

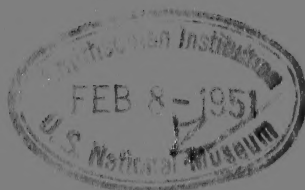
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Journal of the Botanical Society
of the British Isles

VOL. I. PART VI.

EDITED BY
E. F. WARBURG
M.A., Ph.D.

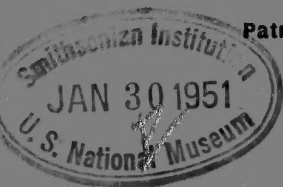


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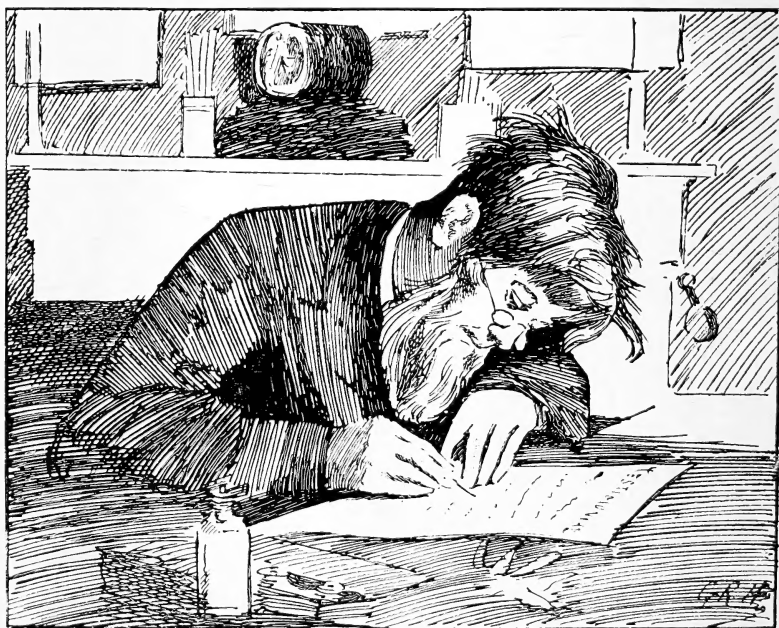
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From a painting by Joseph W. Forster,
JOHN GILBERT BAKER (1834-1920).



A Testimonial. "With acknowledgements to Pall Mall Budget, 1893
"Two years ago I was induced to buy your lotion for the hair ; since
then I have been unable to wear a hat."

From the Trower Fund.

THE E. G. BAKER BEQUEST

By J. E. LOUSLEY.

Under the terms of the will of Mr Edmund Gilbert Baker the Society receives unconditionally the portrait of his father by Joseph W. Forster. This picture of John Gilbert Baker is one of the best known of any British botanist of the last century. It has been described by a contemporary writer as "an excellent and characteristic likeness" and was hung in the Royal Academy in 1893 (No. 524 in the catalogue of that year). It has been reproduced in botanical periodicals on several occasions (e.g., 1893, *J. Bot.*, **31**, 243; 1893, *Gardener's Chronicle*, ser. 3, **13**, 746; 1933, *Rep. Bot. Soc. and E.C.*, **10**, t. 45, 289). Many framed copies were distributed to botanists in 1893, and one was hung as far afield as the office of our member, Mr H. N. Ridley, in Singapore. A cartoon in which the ink-stand is replaced by a bottle of hair lotion with an apt caption appeared in the *Pall Mall Budget* for May 25, 1893, and is here reproduced.

An American "appreciation" of the portrait of J. G. Baker quoted from *Meehan's Monthly* for September 1893 (1893, *J. Bot.*, **31**, 350) seems to anticipate recent research on the important influence of posture on work. It was quoted as follows:—

"He is represented with some Onoclea-like fern on the table before him, about which he is penning notes. The pleasure it gives to see for the first time the facial outlines of one so much beloved is mingled with regret that his hard labours cannot be softened by the use of a fountain pen instead of an old steel one; and instead of having himself bent down to his work till his body is at right angles with his legs, and his nose but a few inches from his wrist, some better care for his vital organs have not been provided for. It is well worth some thought and a little expense in improved furniture to add ten or fifteen years to the life of such a useful man as J. G. Baker."

In spite of the fears of the American writer this "useful man" lived for another 27 years, and the lesson of comfort has still to be learned by many enthusiastic botanists!

An obituary notice of Edmund Baker will appear in *Watsonia*, but this seems a suitable place to recount his early connection with the affairs of our Society. His father, J. G. Baker, was President of the Thirsk Natural History Society which took over the Botanical Exchange Club section of the work of the Botanical Society of London when that body was disbanded in 1858. Managing a large general drapery and grocery business founded by his father in Market Square, Thirsk, J. G. Baker was, nevertheless, able to find time for botanical work which established him as one of the leading amateur botanists of his day. On May 9th, 1864, he met with a misfortune which changed the whole course of his future career.

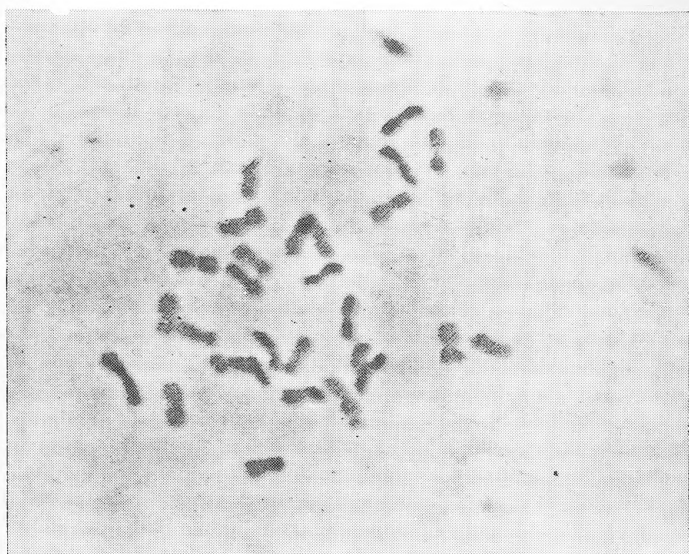
The fire which on that night destroyed J. G. Baker's house with almost all its contents—including his herbarium, botanical library and the stock of the first edition of his *Flora of North Yorkshire*—has been graphically described by T. J. Foggitt who witnessed it (1933, *Rep. Bot. Soc. and E.C.* 10, 296-297). Edmund Baker, then exactly three months old, saved his parents' lives with his cries. It is from the will of this infant of 85 years ago that the Society has now benefited.

His father's disastrous loss had a remarkable sequel. Various circumstances (which are described fully in 1921, *Proc. Roy. Soc. B*, 92, xxv) had paved the way for a new appointment at Kew, and Dr (afterwards Sir Joseph) Hooker invited J. G. Baker to accept the post of First Assistant. He took up this appointment in January, 1866. The letter conveying the invitation, together with connected correspondence, was found amongst Edmund Baker's papers and has been presented by Mrs Trent to the Royal Botanic Gardens, where it has been filed in the Herbarium Library. Gilbert Baker retained his interest in the Botanical Exchange Club which, following his removal, became known as the London Botanical Exchange Club in 1866. He will always be remembered for his work in continuing the activities of our Society at a time when his own troubles were enough to have overcome a lesser man.

It is, therefore, appropriate that his son should have bequeathed this fine portrait to the larger organisation which has descended from the modest Club for which his father did so much. The picture will be labelled with a plaque and housed on our behalf by the Linnean Society in their rooms. Of that Society both Bakers were Fellows for many years and it is appropriate as well as generous of their Council to undertake care of the portrait.



A.



B.

Plate 1. Chromosomes of *M. scabrum* (A) and *M. effusum* (B) from root-tip preparations pre-treated with bromo-naphthalene for 3 hours, fixed in acetic alcohol and stained with Feulgen's stain. $\times 1800$.

From the Trower Fund.

MILIUM SCABRUM Merlet

By T. G. TUTIN.

(a) GENERAL.

The occurrence of *Milium scabrum* in Guernsey was first reported by C. R. P. Andrews (1900A, B) but in spite of several searches it was not refound until 1949. Andrews found the plant in April 1899 and during the period of 50 years which has elapsed before its rediscovery it has been suggested that it was never more than a casual. The following facts will, I believe, make it clear that the plant is native on the island and will also, at least in part, explain why it was not refound sooner.

Andrews stated that the locality in which he found it was on the cliffs near Petit Bot on the south coast of Guernsey and subsequently (1940) amplified this in a letter, a copy of which is in the Herbarium at Kew. In this letter it is said to have been found on a grassy patch below the path along the top, but well above the vertical part of the cliff (not at the foot of a vertical cliff as Marquand (1901) states, about half way between Jaonnet and Petit Bot. In spite of these definite statements there appears to be some doubt about the original locality, as Lousley (*in litt.*) states that Pugsley informed him that Andrews found the plant in his vasculum at the end of a day's collecting and there was some uncertainty about the exact locality.

This doubt is increased by the fact that it was rediscovered by J. E. Raven and myself on L'Ancrese Common on the north coast of Guernsey, and that in spite of repeated search we failed to find either the plant or any apparently suitable habitat for it in the neighbourhood of Petit Bot. It is likely, therefore, that search has been made during the past 50 years in a locality where the plant does not grow at all, or is at best very rare.

On the north and north-west coasts of Guernsey the plant grows abundantly, though usually in small patches, towards the western end of L'Ancrese Common, Grand Havre (N. D. Simpson *in litt.*), at Vazon Bay and, doubtless, elsewhere.

The habitat in which *Milium scabrum* grows in Guernsey is on fixed dunes in short but nearly closed turf. The following lists from two stations on L'Ancrese Common will give an idea of the common associates:—

A		B	
<i>Ranunculus bulbosus</i> L.	o	<i>Cochlearia danica</i> L.	la
<i>Erophila</i> sp.	o	<i>Cerastium semidecandrum</i> L.	r
<i>Cochlearia danica</i> L.	o	<i>Trifolium repens</i> L.	r
<i>Cerastium semidecandrum</i> L.	r	<i>Lotus corniculatus</i> L.	f
<i>Ononis repens</i> L.	f	<i>Vicia lathyroides</i> L.	r
<i>Lotus hispidus</i> Desf.	f	<i>Sedum acre</i> L.	lf
<i>Poterium Sanguisorba</i> L.	o	<i>Galium verum</i> L.	r
<i>Daucus Carota</i> L.	f	<i>Bellis perennis</i> L.	f
<i>Galium verum</i> L.	r	<i>Thymus</i> sp.	f
<i>Bellis perennis</i> L.	f	<i>Plantago Coronopus</i> L.	o
<i>Myosotis hispida</i> Schlecht. (<i>M.</i> <i>collina</i> auct.)	r	<i>Milium scabrum</i> Merl.	o
<i>Thymus</i> sp.	la	<i>Mibora minima</i> (L.) Desv.	r
<i>Plantago Coronopus</i> L.	r	<i>Dactylis glomerata</i> L.	f
<i>Plantago lanceolata</i> L.	f	<i>Festuca pratensis</i> Huds.	f
<i>Euphorbia portlandica</i> L.	r	<i>Festuca ovina</i> L.	a
<i>Milium scabrum</i> Merl.	f		
<i>Mibora minima</i> (L.) Desv.	o		
<i>Dactylis glomerata</i> L.	f		
<i>Festuca ovina</i> L.	a		
<i>Agropyron pungens</i> R. & S.	la		
<i>Camptothecium lutescens</i> B. & S.	la		

a=abundant, f=frequent, o=occasional, r=rare, l=locally.

It will be noticed that *Scilla autumnalis* L., though abundant in the neighbourhood and often occurring within a few feet of patches of *M. scabrum*, does not appear to grow actually mixed with it. All the plants of *Milium* we observed had the culms bent sharply about 2 cm. above the base so that the small culm leaves and narrow inflorescence were lying flat among the other constituents of the turf, a habit that makes the plant difficult to see and indeed less conspicuous than the considerably smaller, but erect and reddish tufts of *Mibora*. Mr N. D. Simpson, who visited the locality when the seed was ripe early in May, tells me that at that time the plant was more conspicuous, as it had bleached to a whitish colour.

The distribution of *M. scabrum* is not very clearly understood, as this species has been confused with *M. vernale* M. Bieb., a similar but larger plant with a spreading panicle. As far as can be ascertained *M. scabrum* is confined to the coasts of western Europe from the Netherlands (coast near Leiden) to Portugal, while *M. vernale* is essentially a Mediterranean species. *M. scabrum* appears to be local throughout its range and to grow in habitats similar to those it occupies in Guernsey.

In view of its very local occurrence, early flowering season and inconspicuousness it is possible that it may have been overlooked and it seems worth making a careful search for it in suitable habitats in the southern part of England.

(b) CYTOLOGY.

Milium scabrum shares with *Airopsis tenella* (Cav.) Coss. & Dur., *Periballia laevis* (Brot.) Asch. & Graebn. (Litardière, 1948) and *Holcus*

Gayanus Boiss. (Litardière, 1949) the peculiarity of having the diploid chromosome number of 8 (plate 1). The three species examined by Litardière are, like *M. scabrum*, small annuals and have a south-western (hispano-lusitanian) distribution. In other respects, however, *M. scabrum* is widely different from the other three grasses with $2n = 8$, which are all members of the Tribe *Aveneae*, and shows an exceedingly close morphological agreement with *M. vernale* M. Bieb. and *M. effusum* L. *M. vernale* and *M. effusum* were examined cytologically by Avdulov (1928), who found $2n = 18$ and $2n = 28$ respectively. The latter number has been confirmed by A. & D. Löve (1944) and by myself (plate 1) using material from Swithland Wood, Leicestershire. It is rather curious to find three different basic chromosome numbers (4, 9 and 14) in a small genus which appears to be very homogeneous morphologically, especially when it is combined with the considerable difference in size of chromosomes that there is between *M. scabrum* and *M. effusum*. It has not so far been possible to re-examine *M. vernale* but as most of the differences between it and *M. scabrum* are matters of size it is possible that it is in fact a tetraploid with $2n = 16$.

(c) SYSTEMATIC POSITION OF MILIUM.

The genus *Milium* must in spite of its diverse chromosome numbers be regarded as a "natural" genus, since there is very close agreement in all other characters between its three species. It has been variously placed in the tribes *Stipeae*, *Paniceae* and *Agrosteae* or *Agrosteae* subtribe *Milieae* (Cosson & Germain, 1845), all of which have spikelets with one floret. It resembles the *Stipeae* in the strongly indurated lemma and palea and the untoothed lodicules, but differs in the absence of awn, in having 2 lodicules instead of 3 and in the basic chromosome numbers, which in the *Stipeae* are 9, 10, 11, 12, 17 and 19, but apparently never 4 or 14. From the *Agrosteae* it differs in having untoothed lodicules and, at least from the bulk of this tribe, in having the lemma and palea strongly indurated in fruit. It resembles the *Paniceae* in the dorsally compressed spikelets and indurated lemma and palea but differs from this tribe in most other respects. It would therefore seem best to keep the small tribe *Milieae* with *Milium* as the only genus.

This tribe may be described as follows: Annual or perennial herbs. Leaves of the festucoid type but with few or no silica cells; 2-celled hairs absent. First foliage leaf of seedling narrow and erect. Ligule glabrous. Inflorescence an effuse or narrow panicle of rather few spikelets. *Spikelets* of one floret, awnless, slightly *dorsally compressed*; rhachilla disarticulating above the glumes, not or very rarely produced beyond the floret. Glumes exceeding the lemma or equalling it in length, subequal, persistent, herbaceous-membranous, 3-nerved; nerves more or less parallel, not reaching the tip of the glumes. *Lemma* rounded on the back, thick, *becoming strongly indurated in fruit*, very smooth and glossy, faintly 5-nerved; *awn absent*. *Palea strongly indurated in fruit*, 2-nerved. *Lodicules* 2, *untoothed*, acute. Stamens 3. Ovary

glabrous, without an appendage; styles free. Fruit with a linear hilum $\frac{1}{3}$ - $\frac{2}{3}$ the length of the caryopsis. Starch grains compound. Chromosome large or rather small, basic numbers 4, 14, (? 9).

I should like to thank the Director of the Royal Botanic Gardens, Kew, for the loan of specimens, and Mr C. E. Hubbard for assistance with the description of the tribe *Milieae*.

ANDREWS, C. R. P., 1900A, Two grasses new to the Channel Islands, *J. Bot.*, **38**, 35-37.

—, 1900B, *Proc. Linn. Soc.*, sess. **112**, 5.

COSSON, E. ST. C., & GERMAIN DE SAINT-PIERRE, E., 1845, *Fl. Env. Paris*, 616.

MARQUAND, E. D., 1901, *Flora of Guernsey and the lesser Channel Islands*, London.

LITARDIERE, R. DE, 1948, *Comptes Rendus des séances de l'Académie des Sciences*, **227**, 1071-2.

—, 1949, *ibid.*, **228**, 1786-7.

AVDULOV, N. P., 1928, *Dnevn. Vsesoyuzn. S'yezda Bot. Leningr.*, **1**.

LÖVE, Á. & D., 1944, Cyto-taxonomical Studies on Boreal Plants. III. Some new chromosome numbers of Scandinavian plants, *Arkiv för Botanik*, **31A**, No. 12.



Museum botanicum universitatis Vindobonensis.

Herb. Persicum Dr. J. E. Polak. 1882.

Veronica comosa Richt.

Persia borealis.

Dr. Rescht, in fossis

Legit Th. Pichler.

HERBARIUM ORIENTALE

Dr. O. Stapf: purchased 1891.

Plate 1. *Veronica comosa* Richt. Isotype. $\times \frac{2}{3}$ approx.

From the Trorer Fund.

THE CORRECT NAME FOR VERONICA AQUATICA Bernhardt

By J. H. BURNETT,
Department of Botany, Oxford University.

The section *Beccabunga* Griseb. of the genus *Veronica* Linn. includes three plants found in the British Isles, namely *V. Beccabunga* L., *V. Anagallis-aquatica* L. and *V. aquatica* Bernh. This last plant was long confused with *V. Anagallis-aquatica* and it was first described as a separate species by Bernhardt (1834). Unfortunately, S. F. Gray (1821) had already used the name *Veronica aquatica* to designate *V. anagallis-aquatica* L. Therefore, under Article 61 of the International Rules of Botanical Nomenclature (1935), *Veronica aquatica* Bernh. is an illegitimate later homonym and must be rejected. It has thus become necessary to establish the correct name for this plant, although Keller (1942, 1944) has proposed that *V. aquatica* Bernh. be retained as a *nomen conservandum*.

Fernald (1939) first drew attention to this matter and advocated the use of *Veronica salina* Schur, and earlier Jávorka (1925) had in fact used this name. Fernald has also been followed by Pennell (1943) in his latest work. Mansfeld (1940) and Hylander (1945) have not accepted this name and have proposed *Veronica comosa* Richter instead.* I do not consider either of these names to be applicable and propose the adoption of *VERONICA CATENATA* Pennell (1921).

Possible synonyms may be found in Römpf's and Schlenker's monographs (Römpf, 1928; Schlenker, 1936); in historical sequence these are:—

- 1791 *Veronica tenerrima* Schmidt
- 1792 *Veronica acutifolia* Gilibert
- 1830-1832 *Veronica indica* Roxburgh ex A. Dietrich
- 1866 *Veronica salina* Schur
- 1885 *Veronica comosa* Richter
- 1921 *Veronica catenata* Pennell
- 1935 *Veronica connata* Rafinesque sensu Pennell

Schmidt's original sheet of *V. tenerrima* is in the Vienna herbarium and Schuster, commenting on it, says:

"Auf der originale Tikette bermerkt Schmidt: 'An varietas sit Anagallidis, adhunc dubito, donec cultura decidat.' Da sie Schmidt (1793) in seiner Flora Boëmica als Art aufnahm, scheint sie sich samenbeständig gehalten zu haben. Wegen der ganzrandigen teilweise kurz gestielter unterem Blätter hielt sie Beck vermütlich für eine Form von *beccabunga*, aber alle Merkmale, namentlich die vierkantige Stengel, sprechen für *aquatica*." (Schuster, 1906.)

"On the original label Schmidt remarks, 'An varietas sit Anagallidis, adhunc dubito, donec cultura decidat.' As Schmidt took up the

*Fernald (1950, *Gray's Manual of Botany*, ed. 8, 1984) has, while this paper was in the press, also adopted this name, but without explanation.

species in his *Flora Boëmica* (1793) it seems to have bred true for him. Beck believed it to be most likely a form of *beccabunga* because of the entire, sometimes shortly-petioled, lower leaves, but all the characters, especially the four-angled stem, suggest *aquatica*."

As Schuster remarks, the four-angled stem militates against *V. Beccabunga*, but there is general agreement (Britton, 1928; Schlenker, 1935/6, 1936; Glück, 1936) that the leaves, even the primary leaves and those of depauperate forms, of *V. aquatica* are never petiolate. It seems probable, therefore, that Schmidt's plant is referable to that form usually known to British botanists as *V. Anagallis-aquatica* L. var. *montioides* Boiss. (Hiern, 1898), and indeed Schlenker so determined Schmidt's original specimens. Therefore, although I have not actually seen the original sheet, the circumstantial evidence is so strong that *Veronica tenerrima* Schmidt may safely be rejected from the synonymy of *V. aquatica* Bernh.

There appears to be no specimen extant of Gilbert's *Veronica acutifolia* but it is clear from his description that he is merely re-describing a form of *Veronica Anagallis-aquatica*. This name may therefore be rejected outright for *V. aquatica* Bernh. as was done by Römpp and Schlenker.

Römpp cites *V. indica* Roxb. in the synonymy of *V. aquatica*, but this is an error. Roxburgh used this name "in litt." for *V. undulata* Wallich, a form closely allied to *V. Anagallis-aquatica* L., and it was published by A. Dietrich in his (6th) edition of the *Species Plantarum*. It is clearly irrelevant to the present issue.

Fernald (1939) has adopted Schur's name *Veronica salina* and supports his view by quoting extensively from the original description. Nevertheless, he omits the description of the capsule, namely "capsula elliptica, obtusa calycem superante" (italics mine). Surely this phrase, coupled with "floribus minimis numerosissimis" and "rachi pedunculis calycibusque parce glanduloso-pilosis," indicates that Schur was, in fact, re-describing *Veronica anagalloides* Guss., despite his statement that the plant had a reddish corolla. Pennell (1921) has remarked, "*V. salina* Schur Enum. Pl. Transsilv., 492, 1866, very similar to *V. anagalloides*," and, although he has since adopted Fernald's usage, it seems likely that Schur considered this to be the true affinity of his plant, since his description, No. 2649, follows, and is separated from that of *V. Anagallis-aquatica* by, that of *V. anagalloides*.

As the type sheet was destroyed during the war at Lwow, it is only possible to decide on the merits of this name from the description. I consider that the description is ambiguous and, in certain important particulars, e.g., the capsule-shape, incorrect for *V. aquatica* Bernh., and I therefore propose that *Veronica salina* Schur be rejected as a *nomen dubium*.*

*Since this paper went to press I have received a sheet of *Veronica salina* from the Vienna Herbarium, named by Schur himself. It is without doubt *Veronica anagalloides* Guss. so completely disposing of Fernald's claim.



Plate 2a. *V. comosa* Richt., single flower. $\times 5$.



Plate 2b. *V. catenata* Pennell, capsule. $\times 5$.

From the Trower Fund.

In 1940, Mansfeld drew attention to the fact that Bornmüller (1907) had referred *Veronica comosa* Richter to *V. Anagallis* L. var. *aquatica* (Bernh.) f. *bracteosa* Bornm. (= *V. anagalloides* Guss. var. *bracteosa* Hausskn. et Bornm.). Accordingly he suggested that *V. comosa* Richt. should be taken up for *V. aquatica* Bernh., and he is followed in this by Hylander (1945). Schlenker, under the heading "Doubtful forms," wrote:

"f. *bracteosa* Bornm. in Bull. l'Herb. Boiss., Sér. II, T, VII, 1907, 970. Synonym: ?*V. comosa* Richt. ex Stapf in Denkschr. k. Akad. Wiss., 50, II, 1885, 24? . . . Die originale der *V. comosa*: Persia borealis, ad Rescht, 23. April 1882 Herb. Wien sind sehr junge Pflanzen vom Habitus der *V. aquatica* Bernh. Die (unreifen) Kapseln sind sehr klein und ziemlich schmal, die Fruchstiele bis über 7 mm. lang. Das von Bornmüller gesammelte Exemplar dieser Form: Mesopotamia Austr. ad Basra (exs. No. 547) im Herb. Berlin besitzt ebenfalls kleine, jedoch breitere Kapseln und kürzere Fruchstiele und kann mit grösserer Sicherheit zu *V. aquatica* subsp. *laticarpa* gerechnet werden. Die Vergrösserung der Deckblätter ist wohl bei beiden Examplaren durch äussere Einflüsse bedingt." (Schlenker 1936, p. 18.)

"The originals of *V. comosa*: Persia borealis, ad Rescht, 23 April 1882, in Herb. Vienna are very young plants with the habit of *V. aquatica* Bernh. The (unripe) capsules are very small and rather narrow, the peduncles up to over 7 mm. long. The example of this form collected by Bornmüller: Mesopotamia Austr. ad Basra (exs. No. 547) in Herb. Berlin also possesses small yet broader capsules and shorter peduncles and can be referred to *V. aquatica* subsp. *laticarpa* with greater certainty. The enlargement of the bracts is probably caused, in both specimens, by external influences."

It is evident, therefore, that Schlenker was not entirely satisfied with the identity of *V. comosa* Richt., and, indeed, the absence of mature capsules or of indication of the flower-colour (which is not given in Richter's original diagnosis) causes a precise determination to be difficult. I have not seen the original sheet, but, through the courtesy of the Director, Royal Botanic Gardens, Kew, I have been able to study an isotype. This sheet is illustrated in Plates 1 and 2a. One is immediately struck by the characteristic appearance of the plant, which is largely determined by its habit and the form of the bracts and the flowers. The habit is unusual in that the internodes are very short in relation to the length of the leaves. I have never seen such a combination in normal or depauperate herbarium material of *V. aquatica* or even in the developmental phases of living plants. The leaves themselves are remarkable for their coarse and close serration, which is quite unlike anything I have seen in *V. aquatica*, although this condition is approached in some specimens of *V. Anagallis-aquatica*. Finally, there are the relatively slender pedicels arising at acute angles from the rhachis, subtended by long elliptical bracts (up to 1.2 cm.) with acute to acuminate tips, and the lanceolate sepals; these are quite unlike

such structures in *V. aquatica* Bernh., which has relatively robust pedicels subtended by oblong-obtuse bracts and narrowly ovate, obtuse sepals. These dissimilarities and the absence of mature capsules make the identification of *V. comosa* Richt. with *V. aquatica* Bernh. very uncertain, and indeed, in my opinion, the former plant more closely resembles *V. Anagallis-aquatica* L. (Richter himself remarked, "Vorliegende Pflanzen steht der *V. anagallis* L. ziemlich nahe, und dürfte sich vielleicht einst als Varietät derselben herausstellen"—"The plant under consideration is rather near *V. anagallis* L. and may possibly in the future turn out to be a variety of this plant.") *Veronica comosa* Richt. should therefore be rejected as a synonym of *V. aquatica* Bernh.

In 1921 F. W. Pennell described under the name *V. catenata* a Water Speedwell which he believed to be indigenous to North America. The type plant, P. A. Rydberg, No. 926, is illustrated in Plates 2b and 3. Through the courtesy of the Director, New York Botanic Garden, I have been able to examine the holotype, and I find it quite impossible to distinguish it from European material of *Veronica aquatica* Bernh. This view has also been expressed by Römpp, by Schlenker and by Fernald, the last two having also seen the holotype. *V. catenata* possesses linear-lanceolate, sessile leaves; fewer-flowered racemes with robust divergent pedicels (becoming horizontally spreading in fruit), each subtended by an oblong-obtuse bract; and orbiculate, deeply-notched capsules usually longer than the narrowly lanceolate-ovate, obtuse sepals. All these features are characteristic of *V. aquatica* Bernh.

It will be noticed, however, that the sheet is also annotated "*V. connata glaberrima* Pennell F.W.P. 1934." In this year Pennell adopted Rafinesque's poorly-characterised *V. connata* (Rafinesque, 1830) of which no type material is known, claiming it to be conspecific with his *V. catenata*. Pennell (1935) describes this plant as having "leaves lanceolate and acute, connate and entire, racemes divaricate and very long, pedicels twice as long as bracts, capsule bi-lobed and compressed." This is clearly a description of *V. scutellata* L., and indeed in 1921 Pennell had referred *V. connata* Raf. correctly to this species, suggesting that it was merely a long-leaved variant. Both Römpp and Schlenker refer *V. connata* Raf. unequivocally to the synonymy of *V. scutellata* L., and with this view I concur. Therefore *V. connata* Raf. may be eliminated from the synonymy of *V. catenata* Pennell.

It may be concluded with some degree of certainty, therefore, that the correct citation of the plant hitherto known as *Veronica aquatica* Bernhardi is in fact *VERONICA CATENATA* F. W. Pennell, 1921, *Rhodora*, **23**, 37.

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TYPE OF
VERONICA CATENATA PENNELL
 PENNELL, 1917

V. connata glaberrima Pennell
 FWP 1917

V. catenata Pennell
 TYPE FWP 1917

No. 926

FLORA OF THE BLACK HILLS
 OF SOUTH DAKOTA

Veronica anagallis L.

Herb. No. 16 1917
 Col. P. A. HEDBERG Alt. 3500 Feet

ADEN
 NYSSER

Plate 3. *Veronica catenata* Pennell. Type. $\times \frac{1}{2}$ approx

From the Trower Fund.

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THE ROOT PARASITISM OF EUPHRASIA SALISBURGENSIS
Funck.

By A. J. CROSBY-BROWNE.

It is usually held that the genus *Euphrasia* is a root parasite upon various grasses and *Carices* (Koch, 1891; Wettstein, 1896; Townsend, 1897). Although there have been occasional reports of *Euphrasias* growing without the aid of root parasitism, it is generally stressed that such plants were depauperate, failed to flower, or died quickly. Heinricher (1898A, 1898B, 1901), however, working in Germany, listed as hosts species of the following genera:—*Poa*, *Avena*, *Festuca*, *Carex*, *Luzula*, *Senecio*, *Trifolium*, *Capsella* and *Epilobium*, but this work appears to have been almost completely ignored (Boeshore, 1920).

In August 1949 the root systems of *E. salisburgensis* were investigated on the Altiplano of Monte Majella in the mountains of the Abruzzi, Italy. Individual plants averaged 3 cms. in height, their root systems often growing down more than 10 cms. All were flowering and colour variations occurred. The data presented below indicate that plants of this species, at least, have an even wider range of hosts than has been reported previously and from an equally wide range of families.

Name of Plant.	No. of cases of parasitism observed microscopically.	No. of cases of probable parasitism observed in the field (hand lens).
* <i>Dryas octopetala</i> L.	4	6
<i>Helianthemum grandiflorum</i> DC.	3	2
<i>Saxifraga aizoon</i> L.	1	
* <i>Draba aizoides</i> L.	1	
<i>Salix retusa</i> L.		3
* <i>Silene acaulis</i> (L.) Jacq.		2 + †
* <i>Trinia glauca</i> (L.) Dum.		1 + †
<i>Thymus subcitratus</i> Schreb.		1
* = British Species.		† = Host dead.

Typical plants were also found growing at points up to 30 cms. removed from any evident plant material either living or dead, on or below the soil surface, but this point requires further investigation.

It is hoped to continue this work, both in this country and abroad, with special reference to the various species of *Euphrasia*, in order to see if any vary in their range of hosts. In view of the number of families of flowering plants involved it would be interesting to see if any differences are detectable between individuals of a species growing unaided, and those upon hosts of different families. Similar problems are raised by other root parasites such as *Melampyrum*, *Bartsia*, *Pedicularis*, *Rhinanthus* and the *Orobanchaceae*.

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NOTES ON THE FLORA OF THE SCILLY ISLES AND THE LIZARD HEAD

By J. E. RAVEN.

The Isles of Scilly and the Lizard Head are still little known to botanists in the early spring. In the course of a stay of ten days (from March 27th to April 6th, 1950) in the Scilly Isles, followed by five days at the Lizard, my father, Dr R. C. L. Burges and I made a number of discoveries that seem to call for a brief note.

The first plant of interest is *Poa infirma* H.B.K., the ally of *Poa annua* L. known to British botanists from the Channel Isles under the names—among others—of *Poa annua* var. *remotiflora* (Murb.) and *P. exilis* (Freyn) Murb. This grass is in perfect condition in early April and may well disappear comparatively early in the season. On the islands of St Mary's, Tresco and St Martin's, we found it to be widely distributed and often abundant on waste places, roadsides, tracks and cliff-paths. We did not visit Bryher or any of the uninhabited islands. On St Agnes we failed to observe it, but there is every reason to suppose that it will be found there also. It frequently grows in the company of *Poa annua*, from which it can usually be distinguished, even at a distance, by its yellow-green colour.

For *Viola nana* (DC.) Corbière there are apparently two old localities: first, sandhills near New Grimsby, Tresco, where it was said to have been exterminated by the building of the sea-plane base in the 1914-18 war; and second, sandy fields below the school on St Martin's. In this latter station, early in June 1948, I did eventually find, in fields that had recently been dug, a very small number of unusually robust plants. Professor T. G. Tutin, however, had told us that in 1936 he had seen the plant on Tresco, and we therefore made a careful search of suitable ground. We succeeded in finding two quite distinct colonies, each restricted to a very small area of sandy, closed, rabbit-grazed turf. In the first of these areas the plant was exceedingly abundant, in the second relatively scarce. It was always very small, about an inch in height, but was already on March 29th flowering freely.

The main objective of our visit to the Scilly Isles was, however, to try to determine the identity of the species of *Ophioglossum* on the islands. On previous visits we had formed the opinion that both *O. vulgatum* L. var. *polyphyllum* Braun and *O. lusitanicum* L. were present; and on this occasion we were able fully to corroborate that belief. Indeed *O. vulgatum* var. *polyphyllum* was found in a large number of localities, chiefly on Tresco and St Martin's, but also in one spot, of which we had been told by Mr J. E. Lousley, at the northern end of St Mary's. The type of habitat was always much the same, gentle slopes of closed turf on a sandy subsoil. On Tresco the plant seems

almost always to be accompanied by *Scilla non-scripta*. In most localities there were already many fronds above ground, a large proportion of which bore fertile spikes in an early stage of development. The roots of this plant are long and fibrous, and the small rhizome bears either one or two fronds, both of which are sometimes fertile. The fronds are narrowly ovate, quite thin in texture and of a uniformly bright dark green with a curiously metallic gloss.

On St Agnes, where we failed to detect *O. vulgatum* var. *polyphyllum*, my father and I had previously found a single small colony of a strikingly distinct plant. On this occasion we twice revisited this same colony, but, despite a careful search of the rest of the island, did not succeed in finding any others. The habitat lies on the rough heath in the southern half of the island. It is a flat area, of little more than a square yard, at the foot of a large boulder. It bears such species as *Armeria maritima* and *Plantago Coronopus* and is surrounded by stunted *Calluna* and *Ulex*. In this small area there were at least a hundred specimens of *Ophioglossum lusitanicum*, a plant of barely half the size of *O. vulgatum* var. *polyphyllum*—often indeed much smaller—the frond of which is narrower, of a leathery texture and with almost parallel sides. By the beginning of April the fertile spikes had all fallen, except for a single one that was dried and bent, and the fronds, which lie flat upon the ground, were beginning to turn yellow. The stock consists of a larger rhizome than that of *O. vulgatum* var. *polyphyllum*, bearing a few shorter fibres. In this case too some rhizomes bear two fronds, but this species evidently fruits, here at least, much less freely than its ally. Both in the nature of its habitat and in its appearance and time of fruiting, the plant on St Agnes seemed to us to be unquestionably conspecific with that which we had seen, on about the same date in 1949, on the cliffs of Petit Bot in Guernsey. And this impression, based primarily upon the field characters, was confirmed by Mr A. H. G. Alston, whose comment on the fresh specimens sent to him from St Agnes was as follows: "I think that it is *O. lusitanicum* because of the narrow fleshy leaves without small secondary veins and the straight-sided epidermal cells."

None of the species here reported from the Scilly Isles had yet been found upon the Lizard Head. We ourselves searched many areas that appeared to be superficially suitable for each, but were successful in finding only *Poa infirma*. It, at least, seems to be not uncommon; though there is only a little of it in the Caerthilian valley and on the Lizard Town green, it proved to be plentiful and widely distributed on a stretch of cliff between Kennack Sands and Black Head. Here it sometimes attains unusual dimensions; Professor Tutin, who kindly confirmed our determination of the grass both here and on the Scilly Isles, commented on one exceptionally coarse and broad-leaved specimen from near Kennack that "the large plant is also *Poa infirma*, looking much more like it does in the Mediterranean than anything else I have seen here." In this station, too, it was occasionally accompanied by dense tufts of *Juncus capitatus* Weig., much of it already in full flower, on

these sheltered sunny slopes, as early in the season as April 9th. But apart from *Poa infirma*, all the other species found on the Scilly Isles were, on the mainland, conspicuous by their absence.

On the other hand, a number of plants characteristic of the Lizard Head have yet to be found in the Scilly Isles. *Isoetes Hystrix* Durieu, for instance, the range of which on the mainland is considerably greater than has yet been reported—we saw it in abundance not only in the Caerthilian and Kynance valleys but also in Gew-graze and near Mullion Cove—would appear to be absent from Scilly: long and careful search of many likely areas proved invariably fruitless. And the same can be said, though with less confidence so early in the season, of *Juncus capitatus*. Again, while *Artrolobium pinnatum* (Mill.) Britten & Rendle, so common in the Scilly Isles, is unknown on the mainland, the three characteristic clovers of the Lizard—one at least of which, *T. strictum* L., was evidently going to be unusually abundant and fine this year—remain as yet undiscovered in the Scilly Isles. It would appear, therefore, if only the rarest species are taken into account, that the differences between the floras of the two districts greatly outweigh the similarities.

The differences between the floras of mainland Cornwall as a whole and the Scilly Isles are indeed much greater than this. Further investigation of this fact, due presumably to a combination of edaphic and climatic factors, might well yield illuminating results. In any case, a week of the spring spent in either area can hardly fail to be of the utmost interest to the field-botanist.

NOTES AND ADDITIONS TO THE FLORA OF THE ISLANDS OF S.W. CORK

By O. POLUNIN.

In August 1947 and 1948 I spent two periods of one month holidaying and botanising among the islands of S.W. Cork. I visited all the islands of any size, including Sherkin, Clear, Horse, Hare, Calf, etc., for a short period, and made lists of flowering plants as a preliminary to a survey of the island plant communities.

A total of 415* species of flowering plants and ferns was recorded for the islands compared with a total of 768 recorded for the whole of v.-c. H3, W. Cork, in the Census list of Praeger (1934, *The Botanist in Ireland*). The total for Sherkin Island was 388 and as by far the greater part of the time was spent on this island it may be considered to be fairly complete.

South West Cork as a whole, with the exception of the favoured district round Glengarriff and Bantry Bay, where some of the rarer Irish plants are to be found, has attracted few botanists in recent years. Nearly all records date from T. Allin (1883, *Flowering Plants and Ferns of the County Cork*) and from R. A. Phillips, who botanised in this area between 1891-1902.

A gap of 45 years in the records of the flora may be expected to reveal some interesting changes among the plants of the islands. During this time the human population has decreased steadily and some islands, viz., Castle and the Calf Islands, are no longer inhabited. Also changes in tillage, and the use of grass and cereal seed from further afield may have had a considerable effect on the weeds of cultivation.

There are, unfortunately, no earlier complete lists of plants from any of the islands and the records that exist are scanty. The following plants recorded by Allin, Phillips† and others for the islands were also found by me:—

Ranunculus Baudotti Godr.
Glaucium flavum Crantz.
Cochlearia groenlandica L.
Raphanus maritimus Sm.
Melandrium dioicum (L.) Coss &
Germ.
Althaea officinalis L.
Lavatera arborea L.

Erodium moschatum (L.) Ait.
Erodium maritimum (L.) Ait.
Trifolium arvense L.
Rubia peregrinum L.
Artemisia Absinthium L.
Centunculus minimus L.
Linaria Elatine (L.) Mill.
Scutellaria minor Huds.

*Further visits to the islands in 1949 and 1950 have increased this number to 441 and the total for Sherkin Island to 413. *Tortilis nodosa*, *Salix fragilis* and *Carex muricata* have now been found.

†Mr R. D. Meikle possesses Phillips' own copy of Allin's Flora, which I was able to see. There are a number of records in his own handwriting of island localities (mostly unpublished) which I have included in the lists below.

<i>Lamium hybridum</i> Vill.	<i>Spiranthes spiralis</i> (L.) Chevall.
<i>Littorella uniflora</i> (L.) Aschers.	<i>Sparganium minimum</i> (Hartm.) Fr.
<i>Rumex pulcher</i> L.	<i>Desmazeria marina</i> (L.) Druce.
<i>Euphorbia hyberna</i> L.	<i>Agropyron junceum</i> (L.) Beauv.
<i>Humulus Lupulus</i> L.	

I failed to find the following plants which had previously been recorded for these islands:—

<i>Fumaria parviflora</i> Lam.	<i>Centaurium pulchellum</i> (Sw.) E. H. L.
<i>Helianthemum guttatum</i> (L.) Mill.	Krause.
<i>Helianthemum nummularium</i> (L.) Mill.	<i>Echium vulgare</i> L.
<i>Eryngium campestre</i> L.	<i>Mentha Pulegium</i> L.
<i>Torilis nodosa</i> (L.) Gaertn.	<i>Lamium amplexicaule</i> L.
<i>Antennaria margaritacea</i> (L.) Gaertn.	<i>Salix fragilis</i> L.
<i>Cichorium Intybus</i> L.	<i>Carex muricata</i> L.
	<i>Asplenium obovatum</i> Viv.

The list of plants that follows is designed primarily to bring Praeger's Census list (1934, *The Botanist in Ireland*) up to date as regards part of v.-c. H3. A few of the rarer and more interesting plants have been added with notes of their occurrence in Kerry, for comparison.

I should like to thank Messrs R. D. Meikle, N. Y. Sandwith and A. J. Wilmott for their help in naming the majority of plants; also Messrs R. A. Graham, C. E. Hubbard, J. E. Lousley, E. Nelmes and S. M. Walters for naming critical species in this list.

* indicates a new vice-county record.

§ indicates an addition or correction to an annotated copy of the *Comital Flora*, as amended by Praeger's (1934) list [i.e., Praeger's list is used as a basis for all species included in it, *C.F.* for other (mostly alien) species].

† indicates a species introduced in the Islands.

If a plant does not occur in Praeger's list, this is stated.

- §*+21/3. *PAPAVER DUBIUM* L. (*sensu stricto*); sparingly, cornfield weed, Sherkin Island. In Kerry this species is more widespread than *P. Lecoqii* Lamotte. The latter was not collected in the islands. Det. R.D.M. and N.Y.S.
- §*+32/5. *FUMARIA BORAEEI* Jord.; ? rare, weed of cultivated ground, Sherkin Island. Has no doubt been overlooked in the past. Det. A.J.W.
- §*+45/1. *COCHLEARIA ARMORACIA* L.; one plant in vicinity of old ruined castle; no longer cultivated in the islands. Not listed in Praeger (1934).
- 103/2. *SAGINA SUBULATA* (Sw.) Presl; rare, Sherkin Island. Det. A.J.W.

- §*+127/7. *GERANIUM PYRENAICUM* Burm. f.; rare, West Calf Island. This island has not been inhabited for about 40 years, but cattle from the mainland are regularly grazed on it. It occurs in E. Cork, but not in Kerry. Det. N.Y.S.
- 128/1. *ERODIUM MARITIMUM* (L.) Ait.; Clare Island, occasional; absent in Kerry. Det. N.Y.S.
- 128/2. *ERODIUM MOSCHATUM* (L.) Ait.; rare, Sherkin, Clear and Hare Islands. Det. R.D.M. and N.Y.S.
- §*155/22. *TRIFOLIUM FILIFORME* L.; rare, growing in close turf near sea with *T. dubium* Sibth., Tragminetu Bay, Sherkin Island. Very rare in Kerry. Det. R.D.M. and N.Y.S.
- +176/12. *VICIA SATIVA* L.; frequent, growing in corn and potato fields but also well established along grass verges, lanes and waste places. On all inhabited islands. Not listed in Praeger (1934). Det. R.D.M. and N.Y.S.
- 189/9. *POTENTILLA ERECTA* L. × *PROCUMBENS* Sibth.; one plant, laneside in close proximity to parents, Sherkin Island. Occasional in Kerry. This hybrid not before recorded for v.-c. H3. Det. N.Y.S.
- §+239/1. <*ERYNGIUM CAMPESTRE* L.; careful search revealed no trace of this plant on Sherkin Island in 1947-1948. (See 1901, *Irish Nat.*, 10, 172.) Therefore presumably extinct in its only Irish station.>
- 295/1. *RUBIA PEREGRINA* L.; rare, Sherkin and Clear Island.
- §*+370/13. *CHRYSANTHEMUM PARTHENIUM* (L.) Bern.; laneside, Sherkin Island. As in Kerry most certainly an escape from gardens. Not listed in Praeger (1934).
- §*+371/2. *MATRICARIA CHAMOMILLA* L.; rare, arable week, Clear Island. Not listed in Praeger (1934). Det. A.J.W.
- 476/1. *CICENDIA FILIFORMIS* (L.) Delarb.; locally abundant in damp and boggy ground on Sherkin and Hare Islands. Occurs only in West Cork and Kerry. Det. R.D.M. and N.Y.S.
- 480/9. *GENTIANA CAMPESTRIS* L.; rare, Horse Island. Some specimens are annuals with cotyledons present. Det. N.Y.S.
- 545/3. *EUPHRASIA BREVIPILA* Burnat & Grelli; locally abundant, all islands; addition to Praeger (1934), but see Pugsley (1940, *J. Bot.*, 7, 13) for earlier record. Det. A.J.W.
- §*545/10. *EUPHRASIA OCCIDENTALIS* Wettst.; ? rare, Sherkin, West Calf Islands. Det. A.J.W.
- 546/4. *BARTSIA VISCOSA* L.; frequent to locally abundant in poor pastures on all islands.

- §*552/2. *UTRICULARIA NEGLECTA* Lehm.; often abundant in small pools and tarns, Sherkin and Clear Islands. Recorded for neighbouring v.-c.'s. Identification from flowering state. Det. R.D.M. and N.Y.S.
- §*+558/4. *MENTHA VIRIDIS* L.; rare, grassy field, Sherkin Island. Det. R.A.G.
- 558/9b. ×*MENTHA VERTICILLATA* L. var. *PALUDOSA* (Sole) Druce; grassy field, Sherkin Island. Det. R.A.G.
- 588/5i. *PLANTAGO MARITIMA* L. var. *BRACTEATA* Blytt; one large plant of this striking form on rocky bank at edge of small salty pool at cliff-edge, Sherkin Point, Sherkin Island. See Druce (1918, *B.E.C. 1917 Rep.*, 49), Pilger (1937, Engler, *Pflanzenreich*, **IV**, 269, 175) treats it as "monstr." *bracteata* (Blytt) Pilger of var. *communis* Williams f. *dentata* (Roth) Pers. ex Williams. Det. N.Y.S.
- §*600/1. *CHENOPODIUM RUBRUM* L.; rare, Sherkin and West Calf Islands. Growing on dried-up boggy pools near sea. Very rare and uncertain in Kerry, and absent in East Cork. Det. A.J.W.
- §*606/8. *ATRIPLEX LACINIATA* L.; one station on sandy shore, Tra-bawn Bay, Sherkin Island; previously only recorded on the East Coast of Ireland. Det. R.D.M. and N.Y.S.
- 606/7×5. *ATRIPLEX GLABRIUSCULA* Edmondst. × *HASTATA* L.
- 606/7×3. *ATRIPLEX GLABRIUSCULA* Edmondst. × *PATULA* L.
Both on gravelly shores, Sherkin Island. Det. A.J.W.
- 618/3×6. *RUMEX CRISPUS* L. × *OBTUSIFOLIUS* L.; on exposed rocky coast; "lowest plant on spray-covered rock"; Horse Island. Recorded once for Kerry. Not previously recorded for v.-c. H.3. Det. J.E.L.
- 628/1. *EUPHORBIA HYBERNA* L.; common along sheltered lanes and walls; probably on all islands.
- +650/3×2. *SALIX ALBA* L. × *FRAGILIS* L. (*SALIX RUSSELLIANA* Sm.); Hare Island. There is an old record from Carrigaline in Power (1845, *The Botanist's Guide for the County of Cork*), but it is not included in Praeger's Census List. Det. R.D.M.
- +650/6(2). ×*SALIX DASYCLADOS* Wimm. (*S. ACUMINATA* Sm.); Hare Island, *P. J. Newbold*. Recorded as common near Cork (as *S. acuminata*) in Power (1845, *l.c.*) but regarded as a doubtful Irish plant by Colgan and Scully (1898, *Cybele Hibernica*, ed. 2, 509) and not mentioned by Praeger (1934). Det. R.D.M. (as *S. calodendron* Wimm.).
- §*722/1. *SPARGANIUM NEGLECTUM* Beeby; ? frequent on Sherkin Island. Det. A.J.W. and N.Y.S.

- 722/5. *SPARGANIUM MINIMUM* Fries; rare, marsh west of Clear Island; rather rare in Kerry. Det. A.J.W.
- §*745/2. *HELEOCHARIS UNIGLUMIS* (Link) Schult.; ? rare, muddy pool, Sherkin Point, Sherkin Island. Recorded in Kerry but not E. Cork. Det. S.M.W. (as ? Western type).
- §*753/1. *CAREX PSEUDO-CYPERUS* L.; two localities, swampy ground on edge of tarn, Sherkin Island. Does not occur in Kerry. Det. E.N.
- 753/18. *CAREX PUNCTATA* Gaud.; sparingly, heathy country, Horse Island. Det. E.N.
- §*+780/3(2). *AGROSTIS GIGANTEA* Roth; Horse Island. Not listed in Praeger (1934). Det. C.E.H.
- §*809/1. *KOELERIA GRACILIS* Pers.; frequent, close turf by the sea, Sherkin, Clear, Horse and Hare Islands. Rather common and locally abundant by the sea in Kerry. Det. C.E.H.
- 814/1b. *CATABROSA AQUATICA* L. var. *LITTORALIS* Parn.; one locality on fine but firm sand, Trabawn Bay, Sherkin Island. The first coloniser of sandy strand. No specimens of the typical species were collected on the islands; it is rather rare in Kerry. Det. C.E.H.
- §*824/4. *POA IRRIGATA* Lindm.; Sherkin Island. Not listed in Praeger (1934). Det. C.E.H.
- 824/14d. *POA ANNUA* L. var. *REPTANS* Hausskn.; occasional, sandy and shingle shores, Sherkin Island. Det. C.E.H.
- §*825/3. *GLYCERIA DECLINATA* Bréb.; marsh, Sherkin Island; the marsh is separated from the sea by a sand-bar. Long Island. Not listed in Praeger (1934). Det. C.E.H.
- 826/7c. *FESTUCA RUBRA* L. var. *BARBATA* (Schränk) Richt.; exposed cliffs, Hare Island. Recorded for Kerry. Det. C.E.H.
- §*+827/17. *BROMUS COMMUTATUS* Schrad.; rare, cornfield, Sherkin Island. It occurs in Kerry and East Cork. Det. C.E.H.
- †829/4. *LOLIUM MULTIFLORUM* Lam.; occasional, cultivated ground, Sherkin and Hare Island. Not given in Praeger (1934) nor in *Comital Flora*. Det. C.E.H.
- 830/1×4. *AGROPYRON JUNCEUM* (L.) Beauv. × *REPENS* (L.) Beauv.; Hare Island. Det. C.E.H.

NITELLA MUCRONATA Miq. **VAR. GRACILLIMA** Gr. & B.-W. IN
WARWICKSHIRE

By G. O. ALLEN.

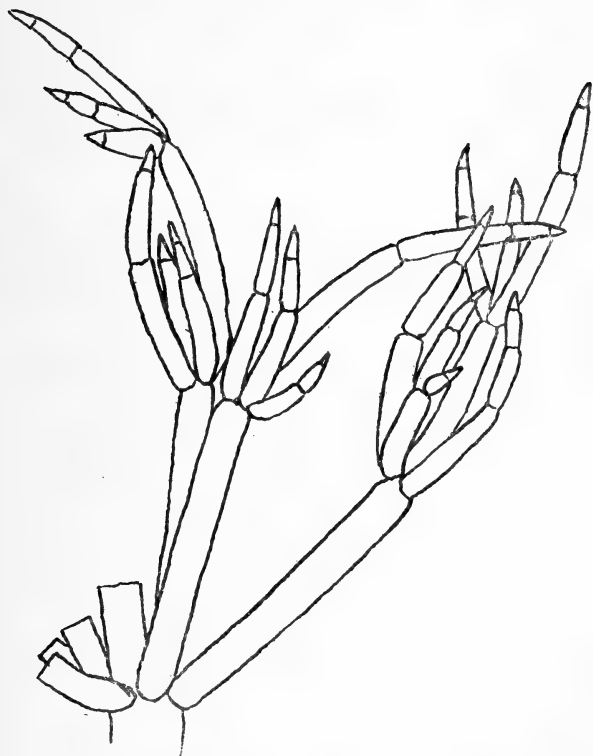
N. mucronata, a rare British species, is distinguishable mainly by the twice-forked branchlet, two-celled dactyl* and the reticulate decoration of the oöspore membrane. Its name is derived from the apex of the lower cell of the dactyl being rounded and the end-cell being small and narrow, so that a conspicuous mucro is formed. Rarely the dactyl is three-celled, but Groves was inclined to attribute this to suppressed forking.

N. mucronata var. *gracillima* Gr. & B.-W. (1917, *J. Bot.*, 55, 324) was described from a plant found by Miss Roper in 1917 near Wickwar, W. Glos., in which the dactyls were often three-celled and the penultimate cell tapered gradually to the apex so as to be little broader than the base of the apical cell. I understand that it has not been found there since then and it has not been recorded elsewhere.

In April 1949, Mr J. L. Lyon found a plant in an old arm of the Oxford Canal, Newbold-on-Avon, near Rugby, which from the frequency of the three-celled dactyls and the tapering of the penultimate cell appears to me referable to this variety, though it tends to be somewhat stouter. It was gathered on several occasions and by August bore ripe oöspores. A few instances of four-celled dactyls were found, and I noticed one in the material from Wickwar.

The branchlets are extremely variable. Three-celled dactyls occur most frequently on sterile branchlets where there is often only one fork, which lends support to Groves's suggestion about suppressed forking. I found this to be the case also with Wickwar specimens.

*Dactyls are the rays at the final fork of the branchlet in *Nitella*. These rays are two or more in number and when there are several they somewhat resemble fingers. The term dactyl is only applicable to *Nitella*, the branchlets of which are always once or more forked, whereas in *Tolytella* and the *Chareae* the growth of the branchlets is constantly monopodial.



Nitella mucronata var. *gracillima* ($\times c. 20$). From a specimen collected by J. L. Lyon, 30th April 1949.

ORCHIS CRUENTA MÜLL. IN THE BRITISH ISLANDS

By J. HESLOP HARRISON.

A short note on the finding of *Orchis cruenta* O. F. Müller in the counties of Galway and Mayo has already been published (Harrison, 1949). The present paper serves to expand the description of this interesting boreal species, and provides additional distributional and cytological data.

Orchis cruenta was described by Müller in Oeder's *Flora Danica* in 1782 from Røros in central Norway. Synonyms, icones and exsiccata are cited by Pugsley (1935) and by Vermeulen (1947). By the latter author the species is renamed *Dactylorchis cruenta* (Müll.) Vermeulen, following his elevation of Klinge's subgenus *Dactylorchis* to the rank of genus. Vermeulen states that he has been unable to locate the type-specimen of Müller, and the description given in his paper of 1947 is based upon a plant from Frösön, Jämtland, Sweden, 170 miles E.N.E. of Røros, which he names as the lectotype, in Herb. L. M. Neuman, Lund, and is augmented from comparison with Swiss, Russian and other Scandinavian material. It is couched in general terms, and may thus be said to refer to a population rather than to an individual. Other descriptions of *O. cruenta* which may be said to define populations in that some attempt is made to indicate the ranges of variation of taxonomic characters are those of Klinge (1898), Ascherson and Graebner (1907, where the plant is named *O. incarnatus* subsp. *cruentus*) and E. and A. Camus (1928). The latter accounts seem largely to be based upon Klinge's original work.

The earlier treatment of *O. cruenta* by the two Reichenbachs (H. G. L. Reichenbach, 1832; H. G. Reichenbach, 1851) is marred by numerous inconsistencies. The "*Orchis cruenta* Roch." of the former should, according to Ascherson and Graebner (1907) and Vermeulen (1947), fall under *O. cordigera* Fries. *O. cruenta* Müll. is represented by the elder Reichenbach's "*Orchis haematodes*," although the diagnosis of this plant is by no means identical with that of the original. The younger Reichenbach provides a plate (t. 43, I) purporting to depict *O. cruenta* Müll. The species is, however, treated in the text in his complex system of subgrouping under *Orchis incarnata* as 2. *Sublatifoliae*, a. *brevicalcaratae* bb. *rhombeilabia cruenta*. The "*O. haematodes*" of his father is relegated to 1. *Incarnatae verae*, where it features as a synonym of a. *lanceata*. Again the caption appended to the plate of this plant shows little agreement with the text, since the plant is there entitled "*O. matodes* Rchb." (*sic*) under the general heading "*Orchis incarnata* L." Neither the figure of *O. cruenta* Müll. (t. 43, I) nor that of *O. matodes* Rchb. (t. 46, I) shows the feature most characteristic of the species: the presence of anthocyanin pigmentation on both surfaces of the leaf. The only case in which this character

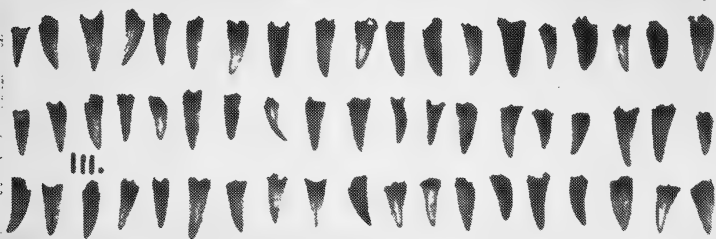
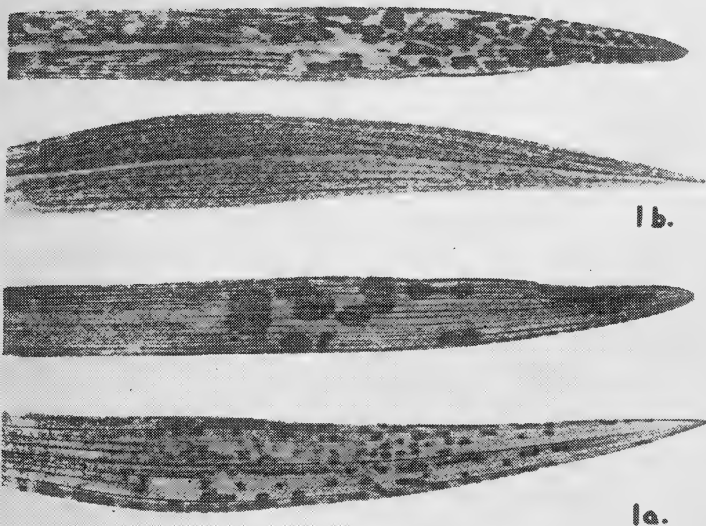


Plate I 1 (a) Upper and (b) lower surfaces of a pair of leaves from two different plants of *O. cruenta*. (Natural size).
 ii Lips from homologous flowers from fifty different individuals (*c.* natural size).
 iii. Spurs from fifty-seven different individuals (*c.* natural size).



is illustrated is in a supplementary plate (t. 170, II) of *Orchis salina* Turcz. This figure might well represent a form of *O. cruenta* Müll., and it is significant that *O. salina* is placed in the supplementary text with *O. haematodes* Reichb. p. under 1, *Incarnatae verae*, a. *lanceata* (that is, *O. cruenta* Müll. sensu Reichb. p.).

Five varieties of *O. cruenta* Müll. are recognised by L. M. Neuman (1909) in his treatment of the Scandinavian forms of the species. These are: *a subelliptica*, *β subtriangularis*, *γ brevifolia*, *δ lanceolata* and *ε haematodes*. The first two are broad-leaved forms (maximum leaf width 2-2.5 cm.), differing from each other in a labellum character. Vars. *brevifolia* and *lanceolata* are narrow-leaved plants (maximum leaf width 1-1.5 cm.), the former with exceedingly short, recurved leaves. Var. *haematodes* is a resuscitation of the elder Reichenbach's "*O. haematodes*," differentiated, according to Neuman's brief diagnosis, mainly through the possession of a greater number of bract-like leaves between the upper foliage leaf and the spike.

The continental range of *O. cruenta* was greatly extended by Pugsley's discovery in 1933 of a plant undoubtedly connected with that of Müller in two regions near Zermatt in Switzerland. Two years later the plant was found in Graubünden by Gsell (1935). Pugsley's description of the Swiss plant (Pugsley, 1935) is apparently based upon selected specimens, and gives little indication of variation—certainly it is not adequate to associate the Swiss race with any particular one of Neuman's varieties. That of Gsell gives some useful biometrical data and an indication of the range of variation of certain characters. The most recent continental find has been that reported by Wilmott (1938), who identified the plant in material from the French Alps. The excellent photograph which accompanies his description portrays a plant which may have affinities with Neuman's var. *subtriangularis*. The inter-relationships of the continental forms are discussed further below.

Brief consideration must be given here to certain erroneous former records of *O. cruenta* from the British Isles. The first record of the species from a British locality occurs in a note by H. Goss (1899) in which it is stated to occur on the Cumberland fells at an altitude of 1000 ft., the identification having been made by Rolfe. Druce (1910) subsequently recorded the plant from Teesdale, Durham, again on the basis of identifications made by Rolfe. In 1916, T. A. Stephenson reported *O. cruenta* from Hawkshead, N. Lancs., and from the Isle of Arran—"corroborated at Kew," presumably also by Rolfe. Druce apparently had some suspicion of these last records, since he saw differences between the plant concerned and that illustrated in Müller's original *Flora Danica* plate. All of these records preceded the establishment by the Stephensons in 1920 of their *Orchis purpurella* as a distinct species. After that date it became clear that all the previous records of "*Orchis cruenta*" from the British Isles referred to *O. purpurella*, and moreover that it had been the practice of certain continental authorities to refer plants of *O. purpurella* to *O. cruenta*, no doubt as

Vermeulen (1947) suggests, as the result of the misleading plate published of the latter species by the younger Reichenbach. This point was demonstrated by Druce (1920), for whom plants of *O. purpurella* were named as *O. cruenta* by Lindman. In a further elucidation of the relationship of *O. purpurella* with other marsh orchids, the Stephenson (1921) pointed out the marked differences between their plant and the *O. cruenta* of Müller. From examination of Druce's herbarium material, they decided that *O. cruenta* is nearer to *O. incarnata* (*O. latifolia* L. sec. Pugsl.) than to *O. purpurella*—"as compared with the minute dots of *purpurella* it has not only more angular markings, but also bright purple blotches on both sides of the leaves." They finally concluded (1922) that "it is now certain that previous records of *cruenta* from Britain are incorrect; the plants found must be assigned to *purpurella*." Druce had already reached this conclusion (1921), and had shown that the original record of Goss was at fault as a result of Rolfe's misnaming. He withdrew his own record for *O. cruenta* in Teesdale, stating that the plants there, too, fall under *O. purpurella* Steph.

The nomenclatural confusion which surrounds *O. cruenta* arises, as in the case of so many other dactylorchids, largely from the extreme inherent variability of the species. Among the dactylorchids, the observation of Camp and Gilly, in a recent discussion on the structure and origin of species (1943), applies with particular force: "the species is not necessarily a particular kind of organism; the species is a kind of population." To be of use in comparative studies, descriptions of taxonomic units within the group must necessarily take into account the range of variation found in natural populations.

The following description is based upon two random mass collections of more than one hundred individuals each from the colonies of *O. cruenta* on the limestone shores of Lough Carra and Lough Mask. For assistance in recording biometrical data I am indebted to Prof. A. R. Clapham and to Dr Y. Massey.

DESCRIPTION

LEAF CHARACTERS.

Number. There are normally two or three membranous leaves ensheathing the stem just above the tubers. Counting the lowest green leaf as the first, and that below the first floral bract as the last, even though it may be bract-like, the distribution of the number of leaves per plant in the populations examined is as follows: 3 leaves, 1%; 4 leaves, 22%; 5 leaves, 68%; 6 leaves, 8%; 7 leaves, 1%. The modal class for leaf number among the Irish plants is thus 5, with about a third as many with 4.

Size and shape. The leaves are characteristically lanceolate or linear-lanceolate, slightly keeled and broadest about one-third of their length from the base. They are normally erect, slightly recurved, and dispersed regularly along the length of the stem. Population parameters for the dimensions of the largest leaf are as follows:

Length (from top of sheath to tip): Range, 5-15 cm.; mean, 8.42 cm.; standard deviation, 2.49 cm.

Width (at broadest point): Range, 0.9-2.1 cm.; mean, 1.25 cm.; standard deviation, 0.29 cm.

Marking. Leaf marking was absent from 35% of the plants examined. The majority of the remainder showed the extraordinary distribution of anthocyanin pigmentation exclusive to *O. cruenta* among the European orchids. The marking is of a reddish-purple or violet hue, dispersed in fine dots or larger spots and blotches, sometimes forming dark bars running parallel to the leaf venation, sometimes forming fields or zones of colour interrupted only occasionally by small rectangular greenish islands, and often covering the entire leaf surface. Except in about 2% of the individuals examined, this marking was repeated on both surfaces of the leaf. The pigment seems to be located in sub-epidermal cells on each surface, and the patterning on the two surfaces is thus not necessarily coincident. This point is illustrated in the photograph of upper and lower surfaces of a pair of leaves reproduced in Plate I, i. The intensity of pigmentation can only be assessed visually; separating the range of variation into five arbitrary classes and taking no account of variation in pattern, the distribution of the Irish plants is as follows: Nil, 35%; Light, 28%; Medium, 14%; Heavy, 12%; Very heavy, 11%.

STEM.

Measured from immediately above the tubers (the point at which the stem parts with a vertical pull at the level of the lower leaves) the stature of the plants examined varied from 19 to 46 cm. The mean of all plants was 31.42 cm., and the standard deviation, 4.80 cm. The stem is invariably hollow, the cavity usually exceeding half the total diameter. In those individuals with heavily marked leaves, the stem is generally suffused with a similar violet or purple coloration, particularly in the upper parts. In others it is striated or flecked with pigment, the markings being continuous with those of the upper leaves or floral bracts.

INFLORESCENCE AND FLOWERS.

The inflorescence of Irish plants of *O. cruenta* is somewhat less dense than in native *O. latifolia* L. sec. Pugsl., and ranges in length from 3 to 7.5 cm., with 11 to 42 flowers. The bracts, which are spotted like the upper leaves, exceed the flowers in the lower part of the inflorescence. The flowers are small and possess a range of lilac-purple colours, with no trace of the flesh or maroon tint of *O. latifolia*. The lateral sepals are erect or slightly reflexed, marked with a pattern of fine dots or short bars. The labellum is entire or obscurely tri-lobed, often reflexed laterally in the fresh state. The range of variation in shape is illustrated in Plate I, ii. The dimensions are as follows:

Width (at broadest point): Range, 4.5-9.0 mm.; mean, 6.38 mm.; standard deviation, 1.04 mm.

Length (measured from spur mouth): Range, 4.25-7.50 mm.; mean, 5.82 mm.; standard deviation, 0.74 mm.

The spur is thick, curved and bluntly conical (Plate I, iii). The dimensions are:

Length: Range, 5.5-9.25 mm.; mean, 7.65 mm.; standard deviation, 0.76 mm.

Width (flattened): Range, 2.0-4.0 mm.; mean, 2.91 mm.; standard deviation, 0.47 mm.

The ovaries are strongly ridged, and commonly flecked with reddish-purple in the manner of the floral bracts and upper part of the stem.

CYTOLOGY.

Root- and tuber-tips were fixed in the field in Lewitsky's modification of Navaschin's solution, and sections were cut at $12\ \mu$. The chromosomes of the dactylorchids are small, and tend to lie in compact groups, or even to form chains (e.g., *O. ericetorum*; Hagerup, 1944). This makes accurate determination of their number difficult. The disadvantage may to some extent be overcome by staining with Johansen's methyl violet method, and carrying the differentiating and destaining action of the final picric-alcohol and clove oil baths to the point where only the outlines of the chromosomes remain visible. Overlapping and clumped groups may then be separated into their individual components with far greater ease than when the chromosomes are stained deeply and uniformly. Forty plates were counted in material from four plants. The chromosome number was found uniformly to be



Fig. 1. *Orchis cruenta* Müll.: metaphase plate from root tip. $\times c. 3000$.

$2n = 40$. A well-spread metaphase plate is illustrated in fig. 1. This finding is in accordance with that of Heusser (1938) for Swiss material of *O. cruenta*, and places the plant in the diploid series to which belong the other members of Pugsley's *Latifoliae verae*.

O. CRUENTA IN RELATION TO OTHER BRITISH DACTYLORCHIDS.

With *O. latifolia* L. sec. Pugsley (*O. incarnata* auct. mult.), *O. cruenta* forms the subsection *Latifoliae verae* of the subgenus *Dactylorchis*

Klinge in Pugsley's classification (1935). *O. latifolia* L. sec. Pugsley is represented in the British Islands by a wide range of varieties, almost all of which are clearly distinguished from *O. cruenta* by the complete absence of leaf markings. As has been seen, populations of *O. cruenta* always contain a high proportion of individuals in which the characteristic marking is present on both sides of the foliage leaves, and in which the bracts and upper parts of the stem are "cruentate"—flecked with reddish-purple pigment. Other differences which distinguish *O. cruenta* from the *O. latifolia* forms are found in flower colour and shape, and in the size, shape and distribution of the leaves. The lilac-purple flower colour is quite distinct from the straw, flesh, salmon, crimson-red series of tones found in many *O. latifolia* forms (var. *Gemmana* Pugsley; var. *ochroleuca* (Boll) Pugsley; var. *coccinea* Pugsley), and in fact is almost as distinct in the fresh state from the reddish-purple colours of the other *latifolia* varieties (var. *pulchella* (Druce) Pugsley and var. *cambrica* Pugsley). Closest to *O. cruenta* amongst the *O. latifolia* forms is var. *pulchella*, some populations of which contain individuals with light pin-point leaf spotting reminiscent of that found in *O. purpurella* T. & T. A. Steph. But the leaf marking in *pulchella* is restricted to the upper surface of the foliage leaves, never extending to the bracts or the stem. The labellum of *pulchella* is considerably larger than in *O. cruenta* (c. 8×8 mm., in contrast with c. 6×6.5), the leaves are broader, more recurved and more numerous, and the stem less fistular. The var. *pulchella* is, moreover, an early flowering plant of mildly acid sphagnum bog (frequently with *Sphagnum squarrosum* in Ireland), while *cruenta* flowers in late June and early July, and is apparently restricted to the highly calcareous type of marsh habitat described below.

COMPARISON WITH CONTINENTAL *O. CRUENTA*.

It is clear from the continental literature that *O. cruenta* is as variable throughout its range as are *O. latifolia* L. sec. Pugsley and *O. majalis* Reichb. Nevertheless, there is a substantial body of agreement between the various descriptions of the species, and there can be little doubt that the Irish plant here described falls within the "Rassenkreis" to which the northern forms of Müller, Klinge and Neuman, and the Alpine forms of Pugsley, Gsell and Wilmott belong. As in the *O. majalis* complex, there seems to be a wide variation in leaf size and shape. The original plate of Müller portrays a rather broad-leaved plant, close to Neuman's var. *subelliptica* (the leaf dimensions given by Neuman for this variety, which was based upon plants from Frösön, Jämtland, are 6-7 cm. × 2 cm.). I understand from Dr H. Smith of Uppsala that the broad-leaved plant is the more common in southern Sweden. Jämtland was, however, also the source of the material upon which Neuman's varieties *subtriangularis* and *lanceolata* were based, the former with a leaf size given as 5-7 cm. × 2-2.5 cm., and the latter, 6-12 cm. × 1-1.5 cm. It is difficult to tell from Neuman's account how well defined were the populations to which these dimensions refer, and it should be noted that Vermeulen (1947) states that the material he saw from this important

Swedish locality showed a very wide range of variation in leaf width*. Klinge, presumably describing Russian material, quotes the dimensions of the largest leaf as 6-8 cm. \times 1-1.5 cm.; dimensions which are accepted without modification in the accounts of Ascherson and Graebner (1907) and of Camus (1928-9). Gsell's dimensions for the Graubünden plants (5-9 cm. \times 1.5-1.8 cm.) define a broad-leaved race, no doubt similar to that represented by the broad-leaved plant illustrated by Wilmott (1938). Summarising the above:

(1) Narrow-leaved and broad-leaved races of *O. cruenta* occur in the Scandinavian region, the former tending possibly to have a more northerly and the latter a more southerly distribution;

(2) the narrow-leaved form is probably the more common in northern Russia;

(3) the Alpine form is characteristically broad-leaved.

While the Irish plants show considerable variation in leaf width (0.9-2.1 cm.), the mean width is 1.25 cm., and the race must therefore be regarded as relatively narrow-leaved. If Neuman's varieties are accepted, then the Irish race is closest to his var. *lanceolata*.

DISTRIBUTION AND ECOLOGY

In Ireland, *O. cruenta* appears to be limited to suitable habitats around the lakes of the Galway-Mayo limestone basin. Its distribution in this area has been explored in some detail by Mrs H. Gough, Mrs D. Teacher and Major R. F. Rutledge (June, 1950). The localities now known are as follows:

East Mayo (v.-c. H.26). Lough Carra: plentiful near Keel Bridge at the south end of the lake, extending up the west shore north of Partry and occurring on some of the islands; also plentiful at Cloonee and on the east shore north of Cloonee. Lough Mask: abundant at Aghinish, and occasional on the lake shore further north. Lough Corrib: occasional on the north-east shore near Castletown.

North Galway (v.-c. H.17). Occasional at Annaghdown, on the north-east shore of Lough Corrib.

The main continental range of *O. cruenta* (*sens. lat.*) lies between latitudes 55° and 65° N., although at the head of the Gulf of Bothnia and possibly in western Russia it approaches the Arctic Circle. The plant is now known from six or seven Alpine localities, following Pugsley's initial discovery of it near Zermatt in 1933. A record for a "race" of the species (*O. cruentus* B *Seemenii* Ascherson & Graebner, 1907) exists for a locality on the Isle of Borkum. Schulze (in Ascherson and Graebner, p. 721) considered this to be a form of *O. in-*

*My own measurements of leaf size made in July 1950 on 25 plants from a colony near Hammerdal in Jämtland, one of the type localities for Neuman's var. *lanceolata*, gave the following results: length 9-14 cm., mean 11.40 cm.; width 0.9-1.9 cm., mean 1.15 cm. In a collection of 100 plants from Omberg in Östergötland some 350 miles south of this locality, the dimensions of the largest leaf were as follows: length 6-14 cm., mean 9.24 cm., width 0.7-2.2 cm., mean 1.29 cm. The distinction between these two Swedish populations in this character is thus hardly significant.

carnata (*O. latifolia* L. sec. Pugsl.). This race is now extinct (*vide* Vermeulen). For reasons outlined above, the Scottish and northern English records quoted by Ascherson and Graebner, Camus, and other continental authors must now be disallowed.

The European distribution of the species, as now known, is thus as shown in the accompanying map, fig. 2. For the spot records of the



Fig. 2. *Orchis cruenta* Müll. : European distribution.

plant from the Scandinavian area I am indebted to Dr E. Hultén, who kindly supplied me with an advance map from his remarkable *Atlas* (1950).* To these I have added a record from Götland (Pettersson, 1947).

**O. cruenta* is placed by Hultén in his Group 14: "North-European plants with a boreal-montane tendency", among the species *without* a central European range. Its presence in the Alps means that it should feature, rather, in the second section of this Group, in which are listed plants possessing central European (often sub-alpine) ranges in addition to their more extensive northern areas.

East of the area shown on the map, the range of the species extends through central and northern Russia, reaching, according to Nevski, east of Lake Baikal. Details of the eastern Siberian range are not available.

O. cruenta generally occurs in small colonies in calcareous marshes and fens, and occasionally in salt-marshes. In Ireland, as for example about Lough Carra, it is a member of an *open* association dominated by *Schoenus nigricans*. This occurs in a belt of varying width extending down to the water's edge, and is subject to frequent inundation. The substratum is a white, highly calcareous deposit, soapy in texture, with a pH ranging from 8.2-8.4 in the samples examined and a solubility in acid of 70-85% dry weight. Characteristic associates include *Ranunculus Flammula*, *Lythrum Salicaria*, *Cirsium dissectum*, *Anagallis tenella*, *Samolus Valerandi*, *Pinguicula vulgaris*, *Juncus acutiflorus*, *Scirpus pauciflorus*, and occasionally *Cladium Mariscus*. The plant rapidly thins out in the drier *closed* associations, at and just above the flood level, which have a richer orchidaceous flora including *Gymnadenia conopsea*, *Anacamptis pyramidalis*, *Orchis Fuchsii*, and, locally, *Epipactis palustris*.

The foregoing distributional data suggest that *O. cruenta* must be added to the problematical little group in the flora of the British Islands which Matthews (1937) has termed the Northern-Montane. This includes plants with a fairly wide lowland distribution in northern Europe which possess disjunct localities further south, mostly in sub-alpine areas. Other examples in the Irish flora with this type of distribution are *Potentilla fruticosa*, *Calamagrostis neglecta* and *Salix phylicifolia*. The comparative sparsity of *O. cruenta* in central Europe suggests that it is of northern origin, and that the Alpine and Irish colonies represent relict stations from late glacial times when the species probably occupied a more extensive region south of the glaciated zone. During the ensuing climatic amelioration the main mass of the species is likely to have migrated northwards to its present station, while the immigration of a vigorous lowland flora eliminated the species in its southern stations except for isolated areas in which it is fitted by specialised ecology to meet competition. In Switzerland, one may suppose that such conditions are found in calcareous sub-alpine marshes. Gsell emphasises the fact that the Graubünden stations are all above the 1800 m. level, that is, at a greater altitude than that at which *O. incarnata* is commonly found. In Ireland, the present distribution may be explained on the assumption that survival was possible in calcareous marsh areas due to the early check to the immigration of potential competitors caused by the opening of the English Channel and the widening of the Irish Sea.

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ABSTRACTS FROM LITERATURE

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SYSTEMATIC, Etc.

6/14. *RANUNCULUS AURICOMUS* L. Schwarz, O., 1949, Beiträge zur Kenntniss kritischer Formenkreise im Gebiete der Flora von Thüringen, *Mitt. Thüring. Bot. Ges.*, 1 (1), 120. *Ranunculus auricomus* L. has been shown to be a collective species, with several constant apomictic microspecies. Nine are recorded for Thuringia and separated by a key.—[A.H.G.A.]

39/1. *CARDAMINE PRATENSIS* L. Clausen, R. T., 1949, Checklist of the Vascular Plants of the Cayuga Quadrangle, 42°-43° N., 76°-77° W., *Cornell Univ. Agr. Exp. Sta.*, Mem. 291, 8-9. Two subspecies are distinguished: subsp. *typica* Clausen occurs in dry situations and subsp. *palustris* (Wimm. et Grab.) Clausen in moist, boggy places. Although they have geographical pattern of subspecies in North America, in Europe their relationships are more complex.—[D.E.A.]

39/1. *CARDAMINE PRATENSIS* L. Hussein, F., 1948, Chromosome number of *Cardamine pratensis*, *Nature*, 161, 1015. The normal plant of damp meadows constantly has $2n = 56$. Plants with semi-double flowers have been found in fifteen localities in wet places, chiefly in the North of England. They too have $2n = 56$. Plants with $2n = 30$ seem to be characteristically from southern England. An ecological difference found by Lövkvist holds good in most cases: the large plant ($2n = 30$) is characteristic of damp banks, whereas the smaller darker-leaved plant grows in wet meadows.—[D.E.A.]

44. *EROPHILA*. Matuszkiewicz, W., 1948, Taxonomic Researches on *Erophila verna* DC., *Ann. Univ. Mariae-Curie*, Lublin, 3, 19-47. (Polish with English summary). The author concludes that there is little statistical correlation between the characters.—[A.H.G.A.]

61/3. *LEPIDIUM DRABA* L. Shove, R. F., 1948, Thanet Weed (*Cardaria Draba*), *School Nature Study*, 43, 11-12. A short account of its history in Britain, morphology and biology.—[A.E.W.]

96. *SILENE*. Marsden-Jones, E. M., & Turrill, W. B., 1948-9, Researches on *Silene maritima* and *S. vulgaris*, XXVII, XXVIII, XXIX, XXX, *Kew Bull.*, 1948, 29-33, 33-42, 253-263, 264-276; XXXI, 1949, 319-339. The first paper deals with the examination of Swedish material of *S. maritima*. 429 plants were grown and scored and the authors conclude that they are all to be classified into *S. maritima*, resulting from the continued back-crossing of a *S. maritima* × *S. vul-*

garis F1 with *S. maritima*; this would result in "infiltration" of *S. vulgaris* genes into a *S. maritima* population. The second paper deals with *S. vulgaris* material from the Pyrenees. The genetic behaviour of populations derived from this material is described; of particular interest is the genetic behaviour of a short bristly type of indumentum, the very inflated calyx, certain capsule characters usually associated with *S. maritima* and a modification of the tubercled character of the coat. Paper XXIX gives the results of three crosses between a plant of *S. maritima*, peculiar in having long cylindrical calyces, and two plants of *S. vulgaris*. It is shown how very rarely either grandparental habit appears in the F2 generation. Paper XXX describes work on crosses between *S. vulgaris* plants from Loch Tay and both *S. maritima* and *S. vulgaris* plants of different origin. F2 families from interspecific crosses showed a high degree of sterility. Paper XXXI suggests that mutation and selection connected with the car-age and its oncoming led to the isolation of *S. maritima* in north Europe.—[K.S.H.]

112/16. *HYPERICUM LINARIIFOLIUM* Vahl. Sandwith, N. Y., 1947, *Trans. Radnor Soc.*, **17**, 13. Its occurrence in Radnorshire is discussed.—[A.E.W.]

117. *MALVA*. Hedlund, T., 1949, Notes on the Appearance of New Biotypes Closely Related to *Malva parviflora* L., *Hereditas*, **35**, 507-520.

123/1. *TILIA PLATYPHYLLOS* Scop. Burchell, J. P. T., & Erdtman, G., 1950, Indigenous *T. platyphyllos* in Britain, *Nature*, **165**, 411. Peat from Addington, Kent (v.-c. 16), contained pollen-grains of *Tilia cordata* and *platyphyllos* (frequency 10%, proportions 75:5), besides alder, birch, hazel, oak, elm, and other trees and herbs in small amounts. The peat layer is assigned to the neolithic period.—[D.P.Y.]

127/3. *GERANIUM SYLVATICUM* L. Lundman, B., 1948, Some Notes on the Regional Variation of Flower Colour in *Geranium silvaticum* L., *Svensk Bot. Tidskr.*, **42**, 153-157 (in Swedish). Light-coloured flowers are common in the northern parts of Sweden, in Norway and in parts of Finland, but rather rare in southern and central Sweden, where they have been found only in mountain districts.—[A.H.G.A.]

185. *RUBUS* L. Bailey, L. H., 1949, *Rubus* Studies, *Gentes Herbarum*, **7**, 480-526. The author gives an account of the theory of species in *Rubus*. He places *R. Leesii* Bab. under *R. idaeus* var. *obtusifolius* Willd.—[A.H.G.A.]

186. *DRYAS*. Porsild, A. E., 1947, The Genus *Dryas* in North America, *Canad. Field-Nat.*, **61**, 175-192. The North American species are revised and compared with those of Eurasia.—[D.E.A.]

189/8. *POTENTILLA PROCUMBENS* Sibth. Dix, W. L., 1949, *Potentilla procumbens* in the United States, *Rhodora*, **57**, 390-391. *P. procumbens* Sibth. is recorded as an escape. The correct name is said to be *P. anglica* Laich.—[A.H.G.A.]

195. *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**, 381-391.

199/17. *SAXIFRAGA GRANULATA* L. Jones, E., & Turrill, W. B., A quantitative Study of Petal Size and Shape in *Saxifraga granulata* L., *J. Genetics*, **48**, 206-218. The paper deals with the Hog's Back population. Environmental conditions have little or no influence on the L/B ratio of the petals, but this varies with the age of the flowers. Female flowers, without viable pollen, were not frequent in the material studied.—[A.H.G.A.]

207. *RIBES*. Hedlund, T., 1948, Om *Ribes vulgare* och *Ribes rubrum*, *Bot. Not.*, **1948**, 39-48. The cultivated plants of *Ribes* called *R. rubrum* by Linnaeus and characterised by "floribus planiusculis" and by separate antheral spaces on the stamens were given the name *R. vulgare* by Lamarck in 1789. *R. rubrum* L. has been used to signify a collective species having campanulate flowers with wholly inferior ovaries and stamens with the antheral spaces close together. The subspecies of *R. rubrum* L. which differ mainly in degree of pilosity and are arranged in order of decreasing pilosity are *R. pubescens* (Sw.) Hedl., *R. scandicum* Hedl., *R. glabellum* (Trautv. et Mey.), and *R. glabrum* Hedl. They are found mainly in northern Europe and northern Asia. A key to some species of *Ribes*, 8 in number, is given.—[A.E.W.]

207/2. *RIBES NIGRUM* L. Vaarama, A., 1948, Cryptic Polyploidy and Variation of Chromosome number in *Ribes nigrum*, *Nature*, **162**, 782. *R. nigrum* has been found to have an oscillating chromosome number varying from 4 to 32. The most frequent number is diploid $2n = 16$. All numbers divisible by four are more frequent than might be expected. If the basic number for the genus is $x = 4$, the recent species are presumably derived tetraploids. The meiosis of certain *Ribes* hybrids indicates that hybridization and amphidiploidy have played a part in the speciation of this genus.—[D.E.A.]

220/1. *EPILOBIUM ANGUSTIFOLIUM* L. Fernandes, R., Uma Espécie de *Epilobium* nova para a Flora de Portugal, *Bot. Soc. Brot.*, ser. 2, **22**, 5-14. *Epilobium angustifolium* L. var. *brachycarpum* (Leight.) is figured, described and recorded as new to the flora of Portugal. The Portuguese plant is said to agree with specimens from Colinton Woods, Edinburgh, collected by Syme.—[A.H.G.A.]

223. *OENOTHERA*. Parrot, A. G., 1948, Les Onagres (*Oenothera* L.) au Pays Basque français, *Bull. Soc. Hist. Nat. Toulouse*, **83**, 83-87.

247. *APIUM*; 253, *SIUM*. Berton, A., 1947, *Sium* et *Helosciadium*. *Tussilago* et *Petasites*. Structure des Petioles; détermination par les feuilles, *La Feuille des Naturalistes*, N.S. **2**, 95. *Helosciadium* has fewer leaflets on the radical leaves (4-6 pairs). The leaflets of the first pair are at least as large as the others (the contour of the leaf is more or less triangular). No articulations on the petiole. No inverted (inversé) vascular bundles. Round cavity in transverse section. *Sium angustifolium* has 6-12 pairs of leaflets. The lowest pair smaller than the others (contour of leaf lanceolate). Rhachis articulate. Central cavity blocked at the articulation. *Petasites*: petiole angular with two

wings on ventral surface. Numerous vascular bundles in transverse section. *Tussilago*: petiole without angles or wings. Vascular bundles in a single arc. *Petasites fragrans* is similar to *Tussilago*, but there are vascular bundles within the main arc.—[A.H.G.A.]

258/1. *CHAEROPHYLLUM AUREUM* L. Håkansson, A., 1948, Syncytiebildning i anthererna av *Chaerophyllum aureum*, *Bot. Not.*, 1948, 425-429. An unusual kind of pollen sterility is discussed. "Meiosis is as a rule regular with 11 II's at diakinesis, but at the end of the second division disturbances set in. In most cases no separate pollen cells are formed, the four 'tetrad' nuclei remaining together in the same cell. The nuclei increase in size and often a vacuole is found as in a normal pollen grain. Often larger syncytia are formed through fusion of a different number of 'tetrads.' Germinable fruits are found, and as agamospermy does not occur, they must be the result of pollination from pollen that must be formed rarely."—[A.E.W.]

277/2. *HERACLEUM SPHONDYLIIUM* L. Duwen, J. M., 1949, De Bereklaun, *De Levende Natur*, 52, 70-73. The paper illustrates and discusses the dissected forms.—[A.H.G.A.]

295/1. *RUBIA PEREGRINA* L. Guillaume, A., 1948, La limite de répartition du *Rubia peregrina*, *Bull. Soc. Bot. Franç.*, 95, 265-272. The writer seeks to demonstrate that the areas occupied by *Rubia peregrina* and *Ruscus aculeatus*, which are south-west European species with a range from Southern England to Northern Italy, are mainly determined by their past history rather than by climatic factors. Salisbury's (1926, *The Geographical distribution of plants in relation to climatic factors*, *Geographical Journal*, 48, 312) theories are criticised.—[A.H.G.A.]

296/5. *GALIUM PUMILUM* Murray. Ehrendorfer, F., Zur Phylogenie der Gattung *Galium*. I. Polyploidie und geographisch-ökologische Einheiten in der Gruppe des *Galium pumilum* Murray (Sekt. *Leptogalium* Lange sensu Rouy) im österreichischen Alpenraum, *Österr. Bot. Zeitschr.*, 96, 109-138.

300. *SHERARDIA*. Garjeanne, A. J. M., 1948, *Sherardia*, *De Levende Natur*, 51, 163-168.

301. *VALERIANA*. Walther, E., 1949, Zur Morphologie und Systematik des Arzneibaldrians in Mitteleuropa, *Mitt. Thüring. Bot. Ges.*, Beiheft, 1, 7-105. A revision of the Genus *Valeriana* Section *Officinalis* based on cytology and herbarium specimens. Four species are recognised and their distribution shown on a map. A fifth, *V. pratensis* Dierb., is confined to the Rhine Valley. Three of these are reported from Britain, while the fourth, *V. sambucifolia*, has a more easterly range from Scandinavia to Jugo-Slavia. The species are separated as follows:—

A. Plants with stolons above ground ("flagellen") and subterranean ("stolonen"). Epidermal cells of the upper surface of the leaf with wavy walls ("stark gewellt"). Leaflets at right angles to the rachis. Flowers 4-8.3 mm. long. Pollen grains 52-65 μ . Fruit glabrous and 4-5 mm. long.

Series *Sambucifoliae*.

- B. Plants early-flowering, small, 40-80 cm. Leaves in the middle of the stem with (2)3-4(5) pairs of leaflets. 1. *V. sambucifolia*.
- BB. Plants late-flowering, usually 80-150 cm. Leaves in the middle of the stem with (2)4-6(8) pairs of leaflets, under surface with long hairs. 2. *V. procurrens*.
- AA. Plants with stolons subterranean or almost wanting. Epidermal cells of the upper surface of the leaf with almost straight walls ("wenig gebogen"). Leaflets making an acute angle with the rachis. Flowers 2-5.7 mm. long. Pollen grains 37-50 μ . Fruits 2-4.4 mm. long. Series *Collinae*.
- B. Under surface of leaves with long hairs.
- C. Plants early-flowering, with short stolons. Leaves in the middle of the stem short-stalked, with (6)7-12(14) pairs of leaflets. 3. *V. collina*.
- CC. Plants late-flowering, almost without stolons, 70-150 cm. Leaves in middle of stem long-stalked, with 6-9 pairs of leaflets. Fruit always glabrous. 4. *V. exaltata*.
- BB. Under surface of leaves glabrous or with short bristles. Plants early-flowering, usually without stolons, 50-100 cm. Leaves in middle of stem with 6-8 pairs of leaflets. 5. *V. pratensis*

The British records and the chromosome numbers are:—

1. *V. sambucifolia* Mikan (non British). n=28.
 2. *V. procurrens* Wallroth (*V. sambucifolia* auct.). n=28.
 - V.-c. 6. N. Som.: Cheddar Gorge, *Skalińska & Sandwith*; *Ross-Craig, Burt & Sealy*.
 9. Dorset: Wareham, hedgebank, *Makins*.
 11. S. Hants.: S. of Minstead, New Forest, *Ross-Craig, Burt & Sealy*.
 17. Surrey: towing-path above Kew, *Fraser*.
 22. Berks.: Kennington, near Oxford, wet places, *Hubbard*.
 23. Oxon.: near Shipton-on-Cherwell, *Turrill*.
 30. Beds.: King's Wood, Heath and Reach, *Milne-Redhead*.
 33. E. Gos.: Mercombe Wood; Perrott's Brook, by roadside at bottom of hill and by R. Churn, *Sprague*; Chescombe Wood, *Sprague & Skalińska*.
 76. Renfrew: Earn Water, between Mearns and Fenwick, *Mackechnie*.
 80. Roxburgh: Newcastleton, in state forest, *Summerhayes*.
 104. Skye: near Portree (Staffin Road), *N. & H. M. Montford*.
 - H.1. Kerry: between Ross Island and mouth of the R. Flesk, Killarney, *Ross-Craig, Burt & Sealy*.
 3. *V. collina* Wallroth (*V. officinalis* L. emend. Maillefer). n=14.
 6. N. Som.: Leigh Woods, *J. W. White*.
 17. Surrey: Hascombe, *E. S. Marshall*; chalkpit, south of West Clandon, *Britton*; Mickleham Downs, in open chalk pasture, *Sandwith*.
 25. E. Suffolk: Burgate, *E. S. Marshall*.
 29. Cambridge: Cherry Hinton, *Babington*.
 30. Beds.: Knotting, *Milne-Redhead*.
 39. Stafford: limestone, Manifold Valley, *Edees*; Biddulph, Hb. Hausknecht; "Kuypersly", Hb. Haussknecht.
 4. *V. exaltata* Mikan. n=7.
 23. Oxon.: marsh near Slade's Bottom, Woodstock district, *Hubbard & Turrill*.
 5. *V. pratensis* Dierbach (non British).
- Hybrid *V. collina* \times *V. procurrens*.
6. N. Som.: Avon Gorge under Leigh Woods, *Skalińska & Sandwith*.
 17. Surrey: Clandon Downs, *Wallace*; Sheerwater, Byfleet, *Fraser*.
 23. Oxon.: damp valley bottom near Kiddington, *Turrill*.
 24. Bucks.: chalk slopes above High Wycombe, *Sandwith*.
 33. E. Gos.: Lower Hilcot, *Sprague & Skalińska*. [A.H.G.A.]

[The spelling of the British localities has been checked by the specimens at Kew by Mr N. Y. Sandwith.—A.H.G.A.]

320. *ERIGERON*. Cronquist, A., 1947, A revision of the North American Species of *Erigeron* north of Mexico, *Brittonia*, **6**, 121-302. *E. canadensis* is placed in the genus *Conyza*, the chief generic difference being in the numbers of central hermaphrodite flowers, which are stated to be few in *Conyza* and many in *Erigeron*. Three North American varieties of *E. acris* are described.—[K.S.H.]

370/4. *CHRYSANTHEMUM LEUCANTHEMUM* L. Gombault, R., 1948, Notules sur la flore française de l'Ouest, *Bull. Mus. Paris*, **20**, 478-480. Describes *Chrysanthemum Leucanthemum* var. *odoratum* with a scented root and trimorphic leaves from Basses-Pyrénées.—[A.H.G.A.]

379. *TUSSILAGO*; 380, *PETASITES*. See 247; 253.

396/2. *CIRSIIUM VULGARE* (Savi) Ten. Arènes, J., 1948, Les races françaisés du *Cirsium vulgare* (Sav.) Ten., *Bull. Soc. Franç. Ech. Pl. Vasc.*, **1947**, 42-45. The species is subdivided into three subspecies:—

Apex of median and outer bracts of capitulum 10-15 mm. long, erecto-patent, arcuate or recurved after flowering, tipped by a strong spine 3-7 mm. long

subsp. *crinitum* (Boiss.) Rouy

Apex of median and outer bracts of capitulum 5-10 mm. long, erect, erecto-patent or patent before flowering, sometimes afterwards, more or less arcuate:—

Leaves concolorous or subconcolorous, glabrous, glabrescent, pubescent or more or less arachnoid (?) beneath. Spines of involucrel bracts 1-5 mm.

subsp. *Savitanum* J.Ar.

Leaves not concolorous, strongly araneo-fomentose or woolly on the lower surface

subsp. *silvaticum* (Tausch.)

These subspecies are further subdivided into varieties.—[A.H.G.A.]

396/4. *CIRSIIUM ACAULON* (L.) Weber. Arènes, J., 1948, Les races françaisés du *Cirsium acaule* (L.) Scop., *Bull. Soc. Franç. Ech. Pl. Vasc.*, **1947**, fasc. 1, pt. 2, 38. The species is subdivided as follows:—

Leaves with rather numerous more or less flat lobes which are patent or erecto-patent. Marginal spines whitish, medium, not erect. Rosettes solitary or united in small tussocks

Stem short or wanting (5 cm. or less)

Capitulum rounded and more or less truncate at base

subvar. *vulgare* J.Ar.

Capitulum attenuate at base

Stem exceeding 5 cm. subvar. *araricum* (Gaud.) J.Ar.

Capitulum rounded and more or less truncate at base

subvar. *collvagum* (Gaud.) J.Ar.

Capitulum attenuate at base

subvar. *disjunctum* (Gaud.) J.Ar.

Leaves with many contiguous lobes separated by deep sinuses with thickened margins. Marginal spines erect, yellowish, long and numerous. Outer bracts of capitulum more cartilaginous and stiff. Rosettes numerous, united in large irregular tussocks

var. *gregarium* (Boiss.) Briq. & Cav.

[A.H.G.A.]

396/8. *CIRSIIUM ARVENSE* (L.) Scop. Arènes, J., 1948, Les races françaises du *Cirsium arvense* (L.) Scop., *Bull. Soc. Franç. Ech. Pl. Vasc.*, **1947**, fasc. 1, pt. 2, 39-40. The species is subdivided into two subspecies:—*eu-arvense* J. Ar. (glabrescent) and *incanum* (Georgi) J. Ar. (leaves pubescent beneath). These are further subdivided into varieties and subvarieties.—[A.H.G.A.]

423. *TARAXACUM*. Tschermak-Woess, E., 1949, Diploides *Taraxacum vulgare* in Wien und Niederösterreich, *Österr. Bot. Zeitschr.*, **96**,

56-63. The *Taraxaca* found near Vienna include both triploid and diploid forms of the *T. vulgare* and *T. laevigatum* groups. The diploid form of *T. vulgare* is not apomictic. The pollen-grains and stomata are larger in the triploid forms than in the diploid.—[A.H.G.A.]

423. TARAXACUM. Chevalier, A., 1948, Essai élémentaire sur les Taraxacum de la flore de France, *Bull. Soc. Bot. France*, **95**, 257-259. The author states that the diploid chromosome numbers may be 16, 24, 32, 40 and 48. Nine sections are keyed out.—[A.H.G.A.]

445/1. CALLUNA VULGARIS Salisb. Poel, L. W., 1949, Germination and development of heather and the hydrogen ion concentration of the medium, *Nature*, **163**, 647-648. Germination and subsequent development of heather seeds on an artificial medium (agar) is optimum at pH 4.—[D.P.Y.]

458. ARMERIA. Lawrence, G. H. M., 1947, The Genus *Armeria* in North America, *Amer. Midl. Nat.*, **37**, 757-779. It is believed that the circumboreal thrifts of the Old and New Worlds represent a single polymorphic species, *A. maritima* (Mill.) Willd.; that a single element of this species, var. *sibirica* (Turcz.) Lawr., is essentially circumboreal, and that the plants of the southerly projecting ranges represent evolutionary developments of it. The author has been unable to treat *A. vulgaris* Willd. as specifically distinct from *A. maritima*. The genus does not afford an abundance of sharply differentiated morphological characters. Despite Druce's contention in 1901 that the vesture of the calyx-tube is a reliable character, it was found that, while it may be reliable in the separation of some of the more stable species, it is very variable in the more polymorphic units. Several geographical races of var. *typica* Lawr., which is limited in America to South Greenland, can be discerned in Old World populations; var. *purpurea* (Mert. et Koch) Lawr. is equivalent to *A. vulgaris* Willd. The differences between these two varieties may be tabulated as follows:—

Outer involucre bracts more than half as long as the inner ones, usually mucronate; inner bracts mucronate to mucronulate and occasionally obtuse; calyces with intercostal spaces glabrous or pubescent; leaves usually 1 mm. wide or less var. *typica* Lawr.
Outer involucre bracts usually shorter than the inner ones, obtuse; inner bracts acute or obtuse; calyces with intercostal spaces glabrous; leaves usually 1.5 mm. wide or more var. *purpurea* (Mert. et Koch) Lawr.

Other varieties occurring in America are described.—[D.E.A.]

460. PRIMULA. Smith, W. Wright, and Fletcher, H. R., 1948, An account of the genus *Primula*: Section *Vernales* Pax., *Trans. and Proc. Bot. Soc. Edin.*, **34**, 402-468. *P. elatior*, *P. veris*, and *P. vulgaris* are dealt with, their hybrids and described forms and varieties are enumerated, together with brief notes on their characteristics.—[A.E.W.]

476. MICROCALA. Garjeanne, A. J. M., 1949, *Microcala*, *De Levende Natur*, **52**, 104-110.

511/2. CALYSTEGIA SYLVESTRIS (Willd.) R. & S. Hylander, N., 1949, *Calystegia silvestris*, en förbisedd kulturflykting i Sveriges och Danmarks flora, *Bot. Not.*, **1949**, 148-156. The occurrence as a

naturalised garden escape of a pink-flowered form in Sweden and Denmark is discussed. This form had hitherto been confused with the corresponding pink-flowered form of *C. sepium* (L.) R. Br., var. *colorata* (Lge.) which the author finds indistinguishable from the var. *americana* (Sims) Kitag. This variety is considered to be only sub-spontaneous. The first record for Sweden of *C. sepium* var. *colorata* made in 1876 proves to be the pink-flowered form of *C. sylvestris*.—[A.E.W.]

515. CUSCUTA. Denffer, D. von, 1948, Über die Bedeutung des Blühtermins der Wirtspflanzen von *Cuscuta Gronovii* Willd. für die Blütenbildung des Schmarotzers, *Biol. Zentralbl.*, **67**, 175-189. On certain hosts the *Cuscuta* takes over the long or short day character of the stock.—[A.H.G.A.]

515/2. CUSCUTA EUROPAEA L. Verdcourt, B., 1948, Notes on the Scottish Records of *Cuscuta europaea*, *Trans. and Proc. Bot. Soc. Edin.*, **34**, 469-471. It is considered that the five certain occurrences of this species in Scotland, from the counties of South Aberdeen, Edinburgh, Roxburgh and Perth were all introductions.—[A.E.W.]

517. SOLANUM. Stebbins, G. L., & Paddode, E. F., 1949, The *Solanum nigrum* complex in Pacific North America, *Madroño*, **10**, 70-81. Several species have been included under *S. nigrum*. They have different chromosome numbers and often hybridise with difficulty. The true *S. nigrum* L. has a chromosome number $2n = 72$, and, though widespread in Europe, is an uncommon introduction in America. It is replaced in N. America by *S. americanum* Mill., which has an umbelliferous (not subracemose) inflorescence and smaller seeds and stamens. *S. nodiflorum* Jacq. is the pantropic representative of *S. nigrum*, while *S. Douglasii* Dunal is common in western North America. *S. villosum* Mill. is a tetraploid ($2n = 48$) species found in Europe and sometimes introduced into the U.S.A. *S. furcatum* Dunal and *S. sarachoides* Sendt. are introduced species, and the latter has become widespread in U.S.A. It is distinguished by its green berry with large seeds and the swelling of the calyx after flowering. *S. furcatum* Dunal is a sparsely pubescent plant with bifurcate inflorescences, deflexed peduncles, large flowers and comparatively few seeds in the berries.—[A.H.G.A.]

543. VERONICA. Garjeanne, A. J. M., 1948, Veronica, *De Levende Natur*, **51**, 101-108.

569. GLECHOMA. Kuprianova, L., 1948, The genus *Glechoma* L. and its species, (Russian), *Bot. Zhurn. SSSR*, **33**, 230-238. Five species are included in the revision. *Glechoma hirsuta* W. & K. is maintained as a species, but is not recorded from Britain. The map shows it as confined to S.E. Europe, so presumably the British records are excluded.—[A.H.G.A.]

596. AMARANTHUS. Contré, E., 1947, Un nouvel hybride d'*Amaranthus*: \times *Amaranthus Ralletii* E. Contré (*A. retroflexus* L. \times *A. Boudronii* Thell.), *La Feuille des Naturalistes*, N.S., **2**, 11. Found in a garden at Paizay-le-Tort (Deux-Sèvres) with the parents.—[A.H.G.A.]

596. AMARANTHUS. Kloos, A. W., 1949, Dix espèces d'Amaranthus nouvelles pour la flore belge, *Bull. Jard. Bot. Brux.*, **19**, 243-250. The author records and describes several species. England figures in the distribution for *A. quitensis* H.B.K. and *A. Dinteri* Schinz var. *uncinatus* Thell.—[A.H.G.A.]

600/4. CHENOPODIUM HYBRIDUM L. Fernald, M. L., 1949, Chenopodium hybridum L. var. Stanleyanum (Aellen) comb. nov., *Rhodora*, **51**, 92. The common American representative is *C. hybridum* L. var. *gigantospermum* (Aellen) Rouleau, with seeds 1.5-2 mm. Those of var. *Stanleyanum* are 2-3 mm.—[A.H.G.A.]

615. POLYGONUM. Garjeanne, A. J. M., 1948, Varkensgrasbloempfer, *De Levende Natur*, **51**, 17-22.

618. RUMEX. Rechinger, K. H., 1948, Beiträge zur Kenntnis von Rumex, IX, *Candollea*, **11**, 229-241. Describes $\times R.$ *erigenus* (*R. cristatus* DC. \times *R. Patentia* L.) from near Vienna as new. Redescribes $\times R.$ *Trimenii* Hausskn. (*R. pulcher* L. \times *R. rupestris* Le Gall) from White Sand Bay, E. Cornwall. In notes on nomenclature, *R. longifolius* DC. is substituted for *R. domesticus* Hartm., and recorded from Scotland. *R. cristatus* DC. non Fries replaces *R. graecus* Boiss. & Heldr., and is recorded from Kew Bridge. *R. altissimus* Wood is recorded from Colchester and Middlesex, and *R. fueginus* Phil. from Galashiels and Glasgow.—[A.H.G.A.]

622. ARISTOLOCHIA. Prell, H. H., 1948, Uitbreiding van de Pijpbloem, *De Levende Natur*, **51**, 116-121 and 135-141.

625/1. HIPPOPHAE RHAMNOIDES L. Darmer, G., 1948, Neue Beiträge zur Oekologie von Hippophaë rhamnoides L., *Biol. Centralbl.*, **67**, 342-361. The map shows that this is a coastal species in northern Europe, but occurs inland in South Europe and Central Asia.—[A.H.G.A.]

633/6. ULMUS STRICTA Lindl. var. SARNIENSIS (Loud.) Lawrence, G. H. M., New Combinations and names of cultivated plants, *Gentes Herbarum*, **8**, 77. The names include *Ulmus carpiniifolia* var. *sarniensis* (Loud.) Bailey, based on *U. campestris* β *sarniensis* Loud., and including *U. foliacea* var. *Wheatleyi* Rehd.—[A.H.G.A.]

641/1. MYRICA GALE L. Bond, G., 1949, Root nodules of Bog Myrtle or Sweet Gale, *Nature*, **163**, 730. Experiments in artificial growth media confirm that the root nodules are associated with nitrogen fixation.—[D.P.Y.]

646/2. QUERCUS PETRAEA (Matt.) Liebl. Weimarck, H., 1947, Bidrag till Skånes Flora, 37: Distribution and ecology of Quercus petraea, *Bot. Not.*, **1947**, 189-206. The sessile oak seldom forms pine woods in Scania, and as a rule is associated with other trees, especially *Q. Robur*. The distribution in the provinces is unequal and is restricted to acid soils in broken country, mountain precipices, hill tops and upper slopes. Analyses of a number of soil profiles in sessile-oak woods are given and cultural experiments to determine behaviour in different soils are described.—[A.E.W.]

650. *SALIX*. Harrison, J. Heslop, 1949, Intersexuality in Irish Willows, *Irish Nat. Journ.*, **11**, 269-272. Both "androgyna" and "metamorphosans" forms are found in Ireland. The former have perfect male and female florets in the same catkin, and the latter florets in various degrees of transition between male and female. The former were found in *S. Caprea* and *S. atrocinnerea*, and the latter in *S. Caprea*, *S. aurita* and *S. atrocinnerea*.—[A.H.G.A.]

669. *ORCHIS*. Harrison, J. Heslop, 1949, *Orchis cruenta* Müll.: a new Irish Marsh Orchid, *Irish Nat. Journ.*, **11**, 329-330. An orchid identified as *O. cruenta* was found around the shores of lakes overlying the limestone plain of E. Mayo and N.E. Galway. The species belongs to the *majalis* group, but is easily distinguished by anthocyanin pigmentation of the stem and leaves. Outside Ireland it occurs in Scandinavia, Russia, Siberia and the Alps.—[A.H.G.A.]

669. *ORCHIS*. d'Alleizette, C., 1948, Les Orchidées de Souppes (Seine et Marne), *Bull. Soc. Franç. Ech. Pl. Vasc.*, **1947**, fasc. 1, pt. 1, 14-18. The locality is remarkable for the large number of hybrids, which include $\times O. carnea$ G. Cam. (*elodes* \times *incarnata*), $\times O. Aschersoviana$ Hausskn. (*incarnata* \times *latifolia*), $\times O. ambigua$ Verm. (*incarnata* \times *maculata*), $\times O. Uechtriziana$ Hausskn. (*incarnata* \times *palustris*), $\times O. Braunii$ Halacsy (*latifolia* \times *maculata*), $\times Orchiplatantthera$ Chevallieriana G. Camus (*O. elodes* \times *Platanthera bifolia*) and $\times Orchigymnadenia$ souppensis G. Camus (*O. elodes* \times *Gymnadenia conopsea*).—[A.H.G.A.]

669. *ORCHIS*. Vermeulen, P., 1949, Varieties and forms of Dutch Orchids, *Ned. Kruidk. Arch.*, **56**, 204-242. *Dactylorchis* is maintained as a genus, several new varieties are described and a few British specimens are cited.—[A.H.G.A.]

706. *SCILLA NON-SCRIPTA* (L.) Hoffmannsegg & Link. Peace, T. R., and Gilmour, J. S. L., 1949, The effect of picking on the flowering of Bluebell, *Scilla non-scripta*, *New Phyt.*, **48**, 115-117. It is concluded from experiments at Oxford and at Kew that no harm can be done by moderate picking or pulling, preferably spread over a wide area; trampling on leaves causes marked deterioration.—[K.S.H.]

719. *LUZULA*. Nordenskiöld, H., 1949, Somatic chromosomes of *Luzula*, *Bot. Not.*, **1949**, 81-92. The chromosome numbers of thirteen species are given of which the following occur in Britain. *L. campestris* (L.) DC., $2n = 12$; *L. multiflora* (Retz.) Lej., $2n = 36$; *L. pallescens* Sw., $2n = 12$; *L. spicata* (L.) DC., $2n = 24$; *L. arcuata* (Wahlenb.) Sw., $2n = 36$; *L. pilosa* (L.) Willd., $2n = c. 70$; *L. sylvatica* (Huds.) Gaud., $2n = 12$; *L. luzuloides* (Lam.) Dandy & Wilm., $2n = 12$. The material examined was collected in Sweden. Some of these numbers differ from those previously determined by other workers. It is suggested that the divergence may be due either to the existence of different chromosome races or to the use of wrongly named material. "The

chromosome numbers form a polyploid series with three as the basic number. In spite of this fact, some species have a chromosome size remarkably different from that of other closely-related species. The different chromosome lengths occurring among the species studied are found around the following magnitudes (expressed in μ): 1.9, 1.1, 0.7, 0.4, and the smallest about 0.3. The most common chromosome size is 1.1 μ . This size throughout in the cells is found in *L. campestris*, *L. multiflora*, *L. frigida*, *L. arctica*, and *L. parviflora*. *L. sudetica* and *L. pilosa* have the smallest chromosomes, the former having 0.4 μ and the latter about 0.3 μ . *L. spicata* has a chromosome size of 0.7 μ , *L. silvatica*, *L. luzuloides*, and *L. nivea*, on the other hand, have a chromosome size of about 1.9 μ . *L. arcuata* seems to have three different chromosome sizes in the cells of about 1.9 μ ; 1.1 μ ; 0.7 μ . Probably there are 12 chromosomes of each size in the cell."—[A.E.W.]

723. ARUM MACULATUM L. Sowter, F. A., 1949, *Arum maculatum* L., *J. Ecol.*, **37**, 207-218 (Biological Flora).

740. ZOSTERA. Parish, E. L., 1949, Vanishing Eelgrass: a problem affecting wild-fowler and fishermen, *Country Sportsman*, **26**, 221-222. The disappearance of large areas of eelgrass is a catastrophe, because it teemed with marine life and was valuable to fish and fowl. Prawns, widgeon and Brent geese are affected. A two-mile stretch from Selsey Bill to Pagham Harbour had disappeared by 1919. The chief cause of decrease seems to be the wasting disease caused by the fungus *Labyrinthula*. Oil pollution is also considered in this connection.—[A.H.G.A.]

740. ZOSTERA. Parish, E. L., The Eel-Grasses of Britain, *Shooting Times*, 28 Jan. 1950. The author illustrates the species of *Zostera* and describes their differences. He states that fishermen have seen plants 6 to 8 feet long and up to 12 mm. wide, and asks that any plants of this size found growing round the British coast should be sent to the Natural History Museum.—[A.H.G.A.]

745. ELEOCHARIS R. Br. Walters, S. M., 1949, *Eleocharis* R. Br. (Biological Flora), *J. Ecol.*, **37**, 192-206. The general account of the genus, defined as by Svenson to include *Eleocharis pauciflora* (Lightf.) Link and *E. parvula* (R. & S.) B., N. & S., includes information on the general morphology and cytology of the six species, and indicates differences in their habitat preferences. In the account of *E. palustris* (L.) R. Br. emend. R. & S., two new subspecies are published, viz., ssp. *vulgaris* and ssp. *microcarpa*. The former is the common plant throughout the British Isles, whilst ssp. *microcarpa* seems to be restricted to S. and S.E. England and the Midlands, being recorded for v.-c.s 7, 13, 15, 16, 17, 19, 21, 22, 23, 25, 28, 29, 33, 37. In Europe both subspecies occur, but ssp. *microcarpa* becomes commoner to the south and east. The differential characters of the two subspecies are quantitative, as follows:—

<p>ssp. <i>vulgaris</i> spikes usually 20-40 flowered. glumes (from middle of spike) 3.5-4.5 mm. in length. fruit, excluding style-base, usually 1.4-1.8 mm. long. stomatal length 0.065-0.850 mm. chromosomes $2n=38$.</p>	<p>ssp. <i>microcarpa</i> spikes usually more crowded, 40-70 flowered. glumes 2.75-3.5 mm. fruit usually 1.2-1.4 mm. stomatal length 0.05-0.065 mm. chromosomes $2n=16$.</p>
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The account of *E. uniglumis* includes a differential description of this species, in which the following characters are mentioned as distinguishing it from *E. palustris*:—Haulms *slender*, even under favourable growth conditions; rhizomatous development *strong*. Basal leaf-sheaths *deeper reddish purple*. Spike *few (15-30) flowered*; *single sterile basal glume* surrounding base of spike. Style-base of fruit *often broader than long*; *bristles 4(5)*: fruit surface usually more *strongly and coarsely punctate* under lens.—[S.M.W.]

746/7. SCIRPUS CAESPITOSUS L. Duwen, J. M., 1948, De Veenbies. *Trichophorum caespitosum* Hartm., *De Levende Natur*, **52**, 168-171.

746. SCIRPUS. Beetle, A. A., 1949, Annotated List of Original Descriptions in Scirpus, *Amer. Midl. Nat.*, **41**, (2), 453-493. 1,550 specific and 322 subspecific names are listed with references and referred to their place in synonymy when the species are not accepted. *S. compressus* (L.) Pers. is referred to *Nomochloa compressa* (L.) Beetle.—[A.H.G.A.]

750/1. CLADIUM MARISCUS (L.) R. Br. Hansen, S., 1949, Bidrag til Skånes Flora, 43, *Cladium mariscus* in Skåne, *Bot. Not.*, **1949**, 127-136. The distribution and ecology of the species in Scania, Sweden, is discussed.—[A.E.W.]

753/15. CAREX BINERVIS Sm. Nelmes, E., The Utricle of *Carex binervis* Sm. and its two submarginal ribs, *Kew Bull.*, **1949**, 318. The prominent green submarginal ribs are not characteristic as stated by Smith, but are found in many other species, for example *C. laevigata* Sm.—[A.H.G.A.]

777. PHELEUM. Litardière, R. de, 1948, Sur l'existence dans les Pyrénées d'une nouvelle race chromosomique du groupe du *Phleum alpinum* L., *Comptes Rendus Acad. Sci.*, **226**, 1327-1329. Two species have been distinguished. *P. alpinum* L., self-fertile, $2n = 14$, arista ciliate, and *P. commutatum* Gaud., self-sterile, $2n = 28$, arista scabrid. The new plant has the chromosome number of *P. alpinum* with the morphological characters of *P. commutatum*.—[A.H.G.A.]

791. DESCHAMPSIA. Nygren, A., 1949, Studies in vivipary in the genus *Deschampsia*, *Hereditas*, **35**, 27-32.

791/3. DESCHAMPSIA SETACEA (Huds.) Hackel. Buschmann, A., 1948, Charakteristik und systematische Stellung von *Deschampsia setacea* (Huds.) Hackel, *Phyton*, **1**, (1), 24-41. *D. setacea* is an Atlantic species found from the north coast of Europe from Spain to Holstein, Rügen, Bornholm, southern Scandinavia and the British Isles.

The author places it in the section *Campbella*. The structure of the epidermal cells of the root is considered useful for the separation of the species. A key is given. There are also keys, accompanied by illustrations, which are based on the leaf-structure and on the palea (Deckspelze) and the glumes. Differences in the anthers and caryopsis are also discussed. A chromosome number of $2n = 28$ is given for *D. flexuosa*, and $2n = 14$ for *D. setacea*.—[A.H.G.A.]

813/1. MOLINIA CAERULEA (L.) Moench. Matuszkiewicz, A. & W., 1948, A Contribution to the taxonomy of the Genus *Molinia* Schrk., *Ann. Univ. Mariae-Curie*, Lublin, 3, 347-367. (Polish with English summary). The scheme of classification is:—

- a. Large plant (77)-111.8-132.1-(215) cm., with broad leaves (5)-7.6-8.7-(14) mm.
 - b. Large panicle, (35)-43.0-(54) cm. long; long leaves (45)-57.2-(69) cm. Spikelets (4.9)-5.07-(7.0) mm. long; lower outer glume (2.4)-2.59-(2.8) mm. long; upper glume (2.7)-3.07-(3.4) mm. long; lower flowering glume (3.2)-4.02-(5.2) mm. long 1. subsp. *arundinacea* Schrank.
 - bb. Smaller panicle (19.5)-25.2-(38) cm. long; leaves shorter (21)-34.6-(45) cm. long. Spikelets large (5.4)-6.71-(8.0) mm. long; lower outer glume (2.3)-3.02-(4.4) mm. long; upper outer glume (2.8)-3.55-(4.6) mm. long; lower flowering glume (3.7)-4.6-(5.5) mm. long 2. subsp. *ltoralis* (Host).
 - aa. Smaller plants 52-124 cm. high, with narrow leaves (3.5)-5.05-5.53-(7.9) mm. broad; spikelets (3.2)-4.76-5.06-(6.3) mm. long; lower flowering glume (2.7)-3.50-3.73-(4.71) mm. long 3. subsp. *minor* Besser.
 - aaa. Very small plants. Leaves (2.1)-3.4-(4.0) mm. broad, (2)-10.8-(16.5) cm. long; small spikelets (3.5)-4.31-(5.8) mm. long; lower outer glume (1.5)-2.02-(2.8) mm. long, upper outer glume (1.9)-2.42-(3.0) mm. long; lower flowering glume (3.0)-3.44-(3.8) mm. long 4. subsp. *minima* Mat. [A.H.G.A.]

824/14. POA ANNUA L. Litardière, R. de, Recherches sur les *Poa annua* subsp. *exilis* et subsp. *typica*, *Rev. Cytol. et Cytophysiol. végét.*, 3, 135.

824/14. POA ANNUA L. Magron, T., 1947, *Bull. Soc. Bot. Fr.*, 94, 317-319. The adaptation of *Poa annua* L. to high altitudes in the Central Pyrenees is discussed. It is suggested that the perennial mountain form (*P. annua* subsp. *varia* (Gaud.)) is derived from the lowland plant (*P. annua* subsp. *typica* (Beck.)) by adaptation to mycorrhiza. The lowland plant is without mycorrhiza or the mycorrhiza is destroyed soon after it invades the roots. Quoting M. de Litardière *P. annua* subsp. *typica* is stated to be tetraploid ($2n = 28$) whilst *P. annua* subsp. *varia* includes two "varieties": *P. supina* (Schrad.) Reichb. a diploid ($2n = 14$) and *P. rivulorum* (Maire et Trab.) R. Lit. et Maire, emend. a tetraploid ($2n = 28$).—[A.E.W.]

825/3b. GLYCERIA DECLINATA Bréb. Walters, S. M., 1948, *Glyceria declinata* Bréb., En förbisedd nordisk art, *Bot. Not.*, 1948, 430-440. The occurrence of the species in Denmark, Norway and Sweden is discussed. He states that "the plant seems to have a S.W. distribution in Scandinavia. Ecologically it may be confined in Sweden to eutrophic regions; although this is not the case in Britain. Many Scandinavian localities resemble the typical localities for the plant in Britain, i.e. disturbed or trodden ground by water. Its general European distribution is by no means clear, but it appears to be western (material from

France, Portugal and N.W. Germany has been seen), and no certain records are known from Central or eastern Europe".—[A.E.W.]

825(2)/2×1. *PUCCINELLIA DISTANS* (L.) Parl. × *P. MARITIMA* (L.) Parl. Jansen, P., 1949, *Floristische Aantekeningen*, No. 5, × *Puccinellia Krusemaniana* Jans. & Wacht., *Ned. Kruidk. Arch.*, **56**, 248. *Glyceria maritima* × *G. procumbens*, which was originally described from Chichester, Sussex, by Druce, is referred to this hybrid, which was formerly described and figured in the same journal in 1932. There the description reads (translated):—"Larger than *P. maritima*, which it resembles in habit and superficial sterile stolons, but differs from it by the flat, narrow and flaccid (not rigid and folded) leaves of the stolons. Panicle like *P. maritima* but rigid, basal branches with sessile spikelets. Verticils composed of two long and one short branches, the longer alternating, the shorter secund (as in *P. rupestris*). Spikelets large (8-9 mm. long), glumes 1-3-nerved, lemma (when dry) prominently nerved; anthers large (2 mm. long) with a few abortive pollen grains. Fruit sterile."—[A.H.G.A.]

826. *FESTUCA*. Litardière, R. de, 1947, *Festuca nouveaux ou rare des France et d'Espagne*, *Bull. Soc. Hist. Nat. Toulouse*, **82**, 110-122. Deals mainly with varieties of *F. ovina*.—[A.H.G.A.]

827/4. *BROMUS TECTORUM* L. Stewart, G., & Hull, A. C., 1949, Cheatgrass (*Bromus tectorum* L.), An ecologic intruder in southern Idaho, *Ecology*, **30**, 58-74. An adventive from Europe, first recorded in the U.S.A. about 50 years ago, and from southern Idaho about 1900, has, in that State, become a dominant species over large areas. At first it occurred on roadsides, and in cultivated land, etc., and then spread to range lands wherever the plant cover was badly injured by drought, fire or overgrazing. The biological and ecological relationships of this grass and its control are discussed. It is said to be valuable for soil protection, but is highly inflammable and allows fires to spread rapidly.—[A.E.W.]

828. *BRACHYPODIUM*. Jouvot, P., & Bouby, H., 1949, *Brachypodium phoenicioides* Roem. & Schult., *La Feuille des Naturalistes*, N.S., **4**, 68. This species is recorded from near Paris, perhaps introduced on a railway bank. It was previously known from Southern France and the west Mediterranean. It looks like *B. pinnatum*, but is glaucous with inrolled leaves shortly mucronate.—[A.H.G.A.]

835. *HORDEUM*. Covas, G., 1949, Taxonomic Observations on the North American species of *Hordeum*, *Madroño*, **10**, 1-21. The North American representatives of *H. nodosum* are separated as *H. californicum* and *H. brachyantherum*. *H. Stebbinsii* and *H. leporinum* are separated from *H. murinum*. *H. marinum* Huds. is only a casual in U.S.A.—[A.H.G.A.]

847/1. *PTERIDIUM AQUILINUM* (L.) Kuhn. Conway, E., & Arbuthnot, M., 1949, Occurrence of endotrophic mycorrhiza in roots of *Pteridium aquilinum* Kuhn, *Nature*, **163**, 610. Bracken roots from two areas in W. Scotland (v.-c. 75 and 99), one acid moorland and the other cul-

tivated ground, contained hyphæ of an endotrophic fungus. Affected roots were often rather fleshy and larger than normal.—[D.P.Y.]

FLORAS, Etc.

BELGIUM. Lawalrée, A., 1949, Catalogue des Ptéridophytes de Belgique, *Lejeunia*, **13**, 21-27. A revised catalogue arranged by Copeland's system. *Isoetes echinospora* Durieu is reduced to *I. tenella* Lem. Belgium has *Lycopodium tristachyum* Pursh, *Selaginella helvetica* (L.) Spreng, *Botrychium simplex* Hitchc., *Azolla caroliniana* Willd. and *Asplenium foresiacum* (Le Grand) Christ, which do not occur in Britain.—[A.H.G.A.]

HOLLAND. Heukels, H., 1949, *Geïllustreerde Schoolfloora voor Nederland*, ed. 13 (by W. H. Wachter & S. J. van Ooststroom), Groningen, 900 pp. In Dutch. It has keys and illustrations. Many aliens are also described.—[A.H.G.A.]

PALESTINE. Duvdevani, S., & Osherov, S. Analytical key for the identification of wild plants in yard, garden and field, from their leaves, stems and roots, (in Hebrew), *Kew Bull.*, **1948**, 45-46. W. B. Turrill reviews the work and points out that such a key could be of value to specialists, e.g. ecologists and horticulturists, who have to follow their plants through their whole life histories. There are special difficulties in the preparation of a key based on vegetative characters, for example, change in leaf shape with age of the individual plant, but it is felt that many will agree with the author's conviction that very much more use should be made of vegetative characters in floras and monographs.—[K.S.H.]

HISTORY.

DONY, J. G., 1949, A Bobart Herbarium at Bedford, *Beds. Nat.*, **3**, 15-16. Quotes *Proc. Linn. Soc.*, **160**, Pt. 1 (Nov. 1946).—[J.G.D.]

DONY, J. G., 1949, Bedfordshire Naturalists: III, Charles Abbot, *Beds. Nat.*, **3**, 38-42. An account with original information of the work of Abbot (1761-1817), author of *Flora Bedfordiensis* (1798), etc.—[J.G.D.]

EDEES, E. S., 1948, The Early History of Field Botany in Staffordshire, 1597-1839, *Trans. N. Staffs. F.C.*, **82**, 81-110.

EDEES, E. S., 1949, Richard Forster of Stone, *Trans. N. Staffs. F.C.*, **83**, 96-97. Gives some biographical details relating to the late 18th century Staffordshire botanist, Richard Forster.—[A.E.W.]

GRANT, V., 1949, Arthur Dobbs (1750) and the Discovery of the Pollination of Flowers by Insects, *Bull. Torr. Bot. Club*, **76**, 217-219. The discovery of the pollination of flowers by insects has usually been attributed to J. G. Kölreuter, but the author points out that the Irish amateur botanist Dobbs preceded him.—[A.H.G.A.]

RUMILLY, R., *Le Frère Marie-Victorin et son temps*. Brother Marie-Victorin, whose real name was Conrad Kirouac, was a teacher at the College of Longueuil at Westmount, Canada. His deeply reli-

gious and mystic personality, combined with an enthusiasm for the teaching of Science, made him many friends and admirers. Specialising in Botany, he was given the Chair in Botany at the University of Montreal. This book describes in detail this period of Canadian history, a period which may be said to have produced in him one of the most famous men of French Canada. The book consists of 500 pages and the price is \$2. The most important of a number of Marie-Victorin's publications appears to be *La Flore Laurentienne*, published in 1935, price \$10. Both the above books are to be obtained from Les Frères des Écoles Chrétienues, 949, rue Côté, Montreal, 1, Canada.—[W.R.P.]

SARTON, G., 1948, *Introduction to the History of Science*, 3, pt. 2, Carnegie Inst. The second half of the third volume, which brings the work done to the end of the fourteenth century. The author states that the Silesian doctor Thomas of Sarepba (1297-c. 1378) made himself a herbarium of dried plants, which is the earliest mention of such a collection except that Villard de Honnecourt gave a recipe for the preservation of colours in dried flowers. The herbarium contains some English specimens mentioned in the MS. Michi competit.—[A.H.G.A.]

NOMENCLATURE

FURTADO, C. X., 1949, A Further Commentary on the Rules of Nomenclature, *Gardens Bull. Singapore*, 12, 311-377.

HERTER, W. A., 1949, Weitere Vorschläge zur Abänderung der Nomenklaturregeln (Further proposals for the alteration of the rules of Nomenclature), *Rev. Sudamer. Bot.*, 8, 11-12. An amplification of proposals published in *Rev. Sudamer. Bot.*, 6, 46 (1938) for the modification of certain articles and recommendations of the International Rules of Nomenclature.—[K.S.H.]

HORN AF RANTZIEN, H., & OLSEN, S., 1949, A suggested starting-point for the nomenclature of Charophyta, *Svensk. Bot. Tidskr.*, 43, 98-103. The authors suggest Alexander Braun's *Fragmente* (1883) instead of Linnaeus, largely to avoid the old names revived by Groves and Bullock-Webster.—[A.H.G.A.]

INTERNATIONAL RULES OF BOTANICAL NOMENCLATURE, 1947, *Brittonia*, 6, 1-120. Formulated by the International Botanical Congress of Vienna, 1905, Brussels, 1910, and Cambridge, 1930, adopted and revised Amsterdam, 1935. Compiled from various sources by Camp, W. H., Rickett, H. W., and Weatherby, C. A.—[K.S.H.]

LAWRENCE, G. H. M. Discussions in Botanical Names of cultivated plants, *Gentes Herbarum*, 8, 3-. The author adopts *Anemone hybrida* Paxt. for the garden plant misidentified with *A. japonica* Thunb., *Arabis caucasica* Willd. for the *A. albida* of gardens, *Lens culinare* Medic. for *L. esculenta* Moench, *Oenothera erythrosepala* Borb. for *O. Lamarckiana* De Vries (non Seringe), *Stachys olympica* Poir. for *S. lanata* Jacq. non Crantz, \times *Nepeta Faassenii* Bergmans for *N. Mussinii* hort., *Collinsia heterophylla* R. Grah. for *C. bicolor* Benth., *Echinops*

exaltatus Schrad. for *E. Ritro* hort. amer. and *E. sphaerocephalus* hort. amer. and *Dimorphotheca pluvialis* (L.) Moench for *D. annua* Less. (*Gattenhoffia pluvialis* (Moench) Druce). *Rudbeckia columnifera* Nuttall is said to be the commonly cultivated Coneflower. The generic separation of *Pyrus* and *Malus* is discussed. The pale form of *Impatiens glandulifera* Royle is designated forma *pallidiflora* (Hook.) Weatherby.—[A.H.G.A.]

LAWALRÉE, A., 1949, Note sur quelques ptéridophytes de Belgique, *Bull. Jard. Bot. Brux.*, **19**, 237-242. The author makes a number of new combinations for varieties and forms.—[A.H.G.A.]

McVAUGH, R., 1949, Questionable validity of names published in Gilibert's Flora of Lithuania, *Gentes Herbarum*, **8**, 83-90. The writer gives arguments for rejecting Gilibert's names.—[A.H.G.A.]

PICHON, M., 1948, Sur l'article 37 ter des Règles de la Nomenclature, *Notulae Systematicae*, **13** (4), 253-260. The writer discusses the article, which reads:—"A name of a taxonomic group is not validly published unless it is definitely accepted by the author who publishes it. A name proposed provisionally (nomen provisorium) in anticipation of the eventual acceptance of the group, or if a particular circumscription, position or rank of a given group, or merely mentioned incidentally, is not validly published." He argues that the simultaneous publication of alternative names, such as *Cymbopogon Bequaerti* and *Andropogon Bequaerti* should be valid.—[A.H.G.A.]

SCHWARZ, O., 1949, Beiträge zur Nomenklatur und Systematik der mitteleuropäischen Flora, *Mitt. Thüring. Bot. Ges.*, **1** (1), 82-. The author adopts:—*Allosorus* Bernh. for *Cryptogramma* R. Br., *Gymnocarpium obtusifolium* (Schrank) O. Schwarz for *G. Robertianum* (Hoffm.) Newm., *Polystichum paleaceum* (Borek.) O. Schwarz for *P. Braunii* Spenn., *Sparganium minimum* Wallr. (1840) for Fries (1846), *Bromus ramosus* Huds. for *B. asper* auct., *Agropyrum littoreum* (Schum.) O. Schwarz for *A. littorale* (Host) Dum., and many other name changes.—[A.H.G.A.]

SMITH, ALBERT C., 1949, A Legislated Nomenclature for Species of Plants?, *Amer. J. Bot.*, **36**, 624-626. The principle of *nomina specifica conservanda* will doubtless be discussed at the forthcoming Seventh International Botanical Congress to be held at Stockholm in 1950. [It was discussed and again rejected.—Ed.] The author argues that this principle, which has been rejected by previous Congresses, is impracticable; the number of conserved generic names is at least 850, and if the principle were extended to specific names, a very much larger number would be likely to be affected. He considers it is better to have a specific nomenclature which is slowly evolving towards stability under the ministrations of competent specialists.—[K.S.H.]

SYMPOSIUM ON BOTANICAL NOMENCLATURE, 1949, *Amer. J. Bot.*, **36**, 1-32, includes the following papers:—I, Introduction, by Sherff, E. E. II, Botanical Nomenclature since 1867, by Weatherby, C. A. III, Byways of Nomenclature, by Blake, S. F. IV, An Editor's point of

view. V, Adventures in locating validly published but unlisted binomials, by Merrill, E. D. VI, Towards a simple and clear nomenclature, by Pennell, W. VII, Problems in Taxonomy, by Bailey, L. H. VIII, The Problem of Subspecific Categories, by Rosendall, C. O. IX, The nomenclature of Fossil Plants, by Just, T.—[K.S.H.]

TOPOGRAPHICAL

5-6, SOMERSET. The *Proceedings of the Somersetshire Archaeological and Natural History Society*, **92**, 98-100, 1947, contains the recorder's (W. Watson) notes on the more interesting plants observed during 1946.—[A.E.W.]

6, 34, N. SOMERSET; W. GLOS. Sandwith, C. I. & N. Y., 1948, Bristol Botany in 1947, *Proc. Bristol N.S.*, **27**, 203-208.

7-8, WILTS. Collett, Gilbert W., 1949, Some phenological notes, *Wilts. Arch. and N.H. Mag.*, **53**, 94-96.—[A.E.W.]

7-8, WILTS. Grose, J. D., 1948-1949, Wiltshire Plant Notes, *Wilts. Arch. and N.H. Mag.*, **52**, 224-231; **53**, 88-93. Gives a large number of locality records. Several species new to the county are given. See Plant Records.—[A.E.W.]

14, EAST SUSSEX. Brightmore, D., 1949, *Hastings and East Sussex Naturalist*, **7**, 172-174, lists the more interesting records made during 1948 and also gives a list of species observed during 1946 on eight bombed sites in closely built-up areas in Hastings. 59 species are recorded, the highest number from any one site being 33, and the lowest 13.—[A.E.W.]

28, W. NORFOLK. Chapman, V. J., 1948, Some Vegetational Changes on a shingle off-shore bar at Thornham, West Norfolk, *Trans. Norfolk and Norwich N.S.*, **16**, 274-279. The article is illustrated by photographs and three vegetation maps of Thornham Island in 1937 and 1941 with lists of species.—[A.E.W.]

32, NORTHANTS. Collyer, E., Allen, H. G., and Gilbert, J. L., 1949, *Journ. Northants N.H.S.*, **31**, 188-194. Notes on the more interesting plants met with in 1948, and J. Wilson gives a list of 18 species found by the River Nen between Westley's Mill and the paper mills in the same year.—[A.E.W.]

32, NORTHANTS. Gilbert, J. J., 1948, Botanical Records, 1947, *Journ. Northants N.H.S.*, **31**, 131-134. *Lactuca Serriola* L. recorded from waste places in Peterborough is apparently new to the county.—[A.E.W.]

39, STAFFS. Edees, E. S., 1948, *Trans. N. Staffs. F.C.*, **82**, 138-148. Reports on botanical activities and gives the Plant Notes and Records for 1947, and an account of *Myrica Gale* L. in the county, and Records for 1949, *ibid.*, **83**, 88-96. *Cochlearia danica* L. is recorded as an inland adventive.—[A.E.W.]

40, SHROPSHIRE. Lloyd, Ellen R., 1949, *Trans. Caradoc and Severn Valley F.C.*, **12**, 25-27. A report on the botany for 1943-44. The list of plants is preceded by a few phenological notes.—[A.E.W.]

63, S.W. YORK. Jackson, G., & Sheldon, J., 1949, The Vegetation of Magnesian Limestone Cliffs at Markland Grips near Sheffield, *J. Ecol.*, **37**, 38-50. Includes a discussion of the status of *Tilia platyphyllos*, and it is concluded that there are strong reasons against regarding it as a native tree of the area. *Carex montana* and *C. ericetorum* are recorded.—[K.S.H.]

96, EASTERNNESS; 97, WESTERNNESS. Gordon, S., 1950, Snow Flora of the Scottish Hills, *Nature*, **165**, 132-134. In Scotland two small snowfields usually, and perhaps permanently, remain unmelted throughout the year: under Ben Nevis and in Garbh Choire Mor, Braeriach. The flora around the margins, which are free from snow for progressively shorter periods as one approaches the permanent snow, is described. Phanerogams which grow in the area uncovered by snow for only a few weeks in the year (in October) on Braeriach are *Saxifraga stellaris* and *Gnaphalium supinum*; only the latter ripens seeds. The only phanerogam around the snowfield on Ben Nevis is *S. stellaris*, which never flowers, and which may arise from seeds from the colony on the plateau above.—[D.P.Y.]

104, N. EBUDES. Raven, J. E., 1949, Alien plant introductions on the isle of Rhum, *Nature*, **163**, 104-105. *Polycarpon tetraphyllum* L. was first detected at Kinloch Burn by J. W. Heslop Harrison in 1939, when there was a single plant. On the 6th Aug. 1948 the author found four plants, which differed in their much-branched inflorescence and narrow acuminate sepals from the southern English form, and indeed did not match any specimen in the British Museum Herbarium, although they were most like Maltese and Greek material. Amongst one of the plants was growing a small plant of *Wahlenbergia* (?) *nuta-bunda* A. DC., which is subspontaneous in some botanical gardens but otherwise unknown in Britain. The author also saw *Carex bicolor* Bell. in a recently found colony (the third to be discovered) in Coire Dubh. This consisted of seven mature and two young plants, on bare gravel banks at the junction of two small burns. Six of these had *Poa annua* L. and/or *Sagina apetala* Ard. sprouting amongst the leaves, although neither of these could be found elsewhere in the neighbourhood, which was an unlikely habitat for either. Associated with both *Polycarpon* and the *Carex* was the very rare *Juncus capitatus* Weig. The author concludes that *Polycarpon tetraphyllum* and *Carex bicolor* are both introductions in these stations.—[D.P.Y.]

110, OUTER HEBRIDES. Poore, M. E. D., & Robertson, V., 1949, The Vegetation of St Kilda in 1948, *J. Ecol.*, **37**, 82-99. Considerable changes have occurred in plant species since the evacuation in 1930 of the human population and their grazing animals.—[K.S.H.]

MISCELLANEOUS

ABBAYES, H. DES. Quelques Phanérogames adventices de Bretagne, III, *Bull. Soc. Sci. Bretagne*, **21**, 61-62; *op. cit.* **22**, 73-76 (1947).

ALLAN, H. H., 1949, Wild Species-Hybrids in the Phanerogams, II, *Botanical Review*, **15** (2), 77-105. This is a supplement to the author's paper in vol. **3**, 593-615 (1937) of the same periodical. There is a useful list of hybrids recorded with references to the original papers.—[A.H.G.A.]

BEHRENS, G., 1949, Blüten- und Gestaltsbildung bei *Chrysanthemum* und *Sempervivum* unter photoperiodischen Einflüssen, *Biol. Zentralbl.*, **68**, 1-32. Phyllody of the inflorescence can be brought about by photoperiodic influences.—[A.H.G.A.]

BELLINGER, H. E., 1949, Phyto-photo-dermatitis, *Brit. Med. J.*, **1949**, **1**, 984-986. Attention is drawn to the fact that blistering of the skin may occur after 24 hr. following contact in bright sunlight with *Anthriscus sylvestris*, *Pastinaca sativa*, *Achillea Millefolium*, *Angelica sylvestris*, *Ranunculus bulbosus*, *Sinapis arvensis*, *Convolvulus arvensis*, *Heraclium Sphondylium*, *giganteum* and *Mantegazzianum*, "meadow grass", *Agrimonia Eupatoria* and *Rutaceae*.—[D.P.Y.]

CHENERY, E. M., 1948, Aluminium in the plant world, *Kew Bull.*, **1948**, 173-182. The author considers that the uptake of aluminium has some value in plant taxonomy, as it appears to be highly specific.—[K.S.H.]

GUSTAFSSON, A., 1948, Polyploidy, Life-form and Vegetative Reproduction, *Hereditas*, **34**, 1-22. Mentions evolutionary trends in *Poa*, *Bromus*, *Juncus*, *Rumex*, *Polygonum*, *Chenopodium*, *Stellaria*, *Cerastium*, *Sagina*, *Ranunculus*, *Papaver*, *Lepidium*, *Cardamine*, *Sedum*, *Saxifraga*, *Alchemilla*, *Medicago*, *Trifolium*, *Vicia*, *Lathyrus*, *Geranium*, *Malva*, *Viola*, *Myosotis*, *Lamium*, *Stachys*, *Solanum*, *Veronica*, *Plantago*, *Galium*, *Campanula*, *Erigeron*, *Gnaphalium*, *Chrysanthemum*, *Senecio*, *Cirsium*, *Centaurea*, *Crepis* and *Sonchus*. Annual groups show low basic numbers, while perennial groups often acquire high basic numbers and high polyploids. Vegetative propagation is thought to be an important agent in these evolutionary events.—[A.H.G.A.]

DOVASTON, H. F., 1949, A factor limiting downward spread of some Scottish mountain plants, *Nature*, **164**, 370. It is suggested that, as in the Himalayas, etc., certain Scottish alpine plants are confined to above the winter snow-line because of their sensitivity to winter moisture. For example, *Veronica fruticans*, *Cerastium alpinum* and *arcticum*, *Arenaria rubella* and *sedoides*, *Lychnis alpina*, and *Gnaphalium supinum* are liable to die off in cultivation at lower altitudes unless protected from rain; the last-mentioned sp. is found as low as 1000 ft., but is then an annual. Other spp., e.g. various *Draba*, *Saxifraga*, *Salix*, etc., can tolerate moisture in winter.—[D.P.Y.]

ERDTMAN, G., 1948, Palynology, aspects and prospects, *Svensk. Bot. Tidskr.*, **42**, 467-483. The paper consists of contributions from various authors reviewing the present position of research on pollen and spores in their respective countries.—[A.H.G.A.]

FASSETT, N. C., Herbarium Technique, *Rhodora*, **51**, 59-60. The writer recommends such detergents as "Tide", "Vel" and "Dreft" for softening herbarium material for dissection, instead of boiling.

GODWIN, H., 1949, The Spreading of the British Flora considered in relation to conditions of the late-glacial period, *J. Ecol.*, **37**, 140-147. Over 78 species plus 22 genera have been identified from Late-Glacial or Early Post-Glacial mud layers at Nazeing near London, and native status has been in consequence assured to such plants as *Linaria vulgaris*, *Taraxacum officinale et alia*. It seems probable that as such work proceeds, more and more of our ruderal and weed species will be recognised as being native to the British flora. Several species have been identified widely beyond their present-day area in Britain; their contraction was probably largely due to dense forest establishment, and to a lesser degree to the development of peat meres upon flat and gently sloping mountains at altitudes above the forest limit. Under-representation of certain categories of British plants in Ireland can be explained as a result of their being able to spread in the Late-Glacial or Early Post-Glacial period owing to temperature limitations. Later movement was hindered by the Irish Sea, which previously occupied only a very small area, having reached its present size.—[K.S.H.]

KLOOS, A. W., 1948, Nieuwe vondsten van zeldzame planten in Nederland in 1943-1947, *De Levende Natuur*, **51**, 75-79.

LINDQUIST, B., 1948, The main varieties of *Picea Abies* (L.) Karst. in Europe, *Acta Hort. Berg.*, **14** (7), 249-342. The writer finds that there is a striking agreement between the presumed glacial refuges and the habitats of *Picea Abies* var. *arctica* Lindq., and adds a general discussion of the Scandinavian refuges. Some were nunataks and some probably areas now submerged. The species regarded as probable glacial survivors are *Pedicularis flammea*, *Rhododendron lapponicum*, *Vahlodea atropurpurea*, *Papaver* spp., *Arenaria humifusa*, *A. norvegica*, *Poa flexuosa*, *P. arctica*, *Luzula parviflora*, *Aconitum septentrionale*, *Anemone ranunculoides*, *Viola rupestris*, *Ranunculus plataniifolius*, *Alchemilla glomerulans*, *A. Wichurae*, *Urtica dioica* var. *Sondenii*, *Betula tortuosa*, *B. callosa*, *Draba crassifolia*, *Cavernularia Hultenii* (lichen), *Tholurna dissimilis* (lichen) and others. The bulk of the mountain flora and a number of sub-alpine species are considered to be glacial survivors.—[A.H.G.A.]

LINTON, D. L., 1949, Unglaciated enclaves in glaciated regions, *Irish Geography*, **2** (1), 1.

POST-GLACIAL CLIMATE CHANGE, 1949, *Nature*, **163**, 160-161. Record of joint meeting of Royal Meteorological and Royal Astronomical Societies. Dr Godwin describes pollen analyses indicating a climatic optimum about 3000 B.C., and a sudden worsening about 500 B.C. Holly and ivy are controlled by winter temperature and mistletoe by summer temperature. Prof. Manley stated that the greatest post-glacial expansion of glaciers began in Scandinavia about 1750 A.D., in the Alps 1550 and in Iceland 1350. Glaciers are now retreating rapidly. Dr Brooks stated that tidal maxima would tend to break up the Arctic ice-cap and ice would drift into the Atlantic.—[A.H.G.A.]

POUCQUES, M. L. DE, 1949, Recherches caryologiques sur les Rubiales, *Rev. Gén. Bot.*, **56**, 5-27, 75, 138, 172-188. The chromosome numbers

of a number of genera have been counted, and the writer makes the following comments. Polyploidy is frequent in *Galium* and *Rubia*. *Adoxa* bears a strong resemblance to the *Caprifoliaceae* in caryological characters, and these justify a separate family for the genus. New counts are given for *Sambucus Ebulus* ($n = 18$), *Lonicera Caprifolium* ($n = 9$), *L. Xylosteum* ($n = 9$), *L. Periclymenum* ($n = 18$), *Kentranthus ruber* ($n = 7$).—[A.H.G.A.]

REID, Mrs E. M., 1949, The Late Glacial Flora of the Lea Valley, *New Phyt.*, **48**, 245-252. The paper discusses material from Lea Valley pits, provided in 1933 and subsequently by Hazeldine Warren, and incorporates with this the results of the earlier investigations of the Lea Valley flora made by Clement Reid (1910) and by Reid, E. M., and Chandler, M. E. J. (1923). Material from a total of ten pits is listed; these are tentatively assigned to Sub-arctic climate (3 pits), Cold or Cool (6 pits) and Cool Temperate (1 pit). A list is given of 156 species, some of which are imperfectly identified, with the localities in which they were found. There are included notes on the determination of *Ranunculus hyperboreus*, *R. acris*, *Silene* spp., *Linum praecursor*, *Armeria* sp., *Salix herbacea* and *Carex atrata*.—[K.S.H.]

TAMM, C. O., 1948, Observations on reproduction and survival of perennial herbs, *Bot. Not.*, **1948**, 303-321. Describes investigations to determine the average rate of both reproduction and mortality of some perennial herbs in sample plots. Diagrams are given showing the flowering frequencies in different years and the fates of individual plants of the species examined. A very low rate of renewal in some meadow and forest habitats has been found, and irregular flowering observed in some species. "The longevity of the individual specimens, which is closely connected with the low rate of renewal, is interpreted as an expression of the hard competition within closed plant communities. The significance of this longevity factor for stability and composition of vegetation is briefly discussed". Among the species dealt with are *Filipendula hexapetala*, *Fragaria vesca*, *Orchis mascula*, *Primula veris*, *Sanicula europaea*, and *Taraxacum vulgare*.—[A.E.W.]

WEBB, L. J., 1950, Alkaloid tests in herbarium specimens, *Nature*, **165**, 411. A technique is developed for detecting alkaloids in 0.1 g. of dried plant, and herbarium specimens are found to provide suitable material. The alkaloid content fell, in general, with the age of the specimen.—[D.P.Y.]

REVIEWS

Botany of the Canadian Eastern Arctic. Part III: Vegetation and Ecology. National Museum of Canada, Bulletin No. 104. NICHOLAS POLUNIN. Pp. vii + 304, 2 maps, 107 plates in the text. Ottawa: King's Printer, 1948; 75 cents.

The book here noticed is the third part of this very comprehensive account of the plants of North-Eastern Canada. The first part, dealing with the individual flowering plants and Pteridophytes, was reviewed in the *B.E.C. 1939-40 Report*, pp. 391-392.

The present volume describes the plant communities of that part of the region lying north of the 60th parallel of latitude. These are dealt with under the ten major districts adopted in Part I, and this enables comparisons to be made more readily between the two volumes. In each major district a general account of the habitat and plant communities is given, and this is supplemented by (or in some cases chiefly based on) detailed accounts of the vegetation of limited areas visited personally by the author.

The area studied lies between the 60th and 83rd parallels of latitude (about 1600 miles altogether from north to south) and thus experiences a wide range of climatic conditions—though all of an arctic nature—from the severe high-arctic conditions of Ellesmere to the almost sub-arctic climate of northernmost Quebec. There is also a gradation, though less striking, between the relatively oceanic climates of the eastern seaboard along Davis Strait and the more continental conditions farther west, this being more noticeable in the south.

In spite of these differences it must be remembered that the climate everywhere is very severe in comparison with that of any part of the British Isles, the most southerly districts having only four months (June-September) with a mean temperature above freezing point, while in the extreme north no month is free from frost. This severity may be summed up in the statement that the whole of the region lies north of the tree-line, the tallest vegetation being of willow-scrub, which is said to reach a height of 7-8 feet in favourable places.

Another important factor in the differentiation of the vegetation is the nature of the underlying rock, the two chief divisions being acid granites and gneisses on the one hand, and limestone on the other. Curiously enough, in contrast to Britain, the richest vegetation occurs on the acid rocks, the weathering of the limestone tending to form unsuitable substrata. Much of the ground is covered by glacial deposits, usually derived from one or other (or sometimes a mixture) of the rock types mentioned.

As might be expected, there is a gradual increase in the luxuriance and variety of the vegetation as one passes from north to south, though

the higher areas in the south support much the same vegetation as that of the lowlands farther north. There is also another interesting change in the vegetation as regards the constituent species. In the north nearly all the species are found also in arctic Europe, while many are inhabitants of this country. As one progresses southwards one finds an increasing proportion of American species which there fill the same ecological niches as are filled in Europe by their European counterparts. This is particularly noticeable in the willows, *Carices*, *Eriophora*, etc.

In all districts the most unfavourable localities are occupied by open vegetation ("barrens"), consisting of isolated tufts of various species. These include especially *Saxifraga oppositifolia*, *Cerastium alpinum*, *Papaver radiculatum*, *Luzula confusa*, and, except in the extreme north, *Dryas integrifolia*, which throughout the area replaces the European *D. octopetala*, but appears to have almost identical ecological preferences. The dwarf willow *Salix arctica* replaces the European *S. polaris*, but both *S. herbacea* and *S. reticulata* occur.

Where conditions are more favourable "heath" of varying degrees of luxuriance occurs, including such species as *Cassiope tetragona*, *Vaccinium uliginosum*, *V. vitis-idaea*, *Empetrum hermaphroditum*, *Ledum palustre* and other ericaceous plants. This is developed especially on the acid rocks and covers very extensive areas in the southern districts, usually associated with dwarf willows and birches of various species. These heaths are also very rich in Cryptogams, particularly lichens, which are always a striking feature of arctic vegetation.

In especially sheltered valleys, particularly in the southern half of the region, willow-scrub of limited extent is found, while on slopes where the exposure, drainage and nature of snow cover are combined in an exceptionally favourable manner one finds "flower slopes" containing a remarkably rich assemblage of flowering herbs and grasses.

Where the drainage is poor, or in the immediate vicinity of the numerous lakes, extensive marshes are formed, which are dominated by grass-like vegetation. This consists of the widespread grasses *Arctagrostis latifolia*, *Alopecurus alpinus*, and *Dupontia Fisheri*, numerous species of *Carex*, in particular *C. aquatilis* var. *stans*, and species of *Eriophorum*, especially *E. angustifolium* and *E. Scheuchzeri*. In the south, American species of the above groups become increasingly important. Mosses are also very abundant, but *Sphagna* occur in quantity only in the extreme south of the region. Truly aquatic vegetation is found only in the more southern regions, where *Hippuris* and aquatic species of *Ranunculus* are present.

The volume gives a very clear and graphic picture of this region, so unlike our own country in general features and yet with a flora including so many species native to these Islands.

V. S. SUMMERHAYES.

Recherches écologiques sur le littoral de la Manche. Dr JEAN JACQUET.
Pp. 374 with 42 line drawing figs. and 27 photogravure plates.
Paris: Paul Lechevalier, 1949; Fr. 2500. [25 × 16 cm.; paper.]

Attention should first be drawn to the general title of the book which, if taken literally, somewhat overshadows the most important subject; also to the fact that "Manche" is to be taken in its double meaning: the Channel, in a general sense, and, more particularly as the French department of that name, the littoral of which the author has thoroughly studied.

As a matter of fact, the work primarily centres on *Spartina Townsendii*, and is the practical development of a doctorate thesis on this Anglo-French invader of mud-flats on both sides of the Channel.

A great many notes have been written about the plant and related problems, but most of them have been spread over numerous more or less accessible publications, and no comprehensive work had yet dealt fully with the matter. This long-felt need has now been excellently fulfilled; the author has done much more than bring together the scattered information and has reported many previously unpublished observations.

While *Spartina Townsendii* and its problems in connection with its peculiar habitat, its chemical composition, and hence its possible uses, serve as the central theme of the work, many other matters pertaining to tidal lands and salt-marshes have been studied, e.g., their flora and fauna, their reclamation, the oceanography of estuaries and bays, the little known fluvio-marine deposits such as the "tangué" (i.e., the sort of mud in the Mont-Saint-Michel bay, where *Spartina* thrives), the biology of halophytes, etc. Special emphasis is placed upon some methods of soil and other analysis.

Contents.—Introduction: botanical status of European *Spartina* (13 pp.). 1st Part: comparative anatomy; descriptive anatomy; histology (32 pp.). 2nd Part: geographical distribution; mode of dispersal of *S. Townsendii* (40 pp.). 3rd Part: Chapter I: ecology; bionomical aspect of *S. Townsendii* stations in the department of the Manche; associations; the notion of *slikke* and *schorre* (47 pp.). Chapter II: environmental conditions; climate; waters; soil, chemical composition and physical properties (pp. 91). Chapter III: *S. Townsendii* in its habitat; adaptation; xerophytes *v.* halophytes; influence of salt; resistance to immersion (65 pp.). Conclusions. Bibliography (some 1350 references).

As far as species and hybrids growing in Europe are concerned, the genus is divided into two subgenera, viz.—*Euspartina* (incl. *S. stricta*, *alterniflora*, *Townsendii*, *Neyrauti*) and *Fremya* (incl. only *Spartina juncea* Willd.).

The interest of the book extends far beyond *S. Townsendii*, however fascinating this grass may be, and, therefore, should prove invaluable to all botanists—British and French alike—studying these matters.

The illustrations are a valuable part of the book and the photographs have been adequately selected.

P. SENAY.

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