rare London issue are fully discussed and elucidated, and Mr. Keynes rightly includes a note on John Martyn's *Methodus* (1727), which was based on Ray's *Catalogus*; one misses, however, a description of Martyn's own interleaved volume containing the two works in the Botany School, Cambridge.

One of the most important discoveries recorded in the Bibliography is the hitherto undescribed copy in the British Museum of the second edition of the *Catalogus Plantarum Angliæ* (1677), with annotation in Ray's own hand. These comprise notes for a third edition which was never published, though they eventually saw the light in the *Fasciculus* of 1688.

In the sections on each of Ray's other works on British botany—the *Methodus* (1682), the *Synopsis* (1690) and the county lists in Gibson's *Camden* (1695)—there are points of interest, such as differing impressions of particular editions, which will be unknown to most readers and which will add new excitement to the examination of their own copies, if they are fortunate enough to possess any.

The rough grey paper on which the Publishers have seen fit to print the volume has pleased some and repelled others. I will content myself with quoting Mr. Pooter's entry for April 22 in *The Diary of a Nobody*: "I wish Mrs. James wouldn't come to the house. Whenever she does she always introduces some new-fangled rubbish into Carrie's head . . . I am sure it was Mrs. James who put Carrie up to writing on dark slate-coloured paper with white ink. Nonsense!'" But the paper of a book is less important than its text, and Mr. Keynes has added yet another masterly bibliography to his list—and one that will be of intense interest to all students of the British flora.

J. S. I. GILMOUR.

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PLANT NOTES

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These should include date of birth and death, summary of life so far as events have a bearing on botanical work, whereabouts of herbarium and any manuscripts, and chief botanical publications. Offers to write obituary notices may be sent either to the Editor or to Mr. J. E. Lousley, 7 Penistone Road, Streatham Common, London, S.W.16.

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