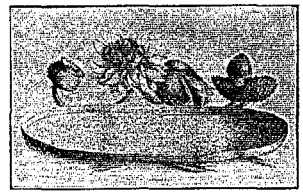
THE BOTANICAL SOCIETY AND EXCHANGE CLUB OF THE BRITISH ISLES.

(VOL. XII. PART I).

Victoria Regina.



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REPORT FOR 1938

BY THE

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Orme, Mrs R., c/o Westminster Bank Ltd., Exmouth, Devon.

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Post, Miss Eliz., 58 Eccleston Square, S.W.
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Thomas, Miss E. Mary, Moorfield, Nottage, Porthcawl, Glam.
Thorold, C. A., Hele, Bradninch, Devon.
Tindall, Mrs K. B., West Downs, Winchester, Hants.
†Todd, Miss E. S., Aldbourne, Marlborough, Wilts.
Toke, C. H., The Haven, Green Lane, Jarvis Brook, Sussex.
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Weyer, William Van de, Clyffe, Dorchester, Dorset.
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†Wright, Dr F. R. Elliston, Braunton, N. Devon.

Yeoman, Miss Ruth, The Green, Brompton, Northallerton, Yorks.
York Public Library, City of, York.
Young, Rev. A. J., Seamark, Lloyd Road, Hove, Sussex.
Young, Miss Gertrude, 5 Woodlands Terrace, Glasgow, C.3.
Yuill, Edward, Chingford, Askham Lane, Acomb, York.

ACCOUNTS FOR THE YEAR 1938.

GENERAL FUND.

To Balance from 1937,	£180	12	0	By Insurance,	£0	6	0
,, Subscriptions for 1938 (£187 17s 0d); paid in advance (£29 10s),	217	7	0	,, Printing (other than Reports), Stationery, & Binding,	30	0	1
,, Excursion Fees,	1	5	0	,, Printing Reports,	145	12	0
,, Sales of Reports and Reprints,	1	4	6	,, Expenses of Distributor,	1	9	5
				,, Honorarium to Secretary,	25	0	0
				,, Excursion Expenses,	0	16	3
				,, Postage & Petty Expenses (Secretary),	13	2	9
				,, Balance,	184	2	0
	£400	8	6		£400	8	6

PUBLICATIONS FUND.

To Balance from 1937,	£126	3	10	By Balance,	£137	7	4
,, Sales of Comital Flora and Plant List, etc.,	11	3	6				
	£137	7	4		£137	7	4

LIFE MEMBERS' FUND.

To Balance from 1937,	£144	8	0	By Deposit with P.O. Savings Bank,	£ 21	0	0
				,, Balance,	123	8	0
	£144	8	0		£144	8	0

Miss TROWER'S FUND.

To Balance from 1937,	£16	7	11	By Balance,	£16	7	11

BENEVOLENT FUND.

To Balance from 1937,	£41	3	6	By Balance,	£41	3	6

BALANCE-SHEET AT 31st DECEMBER 1938.

General Fund,	£184	2	0	500 National Savings Certificates, at cost,	£400	0	0
Publications Fund,	137	7	4	Cash at Bank,	102	8	9
Life Members' Fund,	144	8	0	Post Office Savings Bank Deposit (Life Members' Fund),	21	0	0
Miss Trower's Fund,	16	7	11				
Benevolent Fund,	41	3	6				
	£523	8	9		£523	8	9

(Signed) FRANCIS DRUCE, Hon. Treasurer.

14th February 1939.—Examined and found correct.

(Signed) H. W. PUGSLEY, Hon. Auditor.

SUMMARY OF PROCEEDINGS OF MEETINGS.

A meeting of the Committee was held on November 16th, 1938, at which it was decided that the Editorial Sub-Committee should draft a letter for publication in *The Gardeners' Chronicle* expressing the views of the General Committee with regard to an article in the *Bulletin of the Alpine Gardens Society* drawing attention to native British Alpines.

It was resolved to invite the Association for the Study of Systematics in relation to General Biology to call a conference of biologists to define more precisely the boundaries of the Watsonian vice-counties in order to obtain uniformity of records in the various branches of Biology. A Sub-Committee consisting of Mr J. E. Dandy, Mr J. E. Lousley, Mr A. J. Wilmott, and the Hon. Editor were appointed to represent the Society at this Conference.

The report of the Excursions Sub-Committee on the 1938 Excursions was received and approved and a list of proposals for 1939 Excursions was submitted and approved.

At a meeting of the Committee on March 15th, 1939, Mr H. W. Pugsley was re-appointed Hon. Auditor and Mr N. D. Simpson was appointed Distributor to the Exchange Club for 1939.

Mrs Foggitt was asked to make the arrangements for the Conversazione to take place at the Great Central Hotel, London, on Wednesday, November 15th.

Mr Hall raised the matter of the Society's publications—the *British Plant List* and *The Comital Flora*—and said that while he had been informed that there was an ample stock of the former still available, the stock of the latter would soon be exhausted. In view of this position, the Editorial Sub-Committee were of the opinion that it seemed desirable to make a start on a new edition of *The Comital Flora*, and it was proposed by Dr Ramsbottom, seconded by Mr Druce, that the recommendation of the Editorial Sub-Committee be adopted.

It was resolved on the proposition of Mr Pugsley, seconded by Mr Sandwith, that the Honorary Secretary should send out a post-card on the 1st January drawing the attention of members to Rule 3e regarding nominations for the four annual vacancies on the Committee.

Mr J. S. L. Gilmour was co-opted to the Committee.

The Editorial, Excursions, and Rules Sub-Committees were appointed for the ensuing year. Mr J. E. Lousley was elected to represent the Society on the Phenological Committee of the Meteorological Society.

At the Annual General Meeting on the same date 37 members were present, and the meeting was presided over by the Chairman, the Rt. Hon. H. T. Baker.

The Honorary Secretary's and Honorary Treasurer's reports were adopted, and the Officers for the Society were elected as enumerated on p. 5.

A vote of thanks to the Linnean Society of London for allowing the Society to use their Rooms was passed.

Mr P. M. Hall read a paper entitled " The British Species of *Utricularia*," which is printed in an extended form below. The paper was illustrated by numerous specimens from Mr Hall's collection and from the Druce Herbarium and by maps showing the distribution of the species in Britain as at present known.

REPORT OF THE HONORARY SECRETARY FOR 1938.

The favourable increase in the Society's membership recorded in my two previous reports has not been maintained in 1938. The number of new members is 22 (the same as in 1937), but after taking into account 16 resignations, 5 deaths and 6 whose membership lapsed under Rule 6(d), the nett result is a decrease of 5 in the total membership.

It is with regret that I record the death of the following members in 1938: Sir Maurice Abbot-Anderson, Mrs Godden, Mr F. J. Hanbury, Mrs Perrycoste and Sir Sidney Peel. Mr Hanbury joined the Society in 1883, and for many years took an active interest in the Exchange Club.

The Committee, having received requests for some form of lecture at one of the Society's meetings, arranged for a paper of botanical interest to be read at the conclusion of business at the Annual General Meeting. Should this meet with members' approval and support, it is hoped to maintain it as an annual event.

1938 was a year of greater activity on the part of members and the number of specimens sent in for identification and verification was considerably larger than in previous years. Now that the Society has obtained the services of a complete panel of Referees, it is hoped that members will co-operate in providing them with the desiderata they require as set forth in the Supplement to the last B.E.C. Report.

The excursions held during 1938 were well attended, and an account of them, with a summary of the proceedings of meetings, will appear in the Distributor's Report.

As in previous years, the Society is deeply indebted to the Linnean Society for being allowed the use of their rooms during the year; to the authorities of the British Museum (Natural History), and of the Royal Botanic Gardens, Kew; and to the Referees and many others for their continued and willing help.

OBITUARIES.

Sir Maurice Abbot-Anderson, C.V.O., M.B., B.S., M.R.C.S. (1861-1938). By the death of Sir Maurice Abbot-Anderson on May 3rd, 1938, the cause of Wild Plant Conservation in Britain lost one of its foremost advocates, and many botanists a kindly and honoured friend.

Sir Maurice was born in 1861 and educated at University College, London, and at Durham. He took up a medical career with very distinguished success and amongst the many important appointments which he held at various times he was honoured with that of honorary physician to the late Princess Royal (Duchess of Fife).

His interest in botany dated from youth, but his busy professional life allowed little leisure and it was not until retirement that his hobby could be fully indulged. In 1925, after considerable preliminary discussion, he founded Flora's League, The Society for the Protection of Wild Flowers, Ferns, and Trees, which was intended, mainly by the means of propaganda amongst children and the general public, to reduce thoughtless destruction of our flora. In this field the efforts of the founder enjoyed very considerable success, and the League is to be carried on as a fitting memorial to its first President who had its objects so very much at heart.

Sir Maurice's efforts in the cause of the protection of wild flowers helped to pave the way for the formation of the Wild Plant Conservation Board, which he later represented on the Council of the Society for the Preservation of Rural England. He was also a member of the National Trust, the Council for the Preservation of Rural Wales, and the Association for the Preservation of Rural Scotland.

His work in this connection was greatly strengthened by a most remarkable facility for sympathising with those whose views were not identical with his own, and for understanding their arguments, and even at times modifying important contentions of his own when adequate reasons had been produced that this was desirable. In this manner, aided by a most lovable nature, he was often able to win support for his cause even from his critics.

Sir Maurice's character is best described as that of the most perfect type of an English gentleman. Kindly in word, thought, and deed, he always sought to avoid hurting the feelings of his fellow creatures, and this character was never more in evidence than when he was dealing with people who were socially inferior to himself. His delightful house at Lyme Regis was a Mecca to which many flower lovers were invited, and whence they returned with happy memories of a perfect host.

J. E. Lousley.

More detailed notices will be found in the " Times " for May 4th, 1938, and " Countryside," xi, 308, Autumn 1938, to which the writer is indebted for several facts.—J.E.L.)

Donald Alexander Haggart (1850-1939). Very many botanists, especially of the older generation, will regret to hear of the death, at the age of 89, of Donald Alexander Haggart, who died on the 15th of January 1939 at Grandtully Cottage, Aberfeldy. Mr Haggart's family had a long connection with Loch Tayside district, going back for four or five generations. He himself was a banker in Killin for the greater part of his life. He was a very keen botanist and no one was more

familiar with the flora of the Breadalbane mountains than he. He had been on the summit of Ben Lawers over 300 times. Being a tireless walker, he was always ready to take the hill with anyone of kindred interests. Many botanists, both past and present, owe their knowledge of the rarer Lawers plants to him. He was a friend of Druce, Marshall, Shoolbred, the Groves, the Lintons, Babington, and many others. The only wreath placed on Babington's coffin was one of *Saxifraga oppositifolio* sent by Haggart from Meall-nan-Tarmachan. Though he never possessed a microscope he knew the Bryophyta well and Stirton named a moss in his honour. The geology as well as the flora of the district attracted him and although he could not speak a word of German he had studied it so that he could read with ease the German literature on the subject. It is sad to record the death of such a kindly and interesting personality. R. H. C.

FREDERICK JANSON HANBURY (1851-1938). Frederick Janson Hanbury, who was a member of the Society for many years, was born on May 27th, 1851, and died on March 1st, 1938. He was a grandson of Cornelius Hanbury, who had entered into partnership with William Allen in 1795 to found the famous firm of Allen & Hanbury. After serving his apprenticeship he entered the family business in 1872 and was Chairman from 1916 onwards.

He became interested in flowering plants at an early age and his contributions to the *Journal of Botany* commenced in 1871, while two years later a note stated he had begun to gather material for a Flora of Kent. For many years after this date he spent much of his leisure in investigating plants of that County and the *Flora of Kent* was published with the collaboration of the Rev. E. S. Marshall in 1897. He will be particularly remembered for his work upon *Hieracium*; he commenced to publish a monograph of the genus in 1889 but this was unfortunately never completed, only 8 parts being published, the last of them in 1898. The monograph is especially notable for the excellence of the coloured plates, most of which were drawn by his cousin, Miss Gulielma Lister.

Hanbury was also well known as a gardener and at East Grinsted he built a famous rock garden. The plants growing in this included a very representative collection of British natives.

Hanbury's herbarium and collection of *Hieracia* were bequeathed to the British Museum, South Kensington, to join Boswell-Syme's harbarium which Hanbury had already presented in 1932.

P. M. H.

CHARLES WATERFALL (1851-1938). The Society has lost an old member and a contributor to the Exchange Club Distributions for many years in the death of Charles Waterfall. Born at Leeds on January 7th, 1851, he acquired an interest in botany at a very early age, possibly from Dr Christopher Johnson of Lancaster. Between 1896 and 1910 he was resident at Hull, and, a member of the Hull Scientific and

Field Naturalists' Club, he made numerous contributions to J. Fraser Robinson's *Flora of the East Riding of Yorkshire*. From 1910 until his death on January 26th, 1938, he lived at Chester. His herbarium has been presented to the Botanical Department of Sheffield University. E. S. Marshall named *Epilobium Waterfallii* (*E. hirsutum* L. × *palustre* L.) in his honour. P. M. H.

EDITORIAL NOTES.

PATRICK M. HALL, Hon. Editor.

Some explanation may be necessary in connection with the separate publication of the two parts of the Report. Reference has been made by me already to the criticism of the late appearance of the Society's Reports and I feel strongly that our Reports lose some part of their value if they do not appear in time for use in the early part of the next collecting season. In order, therefore, to get this part of the Report issued earlier, it has been decided to publish the two parts of the Report independently, not waiting for the completion of the Distributor's Report and the Report on the 1938 Excursions, which will appear together later.

Even so, I feel that the present date of publication of Part I is much later than it should be. If the expedient now adopted meets with general approval it may be possible in another year to obtain the earlier publication which is so desirable. In extenuation I can only ask members to believe that the difficulties and delays which have to be overcome in editing the Reports are more considerable than one can realise until one actually experiences them, especially in such times as we have been through in recent months with all their attendant distractions.

Another feature of this year's Report is the complete absence of Reviews. This is a very regrettable state of affairs but it appears that publishers no longer send their new books to the Society's Officers for review, in consequence of the printing periodically of the complete list of members, to whom publishers send their prospectuses direct. It has also to be remembered that much material which might be classified under the heading " Reviews " does in fact appear in the Reports in the form of Abstracts.

As usual, I have to thank many members of the Society as well as the members of the Editorial Sub-Committee and Mr Chapple for much kind help during the past year.

Comital Flora. As there appears to be a steady sale for this book and the stock is nearly exhausted, the Committee, on the recommendation of the Editorial Sub-Committee, have instructed me to prepare for a second edition. In this the assistance of the Society's Referees will be sought and all members are invited to send to me particulars of

corrections which have come to their notice in those areas or groups in which they are interested.

Plant Records. All records should give the following data:—

(a) The specific (and, where applicable, varietal, etc.) name.
(b) Locality and Watsonian vice-county (the county alone will not suffice).
(c) Date.
(d) Name of finder, if not the person submitting the record.
(e) If the plant belongs to a critical group, the name of the expert by whom it was determined: if the plant has not been named by an expert, a specimen must be sent for determination. Records in critical groups will not be published unless this procedure has been complied with.
(f) If material has been dried, the Herbarium in which it is kept, so that it may be traced if required for study.
(g) Information as to the status of the plant (whether native, naturalised or casual), habitat, altitude, soil, etc., is desirable.

It is important that new vice-comital records should be supported by voucher material and members making such records are urged to deposit material in the herbarium of the Dept. of Botany, British Museum (Natural History), S. Kensington, or one of the other national or public herbaria.

PERSONALIA.

FLORA OF THE ISLES OF SCILLY.

Work on the Flora of these islands during 1938 has resulted in a number of very interesting records. Owing to the necessity of visiting the islands during every month of the summer, it is likely to be at least two years before publication of the full results. Members contemplating a visit to Scilly are invited to communicate with Mr J. E. Lousley, 7 Penistone Road, Streatham Common, London, S.W.16, beforehand in order that they may be supplied with lists of species which require verification. All records, even those of many common plants, will be appreciated if the island on which they are found is specified.

VALERIANA.

Dr K. B. Blackburn, King's College, Newcastle-on-Tyne, is studying the cytology of this genus and will be glad to receive material.

Professor J. R. Matthews, Department of Botany, University of Aberdeen, Aberdeen, will be glad to arrange to send to any Referee the material of any group in the Herbarium of Aberdeen University.

Mr G. H. Beale, of the John Innes Horticultural Institution, 31 Mostyn Road, Merton Park, S.W.19, is working on flower pigments and is collecting data of the occurrence in nature of colour variations of commonly occurring species. Members observing such variations should send a few flowers of both the typical and variant forms together with particulars of habitat and information as to the occurrence of any related species in the neighbourhood.

THE PROGRAMME OF EXCURSIONS.

arranged for 1939 was sent out to all members with the notices of the Annual General Meeting.

NOTICE.

THE 1939 CONVERSAZIONE

will be held at the Great Central Hotel, London, on Wednesday, November 15th, from 3 to 6 p.m.

Arrangements as in previous years. Tickets, price 3/6 per head, including tea, may be had on application to

Mrs FOGGITT, Stoneybrough, Thirsk, Yorks.

Please enclose cheque or postal order, and stamps for reply. A few friends may be invited.

PLANT NOTES.

[In the case of direct contributions the name of the author of the Note is printed in small capitals. Where the name of the author is not in small capitals, and is coupled with a date (the name and date, or date alone, being bracketed), the Note is an Abstract, its origin being ascertainable by reference to the Bibliography.—ED.]

32/11×10. **Fumaria micrantha** Lag. × **officinalis** L. 17, Surrey; Epsom College farm, A. E. ELLIS, det. H. W. PUGSLEY.

54/14. BRASSICA ARVENSIS (L.) Kuntze. According to Wheeler (1938) the valid name for *Sinapis arvensis* L. under *Brassica* is **B. haber** (DC.) Wheeler.

54/15. BRASSICA ALBA (L.) Boiss. Wheeler (1938) writes the name as "*B. alba* (L.) Rabenhorst," but says that the earliest available name is **Brassica hirta** Moench.

54/22. BRASSICA ADPRESSA Bois. According to Wheeler (1938) the valid name for *Sinapis incana* L. is **Brassica geniculata** (Desf.) J. Ball.

66/2. **Teesdalia Lepidium** DC. In June 1938 I detected a small colony of what was assumed to be *T. nudicaulis* (L.) Br. on sandy ground behind Laig Bay, Isle of Eigg (104), and one plant was taken as a voucher. When it was examined in the laboratory, it appeared to be different from the ordinary form of *T. nudicaulis* found in Northumberland and was therefore submitted to Dr R. W. Butcher, who assigns it to the allied species, *T. Lepidium* DC.—J. W. HESLOP HARRISON. [According to Rouy and Foucaud, *Fl. Fr.*, *2*, 141 (1895) this species differs from *T. nudicaulis* in its shorter stems, linear-lanceolate, acute leaves, entire or pinnatifid with all lobes acute, the upper rarely slightly obtuse, flowers ordinarily with 4 stamens (6 in *T. nudicaulis*), and silicles smaller, orbicular, with no style. This species has a mediterranean distribution and in France occurs principally in the Midi and Corsica.—ED.]

101/3e. STELLARIA MEDIA L. var. **glaberrima** Beck, *Fl. v. Nied. Oesterr.*, *1*, 364 (1890). Plants destitute of hairs in all parts, including the internodes, from Nottingham (R. Bulley) are referred to this variety by C. E. Britton (*J.B.*, *76*, 23, 1938). Another form from the Hebrides is subglabrous, with the pubescence restricted to the internodes.

103. SAGINA L. The characters and variation of the Scottish alpine Saginas are discussed by Elliston Wright (1938 A) and illustrated by 15 photographic plates and 2 text-figures. *Sagina nivalis* (Liljeb.) Liljeb. appears to have affinities with *S. maritima* Don but cytological research,

as yet incomplete, by Dr K. B. Blackburn, shows that the former species has the highest chromosome-count of any British *Sagina*, while that of the latter is much lower. Both *S. nivalis* and *S. saginoides* (L.) Dalla Torre are more variable than is generally supposed and several inaccuracies in text-book descriptions are pointed out. *S. saginoides* (including *S. scotica* Druce) may be distinguished from all other species by the shape of the petals, which are broad, almost orbicular, sometimes slightly emarginate. It is considered that *S. saginoides* and *S. scotica* are conspecific, the former being a plant of dry rocks at higher altitudes, while the latter is a plant of wet bare places at lower altitudes and is given the name, *S. saginoides* Dalla Torre forma *scotica* (Druce) Elliston Wright, " comb. nov." [Elliston Wright uses the name *S. caespitosa* Lange, which is incorrect. Our British plant has been erroneously identified with *S. caespitosa* (J. Vahl) Rink resulting in the further erroneous use of the name *S. caespitosa* Lange for it, whereas it is *S. nivalis* (Liljeb.) Liljeb. = *S. intermedia* Fenzl.—A.J.W.]

103/6. SAGINA BOYDII Buch.-White. The characters of this plant are described and illustrated from cultivated specimens by Elliston Wright (1938 B: 361-364), who considers the original more likely to have come from Aberdeenshire than from Switzerland and that it was probably not a chance mutation or a hybrid. The chromosome-count (Blackburn) is $2n = 22$, i.e. in the same group as *S. procumbens*, *S. subulata* and *S. saginoides*.

103/9. SAGINA REUTERI Boiss. Without actually seeing Spanish material Elliston Wright (1938 B: 364) believes the English plant to be that described by Boissier. The chromosome-count (Blackburn) is $2n = 12$, which puts it in the same group as *S. ciliata* and *S. apetala*. For three years English material of *S. Reuteri* from four separate localities has been under cultivation and with shelter, sufficient moisture and good soil all have developed into *S. ciliata*. The name **S. ciliata** Fr. forma **Reuteri** (Boiss.) Elliston Wright has therefore been given to this form.

194. ROSA L. The distribution of Roses in numerous Scottish Islands belonging to v.-cc. 100, 103, 104, 108 and 110 is described by Harrison and Bolton (1938).

194/20l. ROSA SHERARDI Davies var. **Cookei** Heslop Harrison. 110, Outer Hebrides; several stations in the South of S. Uist, R. B. Cooke and J. W. Heslop Harrison. Described as a new variety—" clearly an endemic form of some importance "—with diagnosis but without designation of type by Harrison (1938).

216/2b. MYRIOPHYLLUM ALTERNIFLORUM DC. var. **americanum** Pugsl. Leaves only 3-5 mm. in length and segments measuring 2-4 mm., as compared with leaves 10-25 mm. long, and segments of 6-20 mm. in the typical form. Described by Pugsley (1938) as a new variety based on

material collected in company with Dr R. Ll. Praeger in Lough Beg, August 1938. Dried material has also been seen from:—Lough Neagh, Antrim, July 13th, 1867, S. A. Stewart in Hb. Mus. Brit.; same locality and date, G. Dickie in Hb. Druce; Lough Ree, Co. Longford, June 28th, 1899, R. Ll. Praeger in Hb. Bennett (in Hb. Mus. Brit.).

No European material in Hb. Mus. Brit. or Hb. Kew matches this Irish form, although some Scandinavian gatherings approach it. N. American material in both these herbaria is uniform and identical with the Irish form, which is the prevalent, if not only, form of *M. alterniflorum* known in N. America, where it has been regarded as the typical species. The normal form occurs however in Greenland. The variety is figured by Britton and Brown, *Illustrated Flora of N. United States, Canada, etc.*, ed. 2, *2*, 615, fig. 3083 (1913). The addition of another plant common to the floras of Ireland and N. America is of great interest.

Praeger (1938) records the variety from all five counties bordering L. Neagh—Down, Antrim, Londonderry, Tyrone and Armagh; from Antrim and Londonderry bordering L. Beg; from Co. Longford, L. Ree, as above; and from " the other great limestone lake of the Shannon—L. Beg " [sic: is not this a misprint for L. Derg?—Ed.]. Typical *M. alterniflorum* is common in Ireland, especially in the acid waters of the west, but has not been seen in L. Neagh or L. Beg, where the water is alkaline, with a pH as high as 7. *M. spicatum* occurs in L. Neagh and in Ireland tends to be calcicole.

250/3. **Petroselinum crispum** (Mill.) Nym. is the correct name of the Common Parsley according to Airy-Shaw (1938 A), who lists three varieties:—(a) var. *crispum* (Mill.) Airy-Shaw, (b) var. *latifolium* (Mill.) Airy-Shaw and (c) var. *anatolicum* (Freyn & Sint.) Airy-Shaw.

283/3. Caucalis Anthriscus (L.) Huds. Under *Torilis* the valid name for *Tordylium Anthriscus* L. is *Torilis japonicus* (Houtt.) DC.—Merrill (1938)

291/2c. Lonicera Periclymenum L. var. **Clarki** Heslop Harrison. 110, Outer Hebrides; cliffs on Ben More, S. Uist, J. W. Heslop Harrison. Distinguished by its glabrous, subcoriaceous, elliptical, broad leaves. Described as a new variety with diagnosis but without designation of type by Harrison (1938: 117).

296/8. Galium debile Desv. A description of this species, prepared from Devonshire specimens, is given by Britton (1938).

396. Cirsium Mill. The following three names are proposed by Airy-Shaw (1938 B).

396/2. **Cirsium vulgare** (Savi) Airy-Shaw. This combination must now be used for the Spear Thistle, since the combination *C. lanceolatum* (L.) Scop. (1772), based on *Carduus lanceolatus* L., is found to be a later

homonym of *C. lanceolatum* Hill (1769). The latter was actually an illegitimate "new name" for *Carduus dissectus* L., and had no connection with *Carduus lanceolatus* L., but it invalidates the use of the same name for any other species.—H. K. A.-S.

396/3. **Cirsium helenioïdes** (L.) Hill. This name must be used for the Melancholy Thistle, since two forms of this species, described by Linnaeus as *Carduus heterophyllus* and *C. helenioïdes* (the latter Siberian), were united by Hudson (1778) under the latter name. As Hudson was the first to unite the two Linnean species, his choice of epithet must be followed, under Art. 56 of the International Rules. This rule applies, whether the species is retained in its original genus or transferred (as in this case) to another.—H. K. A.-S.

396/5. **Cirsium dissectum** (L.) Hill. The Meadow Thistle was long supposed to have been unaccounted for by Linnaeus, and has been generally known either as *Cirsium anglicum* (Lam., 1784) Lam. & DC. or as *C. pratense* (Huds., 1778) Druce—the latter being an illegitimate later homonym of *C. pratense* (Lam.) Lam. & DC. (1805). It is now shown that the much misunderstood *Carduus dissectus* L. (1753) was based on a figure and description by Lobel (1576) of a specimen of the Meadow Thistle from Gloucestershire, and therefore *Cirsium dissectum* (L.) Hill (1768) is the correct name for this species.—H. K. A.-S.

416/9. Crepis foetida L. This variable and polymorphic species is considered by Babcock (1938) to be a "Rassenkreis," originating from three species, which for taxonomic purposes are treated as three subspecies of *C. foetida* L., *sensu lato*. The British plant belongs to *C. foetida* L. subsp. **vulgaris** (Bisch.) Babcock, of which thirteen forms are listed with a geographical range covering Western, Central and Southern Europe to the Crimea, Asia Minor, Syria and S.W. Persia.

438/3. Vaccinium Vitis-idaea L. Early and late flowering seasons of this species in 38, 57 and 88 are described by R. C. L. Burges, W. Watson and Miss M. S. Campbell (*J.B.*, *76*, 24, 1938).

467/2. Anagallis arvensis L. and 467/3. Anagallis foemina Mill. Schinz and Keller's subdivision of the species *A. arvensis* into two subspecies is followed by Marsden-Jones and Weiss (1938) in a study of the morphology and genetics of the two subspecies. These are 1. subsp. **phoenicea** (Scop.) Schinz and Keller, which includes five colour-varieties —scarlet, salmon, white, lilac and blue—and 2. subsp. **foemina** (Mill.) Schinz and Keller, which occurs in one colour only, "Grayish Violaceous Blue." Morphologically the subspecies differ considerably, especially in the shape and the margins of the petals, which are broadly ovate in subsp. *phoenicea* and entire or obscurely crenulate, while in subsp. *foemina* they are narrowly obovate and denticulate. The genetic behaviour of crosses within and between the subspecies is described.

467/2b. ANAGALLIS ARVENSIS L. var. CARNEA Schrank. This plant is generally treated in Floras as a colour-variety of *A. arvensis* with flesh-coloured flowers but Rilstone (*J.B.*, *76*, 85) considers it to have greater taxonomic importance than this. It has a neater habit than typical *A. arvensis*, with semi-upright stems and in Cornwall it is almost entirely a maritime plant: it nearly always occurs on sand-dunes, *cf.* Lousley, *B.E.C. 1936 Rep.*, 267, 1937 [also Hall and Simpson, *loc. cit.*—ED.]: where it does occur inland, it is due to the conveyance of dune sand to farm land for agricultural purposes.

Marsden-Jones and Weiss (1938: 147), however, treat var. *carnea* Schrank as a colour-variety of *A. arvensis* L. subsp. *phoenicea* (Scop.) Schinz and Keller.

558/6f. MENTHA PIPERITA L. var. SYLVESTRIS Sole. Still (1938) has modified his previous views (see abstract in *B.E.C. 1937 Rep.*, 455, 1938). The plant from which Fraser drew up his description of *M. hircina* Hull was not identical with Hull's plant. The identity of the latter with Sole's "*M. piperita sylvestris*" is confirmed: this plant seems to have been a local form occurring near Bath and is now possibly extinct. The specimen, now in Hb. Kew, from which Fraser drew up his description of *M. hircina* Hull, is a hairy form of *M. piperita* L. var. *subcordata* Fraser, while *M. hircina* Hull var. *hirsuta* Fraser is a similar form of *M. piperita* L. var. *officinalis* Sole. To the latter, "lusus *pilosus*," are referred the gatherings from Danehill, Aldborough, Bedwyn, Weston-in-Gordano and Fern Den, Angus.

558/9u. MENTHA VERTICILLATA L. var. **hylodes** Topitz, *Beihefte zum Bot. Centralblatt*, *30*, Abt. 2, 232 (1913). A weak but rather large form, with long petioles, large leaves tapering much to both ends and about equally, while the whorls are pedunculate. 36, Hereford; marshy coppice, Brockbury Farm, Colwall (*F. M. Day*). No doubt just one of the infinite number of hybrid forms but recognisable from Topitz' figure and description.—A. L. STILL.

588/10h. PLANTAGO MAJOR L. Mr F. T. Baker sent me a specimen of this species which had been collected in a Lincoln garden and matches the "variety" *bracteata* Druce. This is a morphological state and not a taxonomic variety. The whole plant is very large and coarse, with irregular serrate leaves, and with a spike nearly 30 cm. long, having enlarged foliaceous bracts in the lower part which gradually become normal towards the apex.—J. F. G. CHAPPLE.

633. ULMUS L. The view expressed by Stearn and Gilmour (*Kew Bull. 1933*, 503), that the name *Ulmus campestris* L. should be rejected as a *nomen ambiguum* under Art. 62 of the International Rules of Botanical Nomenclature, is supported by Melville (1938 C). Linnaeus was undoubtedly most familiar with *U. glabra* Huds. and this is the tree represented in his herbarium, but in his writings he appears to

have intended to cover all European elms with the one name *campestris*. This has resulted in later botanists in each country seeing Linnaeus' species in that with which they themselves were most familiar. The use of this name with different meanings for over a century has made it a permanent source of confusion and error.

633/6c. ULMUS STRICTA Lindl. var. **Goodyeri** Melville in *Journ. Bot.*, *76*, 185-192. " Goodyer's Elm." In the second edition of Gerard's Herbal, published in 1633 with T. Johnson as editor, John Goodyer was responsible for the descriptions of four elms, two of them then described for the first time. One of these, " Ulmus minor folio angusto scabro. The Narrow-leaved Elme," has been identified by Melville (1938 B) and described as above. The round-headed habit of the tree separates it markedly from typical *U. stricta*, which however it closely resembles in its leaves and branchlets. The habit of the tree, as well as various types of foliage, are illustrated by text-figures. It is found as a hedgerow tree in the coastal plain of south-west Hants, between Lymington, Christchurch and Ringwood.

652/2. EMPETRUM HERMAPHRODITUM (Lange) Hagerup. Doubt is expressed by Blackburn (1938 A) as to whether the true plant occurs in Britain following the discovery near Edmondbyers, Durham (66) of a hermaphrodite specimen of *E. nigrum* L. This was indistinguishable in vegetative characters from near-by male and female plants. When examined cytologically, it was found to have $n = 13$, whereas *E. hermaphroditum* should give $n = 26$.

668/5. EPIPACTIS RUBIGINOSA Crantz. The flowers of British specimens are usually less brightly coloured and the plants shorter than in S. France and Switzerland. In less arid situations, such as Arnside Knott and Newbiggin Crags, the plants agree with the Continental form in colour and size.—T. Stephenson (*J.B.*, *76*, 56).

669/4. ORCHIS SIMIA Lam. As a result of comparing the description in Godfery, *Monogr. and Iconogr. Nat. Br. Orch.*, 166 (1933), of *O. simia* Lam. var. *macra* (Lindl.) Godfery with a Kentish specimen found in 1923, Brooke (1938) advances the theory that there are two British forms of this species, " the true *O. simia* " in Kent and var. *macra* in Oxfordshire. [There are several points in this paper which call for more detailed comment than can be made in a note on an Abstract. Most of the material for a paper on the *Militares* section of *Orchis* has been collected for some time and the projected paper is overdue.—P.M.H.]

669/10 and 11. ORCHIS MACULATA L. (*sec.* Druce) and FUCHSII Druce. Hagerup (1938) uses the names " *O. maculatus* L." and " *O. maculatus* var. *genuinus* Reichb." for the tetraploid ($2n = 80$) species. He also refers to " var. *helodes* " as a tetraploid, but does not in this paper state the differences between *genuinus* and *helodes*. The only

diploid ($2n = 40$) plant seen by him in Denmark is *O. maculatus* var. *Meyeri* Reichb. f., which from the illustration has a labellum shaped like that of *O. Fuchsii*. This " variety " occurs in one Danish locality " on almost pure limestone under *Fagus*." It is said to range from France to Scandinavia, " but everywhere as a rarity." Its most marked character, besides the shape of the labellum, is said to be its very broad lower leaves, a character shared by *O. Fuchsii* also a diploid. Vermeulen (1938) equates *O. maculata* L. var. *Meyeri* Reichb. f. with *O. Fuchsii* Druce.

Hagerup attributes to the polyploid nature of *O. maculata* (*genuina*) the following characteristics as compared with var. *Meyeri*:—(a) a wider geographical distribution: (b) a greater abundance of individuals: (c) capacity to tolerate drought, moisture and cold: (d) capacity to tolerate acidity of the soil: (e) longer and later flowering period: (f) smaller size.—P. M. HALL.

669/17c. ANACAMPTIS PYRAMIDALIS (L.) Rich. var. **fudayensis** (Heslop Harrison) P. M. Hall, comb. nov. " *Orchis pyramidalis* var. *Fudayensis* var. nov." Heslop Harrison, *The Vasculum*, *24*, No. 4, 116-117 (1938).

110, Outer Hebrides; Island of Fuday, J. W. Heslop Harrison. In this variety described by Harrison (1938: 117) the inflorescence is said to be elongated to a length of 8 cm. or over, cylindrical in outline instead of pyramidal but it is stated that " more normal plants were also encountered there."—P. M. HALL.

719/9. **Luzula luzuloides** (Lam.) Dandy and Wilmott, " comb. nov.," in *Journ. Bot.*, *76*, 352-353. This combination is based on *Juncus luzuloides* Lam. in *Encycl. Méth. Bot.*, *3*, 272 (1789) and reasons for adopting it in place of *L. albida* (Hoffm.) DC. and *L. nemorosa* (Pollich) E. Mey. are given by Dandy and Wilmott (1938).

723/1(2). **Arum neglectum** (Towns.) Ridley. *A. italicum* Mill. var. *neglectum* Townsend in *Fl. Hants.*, 327 (1883) [=723/1c. of *B.P.L.*, *ed. 2*]. *A. italicum* Mill. var. *immaculatum* Rouy, *Fl. de France*, *13*, 279 (" probably ") [=723/1b. of *B.P.L.*, *ed. 2*]. *A. italicum* auct. brit. *non* Miller. This new combination is made by Ridley (1938), who gives a detailed description and considers the plant to be specifically distinct from *A. italicum* Mill., lacking the white leaf-venation of the latter and having other differences in the shape of leaf and spathe. In addition the upper sterile organs are fewer than in *A. italicum* and papillose, the bare spaces above and below the male flowers are much longer, the ovaries are globose-obconic not oblong, the fruit-spike is usually shorter and the seeds less numerous, 1-2 compared with 2-4. Plants with spotted leaves are considered to be hybrids with *A. maculatum*. Records are cited from v.-cc. 1-4, 9, 10, 11, [12!—P.M.H.], 13, 15, 41 [" Curtynalu " should read " Cwrtyala."—P.M.H.]; also recorded from Jersey, Guernsey, Alderney and N. France. All British

localities with the exception of those in 11 [and 12 and 13 (Arundel Park).—P.M.H.] are stated to be within one mile of the sea.

737/23×27. POTAMOGETON BERCHTOLDII Fieb. × TRICHOIDES Cham. & Schlecht. = × *P. franconicus* Hagström. Two Surrey gatherings have been referred to var. *spicosus* Hagström of this hybrid:—(1) by Hagström himself, from Hedge Court Mill Pond, September 28th, 1879, and September 12th, 1886, Beeby; (2) by A. Bennett, from Ewood Pond, July 1884, Beeby (wrongly ascribed by Bennett to Straker). Dandy and Taylor (1938 B) find that there is no justification for ascribing a hybrid origin to either gathering, which both agree in all respects with *P. trichoides*.

737/24. POTAMOGETON RUTILUS Wolfg. This species has been much confused by British authorities with other species. Details of these erroneous identifications are given by Dandy and Taylor (1938 C). *P. rutilus* is allied to *P. Friesii* and *P. pusillus*, having closed, tubular, stipular sheaths. It is altogether more slender than *P. Friesii* and from *P. pusillus* it may be distinguished by the firmer texture of the stipular sheaths, which are more strongly nerved and more persistent, tending to become fibrous, and are tubular only towards their base. Hagström's statement that this species occurred in N. America has been disputed by Fernald who pointed out that Hagström had confused it with an endemic American species.

737/27. POTAMOGETON TRICHOIDES Cham. & Schlecht. The characters by which this species may be distinguished from narrow-leaved forms of *P. pusillus* and *P. Berchtoldii*, with which they have been confused in the past, are given by Dandy and Taylor (1938 B). *P. pusillus* is separated from the other two species by its closed, tubular, stipular sheaths, while *P. trichoides* and *P. Berchtoldii* both have convolute, open, stipular sheaths but may be separated by their leaf-venation. In the latter the midrib is bordered, at least towards the base, by one or more rows of lacunae and the two lateral nerves are evident, while in *P. trichoides* the midrib is relatively thicker and more prominent and usually without a border of lacunae and the lateral nerves are so faint as to be often hardly visible. *P. trichoides* has a tendency to monocarpy and in comparison with the other two species the fruits are larger and are usually somewhat muriculate along the dorsal keel.

The British distribution of this species has been thoroughly reviewed (see p. 62 below). The species may be commoner in Britain than has been supposed and should be looked for wherever *P. pusillus* occurs as the two species favour similar ecological conditions.

737/27b. POTAMOGETON TRICHOIDES Cham. & Schlecht. var. TRIMMERI Caspary. This variety was described by Caspary in *Journ. Linn. Soc., Bot., 8*, 273 (1865), from material received from K. Trimmer from Framlingham Earl, E. Norfolk. After examining a large series of *P.*

trichoides Dandy and Taylor (1938 B) conclude that the variety is untenable, since the muriculations on the dorsal keel of the fruit, on which the variety is based, are variable in degree of development and are an unsatisfactory diagnostic character.

753/14. CAREX CAPILLARIS L. forma MAJOR Blytt. The view expressed by Mr Wilmott in *B.E.C. 1936 Rep.*, 229-230 (1937), that this form is of no taxonomic value, is supported by a specimen gathered on Meall Ghaordie (88) in July 1938. This specimen had attached to it a stem of the 1937 growth, 2.5 dm. in length, whereas the growth of the current year on the same plant was no more than 0.8-1.2 dm. in length.—P. M. HALL.

753/49m. CAREX GOODENOWII Gay var. HEBRIDENSIS (Ar. Benn.) Wilmott. *C. spiculosa* Fr. var. *hebridensis* Ar. Benn. The new combination made by Wilmott (1938) was referred to in *B.E.C. 1937 Rep.*, 459 and 555-556 (1938). Duncan's plant, on which Bennett's variety was based, was an extreme narrow-glumed form of *C. Goodenowii* without any trace of the excurrent midrib to be expected in a variety of *C. spiculosa*. Connecting links occur between typical *C. Goodenowii* and the narrow-glumed form.

827/19×19(2). **Bromus hordeaceus** L. × **lepidus** Holmberg. Plants growing with the presumed parents were determined by C. E. HUBBARD as probably this hybrid from:—3, S. Devon; roadside, E. Prawle, *B.E.C. Excursion*. 23, Oxon.; waste ground, Manor Road, Oxford, J. P. M. BRENAN: waste ground, Jackdaw Lane, Oxford, J. F. G. CHAPPLE.

829/4×1. **Lolium multiflorum** Lam. × **perenne** L. Plants have been determined by C. E. HUBBARD as probably this hybrid from:—23, Oxon.; waste ground, Jackdaw Lane, J. F. G. CHAPPLE. 32, Northants.; Brampton Ash, 1921, A. E. ELLIS.

830/1. AGROPYRUM JUNCEUM (L.) Beauv. Simonet and Guinochet (1938) describe and discuss the geographical distribution of two subspecies:—*A. junceum* (L.) Beauv. subsp. *boreo-atlanticum* and *A. junceum* (L.) Beauv. subsp. *mediterraneum* which differ not only in their chromosome numbers, $2n = 28$ and $2n = 42$ respectively, but also in their morphological characters. The British plant is subsp. **boreo-atlanticum**. See also Pardi (1937).

851/6. ASPLENIUM FONTANUM (L.) Bernh. The specimens of *Polypodium fontanum* in the Linnean herbarium do not represent the plant known as *Asplenium fontanum* but are *Woodsia glabella*, while the diagnosis in *Spec. Plant.*, ed. i, is also ambiguous. Taylor (1938) argues that there are weightier reasons for retaining the specific epithet in *Asplenium* than for transferring it to *Woodsia* and selects the plant in Burser's herbarium, identified by Linnaeus as his *Polypodium fontanum*, as the lectotype.

872/6c. NITELLA MUCRONATA Miq. var. **heteromorpha** Kützing. Characterized by the fertile whorls forming dense heads, whereas in the normal form the growth is uniformly lax. 14, E. Sussex; reservoir at Scolescombe, near Hastings, August 1937, D. F. Leney ex Allen (1938: 49).

876/16. **Chara globularis** Thuill. This name is adopted in place of *C. fragilis* Desv. by Allen (1938: 50).

PLANT RECORDS.

*=New vice-county record. †=Not native in this locality.

Note.—Where these signs are used at the beginning of a paragraph containing more than one record, they refer to the first record only.

In the case of direct contributions, the name of the contributor is printed in small capitals. In the case of records which are Abstracts, the author's name and date, or the date alone, are enclosed in brackets. In every case where no date is printed, it is to be understood that the record refers to 1938.

1/1. CLEMATIS VITALBA L. 13, W. Sussex; Lodsworth and S. Ambersham, hedges on sandy soil, E. C. WALLACE.

†4/1. ADONIS ANNUA L. 61, S.E. Yorks.; Wilson (1938: 4): add to *C.F.* and see Robinson, *Fl. E. Riding Yorks.*, 58, 1902, for previous record.

6/24. RANUNCULUS HETEROPHYLLUS Weber. 39, Staffs.; Alton, R. W. BUTCHER.

*6/27. RANUNCULUS SPHAEROSPERMUS Boiss. & Blanch. 8, S. Wilts.; Teffont Magna, J. D. GROSE, det. R. W. BUTCHER.

6/33e. RANUNCULUS FICARIA L. var. BULBIFERA Marsden-Jones. 11, S. Hants.; lane N. of Whitedell Farm, Fareham, P. M. HALL. 36, Hereford; Colwall, locally plentiful in several places, F. M. DAY.

†10/1. ERANTHIS HYEMALIS (L.) Salisb. 26, W. Sussex; Boxted, locally abundant in a wood, A. E. ELLIS.

†13/3. DELPHINIUM GAYANUM Wilmott. 61, S.E. Yorks.; Kelsey Hill, Burstwick, 1936, H. J. Davis: King George Dock, Hull, 1932-1935, A. K. Wilson (Wilson; 1938: 4, as *D. Ajacis* L.); add to *C.F.* and see Robinson, *Fl. E. Riding Yorks.*, 61, 1902, for previous record.

21/5. PAPAVER ARGEMONE L. 30, Beds.; Bromham, J. G. DONY.

*†22/1. MECONOPSIS CAMBRICA (L.) Vig. 78, Peebles; naturalized by the Newhall Burn, P. M. HALL.

*†24/1. ROEMERIA HYBRIDA (L.) DC. 61, S.E. Yorks.; Hull Docks [probably *c.* 1902], C. Waterfall ex Wilson (1938: 5).

†25/1. CHELIDONIUM MAJUS L. 43, Radnor; lane, Gladestry, W. H. HARDAKER.

†28/1b. ESCHSCHOLTZIA CALIFORNICA Cham. var. **crocea** (Benth.) Jepson, *Fl. Calif., 1,* 570 (1922). Alien, California. 41, Glamorgan; Cardiff, R. L. SMITH and A. E. WADE, see p. 74 below.

*31/1. CORYDALIS CLAVICULATA (L.) DC. 8, S. Wilts.; Castle Wood, Gasper, Stourton, J. D. GROSE.

32. FUMARIA L. Determined by H. W. PUGSLEY.

32/1b. FUMARIA CAPREOLATA L. var. BABINGTONII Pugsl. 5, S. Somerset; Doniford, near Watchet, A. E. ELLIS and J. R. PARSONS.

32/5. FUMARIA BORAEI Jord. 36, Hereford; field between road and the Leech Pool, Clifford, P. M. HALL.

32/8. FUMARIA MARTINII Clav. 17, Surrey; Kingswood, near Chipstead, A. E. ELLIS. [Add to *C.F.*: see *B.E.C. 1914 Rep., 114* (1915) and Salmon, *Fl. Surrey*, 118 (1931) for previous Surrey records.—ED.]

*32/9. FUMARIA BASTARDI Jord. 23, Oxon.; Kidlington, N. E. G. CRUTTWELL.

32/10d. FUMARIA OFFICINALIS L. var. WIRTGENII Hausskn. 17, Surrey; Epsom College farm, A. E. ELLIS. 30, Beds.; Leagrave, J. G. DONY.

*†32/11. FUMARIA MICRANTHA Lag. 61, S.E. Yorks.; Hull Docks, 1902, C. Waterfall ex Wilson (1938: 5) [not det. H. W. Pugsley].

†33/2. MATTHIOLA SINUATA R. Br. 61, S.E. Yorks.; Wilson (1938: 5): add to *C.F.* and see Robinson, *Fl. E. Riding Yorks.*, 64, 1902, for previous record.

†33/6. MATTHIOLA OXYCERAS DC. 3, S. Devon; Churston Ferrers, Galmpton, G. T. FRASER.

35/2. RORIPPA SYLVESTRIS (L.) Smith. 27, E. Norfolk; Abbot's Hall, Aylsham, A. E. ELLIS. 37, Worcs.; waste ground near Kidderminster, W. H. HARDAKER. 42, Brecon; Afon Llynfi, N. of Three Cocks Junction, P. M. HALL and E. C. WALLACE. *82, E. Lothian; Longniddry, Miss W. WILKINSON.

35/4. RORIPPA ISLANDICA (Oeder) Schinz & Thell. 17, Surrey; Epsom sewage farm, A. E. ELLIS.

*†36/2. BARBAREA VERNA Aschers. 38, Warwick; roadside, Gray's Mellory, J. P. M. BRENAN and J. F. G. CHAPPLE.

†36/5. BARBAREA INTERMEDIA Bor. 15, E. Kent; field near Harty Church, Sheppey, J. E. LOUSLEY. *†61, S.E. Yorks.; Hull Docks, 1903, C. Waterfall ex Wilson (1938: 5).

†42/6. ALYSSUM ALYSSOIDES L. 11, S. Hants.; S. Hayling, introduced with shoddy, J. STALEY, comm. P. M. HALL.

†42/9. BERTEROA INCANA (L.) DC. 28, W. Norfolk; near Stanford's Belt, Thetford, 1936, A. E. ELLIS.

*43/4. DRABA MURALIS L. 55, Rutland; old walls, Glaston, 1933, S. A. TAYLOR. *59, S. Lancs.; Walton, 1811, J. Shepherd ex Stansfield (1938: 15).

†49/2. SISYMBRIUM SOPHIA L. 65, N.W. Yorks.; Tanfield Mill, Miss C. M. ROB.

†49/4. SISYMBRIUM ORIENTALE L. 11, S. Hants.; S. Hayling, introduced with shoddy, J. STALEY, comm. P. M. HALL. †17, Surrey; Epsom, waste ground on sewage farm, A. E. ELLIS. †23, Oxon.; Burford, J. P. M. BRENAN. †25, E. Suffolk; Felixstowe Docks, Miss W. WILKINSON. †36, Hereford; Lower Vinesend, Cradley, F. M. DAY.

†49/5. SISYMBRIUM IRIO L. 61, S.E. Yorks.; Hull Docks, 1902, C. Waterfall ex Wilson (1938: 6): add to *C.F.* and see *B.E.C. 1918 Rep.*, 368, 1919, for previous record.

49/6b. SISYMBRIUM OFFICINALE (L.) Scop. var. LEIOCARPUM DC. 3, S. Devon; Elbury Farm, Churston Ferrers, F. M. DAY.

†52/1. CAMELINA SATIVA Crantz. 16, W. Kent; Chiselhurst, 1874, HB. EPSOM COLL., comm. A. E. ELLIS. [Add †15 and †16 to *C.F.*, see Hanbury and Marshall, *Fl. Kent*, 36 (1899).—ED.] †61, S.E. Yorks.; Wilson (1938: 6): add to *C.F.* and see Robinson, *Fl. E. Riding Yorks.*, 68, 1902, for previous record.

*†54/1. BRASSICA OLERACEA L. 61, S.E. Yorks.; Hull Docks, 1933, A. K. Wilson (1938: 7).

*†54/13. SINAPIS NIGRA L. 61, S.E. Yorks.; King George Dock, Hull, 1934, A. K. Wilson (1938: 7).

†54/16. BRASSICA JUNCEA Coss. 37, Worcs.; Puxton tip, Kidderminster, W. H. HARDAKER.

55/1. DIPLOTAXIS TENUIFOLIA (L.) DC. 54, N. Lincs.; Immingham Docks, H. B. WILLOUGHBY SMITH.

55/2b. DIPLOTAXIS MURALIS (L.) DC. var. CAULESCENS Kittel. 41, Glamorgan; shore near Sker, Miss E. VACHELL.

†55/3. DIPLOTAXIS ERUCOIDES (L.) DC. 39, Staffs.; Burton-on-Trent, R. C. L. BURGES and J. F. G. CHAPPLE.

*†61/3. LEPIDIUM DRABA L. 9, Dorset; common on Weymouth backwater and other waste places, Miss V. M. LEATHER. †30, Beds.; Marslets, J. G. DONY. †61, S.E. Yorks.; Wilson (1938: 7): add to *C.F.* and see Robinson, *Fl. E. Riding Yorks.*, 70, 1902, for previous record.

†61/8. LEPIDIUM PERFOLIATUM L. 25, E. Suffolk; Felixstowe Docks, J. E. LOUSLEY.

†61/28. LEPIDIUM BONARIENSE L. 37, Worcs.; Puxton tip, Kidderminster, W. H. HARDAKER.

*64/4. THLASPI CALAMINARE Lej. & Court. 104, Rhum; in some quantity in two distinct stations in the mountains in the west of the island: when collected it was at once referred to this species but, when recorded in *Journ. Bot.*, *77*, 5 (January 1939), it was assigned to the aggregate *T. alpestre* L.: Dr R. W. Butcher has confirmed the original determination.—W. A. CLARK.

†73/1. EUCLIDIUM SYRIACUM (L.) R. Br. 34, W. Gloucester; casual, Avonmouth Docks, new to the Bristol alien flora, Mrs C. I. and N. Y. SANDWITH.

†74/2. BUNIAS ORIENTALIS L. 39, Staffs.; Burton-on-Trent, R. C. L. BURGES.

†87(2). **Cistus** L., *Sp. Pl.*, 523 (1753); *Gen. Pl.*, ed. 5, 234 (1754).
†87(2)/1. **Cistus salviifolius** L., *Sp. Pl.*, 524 (1753). 3, S. Devon; one bush on roadside bank, near Newton Abbot, L. A. W. BURDER, det. KEW.

88. VIOLA L. Determined by P. M. HALL.

88/3c. VIOLA SYLVESTRIS Lam. var. LEUCANTHA Čelak. 36, Hereford; Purlieu Lane, Colwall, F. M. DAY.

88/4b. VIOLA RIVINIANA Reichb. var. DIVERSA Greg. 36, Hereford; Tarrington Common (very near f. *minor* Murb.—P.M.H.), F. M. DAY.

88/4c. VIOLA RIVINIANA Reichb. forma MINOR Murb. 37, Worcester; Kempsey Common, F. M. DAY.

88/6×4. VIOLA CANINA L. × RIVINIANA Reichb. 9, Dorset; Maiden Castle, S. A. TAYLOR. 36, Hereford; Tarrington Common, F. M. DAY.

88/8g. VIOLA ODORATA L. var. SULFUREA (Cariot) Rouy & Foucaud. 36, Hereford; The Winnings garden, Colwall, F. M. DAY. [First found many years ago and recently rediscovered: there is no record of its having been planted.—F.M.D.]

92/3. DIANTHUS ARMERIA L. 6, N. Somerset; walls of Bruton Churchyard, F. K. MAKINS. [Add to *C.F.*: see *Top. Bot.*, *Supp. 1*, for previous record.—ED.]. 9, Dorset; near Wool, R. GOOD.

†108/1. CLAYTONIA ALSINOIDES Sims. 41, Glamorgan; plantation at St Fagan's, well established, Miss WILKINSON, comm. Miss E. VACHELL. *†61, S.E. Yorks.; Birdsall House, 1933, R. D'O. Good ex Wilson (1938: 9, as *C. sibirica* L.).

†108/2. CLAYTONIA PERFOLIATA Donn. 61, S.E. Yorks.; Wilson (1938: 9): add to *C.F.* and see Robinson, *Fl. E. Riding Yorks.*, 79, 1902, for previous record. *†74, Wigtown; near Ardwell Mill, Stonykirk, W. A. P. SPROTT.

†112/3. HYPERICUM HIRCINUM L. 11, S. Hants.; lane, Fritham, Mrs R. C. ASHBY: hedge near Lymore, Lady DAVY and Mrs J. V. PHELPS.

†115/3. ALTHAEA ROSEA L. 17, Surrey; Epsom, casual on sewage farm, A. E. ELLIS.

†116/2. LAVATERA CRETICA L. 61, S.E. Yorks.; Wilson (1938: 9): add to *C.F.* and see Robinson, *Fl. E. Riding Yorks.*, 81, 1902, for previous record.

†116/10. LAVATERA PUNCTATA All. 39, Staffs.; Burton-on-Trent, R. C. L. BURGES and J. F. G. CHAPPLE.

†125/1. LINUM ANGUSTIFOLIUM Huds. 7, N. Wilts.; casual, Old Swindon, J. D. GROSE. [Add to *C.F.*; see *Marlb. Coll. N.H.S. 1894 Rep.* for previous record as *L. bienne* Mill. Also add to *C.F.* †8, S. Wilts.; see Preston, *Fl. Wilts.*, 60, 1888.—J.D.G.]

127/1. GERANIUM SANGUINEUM L. Whilst investigating recently the flora of Coll (103), I rediscovered this plant in the original station mentioned by MacCulloch (1818) in his "Description of the Western Islands of Scotland." In connection with this record, it should be noted that in Vol. I, p. 140, of the same work he reports the species as occurring on the Machair of N. Uist. Obviously, as he correctly recorded and described the species from Coll, there can be no misidentification in this case. Thus we have to recognise what, in view of the neglect of this reference of MacCulloch's, is practically a N.C.R. of *G. sanguineum* L. for v.-c. 110.—W. A. CLARK.

*†127/2. GERANIUM VERSICOLOR L. 36, Hereford; lane near Kinnersley Castle, W. H. HARDAKER.

†127/5. GERANIUM PHAEUM L. 73, Kirkcudbright; roadside 8½ m. W. of Dumfries, W. A. P. SPROTT.

*†127/6. GERANIUM ENDRESSI Gay. 23, Oxon.; damp spinney, Heythrop, Lady ROCHE. *†37, Worcs.; verge of Hagley Wood between Halesowen and Hagley, W. H. HARDAKER.

127/8. GERANIUM COLUMBINUM L. 23, Oxon.; a very rampant and straggling form near Chadlington, Lady ROCHE.

127/11. GERANIUM ROTUNDIFOLIUM L. 23, Oxon.; allotments, Stonesfield, R. C. L. BURGES.

127/13. GERANIUM LUCIDUM L. 92, S. Aberdeen; Craig Leek, Braemar, at 1500 ft., J. G. ROGER, comm. C. LEIGHTON HARE.

*†133/3. IMPATIENS PARVIFLORA DC. 27, E. Norfolk; garden weed, Abbot's Hall, Aylsham, A. E. ELLIS. †37, Worcs.; near Bewdley, W. H. HARDAKER. [Add 37 to *C.F.*: see *B.E.C. 1923 Rep.*, 179 (1924), for earlier record.—ED.]

*†133/4. IMPATIENS GLANDULIFERA Royle. 95, Moray; banks of R. Lossie, Arthur's Bridge, Lossiemouth, J. E. LOUSLEY, R. C. L. BURGES and J. W. CARDEW.

†142/3. ACER PLATANOIDES L. 17, Surrey; Leatherhead Downs, naturalized in plantations and hedges, many self-sown young trees, A. E. ELLIS.

†152/14. TRIGONELLA ARABICA Delile. 39, Staffs.; Burton-on-Trent, R. C. L. BURGES and J. F. G. CHAPPLE.

†153/1. MEDICAGO FALCATA L. 25, E. Suffolk; Felixstowe Docks, J. E. LOUSLEY: Miss W. WILKINSON.

†153/8. ×MEDICAGO VARIA Martyn. 25, E. Suffolk; Felixstowe Docks, in numerous colour forms, J. E. LOUSLEY.

†153/19. MEDICAGO TUBERCULATA Willd. 39, Staffs.; Burton-on-Trent, R. C. L. BURGES and J. F. G. CHAPPLE.

*155/8. TRIFOLIUM SQUAMOSUM L. 59, S. Lancs.; North Shore, Liverpool, 1811, J. Shepherd ex Stansfield (1938: 15).

†155/34b. TRIFOLIUM ECHINATUM M. Bieb. var. **resupinatum** (Schinz & Keller) Aschers. & Graebn. 9, Dorset; replanted wood by north lodge of Sherborne Park, 1937, R. D'O. GOOD, det. KEW.

†160/6. LOTUS TENUIS (L.) Waldst. & Kit. 54, N. Lincs.; Immingham Docks, H. B. WILLOUGHBY-SMITH.

†163/1. GALEGA OFFICINALIS L. 41, Glamorgan; riverside near St Fagan's, Hon. G. CHARTERIS.

†169/2. SCORPIURUS SUBVILLOSUS L. 39, Staffs.; Burton-on-Trent, R. C. L. BURGES and J. F. G. CHAPPLE.

†169/4b. **Scorpiurus muricatus** L., *Sp. Pl.*, 745 (1753) var. **laevigatus** (Sibth. & Smith) Boiss. Reg. Medit. 39, Staffs.; Burton-on-Trent, R. C. L. BURGES and J. F. G. CHAPPLE.

†172/3. HIPPOCREPIS UNISILIQUOSA L. 39, Staffs.; Burton-on-Trent, R. C. L. BURGES and J. F. G. CHAPPLE.

†173/3. ONOBRYCHIS CAPUT-GALLI Lam. 39, Staffs.; Burton-on-Trent, R. C. L. BURGES and J. F. G. CHAPPLE.

†174(2)/1. ARACHIS HYPOGAEA L. 16, W. Kent; High Brooms Tip, J. P. M. BRENAN and N. D. SIMPSON.

†176/6. VICIA DASYCARPA Ten. 39, Staffs.; Burton-on-Trent, R. C. L. BURGES and J. F. G. CHAPPLE.

†176/9. VICIA LUTEA L. 41, Glamorgan; Roath, Cardiff, Miss E. VACHELL. *†61, S.E. Yorks.; Hull Docks [probably *c.* 1902], C. Waterfall ex Wilson (1938: 11).

†176/21. VICIA CALCARATA Desf. 39, Staffs.; Burton-on-Trent, R. C. L. BURGES and J. F. G. CHAPPLE.

176/33(3). **Vicia eriocarpa** (Hausskn.) Halácsy, *Consp. Fl. Graec.*, *1*, 489 (1900). Alien, S.E. Europe. 41, Glamorgan; Cardiff, R. L. SMITH and A. E. WADE, det. KEW (see p. 77 below.—ED.).

†178/1. LATHYRUS LATIFOLIUS L. 17, Surrey; Epsom, waste ground on sewage farm, A. E. ELLIS. *†61, S.E. Yorks.; Hull Docks [probably *c.* 1902], C. Waterfall ex Wilson (1938: 11).

*†178/3. LATHYRUS TUBEROSUS L. 9, Dorset; cornfield, Dorchester, Miss ANGLE, comm. Miss V. M. LEATHER.

†178/17. LATHYRUS ANNUUS L. 39, Staffs.; Burton-on-Trent, R. C. L. BURGES and J. F. G. CHAPPLE.

†180/3. PISUM HUMILE Boiss. & Noë. 39, Staffs.; Burton-on-Trent, R. C. L. BURGES and J. F. G. CHAPPLE.

*†183/4. PRUNUS CERASUS L. 100, Arran; 9 small trees among Ash, Alder, etc., between road and stream near Lamlash village: status doubtful, known here for at least 30 years but thought not to have been planted: fruit produced very sparingly: flowering freely in May 1937, R. MACKECHNIE.

*†184/10. SPIRAEA SALICIFOLIA L. 92, S. Aberdeen; near Aberdeen, Miss KERR, comm. A. H. WOLLEY-DOD.

†185/38. RUBUS LACINIATUS Willd. 30, Beds.; Clophill, J. G. DONY. 88, Mid Perth; naturalized near Lochearnhead, Miss M. STEWART, comm. Miss U. K. DUNCAN.

185/67. RUBUS VESTITUS Weihe. 57, Derby; Via Gellia, S. A. TAYLOR, det. WM. WATSON.

185/112. RUBUS PALLIDUS Weihe. 55, Rutland; Empingham Woods, S. A. TAYLOR, det. WM. WATSON.

†189/4. POTENTILLA ARGENTEA L. 61, S.E. Yorks.; Wilson (1938: 12): add to *C.F.* and see Robinson, *Fl. E. Riding Yorks.*, 99, 1902, for previous record.

189/5. POTENTILLA CRANTZII Beck. 92, S. Aberdeen; on the S. side of Graig Mhor (1 mile N. of Balmoral Castle), at 1000-1100 ft., J. G. ROGER, comm. C. LEIGHTON HARE.

†189/17. POTENTILLA INTERMEDIA L. 9, Dorset; Weymouth railway yards, 1934, N. D. SIMPSON. 82, E. Lothian; Longniddry, Miss W. WILKINSON.

190. ALCHEMILLA L. Determined by A. J. WILMOTT except where indicated.

*190/2. ALCHEMILLA PRATENSIS Schmidt. 49, Caernarvon; on made earth of an artificial conduit which brings water from Llyn Cowlyd for the power station at Dolgarrog, Conway Valley, May 1925, C. RAYMOND BAKER. 62, N.E. Yorks.; Low Horcum, P. M. HALL and W. A. SLEDGE. 75, Ayr; near Woodland, 1937, A. J. WILMOTT. 94, Banff; Birchfield, Glen Avon, E. F. WARBURG. *96, Easterness; banks of Spey, Aviemore, 1922, C. E. SALMON, det. JAQUET (1924): Larig Ghru and near South Kinrara, near Aviemore, E. F. WARBURG. *104, N. Ebudes; near Flodigarry, Skye, 1936, A. J. WILMOTT. H.33, Fermanagh; N. of Drumcose: H.34, E. Donegal; limestone pasture near Ballintra, E. F. WARBURG. [IRISH RECORDS. *C.F.* gives only H.39, Antrim, but Praeger (1934: 506) gives H.9, 15, 17, 18, 21-25, 27-31, 33, 34, 36, 38, 39.—ED.]

190/4. ALCHEMILLA MINOR Huds. 104, N. Ebudes; Quiraing, Skye, 1936, A. J. WILMOTT; Raasay, 1937, R. B. COOKE. *109, Caithness; Latheron, 1935, A. J. WILMOTT.

*190/10. ALCHEMILLA GLOMERULANS Buser. 93, N. Aberdeen; near the river between Edinglassie and Huntly, A. H. G. ALSTON. *97, Westerness; Mam Sodhail range, 1936, A. J. WILMOTT.

191/2. AGRIMONIA ODORATA Mill. 36, Hereford; Limbridge Hill Wood, F. M. DAY. *78, Peebles; between road and R. Tweed opposite Cardrona, P. M. HALL and W. A. SLEDGE.

†193/5. POTERIUM CANADENSE A. Gray. 88, Mid Perth; bed of R. Tay, Taymouth Castle, CARLETON REA. 89, E. Perth; left bank of R. Tay below Perth, Miss C. M. ROB.

*194/23. ROSA SPINOSISSIMA L. 8, S. Wilts.; Lavington Sands, J. D. GROSE.

†195/9. SORBUS INTERMEDIA (Ehrh.) Pers. 61, S.E. Yorks.; Wilson (1938: 12): add to *C.F.* and see Robinson, *Fl. E. Riding Yorks.*, 102, 1902, for previous record.

†211/8. SEDUM MICRANTHUM Bast. 41, Glamorgan; grass sward on outcrop of limestone, Cwm Alum, near Bridgend, in fair abundance: this plant was recorded from this habitat by Principal Trow in the *Flora of Glamorgan*, as "looking like a native and certainly so different from *S. album* as to merit specific rank," and in this habitat deserves more notice than it has received.—Miss E. VACHELL.

216/3b. MYRIOPHYLLUM VERTICILLATUM L. var. PECTINATUM (DC.). 27, E. Norfolk; Buckenham, A. E. ELLIS.

220. EPILOBIUM L. Determined by G. M. ASH.

220/3×10. EPILOBIUM HIRSUTUM L. × MONTANUM L. 16, W. Kent; Tonbridge, J. P. M. BRENAN.

*†220/6. EPILOBIUM LAMYI F. Schultz. 61, S.E. Yorks.; King George's Dock, Hull, 1937, Miss C. M. ROB.

†220/7(2). EPILOBIUM ADENOCAULON Hausskn. 16, W. Kent; Tonbridge, J. P. M. BRENAN. [This restores the record for v.-c. 16, the previous record having been cancelled in *B.E.C. 1937 Rep.*, 479 (1938). —ED.] †17, Surrey; bank of R. Wey, Pyrford: Epsom, sewage farm, A. E. ELLIS. †23, Oxon.; two plants in a gravel-pit, Cassington, J. F. G. CHAPPLE.

220/9. EPILOBIUM LANCEOLATUM Seb. & Maur. 15, E. Kent; sandpit, Aylesford, J. P. M. BRENAN and N. D. SIMPSON. 17, Surrey; near Marepond Farm, Hascombe, A. E. ELLIS.

†223(2). **Godetia** Spach, *Hist. Vég. Phan.*, *4*, 386 (1835).

†223(2)/1. **Godetia viminea** Spach, *op. cit.*, 388. Alien, California. 41, Glamorgan; Cardiff, R. L. SMITH and A. E. WADE, see p. 78 below.

†224(3). **Lopezia** Cav., *Ic.*, *1*, 12 (1791).

†224(3)/1. **Lopezia coronata** Andr., *Bot. Rep.*, *8*, *t.* 551 (1808). Native of Mexico. 23, Oxon.; Jackdaw Lane, Oxford, J. P. M. BRENAN.

*245/3. BUPLEURUM ROTUNDIFOLIUM L. 53, S. Lincs.; cornfield near Monk's Wood, Carlby, Mrs C. L. WILDE.

†245/4. BUPLEURUM OPACUM Lange. 61, S.E. Yorks.; Wilson (1938: 13): add to *C.F.* and see Robinson, *Fl. E. Riding Yorks.*, 111, 1902, for previous record.

†245/6. BUPLEURUM LANCIFOLIUM Hornem. 23, Oxon.; garden weed, Headington, Mrs BLACKBURN.

*248/1. CICUTA VIROSA L. 59, S. Lancs.; Allerton, 1822, J. Shepherd ex Stansfield (1938: 14).

†249/1. AMMI MAJUS L. 17, Surrey; among lucerne in orchard, Epsom College, 1933, A. E. ELLIS.

*†250/3. PETROSELINUM CRISPUM (Mill.) Airy-Shaw. 61, S.E. Yorks.; Wilson (1938: 14).

†252/1. FALCARIA VULGARIS Bernh. 23, Oxon.; near Chadlington, Lady ROCHE. †38, Warwick; pasture, Wilmcote, near Stratford, W. H. HARDAKER.

253/2. SIUM ERECTUM Huds. 30, Beds.; Bromham, J. G. DONY.

†263/1. FOENICULUM VULGARE Mill. 61, S.E. Yorks.; Wilson (1938: 14): add to *C.F.* and see Robinson, *Fl. E. Riding Yorks.*, 114, 1902, for previous record.

†278/2. TORDYLIUM AEGYPTIACUM Lam. 34, W. Gloucester; casual, Avonmouth Docks, new to the Bristol alien flora, Mrs C. I. and N. Y. SANDWITH.

†279/1. CORIANDRUM SATIVUM L. Add 61, S.E. Yorks. to distribution recorded in *B.E.C. 1936 Rep.*, 258-259 (1937); see Wilson (1938: 14) and Robinson, *Fl. E. Riding Yorks.*, 116, 1902.

†283/1. CAUCALIS HETEROPHYLLA L. 39, Staffs.; Burton-on-Trent, R. C. L. BURGES and J. F. G. CHAPPLE.

†283/2b. CAUCALIS DAUCOIDES L. var. MURICATA (Bisch.) Gren. & Godr. 34, W. Gloucester; several plants among the typical form at Avonmouth Docks, Mrs C. I. and N. Y. SANDWITH. [For notes on this variety and its previous occurrence near Avonmouth see *B.E.C. 1925 Rep.*, 772-774 (1926).—N.Y.S.]

283/5b. CAUCALIS NODOSA (L.) Scop. var. PEDUNCULATA (Rouy & Fouc.) Druce. 6, N. Somerset; Uphill, J. P. M. BRENAN.

†283/8. CAUCALIS LATIFOLIA L. 61, S.E. Yorks.; Wilson (1938: 14): add to *C.F.* and see Robinson, *Fl. E. Riding Yorks.*, 116, 1902, for previous record.

287/3. SAMBUCUS EBULUS L. 36, Hereford; Ledbury, in great plenty in the field next to the rubbish-tip, F. M. DAY.

287/2e. SAMBUCUS NIGRA L. var. VIRIDIS Ait. (=var. *leucocarpa* Koch). 63, S.W. Yorks.; one plant in an Elder hedge at Horbury, 1915: the berries remain green until ripe, when they turn white like white currants, P. H. COOKE.

296/2×9. GALIUM MOLLUGO L. × VERUM L. 38, Warwick; between Wilmcote and Billesley, W. H. HARDAKER.

296/8. GALIUM DEBILE Desv. Britton (1938) accepts records of this species from 3, 11 and Jersey only.

*†296/12b. GALIUM VAILLANTII DC. 61, S.E. Yorks.; Hull Docks [probably *c.* 1902], C. Waterfall ex Wilson (1938: 15).

†301/4. VALERIANA PYRENAICA L. 39, Staffs.; in wood by stream, Oakamoor, R. W. BUTCHER.

304/1b. VALERIANELLA OLITORIA Poll. var. LASIOCARPA Reichb. 41, Glamorgan; near Sker, 1937, Miss RAWLINS, det. and comm. Miss E. VACHELL.

*†304/2. VALERIANELLA ERIOCARPA Desv. 61, S.E. Yorks.; Hull Docks [probably *c.* 1902], C. Waterfall ex Wilson (1938: 15).

†307/3. **Cephalaria elata** (Hornem.) Schrad. ex Roem. & Schultes, *Syst.*, *3*, 51 (1818). 61, S.E. Yorks.; roadside between South Cave and Elloughton, 1937, A. N. Peak ex Wilson (1938: 15). [Mr B. L. Burtt of Kew informs me that the name formerly used for this plant—*C. tatarica* (L.) Schrad.—is invalid, being based on *Scabiosa tatarica* L., which is a species of *Knautia*.—ED.]

308/5b. SCABIOSA ARVENSIS L. var. INTEGRIFOLIA Coulter. 64, Mid West Yorks.; Wharfedale, A. TURNER.

320/2. ERIGERON ACRIS L. 8, S. Wilts.; masonry of canal-lock, W. of Crofton, P. M. HALL, J. D. GROSE and E. C. WALLACE. 17, Surrey; Cheam, walls at Nonsuch Park: a scarce plant in N. Surrey away from the chalk downs, E. C. WALLACE. 67, S. Northumberland; Amble, plentiful in disused shipyard, M. E. Urton (*Vasc.*, *24*, No. 1, 34).

†320/3. ERIGERON CANADENSIS L. 25, E. Suffolk; plentiful as a weed, Southwold and Beccles, F. M. DAY. *†56, Notts.; clover field S. of Gainsborough, J. F. G. CHAPPLE and N. D. SIMPSON.

*326/1. ANTENNARIA DIOICA (L.) Gaertn. 7, N. Wilts.; Morgan's Hill, Calstone Wellington, near Calne, Miss M. HORSELL, Miss E. S. TODD and J. D. GROSE.

†339/4. AMBROSIA TRIFIDA L. 17, Surrey; waste ground, Clandon crossroads, E. C. WALLACE and A. L. STILL. †69, N. Lancs.; chicken run, Ash House, Broughton-in-Furness, Hon. M. CROSS.

†339/4b. AMBROSIA TRIFIDA L. var. INTEGRIFOLIA (Willd.) Torr. & Gray. 62, N.E. Yorks.; Topcliffe Mill, Miss C. M. ROB.

†341/3. XANTHIUM SPINOSUM L. 11, S. Hants.; S. Hayling, introduced with shoddy, J. STALEY, comm. P. M. HALL. †25, E. Suffolk; Felixstowe Docks, J. E. LOUSLEY.

†354/1. GALINSOGA PARVIFLORA Cav. 37, Worcs.; Broadwater tip, Kidderminster, W. H. HARDAKER.

†354/2b. **Galinsoga quadriradiata** Ruiz & Pav., *Syst. Veg.*, 198 (1798) var. **hispida** (DC.) Thell., "Über die in Mitteleuropa verkommenden Galinzoga formen" in *Allgem. Bot. Zeitschrift*, *21*, 1-16 (1915); Hegi, *Ill. Fl. v. Mittel-Europa*, Band VI, 523 (1918); Mosseray, *Bull. du Jard. Bot. de l'Etat, Bruxelles*, *14*, fasc. 3, 324-327 (1937). *G. aristulata* Bickn., *Bull. Torrey Bot. Club*, 270 (1916). Also forma **Vargasiana** (Thell.) Mossery, *loc. cit.* Aliens, S. Amer., from Mexico to Chile. For records in Britain see p. 94 below.

†365/11(2). **Achillea alpina** L., *Sp. Pl.*, 899 (1753). Russia. 61, S.E. Yorks.; King George Dock, Hull, 1934, A. K. Wilson (1938: 16).

378/1. ARTEMISIA ABSINTHIUM L. 39, Staffs.; Oakamoor, R. W. BUTCHER.

†378/20. **Artemisia macrantha** Ledeb., *Mém. Acad. Pétersb.*, *5*, 573 (1805). Siberia. 61, S.E. Yorks.; King George Dock, Hull, 1936, A. K. Wilson (1938: 17).

†380/2. PETASITES ALBUS (L.) Gaertn. 39, Staffs.; in wood by stream, Oakamoor, R. W. BUTCHER.

†380/3. PETASITES FRAGRANS Presl. 16, W. Kent; near the Church, Lamberhurst, L. R. WALLIS.

†383/7. SENECIO SQUALIDUS L. 34, W. Gloucester; Avonmouth Docks, a form with the heads either rayless or with extremely short obscure rays, unmatched in the national herbaria, Mrs C. I. and N. Y. SANDWITH. *†36, Hereford; railway station yard, Colwall, F. M. DAY. [This is the first record for this species immediately to the west of the Malvern Hills: hitherto it has failed to penetrate the Tunnel.—F.M.D.] *†61, S.E. Yorks.; Hull Docks, from 1926, Wilson (1938: 17).

†383/8. SENECIO VISCOSUS L. 11, S. Hants.; railway embankment, between 4 and 5 miles south of Winchester, increasing, Miss F. C. BROMET, comm. P. M. HALL. †16, W. Kent; roadside between Lamber-

hurst and Pembury, 1936-7, L. R. WALLIS. †17, Surrey; Epsom, waste ground on sewage farm, A. E. ELLIS. 25, E. Suffolk; sandy places on coast, Walberswick Marsh, 1933, F. M. DAY. †37, Worcs.; Broadwater tip, Kidderminster, W. H. HARDAKER.

†383/10e. SENECIO VULGARIS L. var. RADIATUS Trow. 37, Worcs.; Hoo Brook tip, Kidderminster, W. H. HARDAKER.

†383/23. SENECIO INAEQUIDENS DC. 37, Worcs.; turnip field, Hartlebury, W. H. HARDAKER.

†385/1. CALENDULA OFFICINALIS L. 17, Surrey; Epsom, casual on sewage farm, A. E. ELLIS.

†389/2. ECHINOPS RITRO L. 17, Surrey; Epsom, casual on sewage farm, A. E. ELLIS.

396/1b. CIRSIUM ERIOPHORUM (L.) Scop. var. BRITANNICUM Petrak. 30, Beds.; Chambers Odell, J. G. DONY.

396/3. CIRSIUM HELENIOIDES (L.) Hill. 80, Roxburgh; foot of Minto Crags, Miss P. LEAKE.

†397/1. ONOPORDON ACANTHIUM L. 30, Beds.; Barton, J. G. DONY.

†399/1. SILYBUM MARIANUM Gaertn. 37, Worcester; Castlemorton, F. M. DAY. [Add to *C.F.*: see Amphlett and Rea, *Fl. Worcs*,. 213 (1909) for previous record.—ED.]

401/1. SAUSSUREA ALPINA (L.) DC. 97, W. Inverness; Coire Leis, Ben Nevis, very sparingly at head of corrie, E. C. WALLACE.

†405/15. CENTAUREA CALCITRAPA L. 61, S.E. Yorks.; Wilson (1938: 18): add to *C.F.* and see Robinson, *Fl. E. Riding Yorks.*, 133, 1902, for previous record.

†405/20. **Centaurea cheiranthifolia** Willd., *Phytog.*, 12 (1794). *C. axillaris* Willd., *Sp. Pl.*, *3*, 2290 (1804). Caucasus. 61, S.E. Yorks.; Kelsey Hill, Burstwick, 1935, F. Singleton ex Wilson (1938: 18).

†405/31. CENTAUREA SOLSTITIALIS L. 25, E. Suffolk; Felixstowe Docks, Miss W. WILKINSON. †54, N. Lincs.; Blyton, H. B. WILLOUGHBY-SMITH.

†405/32. CENTAUREA MELITENSIS L. 65, N.W. Yorks.; Tanfield Mill, Miss C. M. ROB.

†407/1. CARTHAMUS LANATUS L. 6, N. Somerset; waste ground, Bristol, 1937, Mrs C. I. SANDWITH. [A form with pure white flowers, matching *Sintenis* No. 1957, from the Transcaspian region, in Hb. Kew. Apparently as yet without a name.—N. Y. SANDWITH.] †65, N.W. Yorks.; Tanfield Mill, Miss C. M. ROB.

†407/3b. CARTHAMUS TINCTORIUS L. var. INERMIS Schweinf. 16, W. Kent; Tonbridge, J. P. M. BRENAN.

†407/5. **Carthamus oxyacantha** M. Bieb., *Casp. App.*, 198 (1800); *Fl. Taur. Cauc.*, *2*, 283 (1808); Boiss., *Fl. Orient.*, *3*, 709 (1875). Alien, Orient: has occurred as an adventive at Port Juvenal, France. 34, W. Gloucester; casual, Avonmouth Docks, Mrs C. I. SANDWITH.

410/1. ARNOSERIS MINIMA (L.) Schw. & Koerte. 12, N. Hants.; Yateley, J. B. L. STILLWELL, comm. P. M. HALL.

†412/1. RHAGADIOLUS EDULIS Gaertn. 39, Staffs.; Burton-on-Trent, R. C. L. BURGES and J. F. G. CHAPPLE.

416/3. CREPIS BIENNIS L. 17, Surrey; hayfield, Hascombe, A. E. ELLIS. 41, Glamorgan; near Bridgend, on field borders and hedgebanks in great profusion for ¼ mile on both sides of main road, usually very rare in Glamorgan, Miss E. VACHELL. 62, N.E. Yorks.; Topcliffe, Miss C. M. ROB.

*†419/7. HIERACIUM STOLONIFERUM Waldst. & Kit. 38, Warwick; railway bank, Hannington, W. H. HARDAKER.

419/179. HIERACIUM SURREJANUM Hanb. 13, W. Sussex; bank of lane near Bedham Hill, P. M. HALL and E. C. WALLACE, det. H. W. PUGSLEY.

421/1. HYPOCHAERIS GLABRA L. 12, N. Hants.; sandy field at East end of Fleet Pond, G. WATTS.

421/2c. HYPOCHAERIS RADICATA L. var. LEIOCEPHALA Regel. 6, N. Somerset; Beacon Hill, near Oakhill, J. R. PARSONS, comm. A. E. ELLIS.

†425/1. LACTUCA VIROSA L. 17, Surrey; garden weed, Balham. Epsom sewage farm, A. E. ELLIS.

†425/2. LACTUCA SERRIOLA L. 17, Surrey; Beddington Park, near Croydon: Drift Bridge, Epsom, A. E. ELLIS. *†61, S.E. Yorks.; King George Dock, Hull, 1935-1937, A. K. Wilson (1938: 18).

†428/1. TRAGOPOGON PORRIFOLIUS L. 16, W. Kent; stone crossing below Dartford, one plant, evidently from seed blown from the other bank of the Thames where it is abundant, P. H. COOKE.

†428/6. TRAGOPOGON HYBRIDUS L. 39, Staffs.; Burton-on-Trent, R. C. L. BURGES.

432/1c. JASIONE MONTANA L. var. LATIFOLIA Pugsl. H. 6, Waterford; sea-cliffs near Waterford, Mrs HUTTON, comm. Lady DAVY.

433/1. WAHLENBERGIA HEDERACEA (L.) Reichb. Former occurrences in 20, Herts. and 28, W. Norfolk are referred to by Salisbury (1938: 70).

435/2. CAMPANULA LATIFOLIA L. 28, W. Norfolk; Congham, near Hillington, A. E. ELLIS.

435/4. CAMPANULA RAPUNCULOIDES L. 38, Warwick; abundant in pastures and meadows, Wilmcote, near Stratford, W. H. HARDAKER. *97, Westerness; in a hay field on sandy soil near coast, Morar, Miss M. STEWART, comm. Miss U. K. DUNCAN.

*†435/6. CAMPANULA PERSICIFOLIA L. 61, S.E. Yorks.; introduced, East Park, Hull [probably *c.* 1902], C. Waterfall ex Wilson (1938: 18).

*†435/8. CAMPANULA PATULA L. 61, S.E. Yorks.; King George Dock, Hull, 1933, F. Singleton ex Wilson (1938: 19).

†437/1. TRACHELIUM CAERULEUM L. 54, N. Lincs.; Boston, F. T. BAKER.

†443/2. **Gaultheria procumbens** L., *Sp. Pl.*, 895 (1753). Alien, N. Amer. 97, Westerness; Glen Garry, RALSTON, det. and comm. W. B. TURRILL: "growing in an open wood, the floor of which has little vegetation and is composed of pine needles. The patch gave every indication of having been in position for several years. The site is many miles from any garden."

444/1. ANDROMEDA POLIFOLIA L. 67, S. Northumberland; Boddle Moss, G. Swan, comm. G. W. Temperley (*Vasc.*, *24*, No. 1, 34).

†446/7. ERICA VAGANS L. 61, S. Yorks.; Wilson (1938: 19): add to *C.F.* and see *B.E.C. 1923 Rep.*, 198, 1922, for previous record.

*†449/1. DABEOCIA CANTABRICA K. Koch. 11, S. Hants.; appeared spontaneously by footpath outside Ampfield Church, H. T. WHITE, comm. P. M. HALL.

453/3. PYROLA MINOR L. 80, Roxburgh; Minto, Miss P. LEAKE.

463/2b. LYSIMACHIA VULGARIS L. f. ANGUSTIFOLIA C. E. Salmon. 41, Glamorgan; Blackweir, Cardiff, Miss E. VACHELL.

†463/3. LYSIMACHIA PUNCTATA L. 12, N. Hants.; roadside near Fleet, G. WATTS.

*465/1. TRIENTALIS EUROPAEA L. 59, S. Lancs.; Formby, 1818, J. Shepherd ex Stansfield (1938: 15).

†467/2. ANAGALLIS ARVENSIS L. subsp. PHOENICEA. 39, Staffs.; Burton-on-Trent, R. C. L. BURGES and J. F. G. CHAPPLE.

468/1. CENTUNCULUS MINIMUS L. 12, N. Hants.; east end of Fleet Pond, G. WATTS.

472/1. LIGUSTRUM VULGARE L. 33, E. Gloster; Swinley Green, Forthampton, F. M. DAY.

477/1. BLACKSTONIA PERFOLIATA L. 13, W. Sussex; Shoreham (not on chalk), L. A. W. BURDER.

478/4. CENTAURIUM PULCHELLUM (Swartz) Druce. 3, S. Devon; Idestone, near Exeter, A. E. ELLIS.

480/6. GENTIANA ANGLICA Pugsl. 8, S. Wilts.; White Sheet Hill, P. M. HALL.

482/1. NYMPHOIDES PELTATUM (S. G. Gmel.) Rendle & Britten. [4, N. Devon; pond in a disused quarry two miles from Bideford, Miss L. E. RICHARDS: discovered by G. T. Fraser to have been "sown" there by a former owner.] 17, Surrey; Basingstoke Canal, W. Byfleet, A. E. ELLIS.

†489/1. HELIOTROPIUM EUROPAEUM L. 23, Oxon.; Jackdaw Lane, Oxford, J. P. M. BRENAN.

491/1. CYNOGLOSSUM OFFICINALE L. 37, Worcester; Castlemorton, F. M. DAY.

497/2. SYMPHYTUM TUBEROSUM L. 37, Worcs.; North wood between Bewdley and Ardley, rarely flowering, W. H. HARDAKER.

†497/4. SYMPHYTUM PEREGRINUM Ledeb. 28, W. Norfolk; roadside, Guist, A. E. ELLIS.

†500/1. ANCHUSA SEMPERVIRENS L. 16, W. Kent; Lamberhurst church-yard, L. R. WALLIS.

†500/2. ANCHUSA OFFICINALIS L. 25, E. Suffolk; roadside, Wenhaston (garden escape), F. M. DAY.

506/1e. MYOSOTIS SCORPIOIDES L. em. Hill var. LAXIFLORA (Reichb.). 16, W. Kent; by a backwater of the Teise, J. R. WALLIS, det. A. E. WADE, who says: "I have seen Reichenbach's specimens, which suggest that this is little more than a form of var. *memor* Kittel."

*506/2. MYOSOTIS BREVIFOLIA C. E. Salmon. 64, Mid West Yorks.; West End, Blubberhouses, Miss C. M. ROB, confirmed by A. E. WADE.

506/3. MYOSOTIS REPENS G. & D. Don. 65, N.W. Yorks.; Ilton near Masham, Miss C. M. ROB.

509/1. ECHIUM VULGARE L. 36, Hereford; Colwall, in a field on the site of a bonfire, F. M. DAY.

*†509/2. ECHIUM PLANTAGINEUM L. 61, S.E. Yorks.; King George Dock, Hull, 1933, A. K. Wilson (1938: 20).

†513/5. **Convolvulus pentapetaloides** L., *Syst.*, ed. xii, 229 (1768). Alien, E. Europe; Asia Minor. 39, Staffs.; Burton-on-Trent, R. C. L. BURGES and J. F. G. CHAPPLE.

†522/1. DATURA STRAMONIUM L. 11, S. Hants.; clearing in wood, Westend, Mrs R. C. ASHBY. †27, E. Norfolk; garden weed, Abbot's Hall, Aylsham, A. E. ELLIS. †37, Worcs.; Broadwater tip, Kidderminster, W. H. HARDAKER.

†524/1. HYOSCYAMUS NIGER L. 3, S. Devon; garden weed, Crediton, A. E. ELLIS.

†527/7. VERBASCUM LYCHNITIS L. 16, W. Kent; casual, Willingham, Dartford, P. H. COOKE.

†532/10. LINARIA DALMATICA Mill. 36, Hereford; bank of R. Teme, Leintwardine, Miss F. Pitt ex A. A. Dallman (*NW.Nat.*, *13*, No. 3, 167).

534/2. ANTIRRHINUM ORONTIUM L. 41, Glamorgan; arable land, Horton, Miss SIMONS, comm. Miss E. VACHELL.

†534/3. **Antirrhinum Asarina** L., *Sp. Pl.*, 860 (1753). Alien, Pyrenees. 23, Oxon.; wall of Christ Church, Oxford (probably garden escape), G. HAYNES, det. R. MELVILLE.

†537/1. MIMULUS GUTTATUS DC. 16, W. Kent; naturalized beside a backwater of the Teise near Lamberhurst, L. R. WALLIS.

†537/1d. MIMULUS GUTTATUS DC. var. YOUNGANUS (Hook.) Druce. 78, Peebles; naturalized by Newhall Burn, P. M. HALL.

†537/2. MIMULUS MOSCHATUS Dougl. 93, N. Aberdeen; ditchbank by road, Edinglassie, Mrs C. I. SANDWITH, A. H. G. ALSTON and N. Y. SANDWITH.

543/9. VERONICA AQUATICA Benq. 27, E. Norfolk; Gillingham Marshes: 33, E. Gloster; Swinley Green, Forthampton: *37, Worcester; Pinn's Green; F. M. DAY. [Add 27 to *C.F.*: see *B.E.C. 1921 Rep.*, 391 (1922), for previous record.—ED.]

543/9b. VERONICA AQUATICA Benq. var. ANAGALLIFORMIS Boreau. 37, Worcester; Longdon Marsh, F. M. DAY.

543/10. VERONICA ALPINA L. 97, W. Inverness; Coire Leis, Ben Nevis, very sparingly at head of corrie, but more plentiful on Aonach Beag, E. C. WALLACE.

†543/41. VERONICA FILIFORMIS Smith. 14, E. Sussex; in three places about Alfriston, J. E. LOUSLEY. †37, Worcs.; naturalized on the banks of the Severn, N. of Leachford Ferry near Holt Fleet, W. H. HARDAKER.

545. EUPHRASIA L. Determined by H. W. PUGSLEY.

545/5b. EUPHRASIA NEMOROSA (Pers.) Löhr var. COLLINA Pugsl. 9, Dorset; Studland Heath, R. C. L. BURGES. 54, N. Lincs.; chalk-pit near Gainsborough, H. B. WILLOUGHBY-SMITH. 55, Rutland; Empingham Woods, S. A. TAYLOR.

545/12b. EUPHRASIA FRIGIDA Pugsl. var. LAXA Pugsl. 92, S. Aberdeen; Lochnagar at 2500 ft., R. C. L. BURGES.

545/16b. EUPHRASIA SCOTICA Wettst. var. PURPURASCENS Pugsl. H. 28, Sligo; bog N.W. of Seafin, J. P. M. BRENAN and N. D. SIMPSON.

545/18. EUPHRASIA CONFUSA Pugsl. forma ALBIDA Pugsl. 11, S. Hants.; roadside near Holmsley station, P. M. HALL and A. J. WILMOTT. H. 20, Wicklow; Brittas Bay, R. C. L. BURGES.

*545/19(3). EUPHRASIA RIVULARIS Pugsl. 70, Cumberland; Honister Pass, Mrs C. I. and N. Y. SANDWITH.

545/21. EUPHRASIA PSEUDO-KERNERI Pugsl. forma ELONGATA Pugsl. 27, E. Norfolk; boggy places, E. Ruston, 1922, A. E. ELLIS.

*548/5. RHINANTHUS STENOPHYLLUS Schur. 93, N. Aberdeen; moorland and roadside, Edinglassie, near Huntly, Mrs C. I. SANDWITH, N. Y. SANDWITH and A. H. G. ALSTON. 95, Elgin; Culbin Sands, E. F. WARBURG. *100, Clyde Isles; salt marsh, Ardmaleish, Bute, 1928, A. E. ELLIS. Det A. J. WILMOTT.

548/6. RHINANTHUS MONTICOLA (Stern.) Druce. 97, W. Inverness; moorland near Fort William, E. C. WALLACE, and by path up Ben Nevis, 1929 and 1937, A. J. WILMOTT.

549/3a. MELAMPYRUM PRATENSE L. var. TYPICUM Beck forma LAXUM Beauv. 13, W. Sussex; bank of lane near Bedham Hill, P. M. HALL and E. C. WALLACE, det. C. E. BRITTON.

551/1. LATHRAEA SQUAMARIA L. 30, Beds.; Clophill, J. G. DONY. 40, Salop; Bowhills Dingle, W. H. HARDAKER.

552/2. UTRICULARIA NEGLECTA Lehm. 12, N. Hants.; in stream on East side of Fleet Pond, G. WATTS.

*552/3. UTRICULARIA INTERMEDIA Hayne. 59, S. Lancs.; Litherland, 1820, J. Shepherd ex Stansfield (1938: 15). Add 67, S. Northumberland to *C.F.*: see *Vasc.*, *12*, 2, for earlier record: there are specimens from bog near Craglake in Hb. Winch in Hb. Brit. Linn. Soc. Lond.—P. M. HALL. *100, Arran; Glen Catacol, 1936, R. MACKECHNIE.

552/5. UTRICULARIA MINOR L. 12, N. Hants.; in stream on East side of Fleet Pond, G. WATTS. 43, Radnor; Rhôs Goch Common, P. M. HALL and E. C. WALLACE.

†556/8. **Verbena hispida** Ruiz & Pav., *Fl. Per.*, *1*, 22, *t.* 34 (1798). Native of S. America, Peru to Central Chile. 23, Oxon.; Jackdaw Lane, Oxford, J. P. M. BRENAN and J. CHAPPLE.

558. MENTHA L. Determined by A. L. STILL.

*558/2. MENTHA ALOPECUROIDES Hull. 9, Dorset; Swanage, R. C. L. BURGES. *16, W. Kent; near Lamberhurst, L. R. WALLIS. [Recorded for 15 in *C.F.*, but if this is based on the mention made by Sole in *Menthae Britannicae* (1798), repeated in *E.B.*, ed. 3—and I can trace no other record—it should be deleted.—J. F. G. CHAPPLE.] 25, E. Suffolk; Southwold: Holton: Beccles: a patch at least 150 yards long in a ditch near Badingham, F. M. DAY.

558/3. MENTHA LONGIFOLIA (L.) Huds. 42, Brecon; Afon Llynfi, N. of Three Cocks Junction, E. C. WALLACE and P. M. HALL. *†45, Pembroke; refuse-heaps, Haverfordwest, 1930, A. E. ELLIS.

558/3g. MENTHA LONGIFOLIA (L.) Huds. var. PULVERULENTA Strail. 46, Cardigan; roadside, Towyn Warren, 1927, A. E. ELLIS. [Add to *C.F.* but see previous record for species in *Welsh Fl. Pl.*, 123 (1934).—ED.]

558/3×1. ×MENTHA NILIACA (Jacq.) Fraser nearest to var. VILLOSA (Huds.) Fraser. 100, Clyde Isles; one clump in corner of grass field, Bute, 1928, A. E. ELLIS.

558/3×1. ×MENTHA NILIACA (Jacq.) Fraser var. WEBBERI Fraser. 99, Dumbarton; sea shore at Arrochar, E. C. WALLACE.

558/6d. MENTHA PIPERITA L. var. SUBCORDATA Fraser. 1, W. Cornwall; waste ground, Brane, near Sennen, 1926, A. E. ELLIS. 37, Worcester; Sherrard's Green, Guarlford, F. M. DAY. 48, Merioneth; N. shore of Bala Lake, 1921, A. E. ELLIS.

558/7c. MENTHA AQUATICA L. var. LOBELIANA Briq. 27, E. Norfolk; Gillingham Marshes: 36, Hereford; Everbatch ["very nearly this var."—A.L.S.], F. M. DAY.

558/7e. MENTHA AQUATICA L. var. MAJOR Sole. 37, Worcester; Link Mill, Malvern Link, F. M. DAY. 59, S. Lancs.; pond at Penwortham, near Preston, H. E. BUNKER. 68, Cheviotland; (approaching var. *denticulata* Strail) Holy I., 1906, H. K. WALLACE, comm. A. E. ELLIS.

558/7j. MENTHA AQUATICA L. var. DENTICULATA Braun. 37, Worcester; Drugger's End, Castlemorton, F. M. DAY.

558/9b. MENTHA VERTICILLATA L. var. PALUDOSA Sole. 36, Hereford; Evendine, Colwall, F. M. DAY.

558/9e. MENTHA VERTICILLATA L. var. OVALIFOLIA H. Braun. 36, Hereford; Bloody Furlong, Colwall, F. M. DAY.

*558/9q. MENTHA VERTICILLATA L. var. RIVALIS Sole. 25, E. Suffolk; Wolsey Bridge, Southwood: Wenhaston, 1931: 36, Hereford; Cradley, F. M. DAY.

558/10. MENTHA GENTILIS L. 3, S. Devon; garden at The Goat House, Brixham, F. M. DAY. [I have no recollection of this being planted here. Like all other specimens of this Mint from the Torquay district it has hairy pedicels and calyces.—F.M.D.] 6, N. Somerset; Westhay Heath, Mrs C. SANDWITH and A. L. STILL. *59, S. Lancs.; near Liverpool, 1809, J. Shepherd ex Stansfield (1938: 14).

558/12. ×MENTHA RUBRA Huds. 1, W. Cornwall; waste ground, Brane, near Sennen, 1926, A. E. and E. M. ELLIS.

558/13b. MENTHA ARVENSIS L. var. OBTUSIFOLIA Briq. 36, Hereford; Hoe Court Farm, Colwall, F. M. DAY.

558/13d. MENTHA ARVENSIS L. var. AGRESTIS (Sole) Smith. 45, Pembroke; refuse-heaps, Haverfordwest, 1930, A. E. ELLIS.

558/13e. MENTHA ARVENSIS L. var. AUSTRIACA (Jacq.) Briq. 36, Hereford; Brock Hill, Colwall: Stonehouse Farm, Mathon, F. M. DAY.

558/13f. MENTHA ARVENSIS L. var. PRAECOX (Sole) Fraser. 36, Hereford; Ridgeway, Cradley: Downs School garden, Colwall: 37, Worcester; Pinn's Green, Newland, F. M. DAY.

558/13g. MENTHA ARVENSIS L. var. ALLIONII (Bor.) Briq. 37, Worcester; Pinn's Green, Newland, 1937, F. M. DAY.

558/13l. MENTHA ARVENSIS L. var. CUNEIFOLIA Lej. & Court. 3, S. Devon; Dittisham, F. M. DAY.

†562/3. CALAMINTHA GRANDIFLORA (L.) Moench. 88, Mid Perth; beside Highland burn, near Lochearnhead, Miss M. STEWART, comm. Miss U. K. DUNCAN.

562/7. CALAMINTHA NEPETA Savi. 15, E. Kent; Key Street, J. E. LOUSLEY.

564/4. BARTSIA VISCOSA L. 17, Surrey; Carshalton, 1927, S. A. Chambers ex Salisbury (1938: 70): recorded in Salmon, *Fl. of Surrey*, 498 (1931), but omitted in *C.F.* *20, Herts.; near Welwyn (Salisbury: 1938); the species is of recent origin in this locality where it grows in wet ground adjoining artificial lakes constructed between 1926 and 1930: it is suggested that introduction was effected by migrant water-fowl. Salisbury (*loc. cit.*) illustrates the general British distribution of this species by a map and compares the occurrence of this species in Norfolk (see Tutin; 1936 B) with the former occurrence of *Wahlenbergia hederacea* (see p. 47 above): a humid climate appears to be necessary for the full development of this species together with high autumnal temperature for the proper ripening of seeds.

*†565/1. MELISSA OFFICINALIS L. 8, S. Wilts.; Limpley Stoke, J. D. GROSE.

566/1. SALVIA PRATENSIS L. 53, S. Lincs.; in a grass field on cornbrash near Sleaford, Miss J. GIBBONS.

†566/17. SALVIA VERTICILLATA L. 20, Herts.; Great Amwell, P. H. COOKE. †25, E. Suffolk; Felixstowe Docks, Miss W. WILKINSON. †37, Worcs.; railway bank, Hannington, W. H. HARDAKER.

†566/21. **Salvia lanceolata** Willd., *Enum.*, 37 (1809). Alien, Southern N. Amer. (Nebraska to Mexico). 32, Northants.; waste ground, Sibbertoft, 1920, A. E. ELLIS.

†581/2. LAMIUM MACULATUM L. 23, Oxon.; established in lane near Wilcote Church, Lady ROCHE.

†588/1. PLANTAGO INDICA L. 54, N. Lincs.; Boston, F. T. BAKER.

†588/11. PLANTAGO PSYLLIUM L. 39, Staffs.; Burton-on-Trent, R. C. L. BURGES and J. F. G. CHAPPLE.

593/2. HERNIARIA GLABRA L. 53, S. Lincs.; in quantity in a gravel-pit, Ranceby (near Ancaster, whence it is already recorded), Miss J. GIBBONS.

†596/6. AMARANTHUS RETROFLEXUS L. 1, W. Cornwall; Trenance Farm, Mullion, E. J. PERRY, comm. A. L. STILL. †16, W. Kent; Tonbridge, J. P. M. BRENAN.

†596/6b. AMARANTHUS RETROFLEXUS L. var. DELILEI Thell. 38, Warwick; pasture, Wilmcote, near Stratford, W. H. HARDAKER.

†596/15. **Amaranthus vulgatissimus** Speg., *Anal. Mus. Buenos Aires*, 7, 135 (1902). Alien, Argentine. 41, Glamorgan; Cardiff, 1937, R. L. SMITH and A. E. WADE, see p. 81 below. [Previously recorded with " cf." from Bristol in *B.E.C. 1932 Rep.*, 353 (1933).—ED.]

600/2. CHENOPODIUM BOTRYODES Smith. 16, W. Kent; near Red House Farm, Isle of Grain, J. E. LOUSLEY and R. C. L. BURGES.

†600/5b. CHENOPODIUM URBICUM L. var. INTERMEDIUM (Mert. & Koch) Moq. 37, Worcs.; Longdon, W. H. HARDAKER.

†600/6. CHENOPODIUM MURALE L. 17, Surrey; Epsom Downs, J. E. LOUSLEY and R. C. L. BURGES. †37, Worcs.; Broadwater tip, Kidderminster, W. H. HARDAKER.

†600/7. CHENOPODIUM OPULIFOLIUM Schrad. 16, W. Kent; Tonbridge, J. P. M. BRENAN.

†600/8h. CHENOPODIUM ALBUM L. var. SUBFICIFOLIUM (Murr) Druce. 41, Glamorgan; waste ground, Maendy, Cardiff, Miss E. VACHELL.

†600/8k. CHENOPODIUM VIRIDE L. 39, Staffs.; Burton-on-Trent, R. C. L. BURGES and J. F. G. CHAPPLE.

†600/8×8(2). **Chenopodium album** L. × **reticulatum** Aellen. 23, Oxon.; Manor Road, Oxford, J. P. M. BRENAN and J. CHAPPLE. Dr P. Aellen remarks on specimens sent:—" Fruits not yet ripe: *Ch. album* × *retic.* not impossible, but not sure." However ripe fruits have been procured and on examination the structure is quite intermediate and there seems to be no doubt.—J.P.M.B.

†600/8(2). CHENOPODIUM RETICULATUM Aellen. 15, E. Kent; roadside near Challock Lees, 1937: †16, W. Kent; Tonbridge, 1936-8, J. P. M. BRENAN, det. Dr P. AELLEN. †39, Staffs.; Burton-on-Trent, R. C. L. BURGES and J. F. G. CHAPPLE, det. J. P. M. BRENAN.

†600/12. CHENOPODIUM FICIFOLIUM Smith. 17, Surrey; Epsom sewage farm, A. E. ELLIS.

†600/19. CHENOPODIUM BOTRYS L. 34, W. Gloster; Wapping Wharf, Bristol Harbour, Mrs C. I. SANDWITH and N. Y. SANDWITH.

†600/24. CHENOPODIUM BERLANDIERI Moq. ssp. ZSCHACKEI (Murr) Zobel. 6, N. Somerset; Portishead, J. P. M. BRENAN. †18, S. Essex; Dagenham, J. P. M. BRENAN and N. E. G. CRUTTWELL. Both det. Dr P. AELLEN.

†600/34(7). **Chenopodium missouriense** Aellen, *Bot. Not.*, 206 (1928). Native of N. America. 16, W. Kent; Tonbridge, J. P. M. BRENAN and N. D. SIMPSON, det. Dr P. AELLEN.

†602/1. ROUBIEVA MULTIFIDA (L.) Moq. 25, E. Suffolk; Felixstowe Docks, J. E. LOUSLEY.

†606/5b. ATRIPLEX HASTATA L. var. MICROTHECA Rafn. 23, Oxon.; waste ground, Oxford, J. F. G. CHAPPLE, det. A. J. WILMOTT.

†607/1. AXYRIS AMARANTOIDES L. 11, S. Hants.; Knap Mill, Christchurch, 1921, N. D. SIMPSON.

†613/3. SALSOLA PESTIFERA Nelson. 25, E. Suffolk; Felixstowe Docks, J. E. LOUSLEY.

615/5c. POLYGONUM AMPHIBIUM L. var. GLANDULOSUM Schönh. 99, Dumbarton; Arrochar, arable land in Glen Loin, E. C. WALLACE.

†615/32. POLYGONUM CUSPIDATUM Sieb. & Zucc. 17, Surrey; Epsom, waste ground on sewage farm, A. E. ELLIS.

†618/20(2). **Rumex graecus** Boiss. & Heldr. in Boiss., *Diagn., Ser. 2*, fasc. 4, 80 (1859). Alien, E. Medit. Region. See p. 148 below.

†618/28. **Rumex confertus** Willd. replaces *R. giganteus* Ait. in *Br. Pl. List*: see p. 149 below.

†618/31. **Rumex stenophyllus** Ledeb., *Fl. Altaica, 2*, 58 (1830). Alien, E. Eur. to N. Asia. See p. 149 below.

†619/1. EMEX SPINOSA Campd. 39, Staffs.; Burton-on-Trent, R. C. L. BURGES and J. F. G. Chapple.

623/1. DAPHNE MEZEREUM L. 9, Dorset; Overmoigne, Miss V. M. LEATHER. [Remove brackets from 9 in *C.F.*: several native localiites for this species are given by Mansel-Pleydell, *Flora of Dorsetshire*, 240 (1895).—ED.]

†625/1. HIPPOPHAE RHAMNOIDES L. 45, Pembroke; Tenby, 1937, J. D. GROSE. [Add to *C.F.*; for previous records see *Welsh Fl. Pl.*, 134, 1934.—ED.]

*628/5. EUPHORBIA PLATYPHYLLOS L. 53, S. Lincs.; cornfield near Monk's Wood, Carlby, Mrs C. L. WILDE.

†628/9. EUPHORBIA VIRGATA Waldst. & Kit. 22, Berks.; Thamesside near Wallingford, Lady SEVERN.

†628/9b. EUPHORBIA VIRGATA Waldst. & Kit. f. ESULIFOLIA Thell. 11, S. Hants.; railway-bank, Fullerton Junction, Mrs FOGGITT, det. A. J. WILMOTT.

628/16. EUPHORBIA LATHYRIS L. Add to *C.F.* 7, N. Wilts.; see Preston, *Fl. Wilts.*, 266, 1888.—J. D. GROSE. *†61, S.E. Yorks.; Elvington, 1936, W. A. Sledge ex Wilson (1938: 25).

†628/26. **Euphorbia cuneifolia** Guss., *Pl. rar.*, 190 (1826). Alien, S. Europe. 61, S.E. Yorks.; King George Dock, Hull, 1932, F. Singleton ex Wilson (1938: 25).

†631/1. BUXUS SEMPERVIRENS L. 13, W. Sussex; South Stoke, steep beechwood by the Arun, E. C. WALLACE.

†632/2. MERCURIALIS ANNUA L. 3, S. Devon; Furzeham, Brixham: †25, E. Suffolk; plentiful as a weed, Southwold and Beccles, F. M. DAY.

633. ULMUS L. Determined by R. MELVILLE.

633/6. ULMUS STRICTA Lindl. 4, N. Devon; banks of R. Okement, Nethercott, Iddesleigh, A. E. ELLIS.

633/6b. ULMUS STRICTA Lindl. var. SARNIENSIS (Loud.) Moss. 32, Northants; Clipston, 1921, A. E. ELLIS.

†633/7. **Ulmus laevis** Pall., *Fl. Ross.*, *1*, 75 (1784). Alien, Central Europe. 17, Surrey; Ham, A. E. ELLIS.

643/1b. ALNUS GLUTINOSA (L.) Gaertn. var. LACINIATA Ehrh. 17, Surrey; Beddington Park, near Croydon, one large tree, A. E. ELLIS.

*†647/1. CASTANEA SATIVA Mill. 7, N. Wilts.; self-sown in Savernake Forest, J. D. GROSE.

*†650/1. SALIX PENTANDRA L. 8, S. Wilts.; Hill Deverill, J. D. GROSE. [*C.F.* should read:—1, 32-34, etc. (2, 3, 7, etc.).—J.D.G.] †17, Surrey; 2 trees by Cut Mill pond, E. M. HAZELTON, comm. A. E. ELLIS. 100, Clyde Isles; edge of wood, Rhutlan, Bute, 1928, A. E. ELLIS.

650/4b. SALIX TRIANDRA L. var. HOFFMANNIANA (Smith) Bab. 22, Berks.; Frilford, Lady DAVY, J. P. M. BRENAN and J. F. G. CHAPPLE.

650/4×6. SALIX TRIANDRA L. × VIMINALIS L., ♀. 28, W. Norfolk; by R. Wensum, Great Ryburgh, A. E. ELLIS, det. A. J. WILMOTT.

650/6c. SALIX VIMINALIS L. var. LINEARIFOLIA Wimm. & Grab. 13, W. Sussex; bank of R. Arun between N. Stoke and S. Stoke, E. M. HAZELTON, comm. A. E. ELLIS.

650/8. SALIX CAPREA L. 16, W. Kent; one bush at Abbey Wood, near Plumpstead-on-Thames, with nearly all catkins hermaphrodite, P. H. COOKE.

650/17. SALIX MYRSINITES L. 97, W. Inverness; Aonach Beag, eastern corrie, alt. *c.* 3000 ft., E. C. WALLACE.

*651/1. POPULUS CANESCENS Smith. 7, N. Wilts.; Great Bedwyn: Kington Langley: Okus, Swindon: *8, S. Wilts.; Etchilhampton: Alderbury; J. D. GROSE, det. A. B. JACKSON.

†651/3b. POPULUS NIGRA L. var. BETULIFOLIA (Pursh) Torrey. 7, N. Wilts.; between Swindon and Coate, J. D. GROSE, det. A. B. JACKSON.

*652/2. EMPETRUM HERMAPHRODITUM Hagerup. 94, Banff; lower slopes of Ben Avon, above Loch Builg, *c.* 2200 ft., A. H. G. ALSTON and N. Y. SANDWITH.

*653/2. CERATOPHYLLUM DEMERSUM L. 77, Renfrew; canal timber basin, Firhill, Glasgow, W. RENNIE, comm. J. R. LEE.

91. ORCHIDACEAE Lindl. Determined by P. M. HALL (except where indicated).

666/1. EPIPOGIUM APHYLLUM Swartz. 36, Hereford; moist oak wood, Wye Valley, late July 1910, C. C. MOUNTFORT, comm. F. M. DAY. [This is no doubt the specimen referred to by Godfery, *Mon. and Icon. Nat. Brit. Orch.*, 119 (1933), "a solitary example is said to have been found near Ross on Wye, Herefordshire, in 1910." The specimen was traced by Mr Day and at his request Mr Mountfort kindly allowed me to examine the specimen, which is in good condition, having two flowers and a piece of the coral-like rhizome attached.—P. M. HALL.]

668/2. EPIPACTIS LATIFOLIA (L.) All. H. 39, Antrim; Redhall Glen, near Ballycarry, N. D. SIMPSON and J. P. M. BRENAN.

668/4. EPIPACTIS PURPURATA Smith. 38, Warwick; Bevington Waste, N.W. of Evesham, on Liassic clay, W. H. HARDAKER.

669/7. ORCHIS LATIFOLIA L. 9, Dorset; Powerstock, between Barrowland Farm and railway, A. W. GRAVESON, comm. R. GOOD. 26, W. Suffolk; Thelnetham Fen: 27, E. Norfolk; Roydon Fen, near Diss: 28, W. Norfolk; Blo' Norton Fen, P. M. HALL, H. W. PUGSLEY, N. Y. SANDWITH and E. C. WALLACE. 61, S.E. Yorks.; Newbald Springs, A. K. WILSON.

669/7c. ORCHIS LATIFOLIA L. var. PULCHELLA (Druce) Pugsl. 12, N. Hants.; western edge of Laffan's Plain, between Fleet and Aldershot, G. WATTS. 27, E. Norfolk; Roydon Fen, near Diss, P. M. HALL, H. W. PUGSLEY, N. Y. SANDWITH and E. C. WALLACE.

669/7×10. ORCHIS LATIFOLIA L. × MACULATA L. (*sec.* Druce). 11, S. Hants.; marshy meadow near Soberton, P. M. HALL and E. MILNE-REDHEAD.

669/7×8. ORCHIS LATIFOLIA L. × PRAETERMISSA Druce. 8, S. Wilts.; marsh, Sharcott, near Pewsey, R. B. CROSSKEY, comm. P. M. HALL. 26, W. Suffolk; Thelnetham Fen: 28, W. Norfolk; Blo' Norton Fen, P. M. HALL, H. W. PUGSLEY, N. Y. SANDWITH and E. C. WALLACE.

669/8. ORCHIS PRAETERMISSA Druce. 26, W. Suffolk; Thelnetham Fen: 28, W. Norfolk; Blo' Norton Fen, P. M. HALL, H. W. PUGSLEY, N. Y. SANDWITH and E. C. WALLACE. [The Blo' Norton plants were mostly very typical but those at Thelnetham were not, though clearly belonging to this species. One rather doubtful specimen, probably of this species, was also seen in Roydon Fen, near Diss, E. Norfolk (27).—P. M. HALL.]

669/9. ORCHIS PURPURELLA T. & T. A. Stephenson. 62, N.E. Yorks.; Pickering, H. HIGHFIELD, det. and comm. T. STEPHENSON. 66, Durham; Stanhope, 1905, H. K. WALLACE, comm. A. E. ELLIS. 68, Cheviotland; S.E. of Otterburn, P. M. HALL and W. A. SLEDGE. *93, N. Aberdeen; bogs on moorland between Huntly and Edinglassie, A. H. G. ALSTON, Mrs C. I. SANDWITH and N. Y. SANDWITH [det. V. S. SUMMERHAYES at Kew].

669/9×674/1. ORCHIS PURPURELLA T. & T. A. Stephenson × GYMNADENIA CONOPSEA (L.) R. Br. 104, Inner Ebudes; Broadford, Skye, J. E. LOUSLEY, R. C. L. BURGES and J. W. CARDEW.

669/10. ORCHIS MACULATA L. (*sec.* Druce). 30, Beds.; Flitwick, J. G. DONY.

669/10×8. ORCHIS MACULATA L. (*sec.* Druce) × PRAETERMISSA Druce. 30, Beds.; Flitwick, J. G. DONY.

669/10×9. ORCHIS MACULATA L. (*sec.* Druce) × PURPURELLA T. & T. A. Stephenson. 88, Mid Perth; wet pasture W. of Lawers Hotel, P. M. HALL and W. A. SLEDGE.

669/10×674/1. ORCHIS MACULATA L. (*sec.* Druce) × GYMNADENIA CONOPSEA (L.) R. Br. 62, N.E. Yorks.; Low Horcum: 88, Mid Perth; Litigan, near Keltney Burn: on right bank of R. Lyon between Invervar and Inverinain, P. M. HALL and W. A. SLEDGE.

669/11. ORCHIS FUCHSII Druce. 61, S.E. Yorks.; Newbald Springs: Bromfleet Delphs: Sancton marsh, A. K. WILSON.

669/11×7. ORCHIS FUCHSII Druce × LATIFOLIA L. 27, E. Norfolk; Roydon Fen, near Diss, P. M. HALL, H. W. PUGSLEY, N. Y. SANDWITH and E. C. WALLACE. 61, S.E. Yorks.; Newbald Springs, A. K. WILSON.

669/11×9. ORCHIS FUCHSII Druce×PURPURELLA T. & T. A. Stephenson. 66, Durham; Fulwell quarry, near Sunderland, P. M. HALL and W. A. SLEDGE.

671/1. ACERAS ANTHROPOPHORUM (L.) R. Br. 23, Oxon.; Ipsden, found by a village boy who told his employer, Mrs H. A. Reade, about it: there is a specimen in Hb. Reading Univ. and a photo of a plant *in situ* in Hb. Druce: in *Fl. Oxon.*, ed. 2, among several unconfirmed records for this species, it is stated that " a friend of the Rev. C. E. Abbey says he has seen it near Checkendon." It is not improbable that this might refer to the Ipsden locality.—J. F. G. CHAPPLE. [In *B.E.C. 1933 Rep.*, 680 (1934), Pearsall and I referred to the existence of specimens from Mapledurham, 1853 (*Syme*) in Hb. Mus. Brit. and supposed this species to be extinct in Oxfordshire. It is very satisfactory to know that this is not the case.—P. M. HALL.]

674/3×1. GYMNADENIA ALBIDA (L.) Rich. × CONOPSEA (L.) R. Br. = ×SCHWEINFURTHII Heg. 62, N.E. Yorks., E. J. BEDFORD.

674/4. COELOGLOSSUM VIRIDE (L.) Hartm. H. 34, E. Donegal; pasture, Lough Laheen: H. 40, Derry; fixed dunes near the Umbra; N. D. SIMPSON and J. P. M. BRENAN.

674/6. PLATANTHERA CHLORANTHA (Cust.) Reichb. 30, Beds.; Chicksands, 1937, J. G. DONY.

674/7. PLATANTHERA BIFOLIA (L.) Reichb. 30, Beds.; Streatley, 1925, J. G. DONY.

†678/2. CROCUS VERNUS (L.) All. 9, Dorset; Studland, in profusion, Miss V. M. LEATHER. [Add to *C.F.*: see *B.E.C. 1917 Rep.*, 129 (1918), for previous record.—ED.]

†684/3. NARCISSUS BIFLORUS Curt. 9, Dorset; Studland, Miss V. M. LEATHER. [Add to *C.F.*: see Mansel-Pleydell, *Fl. of Dorsetshire*, 263 (1895), for earlier records.—ED.]

†685/1. GALANTHUS NIVALIS L. 16, W. Kent; naturalized in Lamberhurst churchyard, L. R. WALLIS.

*†686/1. LEUCOJUM AESTIVUM L. 74, Wigtown; Ardwell Mill, Stonykirk, W. A. P. SPROTT.

702/3. ALLIUM SCORODOPRASUM L. 68, Cheviotland; wood near Cornhill on Tweed, K. B. Blackburn (*Vasc.*, *24*, No. 3, 107). [I cannot trace any previously recorded locality for this species in 68. *Top. Bot.* gives " 68. Maclagan sp." and no doubt this is the source of the record in *C.F.*—G. W. TEMPERLEY.]

†702/8. ALLIUM CARINATUM L. 37, Worcs.; in thousands on N. bank of R. Severn, Upton-on-Severn [add to *C.F.*: recorded from here as from 34 in *B.E.C. 1923 Rep.*, 216 (1924), subsequently corrected to 37 in *B.E.C. 1924 Rep.*, 599 (1925).—J. F. G. CHAPPLE.]; also from near River Severn, Eymore Wood, between Bewdley and Arley, W. H. HARDAKER.

†702/13. ALLIUM CEPA L. 17, Surrey; Epsom, casual on sewage farm, A. E. ELLIS.

†702/19. ALLIUM PARADOXUM G. Don. 68, Cheviotland; several places near Cornhill-on-Tweed, Miss WARE and Miss CORBETT, comm. Miss E. VACHELL, det. A. J. WILMOTT.

707/1. ORNITHOGALUM PYRENAICUM L. 17, Surrey; a single plant in garden, Farncombe, Godalming, Mrs C. L. WILDE. [The plant appeared on the edge of a sage patch, where the ground had not been disturbed for years, and its origin is a complete mystery to my brother and myself (except on the thesis set out at end of this note). Its identification is confirmed by my brother, Mr E. B. Bishop. The only Surrey references concerning this species known to us are:—(1) Brewer, *Fl. Surrey*, 311 (1863)—" Only a solitary specimen near Send, about four miles from Guildford; *Lond. Flor.*" (2) Syme, *E.B.*, *9*, 197 (1869)—" Surrey . . . has been reported as producing it, but only on doubtful authority." (3) In *Comital Flora*, p. 297, 17 is given as doubtful. Send is about six miles from Farncombe, and it is very curious that our only acquaintance with *O. nutans* in Surrey was through the finding by me of two or three plants at Send in 1928. Subject to the approval of the Editor, I submit that this note might receive the N.C.R. mark, as this plant was certainly not introduced by us into the garden. We have now occupied our house for over 25 years, and can only suggest that this species has managed somehow to persist unnoticed in the neighbourhood, or else its seeds have lain dormant in the soil (previously meadow or woodland) upon which this house was built 80 years ago.—C.L.W.] [Seed might have been introduced with garden soil or plants. Hardly a N.C.R., as the species has already been recorded for 17 and its status is still uncertain.—ED.]

†707/2. ORNITHOGALUM UMBELLATUM L. 36, Hereford; one plant, Tarrington Common, probably garden outcast, F. M. DAY.

*†708/2. LILIUM PYRENAICUM Gouan. 61, S.E. Yorks.; dunes on E. side of Spurn Point, R. D'O. Good ex Wilson (1938: 26).

†709/1. FRITILLARIA MELEAGRIS L. 61, S.E. Yorks.; Wilson (1938: 26): add to *C.F.* and see Robinson, *Fl. E. Riding Yorks.*, 187, 1902, for previous record.

*†710/1. TULIPA SYLVESTRIS L. 61, S.E. Yorks.; introduced, Wilson (1938: 26).

718/13. JUNCUS SQUARROSUS L. 22, Berks.; Boar's Hill, N. E. G. CRUTTWELL. [Not given for the Ock Division (2) in *Fl. Berks.*, where it is said to be " rare or absent from the north of the county."—J. F. G. CHAPPLE.]

†718/16. JUNCUS MACER S. F. Gray. 13, W. Sussex; Hassocks, about 100 yards west of the v.-c. boundary, 1930, L. A. W. BURDER. [See my note in *B.E.C. 1937 Rep.*, 510 (1938), in which however I overlooked a previous record in *B.E.C. 1936 Rep.*, 282 (1937).—ED.] †59, S. Lancs.; Southport sandhills, Mrs J. V. PHELPS.

719/3×2. ×LUZULA BORRERI Bromf. 13, W. Sussex; bank of lane, Bedham Hill, near Fittleworth, P. M. HALL and E. C. WALLACE.

719/7. LUZULA ARCUATA Wahl. 97, W. Inverness; Coire Leis, Ben Nevis, a few plants at the head of the corrie, R. MACKECHNIE and E. C. WALLACE.

722/1. SPARGANIUM NEGLECTUM Beeby. 25, E. Suffolk; Dunwich: Wenhaston: Thorington, F. M. DAY. 27, E. Norfolk; bank of R. Bure, Aylsham, A. E. ELLIS.

722/2. SPARGANIUM RAMOSUM Huds. 27, E. Norfolk; Gillingham Marshes, F. M. DAY.

722/2b. SPARGANIUM RAMOSUM Huds. var. MICROCARPUM (Neum.). 25, E. Suffolk; Frostenden: Beccles marshes: 27, E. Norfolk; Gillingham marshes, F. M. DAY.

722/3b. SPARGANIUM SIMPLEX Huds. var. LONGISSIMUM Fries. 41, Glamorgan; canal at Nantgarw, Miss E. VACHELL.

724/1. ACORUS CALAMUS L. 17, Surrey; Burgh Heath, small pond on the common, E. C. WALLACE.

737. POTAMOGETON L. Determined by J. E. DANDY and G. TAYLOR.

737/5. POTAMOGETON ALPINUS Balb. 3, S. Devon; Exminster Marshes, 1921, W. S. M. D'URBAN: R. Culm, Culmjohn, 1901, F. SAVERY; comm. G. T. FRASER. [Remove brackets from 3 in *C.F.*—ED.] 64, Mid West Yorks.; Cookridge, 1933, J. B. WYON: 89, E. Perth; Glen Brerechan, 1896, C. D. BLAKISTON: both comm. A. E. ELLIS. 100, Clyde Isles; Greenan Loch, Bute, 1928, A. E. ELLIS.

737/9. POTAMOGETON GRAMINEUS L. 100, Clyde Isles; Greenan Loch and L. Ascog, Bute, 1928, A. E. ELLIS.

*737/11. ×POTAMOGETON NITENS Weber. 59, S. Lancs.; Crosby, 1827, J. Shepherd ex Stansfield (1938: 15). 67, S. Northumberland; R. Tyne, Riding Mill, Broomhaugh, S. A. TAYLOR. 100, Clyde Isles; Greenan Loch, 1928, A. E. ELLIS.

737/22. POTAMOGETON FRIESII Rupr. 55, Leics.; canal near Market Harborough, J. F. G. CHAPPLE and N. D. SIMPSON.

737/23. POTAMOGETON BERCHTOLDII Fieb. 109, Caithness; Halkirk: farm pond near Loch of Wester, Miss E. S. TODD.

737/24. POTAMOGETON RUTILUS Wolfg. All British records are erroneous with the exception of 112, Shetlands (Bardister and Tingwall Lochs). The other records refer to four different species:—*P. pusillus* (14, 38, 39, 52, 77, 111); *P. Berchtoldii* (64); *P. trichoides* (86); *P. pectinatus* (109).—Dandy and Taylor (1938 C).

*737/25. POTAMOGETON PUSILLUS L. (*P. panormitanus* Biv.-Bern.). 7, N. Wilts. and *8, N. Wilts.; canal, Great Bedwyn, 1937, J. D. GROSE and E. C. WALLACE. *23, Oxon.; canal at Wolvercote: gravel-pit near Cassington, J. F. G. CHAPPLE. *38, Warwick; Coventry Canal, Atherstone: *39, Staffs.; Marl Pits, Fradley: both without date, J. A. Power, Hb. Salmon in Hb. Mus. Brit.: *77, Lanark; Glenbuck Reservoir, 1934, G. TAYLOR (recorded as *P. rutilus* Wolfg. *teste* Pearsall in *B.E.C. 1934 Rep.*, 845, 1935); Dandy and Taylor (1938 C). 109, Caithness; Loch of Wester, Miss E. S. TODD.

737/27. POTAMOGETON TRICHOIDES Cham. & Schlecht. All the British records have been revised and all the available material reviewed by Dandy and Taylor (1938 B). This species has been much confused by previous British authorities with other species such as *P. Berchtoldii*, *P. pusillus*, *P. rutilus*, etc. Full particulars of these errors are set out in the paper. The distribution as known at present is:—*5, 6, *13, 14, 17, *21, 25, 26, 27, 28, 29, *30, 31, 33, *52, *54, *86. Requiring confirmation—12, 39. Errors—3 and 4 (*P. Berchtoldii*) [4 was recorded by Hiern in *Vict. Hist. Dev.*, 68 (1906) but was not included in *C.F.*—ED.], 88 (*P. pusillus*), H. 38 (the material, which is in Hb. Mus. Brit., is correct but the record is excluded on account of the doubt attaching to the accuracy of ORR's labels).

737/28. POTAMOGETON PECTINATUS L. 109, Caithness; Loch of Wester, Miss E. S. TODD.

745/2. HELEOCHARIS UNIGLUMIS Schultes. 22, Berks.; saline meadow, Marcham, J. P. M. BRENAN and J. F. G. CHAPPLE.

746/2c. SCIRPUS MARITIMUS L. var. CONGLOBATUS S. F. Gray. 16, W. Kent; Swanscombe marsh, P. H. COOKE.

746/15. SCIRPUS RUFUS (Huds.) Schrad. 97, W. Inverness; foreshore, Morar, E. C. WALLACE.

747/1. ERIOPHORUM LATIFOLIUM Hoppe. 17, Surrey; swamp draining into the Eden Brook, 1937, A. Beadell ex C. E. Britton (*J.B.*, *76*, 23), who also calls attention to the omission in C. E. Salmon's *Flora of Surrey* of the Reigate Heath locality given in the earlier Flora of J. D. Salmon and Brewer. 22, Berks.; Cumnor, J. F. G. CHAPPLE.

753. CAREX L. Determined or confirmed by E. NELMES.

753/1. CAREX PSEUDO-CYPERUS L. 25, E. Suffolk; Wolsey Bridge, near Southwold: 37, Worcester; Mill Coppice, Cowleigh, F. M. DAY.

753/4. CAREX VESICARIA L. 28, W. Norfolk; Congham, A. E. ELLIS.

753/9c. CAREX HIRTA L. var. HIRTIFORMIS Pers. 17, Surrey; Sheerwater, Woking, A. E. ELLIS.

753/17. CAREX DISTANS L. 14, E. Sussex; Eridge Green, A. E. ELLIS.

753/21. CAREX LEPIDOCARPA Tausch. 11, S. Hants.; marshy meadow near Soberton, P. M. HALL and E. MILNE-REDHEAD. 22, Berks.; Cumnor, J. F. G. CHAPPLE. 78, Peebles; by Newhall Burn, P. M. HALL.

753/22. CAREX OEDERI Retz. 27, E. Norfolk; Bryant's Heath, Felmingham, A. E. ELLIS.

*753/40. CAREX ATROFUSCA Schkuhr. 104, Rhum; observed somewhat sparingly on the Ard New-Orval massif, not very far from one of Dr Clark's localities for *Thlaspi calaminare*, J. W. HESLOP HARRISON. [Specimens not seen by Nelmes.]

753/42. CAREX HALLERI Gunn. 88, Mid Perth; Glen Lyon, Coire Heasgarnich, very sparingly, R. MACKECHNIE, P. M. HALL, W. A. SLEDGE and E. C. WALLACE.

753/49e. CAREX GOODENOWII Gay var. JUNCEA (Fries) Aschers. 34, W. Gloster; May Hill, Longhope ("probably this"), F. M. DAY. 37, Worcester; Longdon Marsh, F. M. DAY.

*753/52. CAREX ELONGATA L. 9, Dorset; near Trickett's Cross, Miss V. M. LEATHER. 13, W. Sussex; Billingshurst, still by the Wey and Arun canal, E. C. WALLACE.

753/57×59. ×CAREX AXILLARIS Good. 7, N. Wilts.; Braydon: Battle Lake: Hannington: 8, S. Wilts.; Potterne: Green Lane Wood, J. D. GROSE. [Add both to *C.F.*; for previous records see Preston, *Fl. Wilts.*, 333, 1888.—J.D.G.]

753/60. CAREX CONTIGUA Hoppe. 6, N. Somerset; Blackdown: 13, W. Sussex; Newbridge, Billingshurst: 28, W. Norfolk; Holkham, A. E. ELLIS.

*753/70. CAREX MARITIMA Gunn. (*C. incurva* Lightf.) 67, S. Northumberland; dunes between Seaton Sluice and Blyth, K. B. Blackburn (*Vasc.*, *24*, No. 3, 75): Tynemouth, 1877, but not previously recorded, T. Robson ex J. W. Heslop Harrison, K. B. Blackburn and W. A. Clark (*loc. cit.*). [Specimens not seen by Nelmes.]

†754/1. PANICUM MILIACEUM L. 3, S. Devon; Flowerpot fields, Exeter, A. E. ELLIS, det. C. E. HUBBARD.

†754/8. ECHINOCHLOA CRUS-GALLI (L.) Beauv. 9, Dorset; garden weed, Studland, Miss V. M. LEATHER. [Add to *C.F.*: see *B.E.C. 1917 Rep.*, 133 (1918), for previous record.—ED.]

†754/8e. ECHINOCHLOA CRUS-GALLI L. var. **mitis** (Pursh) Peterm., *Fl. Lips.*, 82 (1838). *Panicum Crus-galli* L. var. *mite* Pursh, *Fl. Amer. Sept.*, 66 (1814). Alien, N. Am. 41, Glamorgan; Splott, 1937: Cardiff, R. L. SMITH and A. E. WADE, see p. 82 below.

*†754/10. DIGITARIA SANGUINALIS (L.) Scop. 61, S.E. Yorks.; Wilson (1938: 26).

†765/6. PHALARIS BRACHYSTACHYS Link. 23, Oxon.; Jackdaw Lane, Oxford, J. P. M. BRENAN.

*†766/2. ANTHOXANTHUM PUELII Lec. & Lam. 7, N. Wilts.; sandy fallow near Spye Park, J. E. LOUSLEY and J. D. GROSE. *†61, S.E. Yorks.; King George Dock, Hull, 1935, T. Stainforth ex Wilson (1938: 27).

770/4. ALOPECURUS BULBOSUS Gouan. 28, W. Norfolk; Holkham, A. E. ELLIS.

770/5×1. ALOPECURUS GENICULATUS L. × PRATENSIS L. = × A. HYBRIDUS Wimm. 14, E. Sussex; by the Cuckmere close to Alfriston, J. P. M. BRENAN.

*778/1. MIBORA VERNA (L.) Desv. 67, S. Northumberland; Seaton Sluice, J. W. Heslop Harrison, K. B. Blackburn and W. A. Clark (*Vasc.*, *24*, No. 3, 75-76). [The authors also state:—"A year or two ago it turned up in Norfolk": a reference to this discovery would be welcomed.—ED.]

783/1. CALAMAGROSTIS EPIGEJOS (L.) Roth. 11, S. Hants.; margin of field near S. Hayling railway station, P. M. HALL.

†794/1. AVENA FATUA L. 36, Hereford; Mathon: 37, Worcester; Birtsmorton, F. M. DAY.

*†797/1. CYNODON DACTYLON (L.) Pers. 19, N. Essex; Dovercourt, well-established on beach near bathing huts, J. E. LOUSLEY.

†801(2). **Cortaderia** Stapf., *Gard. Chron.*, *3rd Series*, *22*, 396 (1897). Pampas-grass.

†801(2). **Cortaderia Selloana** (Schult.) Aschers. & Graebn., *Syn. Mitteleur. Fl.*, *2*, 325 (1900). Cult., origin S. Amer. 9, Dorset; heath, South Haven Peninsula, 1937 and 1938, N. D. SIMPSON.

†808/1. CYNOSURUS ECHINATUS L. 15, E. Kent; sea-shore, Sandwich, H. B. WILLOUGHBY-SMITH. †17, Surrey; oat-field, near Kingswood Station, Chipstead, A. E. ELLIS. *†61, S.E. Yorks.; King George Dock, Hull, 1932, T. Stainforth ex Wilson (1938: 27). *†74, Wigtown; roadside about 1 mile W. of Glenluce, W. A. P. SPROTT.

814/1. CATABROSA AQUATICA (L.) Beauv. 41, Glamorgan; near Neath, Miss M. THOMAS.

†815/1. ERAGROSTIS CILIANENSIS (All.) Vig.-Lut. 17, Surrey; waste ground, Clandon crossroads, E. C. WALLACE and A. L. STILL.

†815/2. ERAGROSTIS POAEOIDES Beauv. (*E. minor* Host). 17, Surrey; waste ground, Clandon crossroads, E. C. WALLACE and A. L. STILL.

†815/8. **Eragrostis pectinacea** (Michx.) Nees, *Fl. Afr. Austr.*, 406 (1841). *Poa pectinacea* Michx., *Fl. Bor. Amer.*, *1*, 69 (1803). Alien, N. Am. 41, Glamorgan; Cardiff, R. E. SMITH and A. E. WADE, see p. 83 below.

824/2b. POA PRATENSIS L. var. ANGUSTIFOLIA (L.) Wahl. 13, W. Sussex; Lancing College, 1926: 17, Surrey; Sheerwater, Woking, A. E. ELLIS, det. C. E. HUBBARD. 36, Hereford; railway embankment near Barton Court, Colwall, F. M. DAY, det. C. E. HUBBARD.

*824/4. POA PRATENSIS L. var. IRRIGATA (Lindm.) Druce. 69, Westmorland; Hilton Gill at *c.* 1000 ft.: "approaching this," rocks on E. side of High Cup Gill at *c.* 1500 ft.; B.E.C. EXCURSION, det. C. E. HUBBARD.

824/13. POA BULBOSA L. 10, Wight; on the brink of the cliffs between Freshwater and the Needles, J. P. M. BRENAN. *23, Oxon.; near Stonesfield, seemingly native, R. BURN and J. P. M. BRENAN.

*825/3b. GLYCERIA DECLINATA Bréb. 16, W. Kent; Tunbridge Wells Common, J. P. M. BRENAN. 69, Westmorland; Rundale Beck at *c.* 1500 ft., B.E.C. EXCURSION, det. C. E. HUBBARD. [Add to *C.F.*: see *Fl. Westm.*, 259 (1938), for previous records.—ED.] 94, Banff; pond behind sand-dunes, Sandend Bay, Cullen, N. Y. SANDWITH. [Add to *C.F.*; for previous record see *Journ. Bot.*, 160 (1906).—ED.]

826/4b×829/1. FESTUCA PRATENSIS Huds. × LOLIUM PERENNE L. 6, N. Somerset; Frome, A. E. ELLIS, det. C. E. HUBBARD.

*826/6. FESTUCA HETEROPHYLLA Lam. 11, S. Hants.; in a spinney near the road between Lyndhurst and Brockenhurst, S. A. TAYLOR, det. W. O. HOWARTH.

826/12. FESTUCA TENUIFOLIA Sibth. (*F. capillata* Lam.). 105, W. Ross; hillside, Dundonnell: 108, W. Sutherland; Cnochan rocks, Miss E. S. TODD, det. W. O. HOWARTH.

826/13. FESTUCA GLAUCA Lam. var. CAESIA (Smith) Howarth. 3, S. Devon; Berry Head, G. M. ASH, J. P. M. BRENAN, J. F. G. CHAPPLE and G. T. FRASER, det. W. O. HOWARTH.

826/17. FESTUCA BROMOIDES L. 37, Worcs.; Broadmoor Wood, W. H. HARDAKER. 38, Warwick; roadside, Grays Mellory, J. P. M. BRENAN and J. F. G. CHAPPLE.

827. BROMUS L. Determined by C. E. HUBBARD.

†827/13(2). **Bromus laciniatus** Beal, *Grasses N. Amer.*, *2*, 615 (1896). (*B. pendulinus* Sessé.) Cult., origin Mexico. 23, Oxon.; Jackdaw Lane, J. P. M. BRENAN. [See note in *B.E.C. 1937 Rep.*, 672 (1938).—ED.]

827/16c. BROMUS SECALINUS L. var. HIRTUS (F. Schultz) Aschers. & Graebn. 17, Surrey; Kingswood, A. E. ELLIS.

827/17. BROMUS COMMUTATUS Schrad. 55, Rutland; Empingham Woods, S. A. TAYLOR.

827/18. BROMUS RACEMOSUS L. 36, Hereford; near Coddington post-office: Mathon: 37, Worcester; Cowleigh, F. M. DAY.

827/19b. BROMUS HORDEACEUS L. var. GLABRATUS Druce. 23, Oxon.; waste ground, Oxford, J. F. G. CHAPPLE.

827/19(2). BROMUS LEPIDUS Holmberg. 23, Oxon.; several localities in Oxford, J. P. M. BRENAN and J. F. G. CHAPPLE. *27, E. Norfolk; sandy field, near Selhouse Broad, S. A. TAYLOR. *32, Northants.; Arthingworth, 1922, A. E. ELLIS.

†827/19(2). BROMUS LEPIDUS Holmberg forma LASIOLEPIS Holmberg. 23, Oxon.; Jackdaw Lane, Oxford, J. P. M. BRENAN. †94, Banff; with the typical plant in a fodder field, Sandend Bay, near Cullen, Mrs C. I. SANDWITH and N. Y. SANDWITH.

†827/22. BROMUS ARVENSIS L. 26, W. Suffolk; near Icklingham, S. A. TAYLOR.

828/2. BRACHYPODIUM PINNATUM (L.) Beauv. 64, Mid West Yorks.; Thorpe Arch, Miss E. S. TODD.

†829/4. LOLIUM MULTIFLORUM Lam. 50, Denbigh; Glyndyfrdwy, 1921, A. E. ELLIS.

†829/4c. LOLIUM MULTIFLORUM Lam. var. COMPOSITUM (Thuill.) Mutel. 37, Worcs.; Hartlebury, W. H. HARDAKER.

830/4c. AGROPYRON REPENS L. var. LEERSIANUM S. F. Gray. 17, Surrey; wheatfield, Langley Bottom, Epsom, A. E. ELLIS.

†831/1. SECALE CEREALE L. 3, S. Devon; Flowerpot fields, Exeter, A. E. ELLIS.

†832/11(2). **Aegilops ligustica** (Savign.) Coss., *B. S. B. Fr.*, *11*, 164 (1864). Alien, Near East. 6, N. Somerset; waste ground, Bristol, I. W. EVANS, comm. N. Y. SANDWITH, det. C. E. HUBBARD.

*833/2. PHOLIURUS INCURVUS (L.) Schinz & Thell. 6, N. Somerset; outer fringe of dunes opposite Berrow Church, growing on dry sand at a point where there is a transition from dune to salt marsh: *P. filiformis* (Roth) Schinz & Thell. was growing nearby on damp spots on the inner side of the salt marsh: *9, Dorset; ledges of limestone rock, Worth Matravers, R. MELVILLE. *15, E. Kent; foot of the chalk cliffs between Folkestone and Dover, 1937, J. P. M. BRENAN.

†835/9. HORDEUM VULGATUM L. var. TRIFURCATUM (Jacq.) Wend. Channel Isles; Lancresse Common, Guernsey, 1936, Miss C. M. ROB.

844/1. EQUISETUM TELMATEIA Ehrh. 13, W. Sussex; Warminghurst, with " sterile stems " bearing cones of sporophylls, A. E. ELLIS.

844/2c. EQUISETUM ARVENSE L. var. NEMOROSUM Braun. 25, E. Suffolk; Blythburgh: Frostenden, etc.: 36, Hereford; Colwall: Coddington, etc., F. M. DAY.

*844/7. EQUISETUM HYEMALE L. 93, N. Aberdeen; open ground among heather in Bin Wood, between Cairnie and Huntly, N. Y. SANDWITH.

*†854/4. POLYSTICHUM LONCHITIS (L.) Roth. 23, Oxon.; on wall of farm-buildings, Sandford St Martin, 1937, J. S. HUGHES.

856/3d. DRYOPTERIS SPINULOSA Kuntze var. DECIPIENS (Syme) Druce. 41, Glamorgan; near Aberdulais, Miss THOMAS and Miss E. VACHELL.

856/8. DRYOPTERIS THELYPTERIS (L.) A. Gray. 12, N. Hants.; Conford, near Liphook, G. M. ASH, comm. E. C. WALLACE.

861/2. WOODSIA ALPINA (Bolton) S. F. Gray. 88, Mid Perth; north side of Glen Lyon, E. C. WALLACE: south side of Glen Lyon, W. A. SLEDGE.

866/1. OPHIOGLOSSUM VULGATUM L. 27, E. Norfolk; Alderfen, near Horning, up to 18 in. tall, A. E. ELLIS.

866/1b. OPHIOGLOSSUM VULGATUM L. var. POLYPHYLLUM Braun. 9, Dorset; Studland Heath, near Littlesea, E. C. WALLACE, det. A. H. G. ALSTON.

†868/1. AZOLLA FILICULOIDES Lam. 37, Worcester; Sherrard's Green, Guarlford, J. HAWKINS, comm. F. M. DAY.

869/3. ISOETES HYSTRIX Durieu. 1, W. Cornwall; Kynance valley, 1937, Melville (1938 A), where an account is given of the habitat and associated plants. [Add to *C.F.*: the first record of this species for 1 by F. Robinson in *J.B.*, *57*, 322 (1919), was rejected by Druce as an error in circumstances which are explained by F. Rilstone in *J.B.*, *76*, 56-57.—ED.]

870/7. LYCOPODIUM SELAGO L. 99, Dumbarton; Arrochar, wood by Loch Long, almost at sea-level, E. C. WALLACE.

[871/4. **Selaginella helvetica** Link, *Fil. Hort. Berol.*, 159 (1841). Fragments of this species were identified in a packet of a moss (*Thuidium tamariscinum*) in the Torquay Natural History Society's herbarium. The moss was part of a collection made by an unknown collector in July 1896 on Slieve Donard, Co. Down (H. 38).—T. STEPHENSON. This record is bracketed in view of the doubtful circumstances of the case.—ED.]

118. CHARACEAE Rich. Determined by G. O. ALLEN.

872/2b. NITELLA OPACA Agardh, var. ATTENUATA Groves. 4, N. Devon; Dove's Moor, Bulkworthy, 1895, W. P. Hiern ex Allen (1938: 48). 17, Surrey, Haslemere, Allen (*loc. cit.*).

872/3. NITELLA FLEXILIS Ag. 41, Glamorgan; Miss Vachell says that the record of this species from Kenfig Pool in *B.E.C. 1937 Rep.*, 597 (1938), is an error and Mr Wade concurs.—ED. *106, E. Ross; L. Ussie, 1936, Mrs S. Sandeman ex Allen (1938: 49).

*872/6. NITELLA MUCRONATA Miq. 17, Surrey; R. Wey, near Little Frensham Pond, 1936, Allen (1938: 49).

873/2. TOLYPELLA PROLIFERA Leonh. 13, W. Sussex; still abundant in a ditch, Amberley Wild Brooks, N. Y. SANDWITH.

†876/1. CHARA BRAUNII Gmel. 59, S. Lancs.; still in Reddish Canal, 1937, Miss E. S. Todd ex Allen (1938: 50). [In *B.P.L.*, *ed. 2* (1928), this species is enclosed in ⟨ ⟩ brackets signifying extinction while in *C.F.* (1932) it is described as "now nearly or quite extinct."—ED.]

876/5. CHARA HISPIDA L. 7, N. Wilts.; Bowood, J. D. GROSE, det. G. O. ALLEN. [Add to *C.F.*; for previous records see *Bot. Club Rep.*, *1884-6*, where "v.-c. 8" should read "v.-c. 7."—J.D.G.]

876/7. CHARA CONTRARIA Kütz. 59, S. Lancs.; Springhead, Twiston Moor, A. TURNER. *83, Midlothian; Gladhouse Reservoir, 1935, G. Taylor ex Allen (1938: 50).

*876/7b. CHARA CONTRARIA Kütz. var. HISPIDULA Br. 20, Herts.; Wilstone Reservoir, near Tring, 1937, J. P. M. Brenan ex Allen (*loc. cit.*).

*876/17. CHARA DELICATULA Agardh. 4, N. Devon; near S. Molton, 1893, W. P. Hiern: *15, E. Kent; Minster, Thanet, 1923, G. O. Allen: 16, W. Kent; Keston Ponds, 1919, St J. Marriott; all ex Allen (*loc. cit.*). *64, Mid West Yorks.; moorland pool, Rimmington, at 1000 ft., A. TURNER.

876/17c. CHARA DELICATULA Agardh var. ANNULATA (Wallm.) Groves & B.-Webst. 104, Inner Ebudes; Raasay, 1936, R. B. Cooke ex Allen (*loc. cit.*).

THE WEATHER OF 1938 AND ITS EFFECTS.

(Adapted by permission from The Phenological Report, 1938, of the Royal Meteorological Society.)

After a December with a temperature about 2.5° F. below the normal, January and the first ten days of February were warm, and after a brief colder spell, were followed by a March which broke all records in a warm spell which, accompanied by drought, extended into the first week of April. Then came a cool, dry spell with night frosts both in April and May, followed by a summer and early autumn with temperature not far from the average.

In November the temperature again rose to abnormal heights, and the first really cold spell of the winter did not set in until December.

There was remarkable general uniformity in the incidence and extent of the departures from the normal temperature throughout the districts, and throughout the season. Rainfall was not so equally distributed, and there was great disparity in this respect between the south-eastern and north-western districts. During the warm period in April and early May, the only districts which experienced an average week of excess rainfall were Scotland N. and W., England N.W. and Ireland N. and S., and by the end of the year the excess in these districts had reached values varying from 30 to 80 per cent., while the south-eastern districts had deficits up to 20 per cent. Sunshine after April was deficient for considerable periods until October was reached. Strong gales were experienced in January and February, at the beginning of June and during the first half of October. The wind graphs show how prevalent was S.W. wind in the southern districts and, after March, N.W. wind in the northern districts.

It is now possible to consider the effects of the meteorological conditions throughout the year.

After the cold December the mildness of January and early February was conducive to forwardness and the abnormal warmth of March brought everything forward with a rush. This precocity, which might have been even more generally pronounced under less droughty conditions, was checked by the cold dry weather in April and May and the night frosts which occurred in many places throughout the country in both these months—notably on April 10-11; and between May 7 and 24—caused widespread damage to blossom and foliage. Amongst the listed items noted by many observers as seriously affected are the blossom and foliage of chestnut, beech and oak, and the blossom of hawthorn, lilac, laburnum and white ox-eye, while, outside the list, fruit trees suffered to a greater or less degree according to the date of blossoming and the site characteristics, some of the worst cases, as usual, occurring in valleys.*

*[Orchids suffered severely from the late frosts in many parts of England: in South Hampshire towards the end of May flowering spikes of *Cephalanthera longifolia* were blackened right off by frost.—P.M.H.]

The damage was not confined to plant life; observers have drawn attention to cases of song thrushes and blackbirds having deserted their nests during the drought and of the starvation of young birds.

The effect on the spring migrant birds appears to have been that, after the first arrivals, they were less seen and heard than usual, main bodies being reported as late in some districts, both southern and northern. The first dates of arrival on the graphs indicate that the marked earliness associated with most of the arrivals in February and March in the South was reduced, disappeared, or was changed to lateness in the period April-May in the north.

After this trying period of drought and cold in April and May there was marked recovery in many directions. A reasonably warm and moist late summer and autumn in most districts resulted in the second flowering of many plants, notably lilac, laburnum, hawthorn and blackthorn, while the number of wayside flowering plants reported during the abnormal warm spell in November was remarkable, amounting to more than twenty species, including blackberry, red clover, scarlet pimpernel, white dead nettle, meadow sweet and buttercup.

The appearance of foliage in the autumn, however, reflected the damage done in the earlier months. Following the frosts, strong winds, carrying salt in many localities, even at some distance from the sea, had already caused browning in early June, and the gales of October completed the damage and spoilt or brought down the leaves, except in very sheltered places where the leaves kept green unusually late; autumn colours, as generally understood, were absent in most localities.

But, if plant life generally experienced a trying season it was an exceptionally good year for wheat and mainly satisfactory for barley and oats, and also for the bulk of the potato crop, which showed marked recovery. While grass and hay were sparse in southern districts they were quite good in the northern districts where the drought was less severe, and was followed by copious rains which, however, in some instances caused the promise of good condition to be disappointed by difficulty in harvesting. Incidentally it was a good year for mushrooms.

NOTES ON THE ADVENTIVE FLORA OF THE CARDIFF DISTRICT.

R. L. Smith and A. E. Wade, F.L.S.

In *B.E.C. 1925 Rep.* the writers published an account of the adventive flora of Cardiff, and a supplement to it in *B.E.C. 1926 Rep.* These two papers embodied the results of the preceding five years' field work, together with the majority of other known records of adventive plants for the district, some of them over forty years old.

An account of the adventive flora of a particular district fulfils a different purpose from that of the native flora. The latter usually gives records of all the species and varieties found, and, as these are rarely of isolated plants, it is an indication of what one may reasonably expect to find. Apart from revision of nomenclature and enumeration of segregates, new records, etc., an ordinary Flora is never really out of date. Natural conditions do not change sufficiently to alter the general character of the flora.

An account of an adventive flora, on the other hand, is obsolescent as soon as published, since conditions for adventives are continually changing, methods of introduction ceasing, localities being built over, new industries starting, and new methods being introduced in industry, so that periodic revision of an adventive Flora is a necessity.

During the last ten or twelve years there have been many changes which have influenced the alien flora. There has been practically no new tipping at Cardiff Docks, and the old localities for adventives being at present undisturbed are becoming overgrown with more robust native plants and denizens. This has meant the disappearance of plants from localities in which they have persisted for very many years, e.g., *Inula viscosa*, *Phytolacca decandra*, etc. The locality at Radyr, formerly so prolific in leguminous plants, is now no more, the spot being entirely covered with busy railway sidings. From the character of the established plants at Barry Docks, it seems certain that these were introduced many years ago by ships' ballast, but nowadays, with very rare exceptions, if indeed there are such, ships carry only water ballast, so that that means of introduction has apparently ceased to operate.

At Barry there is a large grain mill, which is responsible for all the recent introductions. Until about three years ago all the waste from this mill was dumped at the edge of a large tidal pool. In some years, notably 1928, the adventive flora along this pool was quite rich. Nowadays practically all waste from the mill is burnt and from now on there will be very few new records for Barry Docks. However the established adventive flora is still of considerable interest and worth a visit, consisting as it does of about 30 adventive species, nearly all of them perennials. Except during the winter months, there is always one or more of these adventive species in flower.

The Cardiff Docks area is fairly large, but no one part of it is rich in adventives. Its established adventive flora consists of about 15 species, again mostly perennials. The numerous railway banks, patches of waste ground, allotment gardens and the like in the district also have their quota of established species. These number about 30, nearly half of them being other than common plants.

The real fascination, however, of seeking adventive species is not in looking for the expected, but for the unexpected. As is usual with most large towns, Cardiff has a number of municipal rubbish-heaps. Each year one or more of these is closed, and new ones started. The Splott locality, for 15 years a prolific hunting ground for adventives, was a large rubbish-dump. It is now closed, and the whole area is included in the lay-out of the new Cardiff Airport. Broadly speaking, any municipal rubbish-dump is likely to produce a fair crop of adventive plants, and their means of introduction is, in most cases, easy of determination. For instance *Guizotia abyssinica* is an ingredient of a proprietary brand of parrot-food; *Artemisia biennis* and *Phalaris canariensis* form part of most sorts of bird-seed; *Setaria italica* is the plant that produces the long curved fruiting spikes sold in every bird-shop; *Carthamus tinctorius* has large whitish seeds, present in most sorts of chicken-food; the various Sorghums form a proportion of some kinds of bird-seed. A few adventive plants owe their origin to the chemists' shop, e.g., *Carum Carvi* and *Coriandrum sativum*.

Occasionally, however, the botanist finds it difficult to account for the presence of a plant. Some years ago we found a prickly *Solanum* that turned out to be *S. ciliatum*, growing amongst ordinary town rubbish, and there were several plants of it all clustered together. Try as we might, we could not discover how the seeds were introduced. The following Christmas we saw on sale in the streets sprigs of *Ruscus* with large orange fruits impaled on the cladodes. These fruits were full of ripe seeds, which when sown produced our prickly *Solanum*. Thus the occurrence had been due to plants thrown away and deposited with the town refuse.

The Cardiff district has owed its richness in adventive species to the presence of a large grain mill. Until a few years ago this mill was operated upon old-fashioned lines, and large quantities of extracted weed seeds were thrown away. Many of these seeds germinated in the vicinity of the mill, but most of them were deposited on the nearest municipal rubbish heap. The town cleansing authorities soon noticed that there was a lot of grass seed in this mill waste, and so they spread it over the levelled tip, thus making a cheap grazing ground for their horses and, incidentally, providing a paradise for the botanist interested in adventive plants. This state of affairs continued for some time, but an unlucky accident put an end to it. One day a valuable horse, sampling the luscious young grass, slipped and cut itself so badly on a broken bottle that it had to be destroyed. This ended the broadcasting of the weed seeds. About the same time, the grain mill

was re-built, and modern methods of milling introduced. To-day we have a mill in which practically nothing is wasted. A fair proportion of grain is now imported free from weed seeds, but that which is not is cleaned by special machinery and nearly all the one-time waste made into cattle-food. The ground around this great new mill is practically free from weeds, and all that comes out of the mill itself is human food, cattle-food, and a limited amount of floor sweepings. These sweepings are put in bags and carted to the town rubbish-dump, where the bags are emptied into one heap. The effect of all this is that the area worth exploring for adventives has become much more restricted. Moreover 90 per cent. of the total seeds dumped rot instead of germinating. The lot of the present day seeker after adventive plants is indeed hard. Nevertheless, in spite of all these changes, there are still a fair number of grain-adventives to be found here every summer. Hardly a season passes without at least 30 of these adventives appearing on our rubbish-heaps. 1937 and 1938 have been particularly good. In the former year we observed over 50 adventive species, and in 1938 well over 60, in each case exclusive of the 40 or more established species.

A few of the plants mentioned in this paper are new to the "British Plant List." A number of long established species, e.g., *Impatiens glandulifera*, *Cochlearia Armoracia*, *Senecio squalidus*, etc., have been omitted. The native country or area is given in the case of species new to the Cardiff district. Specimens of the majority of the species recorded have been deposited in the Welsh National Herbarium, National Museum of Wales, Cardiff.

Our thanks are due to Mr F. Norton who, for the last three or four years, has helped us in many ways, and has accompanied us on most of our expeditions, and to Dr R. Melville and Mr C. E. Hubbard for assistance in the identification of doubtful specimens.

RANUNCULACEAE.

4/2. ADONIS AESTIVALIS L. Europe. Splott, 1929.
12/1. NIGELLA DAMASCENA L. Cardiff N., 1938.

PAPAVERACEAE.

21/1. PAPAVER SOMNIFERUM L. Of frequent occurrence on rubbish-heaps.
21/5. P. ARGEMONE L. Barry Docks, 1936.
21/6. P. HYBRIDUM L. Not common in recent years.
23/2. GLAUCIUM CORNICULATUM (L.) Curt. This species occurred quite commonly for a few years as a grain alien.
24/1. ROEMERIA HYBRIDA DC. Now quite gone from this district. It persisted for 10 years.
28/1b. ESCHSCHOLTZIA CALIFORNICA Cham. var. CROCEA (Benth.) Jepson. California. Cardiff N., 1938. A grain alien and not a garden escape.
29/3. HYPECOUM PENDULUM L. Europe. Splott, 1927.

CRUCIFERAE.

35/5. RORIPPA AUSTRIACA (Crantz) Bess. Europe. This species is quite naturalised on some allotments within the city boundary. Its extensively creeping rhizomes, luxuriant growth, and production of abundant ripe seeds are making it a serious menace to the allotment holders.

42/9. ALYSSUM INCANUM L. Appears every summer at Barry Docks.

42/10. A. MARITIMUM Lam. Frequent on rubbish-heaps.

48/3. MALCOMIA AFRICANA Br. Reg. Medit. Splott, 1927.

49/2. SISYMBRIUM SOPHIA L. Occurs most years as a grain alien.

49/3. S. ALTISSIMUM L. Naturalised at Cardiff Docks.

49/4. S. ORIENTALE L. Naturalised in three or four places.

50/1. ERYSIMUM CHEIRANTHOIDES L. Formerly a frequent allotment weed at Splott. Now seldom seen in this district.

52/1. CAMELINA SATIVA Crantz. Appears almost every spring on one or other of the city refuse-heaps.

54/6. BRASSICA CHEIRANTHOS Vill. Still on the railway bank at Grangetown.

54/15. B. ALBA (L.) Boiss. Of fairly frequent occurrence on rubbish-heaps.

54/22. B. ADPRESSA Boiss. Naturalised in quantity at both Cardiff and Barry Docks.

61/1. LEPIDIUM GRAMINIFOLIUM L. Naturalised at both Cardiff and Barry Docks.

61/3. L. DRABA L. Abundant on waste ground in several places.

61/4. L. RUDERALE L. Occasionally found on rubbish-heaps.

61/12. L. SATIVUM L. Frequent on rubbish-heaps.

61/22. L. DENSIFLORUM Schrad. Occasionally found on rubbish-heaps.

61/24. L. NEGLECTUM Thell. Frequent on rubbish-heaps.

61/25. L. RAMOSISSIMUM A. Nels. N. Am. Splott, 1927 (*Druce*).

64/1. THLASPI ARVENSE L. Frequent on rubbish-heaps.

76/2. RAPISTRUM ORIENTALE Crantz. Greece. Barry, 1927.

79/1. ERUCARIA HISPANICA (L.) Druce var. LINEARILOBA (Boiss.). Greece. Penarth town rubbish-dump, 1937. Identified as probably *E. linearilobа* Boiss. by Dr Melville.

RESEDACEAE.

85/1. RESEDA ALBA L. Naturalised in abundance at Barry Docks. In flower from early April until late November.

85/5. R. STRICTA Pers. Europe. Splott, 1930.

CARYOPHYLLACEAE.

93/1. TUNICA PROLIFERA (L.) Scop. Cardiff Docks, 1936 (*Mrs Sandwith*).

94/5. GYPSOPHILA ELEGANS M. Bieb. Asia Minor. Splott, 1937. Probably of garden origin.

95/1. SAPONARIA OFFICINALIS L. Naturalised in several places.
95/2. S. VACCARIA L. An occasional grain introduction.
96/7. SILENE GALLICA L. Appears most years with other grain aliens.
96/16. S. DICHOTOMA Ehrh. Persisted for five or six years at Splott, but now gone.
96/27(2). S. COELI-ROSA (L.) Godr. Reg. Medit. Splott, 1937.
96/32. S. ANTIRRHINA L. Grain alien. Cardiff E., 1938.
98/5. LYCHNIS MACROCARPA Boiss & Reut. S. Europe. Splott, 1928.
98/9. L. GITHAGO (L.) Scop. Occasionally found as a grain alien.
100/2. CERASTIUM ARVENSE L. Still at Barry Docks.
106/1. POLYCARPON TETRAPHYLLUM L. Europe. Barry, 1928.

MALVACEAE.

115/2. ALTHAEA HIRSUTA L. Splott, 1937.
116/2. LAVATERA SYLVESTRIS Brot. Splott, 1929; Cardiff N., 1938.
117/7. MALVA NICAEENSIS All. S. Europe. Splott, 1929.
117/9. M. PARVIFLORA L. Occasionally found as a grain alien.
117/11. M. HISPANICA L. S. Europe. Splott, 1927.
122/1. HIBISCUS TRIONUM L. Splott, 1930.

LINACEAE.

125/4. LINUM USITATISSIMUM L. A frequent rubbish-heap plant.

GERANIACEAE.

127/7. GERANIUM PYRENAICUM Burm. f. Almost gone from Radyr, but increasing at Barry Docks.

LEGUMINOSAE.

153/1b. MEDICAGO FALCATA L. var. TENUIFOLIOLATA Vuyck. Quite naturalised at both Cardiff and Barry Docks.
153/3. M. SATIVA L. Naturalised in several places on railway banks, etc.
153/4. M. HISPIDA Gaertn. Splott, 1936.
Var. APICULATA (Willd.). Cardiff N., 1938.
Forma CONFINIS (Koch) Burnat. Appears almost every year and is our commonest alien medick.
153/5. M. ARABICA Huds. Appears occasionally as a grain alien.
153/6. M. MINIMA (L.) Desr. Naturalised in one spot at Cardiff Docks, but gradually disappearing.
153/11b. M. ITALICA (Mill.) Steud. var. MARGINATA (Willd.). Splott, 1937.
154/2. MELILOTUS ALBA Desr. Naturalised at Cardiff and Barry Docks.
154/4. M. INDICA (L.) All. Common about the local docks.
155/37b. TRIFOLIUM RESUPINATUM L. var. SUAVEOLENS (Willd.). Splott.

159/2. DORYCNIUM RECTUM (L.) Sér. There have been two large plants of this species at Barry for many years. *D. hirsutum* Ser. and *D. herbaceum* Vill. have now gone.

160/7. LOTUS HISPIDUS Desf. Europe. Barry, 1927.

170/1. CORONILLA VARIA L. A dozen or more large patches scattered over the Barry Docks area.

171/1. ORNITHOPUS COMPRESSUS L. Europe. Barry, 1927.

171/4. O. ROSEUS Dufour. W. Europe. Cardiff N., 1938.

171/5. O. PINNATUS (Mill.) Druce. Europe. Barry, 1927.

174(2)/1. ARACHIS HYPOGAEA L. Cardiff W., 1937. In view of the enormous number of seeds which must find their way to refuse-dumps, it is curious that this species is so rarely recorded as an alien.

176/2. VICIA TENUIFOLIA Roth. Europe. Naturalised at Barry. Cardiff E., 1938.

176/6. V. DASYCARPA Tenore. An occasional grain alien.

176/9. V. LUTEA L. Cardiff N., 1938.

176/10. V. HYBRIDA L. Europe. Barry, 1935.

176/24. V. FABA L. Occasionally found on rubbish-heaps.

176/33(3). V. ERIOCARPA Hausskn. Cardiff N., 1938.

178/3. LATHYRUS TUBEROSUS L. Naturalised and increasing at Barry Docks.

178/9. L. APHACA L. Naturalised in small quantity at Barry.

180/1. PISUM ARVENSE L. Occasionally found as a grain alien.

180/5. P. SATIVUM L. Occasionally found on rubbish-heaps.

ROSACEAE.

188/1. FRAGARIA MOSCHATA Duchesne. Still on the railway bank at Radyr.

189/4. POTENTILLA ARGENTEA L. Naturalised and increasing on a railway bank in Barry district.

189/11. P. NORVEGICA L. Less frequent in the district than formerly.

189/17. P. INTERMEDIA L. Naturalised and increasing in two places in Cardiff district.

HALORAGACEAE.

215/1. GUNNERA CHILENSE Lam. Chile. Cardiff N., 1938. A garden outcast.

LYTHRACEAE.

219/3. LYTHRUM MEONANTHUM Link. S. Europe. Cardiff E., 1938.

ONAGRACEAE.

223/1. OENOTHERA BIENNIS L. Naturalised and abundant at Cardiff Docks. Sparingly in other waste places.

223/2. O. GRANDIFLORA Ait. N. Amer. A frequent garden outcast. The buds of this plant are orange not yellow as in *O. biennis*.

223/4. O. MURICATA L. Still found sparingly on waste ground at Canton, Cardiff.

223/7. O. SINUATA L. N. Amer. Persisted for a few years at Cardiff Docks but not seen since 1929.

223/10. O. ROSEA Ait. N. Amer. Cardiff N., 1938.

223(2)/1. GODETIA VIMINEA Spach. Calif. Cardiff N., 1938.

224/1. FUCHSIA RICCARTONI Hort. S. Amer. Cardiff N., 1938.

UMBELLIFERAE.

239/1. ERYNGIUM CAMPESTRE L. Naturalised at Barry Docks, but does not flower every year.

250/1. CARUM CARVI L. Appeared at the same spot at Splott for about six seasons but not seen since 1936.

252/1. FALCARIA RIVINI Host. Naturalised and increasing at Barry Docks.

263(2)/1. PRANGOS UECHTRITZII Boiss. & Haussk. One large plant at Barry Docks. It flowers every second year, but seldom ripens seed.

279/1. CORIANDRUM SATIVUM L. Sometimes appears on rubbish-heaps. A vernal species.

283/2. CAUCALIS DAUCOIDES L. Appears almost every June on one waste-heap or another.

283/8. C. LATIFOLIA L. Barry Docks, 1928 and 1938. Cardiff Docks, 1936.

RUBIACEAE.

296/10. GALIUM TRICORNE Stokes. Occasionally found as a grain alien.

296/15. G. VALANTIA Weber. Reg. Medit. Splott, 1931.

298/5. ASPERULA ARVENSIS L. Cardiff Docks, 1936.

VALERIANACEAE.

302/1. KENTRANTHUS RUBER (L.) Druce. Naturalised and increasing in one or two places.

COMPOSITAE.

320/3. ERIGERON CANADENSE L. Frequent on waste ground.

328/1. GNAPHALIUM LUTEO-ALBUM L. Europe. Barry, 1928.

333/7. INULA VISCOSA Ait. Apparently gone from Cardiff Docks, but still at Barry Docks.

339/5. AMBROSIA PSILOSTACHYA DC. N. Amer. Persisted at Barry for 3 years but now exterminated by stronger growing plants.

341/1. XANTHIUM STRUMARIUM L. Hardly a season goes by without this species turning up somewhere. Only one year (1930) has it fruited with us, although the plants persist until late November.

347/4. HELIANTHUS ANNUUS L. Frequent on rubbish-heaps.

351/1. GUIZOTIA ABYSSINICA Cass. Occasionally found on rubbish-heaps.

353/6. BIDENS FRONDOSA L. Decreasing at Cardiff Docks and will probably die out.

354/1. GALINSOGA PARVIFLORA Cav. An abundant garden-weed on the same allotments where *Rorippa austriaca* grows abundantly.

365/7. ACHILLEA NOBILIS L. Still at Cardiff Docks, but gone from Barry Docks.

368/1. ANTHEMIS TINCTORIA L. Now gone from the district.

371/3. MATRICARIA SUAVEOLENS (Pursh) Buch. Very common along roadsides, etc.

378/1. ARTEMISIA ABSINTHIUM L. Occasionally found on waste ground.

378/15. A. ANNUA L. Orient. Splott, 1938 (*Miss Todd*).

378/16. A. BIENNIS Willd. Rather frequent on rubbish-heaps.

378/18b. A. GNAPHALODES Nutt. Gone from Radyr, but still at Cardiff Docks.

380/3. PETASITES FRAGRANS Presl. Naturalised in several places.

383/31. SENECIO CINERARIA DC. Gone from the district.

386/1. CRYPTOSTEMMA CALENDULACEA (L.) Druce. S. Africa. Barry, 1927.

389/2. ECHINOPS RITRO L. Europe. Established on a patch of waste ground, Cardiff W.

399/1. SILYBUM MARIANUM Gaertn. Occasionally on waste ground.

400/1. GALACTITES TOMENTOSA Moench. Barry, 1928.

405/12. CENTAUREA CYANUS L. A frequent grain alien.

405/14. C. PANICULATA L. Europe. Splott, 1937.

405/15. C. CALCITRAPA L. Europe. Splott, 1937.

405/16. C. ASPERA Willd. Increasing every year at Barry.

405/25. C. DIFFUSA Lam. S. Europe. Splott, 1933 (*Miss E. Vachell*).

405/26. C. ORIENTALIS L. S. Europe. Cardiff Docks, 1937 (det. *J. P. M. Brenan* at Kew).

405/31. C. SOLSTITIALIS L. Splott, 1938. Cardiff N., 1938.

405/32. C. MELITENSIS L. A frequent grain alien.

405/37. C. SALMANTICA L. Medit. Splott, 1927.

405/45. C. ALGERIENSIS Coss. & Dur. N. Africa. Splott, 1927.

406(2)/1. TETRAMORPHAEA BELANGERIANA DC. Persia. Splott, 1936 (*Miss Todd*).

407/1. CARTHAMUS LANATUS L. Cardiff E., 1937.

407/3. C. TINCTORIUS L. Occasionally found on rubbish-heaps.

416/10. CREPIS TARAXACIFOLIA Thuill. Very common on railway banks, etc.

416/11. C. SETOSA Haller f. Europe. Persisted at Splott for several years, but not seen since 1936.

417/1. TOLPIS BARBATA Gaertn. Europe. Barry, 1927.

420/2. ANDRYALA INTEGRIFOLIA L. S. Europe. Cardiff N., 1938.

425/2. LACTUCA SERRIOLA L. Still at Barry Docks.

428/1. TRAGOPOGON PORRIFOLIUS L. Naturalised at Cardiff Docks and Barry Docks.

HYDROPHYLLACEAE.

488/1. PHACELIA CILIATA Benth. N. Amer. Porthcawl, 1938. Introduced with chicken-food.

488/4. P. TANACETIFOLIA Benth. Cardiff N., 1938.

BORAGINACEAE.

493/2. LAPPULA ECHINATA Gilib. Occasionally found as a grain alien.

494/1. ASPERUGO PROCUMBENS L. Splott, 1929.

496/4. AMSINCKIA INTERMEDIA Fisch. & Mey. Cardiff N., 1938.

500/1. ANCHUSA SEMPERVIRENS L. Naturalised on roadsides in several places.

509/7. ECHIUM HUMILE Desf. N. Africa. Naturalised and increasing at Barry. Remains in flower for over six months.

SOLANACEAE.

516/1. LYCOPERSICUM ESCULENTUM Mill. In abundance on every rubbish-heap.

517/15. SOLANUM CAPSICASTRUM Lam. Brazil. Cardiff E., 1937.

517/16. S. CILIATUM Lam. S. Amer. Cardiff S.W., 1930.

517/20. S. GRACILE Duval. S. Amer. Barry Docks, 1935 (*Mrs Sandwith*).

518/7. PHYSALIS PERUVIANA L. S. Amer. Cardiff S.W., 1937.

522/1. DATURA STRAMONIUM L. Appears in small quantity every year on allotments at S.W. Cardiff.

SCROPHULARIACEAE.

527/4. VERBASCUM VIRGATUM Stokes. Still maintaining itself in its one locality in S.W. Cardiff.

527/8. V. NIGRUM L. The white-flowered form is still to be found in its original locality.

532/3. LINARIA REPENS (L.) Mill. Still to be found in a few places but decreasing in quantity. The hybrid with *L. vulgaris* Mill. appears every year in one locality in S.W. Cardiff.

535/5. SCROPHULARIA SCORODONIA L. Quite established in one spot at Cardiff Docks.

535/8b. S. CANINA L. var. PINNATIFIDA (Brot.). Established at Cardiff Docks for about 50 years.

537/2. MIMULUS MOSCHATUS Dougl. N.W. Amer. Naturalised in a damp hollow a few miles north of Cardiff.

542/1. ERINUS ALPINUS L. Europe. Appears most seasons on an old wall at Llandaff.

LABIATAE.

562/1. SATUREIA HORTENSIS L. Europe. Splott, 1927.

566/12. SALVIA SYLVESTRIS L. Naturalised in one locality at Barry Docks.

566/17. S. VERTICILLATA L. Naturalised in several places in the district.

570/3. DRACOCEPHALUM PARVIFLORUM Nutt. N. Amer. Splott, 1927.
577/8. STACHYS RECTA L. Thoroughly naturalised at Barry Docks.
578/1. GALEOPSIS SPECIOSA Mill. Appeared in abundance amongst potatoes on an allotment at N. Cardiff, 1935 and 1936. Not seen since.

PLANTAGINACEAE.

588/1. PLANTAGO INDICA L. Cardiff S.W., 1937. Now gone from Cardiff Docks.

ILLECEBRACEAE.

593/4. HERNIARIA CINEREA Lam. & DC. Europe. Splott, 1929.
594/1. CORRIGIOLA LITTORALIS L. Europe. Barry, 1927.

AMARANTACEAE.

596/2. AMARANTHUS HYBRIDUS L. N. Amer. Splott, 1926.
596/4. A. CHLOROSTACHYS Willd. A very frequent grain alien. Appears every year.
596/6. A. RETROFLEXUS L. A frequent grain alien.
596/9. A. ALBUS L. Almost as frequent a grain alien as 596/4.
596/11b. A. ANGUSTIFOLIUS Lam. var. POLYGONOIDES (Moq.) Thell. Europe. Splott, 1936.
596/15. A. VULGATISSIMUS Speg. Argentine. Cardiff E., 1937. Identified by Dr R. Melville as probably *A. vulgatissimus* Speg.

CHENOPODIACEAE.

600/4. CHENOPODIUM HYBRIDUM L. Of occasional occurrence as a grain alien.
600/5. C. URBICUM L. Cardiff E., 1937.
600/7. C. OPULIFOLIUM Schrad. Appears most years as a grain alien.
600/11. C. LEPTOPHYLLUM (Nutt.) Brit. Of occasional occurrence as a grain alien.
600/21. C. HIRCINUM Schrad. S. Amer. Splott, 1937.
602/1. ROUBIEVA MULTIFIDA Moq. Established at Barry Docks.
610/1. KOCHIA SCOPARIA (L.) Schrad. Europe. Cardiff S.W., 1937.

POLYGONACEAE.

615/19. POLYGONUM PATULUM M. Bieb. An occasional grain alien.
615/32. P. CUSPIDATUM Sieb. & Zucc. Established in many places.
615/34. P. COMPACTUM Hook. f. Japan. Thoroughly established on an open piece of ground in the centre of Cardiff.
616/1. FAGOPYRUM ESCULENTUM Moench. A frequent rubbish-heap plant.
618/20(2). RUMEX GRAECUS Boiss. & Heldr. Europe. Established on a roadside, E. Cardiff. (See p. 148 below.—ED.)
618/21. R. BUCEPHALOPHORUS L. S. Europe. Barry, 1928.
618/24. R. CUNEIFOLIUS Campd. S. Amer. Cardiff Docks, 1927 (*Mrs Sandwith*). This is the dock established on the sand dunes at Kenfig.

SANTALACEAE.

627/1. THESIUM HUMIFUSUM DC. Established for many years at Barry Docks, but being gradually choked by larger plants.

EUPHORBIACEAE.

628/9. EUPHORBIA VIRGATA Waldst. & Kit. Gone from Radyr but still flourishing at Barry Docks.

628/10b. E. ESULA L. var. PINIFOLIA (Lam.) Druce. For many years at Cardiff Docks, but gradually dying out.

628/18. E. CERATOCARPA Ten. S. Europe. Naturalised at Barry Docks. Flowers every spring and autumn.

630/1. RICINUS COMMUNIS L. Barry Docks, 1937.

632/2. MERCURIALIS ANNUA L. Rather frequent on rubbish-heaps.

URTICACEAE.

635/1. CANNABIS SATIVA L. Rather frequent on rubbish-heaps.

LILIACEAE.

702/16b. ALLIUM ROSEUM L. var. BULBIFERUM Kunth. Medit. Naturalised and increasing at Barry Docks.

704/1. HYACINTHUS COMOSUS L. Established at Barry Docks and at another spot on the Glamorgan coast. Flowers in May.

CYPERACEAE.

746/10. SCIRPUS HOLOSCHOENUS L. Quite established at Barry Docks, if not a native.

GRAMINACEAE.

754/1. PANICUM MILIACEUM L. A very frequent rubbish-heap plant.

754/6. P. COLONUM L. Medit. Cardiff N., 1938.

754/8c. P. CRUS-GALLI L. var. BREVISETUM Döll. A frequent grain alien.

754/8d. P. CRUS-GALLI L. var. ARISTATA S. F. Gray. Cardiff N., 1938.

754/8e. P. CRUS-GALLI L. var. MITE Pursh. Splott, 1937. Cardiff N., 1938.

754/10. DIGITARIA SANGUINALE (L.) Scop. Cardiff E., 1937.

756/1. SETARIA ITALICA (L.) Beauv. Europe. Cardiff S.W., 1937. Cardiff N., 1938.

756/2. S. VIRIDIS (L.) Beauv. Occasionally found as a grain alien. Var. MAJOR (Gaud.) Koch seems to be the common form of this species on rubbish-heaps.

756/3. S. GLAUCA Beauv. Occasionally found as a grain alien.

756/6. S. GENICULATA Beauv. Mexico. Cardiff N., 1938.

759/1. ZEA MAYS L. Frequent on rubbish-heaps.

763/2. SORGHUM HALAPENSE (L.) Pers. Reg. Calid. Cardiff E., 1937. Forma MUTICA (Hask.). Cardiff E., 1937. Cardiff N., 1938.

763/3. S. CERNUUM Host. Asia. Cardiff S.W., 1935 and 1937.

765/1. PHALARIS MINOR Retz. Rather common as a grain alien.
765/5. P. CANARIENSIS L. The commonest of all rubbish-heap grasses. Never fails to appear.
765/7. P. PARADOXA L. An occasional grain alien.
765/8. P. ANGUSTA Nees. N. Amer. Splott, 1927.
773/1. PIPTATHERUM MULTIFLORUM (Desf.) Beauv. Established in small quantity at Barry Docks.
782/1. POLYPOGON MONSPELIENSIS (L.) Desf. Occasionally found as a grain alien.
782/2. ×P. LITTORALIS (With.) Smith. Quite established at Cardiff Docks.
785/1. APERA SPICA-VENTI (L.) Beauv. An occasional grain alien.
794/6. AVENA STRIGOSA Schreb. Occasionally found as a grain alien.
794/7. A. SATIVA L. A very common grain alien.
797/1. CYNODON DACTYLON (L.) Pers. Naturalised on the river-bank in the centre of Cardiff.
808/1. CYNOSURUS ECHINATUS L. An occasional grain alien.
815/1. ERAGROSTIS CILIANENSIS (All.) Lutati. Cardiff N., 1938.
815/2. E. POAEOIDES Beauv. Eur. Splott, 1930.
815/8. E. PECTINACEA (Michx.) Nees. N. Amer. Cardiff N., 1938.
827/1(2). BROMUS GUSSONEI Parl. In some quantity on a roadside, Cardiff E., 1937.
829/2. LOLIUM TEMULENTUM L. An occasional grain alien.
831/1. SECALE CEREALE L. An occasional grain alien.
832/11. TRITICUM CYLINDRICUM (Host) Ces. Pass. & Gib. Europe. Cardiff S.W., 1937.

NOTES ON THE ROSES OF BEDFORDSHIRE.

EDMUND B. BISHOP.

A few years ago Col. Wolley-Dod drew my attention to certain vice-counties from which he had not a single *Rosa* record, and urged me to take every opportunity of working in any of them. Bedfordshire (30) was one of these, and on my happening to mention this to Mr Hugh Phillips he undertook to do his best to help us, as he and his mother lived at Hitchin, only two or three miles over the county border. During 1936 and 1937 our kind friends made systematic explorations of the whole county, and obtained about 300 gatherings of Roses. These were all submitted to me and the present paper is the outcome.

Explanations are necessary as to various references, abbreviations, etc. Arrangement and nomenclature are (primarily) those of Col. Wolley-Dod's *Revision of the British Roses*, 1930, with a few subsequent published amendments thereto. Every British student of the genus should make this indispensable monograph the groundwork of his or her studies. It has, in so convenient a form, evolved reasonable order out of previous bewildering chaos. Whatever critical knowledge I have acquired of *Rosa* originated from the study of Wolley-Dod's publications, and has since been fostered by his patient help in countless diagnoses of gatherings made by my sister and myself—indeed I can never repay my debt to him. " W.-Dod " (or mere mention of locality without any comment) = as described by Wolley-Dod in his *Revision*.

Later on, it was Col. Wolley-Dod who introduced me to Keller's monumental work, which has now become to me almost a *Rosa* Bible. " Kell." = as described in Dr Robert Keller's *Synopsis Rosarum Spontanearum Europae Mediae* (Zurich, 1931), which contains full descriptions of more than 2600 varieties, forms and hybrids of Mid-European Roses. Even when due allowance be made for the much larger area covered by the *Synopsis* than that by the *Revision*, it is obvious that Keller carries splitting to a finer art than does Wolley-Dod, and consequently must be even more of an anathema to a rigid Benthamite. However, I am not prepared to argue that point here; it can be left to the personal idiosyncrasy of each student.

It must be understood that, although Col. Wolley-Dod has raised no objection to my naming of the more or less generally distributed varieties and forms, I have not cared just now to worry him over the more critical ones, consequently such are given on my own authority. As regards the " Kell." namings all are solely my own, as difficulties of transit and language (to say nothing of my reluctance to trouble Dr Keller in his now very advanced age) make any confirmation by him of such naming quite out of the question.

" Ref. No. —" = a particular number in my own herbarium.

Where, as in many cases, no "Kell." name is suggested, it may usually be understood that the " W.-Dod " name seems a fairly suitable one

from the *Synopsis*, but not infrequently it implies that no " Kell." name seems to fit.

It must be explained that no variety or form has ever been included in Wolley-Dod's List of *Rosa* records, unless a specimen has been passed by him or by me. Of course, I am quite aware that Druce's *Comital Flora of the British Isles* records the occurrence in v.-c. 30 of six of the *aggregate* species mentioned in this paper, only one, *R. obtusifolia*, being new to it. The absence of *R. tomentosa* from the gatherings submitted to me is rather a surprise, though that species is not definitely recorded in *Comital Flora*.

Until quite recently I had no knowledge of any Flora of Bedfordshire, but early in 1939 I was able to inspect a copy of *The Field Flowers of Bedfordshire*, by James Saunders, A.L.S. (Luton, 1911). Herein I find the following species of *Rosa* recorded:—*arvensis*, *canina*, *dumetorum*, *tomentosa* and *rubiginosa*. The only varieties segregated therein are *lutetiana* and *sphaerica* (of *R. canina*) and *urbica* (of *R. dumetorum*). Most of these records seem to have been supplied by Rev. W. Moyle Rogers. Without doubt a detailed search through B.E.C. Reports and through files of the *Journal of Botany* would reveal many individual *Rosa* records, but such a task is beyond my powers just now.

R. arvensis Huds. (Agg.)	Clophill: towards var. *biserrata* Crép., but many leaflets uniserrate or intermediate, so safer under aggregate species (Kell., p. 133: var. *typica* R. Kell. f. *subbiserrata* Schwertchl.).
Var. *vulgaris* Ser.	Barton-in-the-Clay: a form with small leaflets and small fruit (Kell., p. 132: very near f. *parvifolia* Martrin-Donos). In more or less typical form, *vulgaris* occurs throughout the whole county.
f. *major* Coste	A rather weak form, actual locality not stated.
Var. *ovata* (Léj.) Desv.	Bromham. Colmworth: a multiflorous form, with some fruits subglobose or even globose (Ref. No. R.2103).
Var. *biserrata* Crép.	Barton-in-the-Clay. Marston Morteyne. Colmworth (Ref. No. R.2104). Felmersham.
Var. *gallicoides* (Déségl.) Crép.	Near Colmworth: excellent examples of this very striking variety, which is treated by Keller as a comprehensive aggregate, a view with which I am in accord (Kell., p. 137: I incline to place these specimens under var. *glandulosa* (Lloyd) R. Kell.) (Ref. No. R.2105).
R. stylosa Desv. (Agg.)	A gathering with very scanty fruit, actual locality not stated, seems to come under this species. Possibly it may be var. *virginea* (Rip.) Rouy, but the material is hardly good enough for a record.

Var. *systyla* (Bast.) Baker ..... Clophill: two gatherings ± typical, three others multiflorus (Kell., p. 166: under f. *fastigiata* (Bast.) R. Kell.). Colmworth: a small-leafleted form, with peduncles weakly glandular.

Var. *congesta* (Rip.) R. Kell. ..... Colmworth: two separate gatherings. Felmersham: two more separate gatherings. Wilden: very much weathered, of doubtful value. I have no hesitation in placing the Colmworth and Felmersham specimens under var. *congesta*. For first British record of this variety, see *B.E.C. 1937 Rep.*, 448-9. These further gatherings confirm my forecast as to the occurrence of var. *congesta* in Bedfordshire. In the Colmworth specimens only about 25 per cent. of the fruits have any trace of hispidity at bases of styles, whilst the Felmersham specimens have about 50 per cent. In all cases hispidity is weak, usually very weak. Obviously, these Bedfordshire gatherings represent a weaker form of var. *congesta* than those from v.-c. 28 described in *B.E.C. 1937 Rep.* But it must always be borne in mind that in *R. stylosa* the styles are almost invariably quite glabrous, the one and only exception recorded by Keller from the whole of Middle Europe being var. *congesta*, and that from Savoy alone. Consequently, even slight hispidity, which would be ignored in *R. canina*, is in *R. stylosa* of real importance.

R. canina L. (Agg.) ..... Near Colmworth (W.-Dod: perhaps under Group *Transitoriae*, but almost intermediate between that and Group *Dumales*. I cannot make it fit any var. or f. of either Group in *Revision*). (Kell., pp. 467-8: seemingly quite a fair fit for var. *transitoria* R. Kell. f. *heterophylla* R. Kell.) (Ref. No. R.2136).

Group *Lutetianae*.

Var. *lutetiana* (Lem.) Baker ..... Barton-in-the-Clay: towards *sphaerica*. Bromham: towards *sphaerica*. Ampthill (Kell., p. 460: nearest f. *separabilis* (Déségl.) Rouy). Colmworth: a multiflorus form (Kell., p. 462: I think f. *elongato-ramulosa* R. Kell.) (Ref. No. R.2107). Felmersham (Kell., p. 460: perhaps f. *glaucescens* Desv.). Others: ± typical, in various parts of the county.

f. *lasiostylis* Borb. ..... Felmersham: quite characteristic (Ref. No. R.2108.)

Var. *sphaerica* (Gren.) Dum.	Barton-in-the-Clay. Bromham. Clophill (Kell., p. 462: seemingly best under f. *barbatostylis* R. Kell.) (Ref. No. R.2109.)
Var. *flexibilis* (Déségl.) Rouy	Colmworth (Kell., p. 458: a good fit for var. *lutetiana* f. *multiflora* Wirtgen).
Var. *senticosa* (Ach.) Baker	Barton-in-the-Clay. Bromham. Marston Morteyne. Colmworth.
f. *oxyphylla* (Rip.) W.-Dod	Aspley (Ref. No. R.2110).
f. *mucronulata* (Déségl.) W.-Dod	Woburn (Ref. No. R.2111).
Group. *Transitoriae.*	
Var. *spuria* (Pug.) W.-Dod	Marston Morteyne: probably *spuria*, a smallish form.
Var. *globularis* (Franch.) Dum.	Clophill (Ref. No. R.2112). Colmworth: may be *globularis*. Wilden: good, but a small form.
Var. *ramosissima* Rau	Specimens, best placed under this rather loosely-defined variety, were gathered in various parts of the county but, as usual, are all more or less unsatisfactory. Maiden Bower, near Dunstable (Kell., p. 468: in my opinion var. *transitoria* R. Kell. under f. *ololeia* (Rip.) Braun) (Ref. No. R.2113).
Group *Dumales.* (Agg.)	A gathering from near Ampthill, thought by Mr Hugh Phillips to be perhaps var. *medioxima* (Déségl.) Rouy, has some leaflets suborbicular, and several broadly ovate, whilst the remainder (about 50 per cent.) are better described as ovate. Careful comparison with the 10 sheets in the *medioxima* cover in my herbarium will not permit me to bring this specimen under that rare variety, though it does make some approach thereto. Even the most untypical of my specimens does not stray quite over the *medioxima* border-line, as does this Ampthill gathering. For the present I prefer to leave it under aggregate *Dumales.*
Var. *dumalis* (Bechst.) Dum.	Barton-in-the-Clay (Kell., p. 485: a reasonable fit for f. *laxifolia* (Borb.) R. Kell.). Bromham (Kell., p. 485: nearest f. *racemosula* Braun) (Ref. No. R.2114). Clophill (Kell.: perhaps nearest f. *laxifolia*). Ampthill.
f. *viridicata* (Pug.) Rouy	Barton-in-the-Clay. Colmworth. Bromham. Ampthill (Kell., p. 484: perhaps nearest f. *sarmentoides* Braun) (Ref. No. R.2138).
f. *cladoleia* (Rip.) W.-Dod	Many gatherings from various parts of the county. Barton-in-the-Clay (Kell., p. 480: (a) perhaps nearest f. *bicolor* R. Kell.; p. 481: (b) nearest f. *attenuata* Braun) (Ref. No. R.2139). Woburn (Kell., p. 480: a reasonable fit for f. *bicolor* R. Kell.).

Var. *stenocarpa* (Déségl.) Rouy	Barton-in-the-Clay (Kell., p. 481 : seemingly best under f. *conica* R. Kell.) (Ref. Nos. R.2118 and 2119). Ampthill. Felmersham (Kell., p. 481 : a fair fit for f. *suboblonga* R. Kell.) (Ref. No. R.2142). Woburn (Kell., p. 481 : f. *conica* R. Kell.) (Ref. No. R.2120).
Var. *Carioti* (Chab.) Rouy	Clapham. Ampthill. Maiden Bower, near Dunstable. Bromham. These last three all unsatisfactory specimens.
Var. *fraxinoides* H. Br.	
f. *recognita* Rouy, ...	Aspley.
Var. *sylvularum* (Rip.) Rouy	Several gatherings, from various parts of the county.
f. *adscita* (Déségl.) Rouy	Aspley Guise. Bromham.

Group *Andegavenses.*

Var. *andegavensis* (Bast.) Desp.	Turvey. Wilden : with some peduncles glandular and some eglandular. (Passed by W.-D. as *andegavensis.*) (Kell., p. 463 : clearly under an aggregate var. *edita* (Déségl.) Rouy, a weak growing and weakly-armed form, which I cannot fit under either of its four named formae) (Ref. No. R.2121).
f. *agraria* (Rip.) W.-Dod	Colmworth : four separate gatherings, all of practically identical form. (W.-Dod : under *agraria.* Further, all these specimens have been submitted to him and confirmed as such). (Kell., p. 463 : quite clearly under var. *edita* (Déségl.) Rouy f. *mollardiana* (Moutin) Rouy) (Ref. No. R.2122). It must be noted that Keller's *primary* distinctions between vars. *edita* (and its formae) and *andegavensis* (and its formae) are as follows :—The former " *Pedunculorum pars glandulis stipitatis obsita, altera pars nuda;*" the latter " *Omnes pedunculi ± dense hispido-glandulosi.*"
Var. *verticillacantha* (Mér.) Baker	Exact locality is not stated.
f. *clivicola* Rouy	Wyboston (Kell., p. 475 : I think under var. *diversiglandulosa* R. Kell. (as agg.)). Malden Bower, near Dunstable (Kell., p. 475 : I think nearest var. *diversiglandulosa* R. Kell. (as agg.)) (Ref. No. R.2124). Bromham (Kell., p. 491 : var. *adenocalyx* R. Kell. f. *glaucophylla* R. Kell.) (Ref. No. R.2144).

Group *Scabratae.*

Var. *Blondaeana* (Rip.) Rouy	Between Wilden and Colmworth.

Intermediate between *R. canina* L. and *R. dumetorum* Thuill. (So I prefer to regard these gatherings)	Between Clophill and Bedford (Kell., p. 463: I think under *R. canina* L. ssp. *R. vulgaris* Gams var. *hispidula* (Rip. p.p.) Chr.). Actual locality not stated; petioles pubescent, but pubescence only rarely extends by even a few hairs to midribs.
R. dumetorum Thuill. (Agg.)	(W.-Dod: I cannot segregate either of the three undermentioned gatherings, so will leave each as aggregate). Maiden Bower, near Dunstable (Kell.: possibly it may be brought under var. *subglabra* (Borb.) R. Kell.; as agg., but untypical). Woburn (Kell., p. 548: under var. *subglabra* (Borb.) R. Kell., seemingly nearest f. *uncinelloides* (Pug.) Braun). Near Colmworth (Kell., p. 549: var. *subglabra* (Borb.) R. Kell., a fair fit for f. *peracuta* Braun) (Ref. No. R.2253).
Var. *typica* W.-Dod	Marston Morteyne: two separate gatherings seemingly of same form, which may pass as var. *typica* W.-Dod, but certainly not extreme (Kell., p. 543: var. *Thuilleri* Chr., a fair fit for f. *leptotricha* Borbás). Bromham: two gatherings, in flower and fruit respectively, very likely from same bush (W.-Dod: I think best under var. *typica*, a sub-biserrate, smallish-leafleted, densely-armed form) (Kell., p. 551: I make it var. *lembachensis* (J. B. v. Kell.) R. Kell., *sens. lat.*, but cannot segregate further under any named form).
f. *urbica* (Lem.) W.-Dod	About 20 gatherings in all, from various parts of the county. Flitwick: making considerable approach (in pubescence) towards *typica, sens. str.*; with multiflorous inflorescence, and long remarkably pinnate sepals (Kell.: I incline to place it under var. *Thuilleri* Chr., but cannot segregate further; a very interesting Rose) (Ref. No. R.2115). Felmersham: a little towards *typica, sens. str.* (Kell., p. 540: a fair fit for var. *platyphylla* (Rau) Chr. f. *peropaca* (Braun) (Ref. No. R.2125).
f. *semiglabra* (Rip.) W.-Dod	Marston Morteyne. Colmworth.
Var. *ramealis* (Pug.) W.-Dod	
f. *urbicoides* (Crép.) Braun	Flitwick (Ref. No. R.2126). Wilden (Ref. No. R.2127). Felmersham.

Var. *Gabrielis* (F. Gér.) R. Kell. .... Ten gatherings from various parts of the county, often, as is usual in this variety, more or less untypical and doubtful. Flitwick Moor: quite a fair fit (Ref. No. R.2116).

Var. *calophylla* Rouy ..... Flitwick: nearest *calophylla*, and may just pass. Woburn: perhaps nearest *calophylla*, but doubtful.

Var. *platyphylla* (Rau) W.-Dod ..... Fifteen gatherings from various parts of the county. Ampthill (Kell., p. 549: var. *subglabra* (Borb.) R. Kell. f. *jactata* (Déségl.) Rouy). Shefford (Kell., p. 551: perhaps var. *hirtifolia* Braun f. *perciliata* Braun) (Ref. No. R.2117). Woburn (Kell: a fairish fit for var. *hirtifolia* Braun (agg.)) (Ref. No. R.2145). Colmworth (Kell., p. 552: perhaps nearest var. *incanescens* Braun, but hardly a good fit) (Ref. No. R.2146). Clapham (Kell., p. 550: var. *hirtifolia* Braun f. *rivularis* (Braun & Borb.) Braun) (Ref. No. R.2147). It must be borne in mind that Keller's " var. *platyphylla* (Rau) Chr." is far from being synonymous with var. *platyphylla* (Rau) W.-Dod.

Var. *sphaerocarpa* (Pug.) W.-Dod f. *spinetorum* (Déségl. & Ozan.) W.-Dod ..... Shefford: a multiflorous form (Kell., p. 549: I think best under var. *hirtifolia* Braun (agg.), but (see p. 539) not impossible under var. *platyphylla* f. *spinetorum*) (Ref. No. R.2128). Clapham (Kell., p. 550: seemingly a fair fit for var. *vodanensis* Schwertschl.). Felmersham: (a) an even better fit for var. *vodanensis*: (b) and (c) also *vodanensis*; (d) under an agg. var. *hirtifolia*.

Var. *hemitricha* (Rip.) W.-Dod ..... Clophill (Kell., p. 554: a good fit for f. *affinitata* Braun). Ampthill (Kell., p. 555: (a) quite a reasonable fit for f. *quadica* Braun (Ref. No. R.2129): (b) a form with unarmed stems and branches, and thin-textured leaflets (Ref. No. R.2130)).

R. obtusifolia Desv.

Var. *tomentella* (Lém.) Baker ..... About 20 gatherings from various parts of the county. Woburn (Kell., p. 425: a fair fit for var. *Longae* Cornaz). Near Colmworth: (a) with some leaflets larger than usual, and more subfoliar glands (Kell., p. 429: var. *pycnocephala* (Chr.) R. Kell., seemingly a good fit for f. *transsilvanica* R. Kell.) (Ref. No. R.2132); (b) a largish form, making slight approach to var *Borreri*). (Kell., p. 423: near f. *sinuatidens* Chr.) (Ref. No. R.2131). Marston Mor-

teyne (Kell., p. 424: under f. *rectispina* R. Kell.) (Ref. No. R.2148). Shelton: with variable styles, subglabrous to weakly or even decidedly hispid (Kell., p. 424: nearest f. *esinensis* R. Kell.) (Ref. No. R.2149). Between Bedford and Colmworth: with only about 25 per cent. of its fruit well-formed; also, leaflets are variable as regards quantity of pubescence and number of subfoliar glands. In these circumstances, whilst leaving under var. *tomentella* for the present, I incline strongly to suspect that it is a hybrid thereof.

Var. *Borreri* (Woods) W.-Dod ..... Maulden (both W.-Dod and Kell.).

Var. *capucinensis* R. Kell. ..... Four gatherings, all apparently from within a few miles radius, seem to come under this variety, which has not yet been recorded from Britain. My report thereon, after careful examination, is much too long to be included in this paper. Circumstances have prevented me from submitting this and other critical material to Col. Wolley-Dod, consequently, until I can get his opinion, it is advisable to keep any definite naming in suspense, however confident I may feel. To put it briefly, these gatherings are strongly suggestive of *Rothschildii*, but are *minus* the vital key characters of that variety —acicles on flowering branches and glands on peduncles. Their chief departure from *capucinensis* is that their leaflets are (on average) larger, usually much larger than "± 23 mm. longa et ± 10-15 mm. lata," the size of *capucinensis* leaflets, as described by Keller. p. 435. But it seems to me, from the sentence of Wolley-Dod in his *Revision*, p. 73, lines 27-28, "Keller thinks this variety (i.e. *Rothschildii*) is very near his *R. obtusifolia* var. *capucinensis*," a reasonable assumption that Keller would not have rejected our specimens on account of size of leaflets, seeing that *Rothschildii* normally has leaflets at least as large as those now under consideration. Anyhow, we will leave these gatherings as probably *capucinensis*, subject to future confirmation.

Var. *Rothschildii* (Druce) W.-Dod .. Five gatherings from about Colmworth: are all clearly this variety, though not extreme. I am indeed pleased, but not surprised, at its discovery in v.-c. 30. It has already

	been found in the adjacent v.-cc. 24, 31, and 32, also in 53 and 55 (Rutland), Mrs C. L. Wilde being the first to record it from the two last-mentioned. This glorious Rose, always associated by us with its discoverer, is obviously a true native of the Eastern Midlands, and seems specially at home in the north-east corner of Northamptonshire. Probably its correct status is that now accepted, but small wonder is it that Druce in his enthusiasm gave it specific rank (Ref. No. R.2134).
R. rubiginosa L.	
Var. *typica* W.-Dod.	Near Bromham: making a slight approach towards *echinocarpa*, but not that var.
Var. *echinocarpa* (Rip.) Gren.	Near Bromham (Kell.: I think the echinate characters much exceed those of var. *umbellata* (Leers) Dum. f. *echinocarpa* (Rip.) Dum., as described in *Synopsis*, p. 349. In my opinion, this is better under f. *horrida* Lange, pp. 350-1) (Ref. No. R.2135).
R. micrantha Sm.	
Var. *typica* Chr.	Barton-in-the-Clay.

Since my sister and I, throughout the course of our now lengthy lives, have tramped and botanised in all but two of our English counties, it seems strange that so readily accessible a county as Bedfordshire should have been almost neglected by us. Not quite neglected, as a few days spent round Dunstable, in May 1913, did give us some slight idea of its floral possibilities, but that visit took place far too early in the year for Roses. Of course we have often traversed the county by road and rail, but never again was there any opportunity for serious botany. The more cordially welcome therefore was the bountiful harvest of Roses provided for us by the ungrudging labours of Mrs Phillips and Mr Hugh Phillips.

GALINSOGA QUADRIRADIATA Ruiz and Pav. IN BRITAIN.

J. P. M. Brenan.

Galinsoga quadriradiata Ruiz & Pav. var. *hispida* (DC.) Thell. (see p. 44 above) resembles *G. parviflora* Cav. in habit and general appearance but may be distinguished from it by the following characters:— *Stem* more or less pilose, upper part of stem and pedicels more or less thickly clothed with multicellular, spreading, flexuous, simple, and glandular hairs, 0.5 mm. long or more. *Receptacle-scales* not trifid, serrate towards their apices. *Pappus-scales* of tubular flowers fimbriate on their margins, the longer ones on each achene attenuate towards the tops and prolonged into distinct aristas, the shorter ones acute or obtuse, the longest ones usually shorter than the achene but sometimes longer, and also shorter than the corolla: those of the ligulate flowers similar but shorter.

G. parviflora Cav. has the *stem* glabrous or subglabrous, the pedicels clothed with short, ascending, simple hairs less than 0.5 mm. long, usually intermixed with spreading glandular ones. *Receptacle-scales* usually trifid. *Pappus-scales* of tubular flowers fimbriate at the margins, obtuse to acute, not aristate at the apex, as long as the achene, usually more or less equalling, or longer than, the corolla: those of the ligulate flowers very short, about ¼ the length of the achenes.

G. quadriradiata var. *hispida*, which is a native of S. America from Mexico to Chile, has been known for some time as an adventive on the Continent. It has been recorded from France, Belgium, Germany, Austria, Switzerland and Poland, and is apparently a common weed in the Eastern United States. It has been overlooked hitherto in Britain and a careful examination of plants labelled as *G. parviflora* will most likely reveal further localities in addition to those given below.

The related *G. quadriradiata* var. *quadriradiata* (Ruiz & Pav.) Thell. (*G. hispida* Benth., *non* DC.) has very short non-aristate pappus-scales in the tubular flowers, about half as long as the achene and rarely more than half as long as the corolla. The ligulate flowers vary from white to purple (forma *purpurascens* (Fenzl) Thell. = *G. hispida* Benth. f. *purpurea* Fenzl = *G. brachystephana* Regel). Under the var. *quadriradiata* Thellung includes the forma *Vargasiana*, which has the pappus-scales similar in size but aristate. Mosseray, *Bull. du Jard. Bot. de l'Etat, Bruxelles, 14*, fasc. 3, 326 (1937), proposes that the var. *quadriradiata* should be restricted to those plants with very short, non-aristate pappus-scales, while those with the scales aristate would come under var. *hispida*, of which f. *Vargasiana* would be a form with abbreviated scales. This seems to be a more satisfactory arrangement than that of Thellung. Examination of a large series of specimens will be necessary to ascertain whether the f. *Vargasiana* merely represents the extreme of a continuous linear series of variations in reduction of pappus-scale length from var.

hispida, in which case it would be unworthy of retention. For the present, at any rate, it is kept apart.

G. quadriradiata var. *quadriradiata* (including f. *Vargasiana*) has been recorded from Germany as an adventive, and the f. *Vargasiana* under similar conditions from Belgium.

I have seen specimens of var. *hispida* and f. *Vargasiana* from the following localities in Britain:—

Var. *hispida* (DC.) Thell.

11, S. Hants.; Mudeford, 1931, Miss MARGARET CAMPBELL (in Hb. Druce).

18, S. Essex; Dagenham, June 27th, 1937, Mrs SANDWITH, N. Y. SANDWITH, A. H. G. ALSTON and J. P. M. BRENAN (in Hb. Brenan).

34, W. Gloster; tip near Bristol, September 1938, Mrs SANDWITH (sp. comm. Mrs Sandwith).

41, Glamorgan; Leckwith, August 25th, 1922, R. L. SMITH (Hb. Druce).

Forma *Vargasiana* (Thell.) Mosseray.

34, W. Gloster; Avonmouth, July 24th, 1927, Mrs SANDWITH (in Hb. Sandwith and Hb. Kew): cult. Tickenham from this locality, September 26th, 1927 (in Hb. Druce).

My most grateful thanks are due to Mr J. Chapple for facilities and kindly help given in the consultation of the material in Hb. Druce, and to Mrs Sandwith and Mr N. Y. Sandwith for much generous assistance.

NOTES ON MELAMPYRUM.

C. E. Britton, A.L.S.

1. Dubious and Other Records.

In the *Journal of Botany*, 1929, pp. 105-7, the late C. E. Salmon gave the results of an examination of *Melampyrum* specimens by Dr v. Soó, the author of a recent Monograph on the genus. Several names unfamiliar to British botanists were brought to notice, which will be dealt with under the respective species.

M. arvense L.

Under this a subspecies *pseudobarbatum* (Schur) Wettst. is recorded from the Isle of Wight, "field above St Lawrence, abundant, 1900." I fear that the word abundant can only refer to the species in general, for Salmon's plants in the Herbarium of the British Museum do not support the statement referred to. There are three examples collected by Salmon at the locality and on the date in question. One is definitely identified by Soó as subsp. *pseudobarbatum*, a second is noted as approaching that subspecies, and the third, a much less robust plant, does not seem to have been submitted to Soó.

It is probable that the locality of St Lawrence has been more often resorted to for the collection of *M. arvense* than any other known locality, and consequently plants from that neighbourhood are frequent in herbaria. A study of this material has led to the conclusion that the reputed subsp. *pseudobarbatum* is no more than an exceptionally luxuriant plant with long arcuate branches, c. 30 cm. in length, which are again branched, and with two pairs of distant intercalary leaves.

Pseudobarbatum, regarded as species or subspecies, is one of the many instances in *Melampyrum* where a name of long standing has been taken by later authors and characters associated with it that certainly escaped the notice of the original author of the name, for to Schur, who described it in *Enum. Pl. Transs.*, 506 (1866), it differed from *M. arvense* by the slender habit, linear-lanceolate leaves, pale-green or light-yellow bracts, whereon the usual punctuations were absent, and pale-yellow, not rosy, corolla. Beck in *Fl. N.Ö.*, II, 2, 1070 (1893), placed *M. pseudobarbatum* as a form of *M. arvense* with white or yellow flowers and pale-yellow bracts. The wider application of the name is due to Wettstein, who extended it to a form common in the Siebenbürgen. Beauverd referred to var. *impunctatum* Godron plants that authors name *pseudobarbatum*. This variety was defined by Godron, *Fl. Lorr.*, 233 (1843), as possessing greenish-yellow bracts devoid of black glands, calyx teeth short, and wholly yellow, not purple, corollas. Plants with these characters appear to be unknown in Britain. On the whole, it may be said that in England communities of *M. arvense* include individual plants that approach the subspecies *arvense*, *Schinzii* and *pseudobarbatum* without satisfactorily meeting the requirements of the authors' diagnoses.

M. cristatum L.

This species, in Britain, is also of mixed characters, i.e. characters are present that characterise the subspecies *Ronnigeri* (Poeverl.) and *typus* of v. Soó. Plants with the many-noded stem of subsp. *cristatum* do not exhibit the 4-5 pairs of intercalary leaves that should accompany that feature. The intercalary leaves are absent or consist of 1 pair, rarely 2 pairs. Whilst it may be possible to pick out individual plants and refer them to subsp. *Ronnigeri*, such plants appear to be exceptional. This last-mentioned form, recognised by v. Soó from localities in East Anglia, has not been distinguished by Beauverd amongst examples of *M. cristatum* submitted by Druce and the writer.

M. silvaticum L.

The variations of this species in Britain and Ireland are very imperfectly known. Salmon obtained from v. Soó the name of subsp. *subsilvaticum* for plants from Yorkshire and Durham, and expressed the opinion that the ordinary British plant appeared to be this subspecies. With this conclusion I am in full agreement, but the name cannot be applied to cover all British forms. *M. subsilvaticum* Ronn. & Schinz in Schinz & Keller, *Fl. Schweiz*, 3rd ed., II part, 303 (1914) = *M. intermedium* Ronn. & Schinz in Schinz & Keller, *Fl. Suisse*, ed. 3, 521 (1909), non *M. intermedium* Perr. & Song., in *Bull. Herb. Boiss.*, 426-427 (1893), the latter belonging to the species *M. nemorosum* L. Beauverd referred *M. subsilvaticum* to var. *edentatum* Schur, and to the sub-vars. *nephelobium* and *dubium*. As plants of Druce were identified by Beauverd with the first two of these names, subsp. *subsilvaticum* was no real addition to the British list. There are, however, plants in Herb. Mus. Brit. to which it is desirable to draw attention in the hope that such forms may again be collected and carefully studied. Field notes as to the colour of the corolla would be useful. A large plant (20-30 cm.), with 1 pair of erect-ascending branches arising from the second node, cauline leaves 40 × 5 mm., bracts 50-60 × 12 mm., the lower entire, upper bidentate at base, ovate-lanceolate, inflorescence commencing at node 3, was collected by F. Arnold Lees by the Tees, half-a-mile above Middleton Bridge, Durham; noted as " large and succulent." Somewhat similar plants have been gathered at Errigal Banks, Co. Derry, and at Crowglen, Co. Antrim. Another striking form from Glen Roy has long arcuate branches, entire leaves and bracts, and intercalary leaves.

M. pratense L.

Subsp. *oligocladum* (Beauv.) Soó.

Identified from gatherings made at Unwell Wood, Berks., and near Mallaranny, Co. Mayo. With these determinations by v. Soó may be associated plants gathered many years ago by A. O. Hume at Trelawney Woods, W. Looe, Cornwall. This appears to be a form with well-marked characters, and a short description is given of the Cornish

plant. Stem 18-25 cm., stout, branches two pairs, arising from cotyledonary node and succeeding node, cauline leaves one pair, rather broad, intercalary leaves absent or rarely 1 pair; inflorescence commencing at node 3 (rarely 4), lower bracts entire, median coarsely dentate, apical pectinate dentate. It is *M. pratense* L. subsp. *vulgatum* (Pers.) Beauv. var. *oligocladum* Beauv. British plants approach sub-var. *platyphyllum* Beauv.

" Subsp. *hians* (Druce) Beauv."

Under this v. Soó placed plants from Yorks. as f. *britannicum* Beauv. This combination is unknown to the latter author, whose var. *britannicum* is placed in the vicinity of vars. *oligocladum* and *commutatum*. The British plants recognised by Beauverd have little affinity to Druce's *hians*.

2. The Cow-wheats of Johnston's "Flora of Berwick-upon-Tweed."

To Dr G. Johnston may be given the credit of being the first amongst British botanists to recognise the polymorphism existing in *M. pratense*, for in his published works the author plainly showed an acquaintance with the existence of three or four forms in the area covered by his investigations, and his critical acumen established that his *M. pratense* was not identical with the plant of the same name described by Smith and illustrated in *E.B.*, t. 113. It was in the *Flora of Berwick-upon-Tweed*, 1829-30, that Johnston described two species diagnosed in the following terms:—

" 1. *M. pratense*, leaves lanceolate, floral ones toothed at the base; flowers axillary in partly distant pairs, turned to one side; corolla four times as long as the calyx, closed, lower lip direct."

" 2. *montanum*, leaves linear, floral ones quite entire; flowers axillary, in partly distant pairs, turned to one side; corolla about twice as long as calyx, lip direct (nova species). Hab. On the south-east side of Cheviot, plentiful."

After describing his new species in detail, Johnston immediately cast doubt upon its distinctness, for he wrote:—" It is not without hesitation that I give this [*M. montanum*] as a species from the preceding [*M. pratense*] since the differences may be attributed to situation, for we know that an alpine station does alter the aspect to a considerable extent." Further on, he wrote:—" And were the objection valid we might expect the plant at the base of the hill [Cheviot] to be much in its usual state and gradually diverging from it as it attained higher limits; but this was not the case, for it was very uniform in character over a surface of many acres." In the appendix to the " Flora," Johnston receded further from his first estimate of the Cheviot plant, and may be said to have withdrawn his new species, for under *M. pratense* are the words: " My *Mel. montanum* (Vol. I, p. 136) I am now satisfied is only an alpine state of this. It may be found in

profusion on Hedgehope, one of the Cheviots, and on Hepburn Hill at Chillingham, but, in the latter station, the plant begins to assume the appearance of the true *pratense*." In the *Botany of Eastern Borders*, 1852, 2 vols., Johnston gave another grade to the plant, for here he referred to it as "the variety β *montanum* (=*M. montanum* Berwk. Flora)."

Johnston's species or variety is probably better known from the terse characters given in the national floras, for but few botanists can have had access to the works of Johnston, and fewer still have seen authentic specimens, i.e., plants gathered and identified by Johnston. It was ascertained that the Berwickshire Naturalists' Club claimed to be in possession of the herbarium of the author of the *Flora of Berwick-upon-Tweed*, and by the aid of Mr J. B. Duncan, an officer of the Club, the Melampyrums were received for inspection, but unfortunately *M. montanum* was absent. However, opportunity was afforded of ascertaining the character of *M. pratense* of the "Flora." There are two plants under this name. That marked (1), from Houndwood, Berwickshire, is probably, perhaps certainly, the *M. pratense* of the "Flora," wherein it is stated that it "grows very abundantly in the woods between Houndwood and the Pease-bridge." It is added, "but in no part of Berwickshire have I observed it to attain the size of the plant figured in Eng. Botany and which I have gathered in the woods at Roslin. Our plant is rarely above 6 inches, bushy, with narrow linear leaves and very often with entire bracts." Comparison has been made of the Houndswood specimen and the representation of *M. pratense* in *E.B.*, t. 113, with the result that the conclusions expressed appear justified. The specimen of *M. pratense* numbered (2) was gathered at Hepburn, Northumberland, and is a slender plant compared with (1), but is essentially the same form. It is probably the plant previously mentioned from Hepburn Hill as a form of *M. montanum* tending towards the true *M. pratense*.

Authentic specimens of *M. montanum* are poorly represented in herbaria. It is not to be found at Kew and but one example has been seen at South Kensington. Information was received of two sheets of this plant, collected by Johnston, being in the possession of a local northern Natural History Society, but, as a loan of these was refused, opportunity was denied of comparison with plants elsewhere. By the courtesy of the Regius Keeper, Royal Botanic Garden, Edinburgh, the examples of Johnston's plant contained in the Herbarium were received for study. There are two examples collected by Johnston on the Cheviot Hills, and from these, and from another authentic specimen in Herb. Boswell Syme, the following description has been drawn up. Plant c. 15 cm., minutely hispid. Hypocotyl 7 mm., stem slender, 0.75 mm. diam., internodes 12-20 mm. Cotyledons oblong-lanceolate, 15 × 3 mm., cauline leaves 1 pair, linear, 25 × 2 mm., intercalary leaves 1-2 pairs, linear or linear-lanceolate, erect, 22-26 × 2-3 mm. Branches 2 pairs, those from the axils of cotyledons arrested, sterile, or elongating

and flowering, upper pair of branches ascending-erect, or spreading, simple or branched, equalling stem or not. Inflorescence commencing at nodes 4-5; bracts quite entire, erect or spreading, exceeding flowers, these 12 mm., calyx-tube 2-3 mm., teeth 3-4 mm.

Distribution imperfectly known. As the Cheviot plant can scarcely be maintained as a species, when relegated to a lower grade, it should be cited as var. *montanum* Bab., *Man. Brit. Bot.*, 220, 1843.

3. M. PRATENSE L. VAR. ERICETORUM D. OLIVER IN PHYT., 678, 1852.

In passing, it may be said that *M. pratense* of the *Flora of Berwick-upon-Tweed*, judging from Johnston's plants, is this variety. As Oliver's var. is not well known, a detailed description of a type-specimen in the Herbarium, Royal Botanic Garden, Edinburgh, is given. It is labelled "*Melampyrum prat. ericetorum* mihi," with the locality "Urrisbeg, Galway, 8-52." Plant 22 cm. Stem erect, 1-1.5 mm. diam., inclined above, nodes 15-20 mm. distant. Cotyledonary node bare, 2nd, 3rd, and 4th nodes with erect-ascending branches, 65-90 mm., the lowest sterile, the two upper pairs with flowers towards apices; cauline leaves linear, 40 × 3.5 mm., erect or spreading; intercalary leaves 2 pairs, 35 × 4 mm., lanceolate-linear, erect. Inflorescence commencing at node 7, lower bracts entire, linear-lanceolate, 25 × 5 mm., erect, upper bracts lanceolate, with 1 or 2 pairs of linear acute lobes above the base. Flower 12 mm., calyx-tube 3 mm., teeth 3 mm. Shortly but conspicuously hispid in all parts.

THE BRITISH SPECIES OF UTRICULARIA.

P. M. HALL, F.L.S.

(An abridged version of this paper was read at the Annual General Meeting of the Society on March 15th, 1939.)

The title of this paper may be to some extent misleading since it is not my intention to give here a complete survey of the British members of the genus, so much as to indicate the nature of the problems arising from such a survey and to suggest solutions for some of them. Detailed descriptions of the British plants are already available and it would be superfluous to do more than point out such corrections or emendations as may be necessary for better understanding. Neither is it necessary to add to the existing accounts of the anatomy of these most interesting plants and of the functions of their various organs.

In order to write the account of this genus for the forthcoming New Students' Flora, it was necessary to satisfy oneself first as to the number of species occurring in Britain, then to settle any difficulties of nomenclature which might arise, and finally to investigate the distribution of each species in Britain by the examination of as much fresh and dried material as possible. To examine the whole of the herbarium material in this country alone of even such a small group as this is a formidable undertaking and on account of various hindrances this has as yet been only partially completed, but sufficient has been done to indicate what are the problems of taxonomy, nomenclature and distribution which arise in this genus.

According to modern British handbooks, e.g. Druce (1928), we have six British species:—

1. *vulgaris* L.
2. *major* Schmidel.
3. *intermedia* Dreves & Hayne.
4. *ochroleuca* Hartman.
5. *minor* L.
6. *Bremii* Heer.

[Druce also includes in his arrangement one doubtful hybrid, ? *intermedia* × *minor*.]

This arrangement is based upon the account of the genus in *B.E.C. 1910 Rep.*, 511-520 (1911): this account was drawn up by Druce from the writings of Glück and Meister supplemented by "verbal statements made to me by Dr Glück." This paper has formed the taxonomic basis for the genus in all subsequent accounts by British authors, e.g. Wilmott (1922), Butcher (1930), Praeger (1934), and Rendle (1937). The reservation must be made, however, that Butcher and Rendle make no reference to *U. Bremii*, while the other two authors only do so in consequence of and relying upon Glück's determination of Druce's gathering from the Gap of Dunloe.

On the Continent also the same arrangement has been followed by, among others, Rouy (1910) and Hegi (1918).

For reasons which will be given later I propose that the genus *Utricularia* in Britain be restricted to four species, as follows:—

1. *vulgaris* L.
2. *neglecta* Lehm.
3. *intermedia* Hayne.
4. *minor* L.

NOMENCLATURE.

The nomenclature of the British species fortunately raises only two problems. Two of our species, *U. vulgaris* and *U. minor*, were recognised by Linné in *Spec. Plant.*, ed. 1 (1753). There are specimens of both in Linné's herbarium at Burlington House; in Jackson's *Index* both are numbered "1," indicating that they were in the herbarium before 1753; both agree with the diagnoses and both would therefore appear to be type-specimens. [In the case of the sheet of *U. vulgaris* "Utricularia" appears at the top of the sheet in faded ink, which according to Mr S. Savage indicates that the sheet was incorporated in the herbarium at an early date.] Moreover, both specimens unquestionably agree with our own understanding of these two names, which are therefore free from complications of any kind.

U. neglecta J. G. C. Lehmann, *Novarum et minus cognitarum stirpium pugillus* I. (Index Scholarum in Hamburgense Gymnasio Academico anno 1828, p. 38) (1828). I adopt this name in preference to the earlier name, *U. major* Schmidel, *Icones Plantarum* (1762), which has been adopted by many authorities. The citation of *U. major* is usually to *tab.* xxi of that work and in fact there does not appear to be a diagnosis, recognisable as such, of the species in the text, although there are references to "Utricularia major." The legend of the plant reads "Utricularia minor Linn. et majoris fructificatio (fig. a-l)," the principal contents of the plate portraying *U. minor* L., while certain figures lettered "a" to "l" refer to "U. major." Schmidel clearly intends to contrast his "major" with Linné's *minor* illustrated in the same plate. Moreover, one of the figures, we are told, shows the flower in natural size ("mole naturali") and since the labellum in this figure measures only 12 mm. × 12 mm. it is impossible that this should represent a normal flower of the species to which this name has been attributed. It is difficult to say to what species this figure and the others refer but it is quite possible that it represents *U. intermedia*. In any event, even if Schmidel gave a recognisable diagnosis, his name would be invalid for the reason that in *Icones Plantarum* he does not systematically and consistently use the binary system of nomenclature. Any names proposed by him are therefore invalid in accordance with Article 68 (4) of the International Rules of Nomenclature.

U. intermedia Hayne. This name is sometimes cited as of Dreves and Hayne, e.g. by Druce, *loc. cit.*, and by Bennett (1910). The cor-

rect citation would appear to be as of F. G. Hayne in Schrader's *Journal für die Botanik*, Erstes Stück, pp. 18-19, and *tab.* v (1800). The name is also sometimes cited as of A. G. Roth, *Catalecta botanica*, Fasc. secundus, p. 1 (1800), but reference to the text shows that Roth had no intention other than to give all credit to Hayne for the naming and description of this species.

KEY.

A. Shoots of one form only, green floating leaves furnished with numerous bladders.
   I. Lower lip of flower with deflexed margins; pedicels short and stout; fruiting freely. ..... 1. *vulgaris* L.
   II. Lower lip of flower expanded, undulate; pedicels long and slender; fruits very rarely formed. ..... 2. *neglecta* Lehm.

B. Shoots of two forms (a) green floating (or terrestrial) leaves, (b) specialized colourless (subterranean) shoots bearing bladders only.
   I. Bladders practically confined to colourless shoots, rarely occurring among green leaves; flowers large, bright yellow, with long subulate spur; winter buds hairy. ..... 3. *intermedia* Hayne.
   II. Bladders occurring on both types of shoots; flowers small, pale sulphur-yellow with short spur; winter buds glabrous. ..... 4. *minor* L.

U. VULGARIS L. AND U. NEGLECTA LEHM.

The first problem which arises in connection with the identification of the British species is the discrimination between *U. vulgaris* L. and *U. neglecta* Lehm. and the limitation of their respective geographical distributions. The difficulty arises principally from the well-known fact that the members of this genus, in Europe at least, are very shy flowerers: though widely distributed, the localities in which any of the species flower are greatly outnumbered by those in which they seldom or never flower. In the case of barren plants I am of opinion that it is not possible to separate these two species in the present state of our knowledge. The text-books give various characters by which the foliage alone may be identified, relative coarseness in *U. vulgaris* contrasted with slenderness in *U. neglecta*, bladders of larger dimensions in one species and smaller in the other, and so on, but carefully selected material shows that the characters of the foliage and bladders are very variable and appear to be influenced by such matters as light, depth of water and no doubt also the chemical analysis of the water, as well as the content of organic matter.

Linton (1894) in a most valuable paper gives a hint which promises to be helpful when he refers to a statement by Reichenbach (1824) to the effect that the serrations of the young leaves of *U. vulgaris* bear a fascicle of bristles, while those of *U. neglecta* have but a single bristle and it is doubtful whether even the single bristle is always present. Although Linton said of this alleged distinction that he had not succeeded in verifying it or finding it confirmed by other observers, it appeared to be at least worthy of investigation and in this connection

I examined under the lens portions of young foliage from all the flowering and fruiting specimens of both species in Hb. Druce and Hb. Cardiff. The results were very promising and in every case were in accordance with Reichenbach's statement. Later I received from Cardiff material from Hb. Griffith omitted from the first consignment and this included a sheet of flowering material of undoubted *U. neglecta* from Anglesey showing more strongly fascicled bristles than any material of *U. vulgaris* previously examined. This distinction, therefore, though possibly usual, is not absolute: it cannot be accepted as a criterion and I have therefore not applied this test in an attempt to identify barren material.

There is no difficulty in identifying fresh flowering or fruiting material of these two species. The differences may be tabulated as follows:—

Corolla	*U. vulgaris* L.	*U. neglecta* Lehm.
Upper Lip.	About as long as palate.	About twice as long as palate.
Palate.	Relatively more prominent and more projecting in outline.	
Lower Lip.	Margins deflexed ± at right angles on all sides.	Spreading, more or less flat, somewhat undulate.
Pedicels.	Short (6-17 mm.) and generally comparatively stout. "Strongly recurved in fruit."	Longer (11-26 mm.) and generally comparatively slender. "Patent-erect after flowering, flexuous."
Fruits.	Very freely produced.	Very rarely produced.

The last character of *U. neglecta* appears to be true not only for Britain but throughout its European range. In the course of examining a large number of sheets of this species I have only seen one perfect capsule: in this case the pedicel, though long, was reflexed, showing that the reflexed habit in *U. vulgaris* is not specific but is merely due to the weight of the full capsule. This is the reason for the inverted commas in the above table. The supposed difference in the habit of the pedicels is not a real one but, since for practical purposes fruit is never formed in *U. neglecta*, it serves as a distinguishing character.

It is possible to identify dried flowering or fruiting material of these two species provided that the material is both well prepared and mature. But there is much material which fails to satisfy one or other or both of these requirements and for this reason and because both species are so frequently barren, particularly in northern and western localities, it is impossible to say with any degree of certainty what is the vice-comital distribution of either species in Britain. Owing to the late recognition of *U. neglecta* all the early records of *U. vulgaris* in *Comital Flora* are unreliable, as are all the numerous records based only on barren material.

In many instances there is known to be duplication, both species being recorded where only one has occurred. Such for example has been the case with S. Devon (3), Isle of Wight (10), Herefordshire (36), and Glamorganshire (41). The early records were for *U. vulgaris*, later

U. neglecta was found and recorded, and both species are still recorded in the handbooks. In the case of these counties material has been examined from all the recorded localities and has all proved to be *U. neglecta*. No doubt the same thing has happened in many other instances.

If, on the theory that the greater embraces the lesser, one assumes that the distribution given for *U. vulgaris* in *Comital Flora*, with proper emendation, represents the total distribution of the two species, then one finds that one or other [in several cases both] species occurs in 99 of the 112 vice-counties. The thirteen exceptions from which neither species is as yet recorded are v.-cc. 34, 42, 45, 50, 77?, 78, 84, 86, 87, 101, 103, 107, 108. I have seen no record for 71 (Isle of Man) but this is included in the figure 99 above, since there is barren material of one species from this v.-c. in Hb. Leeds Univ., and also of *U. minor* previously unrecorded for 71. Praeger (1934: 521) records *U. vulgaris* from all 40 Irish v.-cc. and *U. neglecta* from 11, but not having seen the material in the Dublin and Belfast herbaria I am not yet in a position to criticise these figures.

All that one can do at present with regard to the distribution of these two species is to indicate those v.-cc. from which indisputable material of each species has been seen, with the following result:—

U. vulgaris L.: **36. H. 3.**
1, 5, 6, 9, 13-15, 17, 22, 23, 25-29, 31-33, 37, 40, 53, 54, 57-59, 61, 62, 64-67, 70, 82, 83, 90, 99. H. 21, 23, 26.

U. neglecta Lehm.: **27. H. 1.**
1-4, 6, 9-13, 15, 17-19, 21, 22, 24, 27, 28, 35, 36, 41, 44, 52, 58, 63, 69. H. 2.

The records for 4 and 35 appear to be new vice-county records for *U. neglecta*, and are based on the following material:—

*4, N. Devon; Braunton Marsh, 1893 and 1911, W. P. Hiern in Hb. Hiern (as *U. vulgaris*).

*35, Monmouth; between Lower End, Magor and Llandavenny, 1904, W. A. Shoolbred in Hb. Kew and J. S. Clarke in Hb. Cardiff (both as *U. vulgaris*).

As there appear to be no other known localities in these vice-counties, 4 and 35 should be deleted from the distribution of *U. vulgaris*.

Further, Dorset (9) should be added to *Comital Flora* since there are several well-known localities. In view of Linton (1894) it is curious that the occurrence of *U. neglecta* in Dorset should have been overlooked in both Supplements to *Topographical Botany* and by Druce (1932).

No doubt there are many reliable records not included in the above figures, which are based only on herbarium material examined by myself and have no claim to be complete. When further material has been examined and as complete a search made as possible, I propose in a

later communication to bring the distribution figures up to date with an enumeration of the herbarium material on which they are based.

If anything can be read into the distributions given above, they tend to show that *U. vulgaris* is more northern and eastern and *U. neglecta* rather more southern and western in general distribution. This is in accordance with the opinions of Continental authorities, e.g. Hegi (1918), who says of *U. vulgaris* (p. 166)—"practically all Europe, temperate N. Asia, N. America (Connecticut)," and of *U. neglecta* (p. 167)—"Europe (especially in South and West: apparently entirely absent from Russia), N. Africa." It should be noted that in Britain *U. vulgaris* flowers and fruits as far north as East Lothian (material from Gullane in many herbaria), Angus and Dumbartonshire, while I have not as yet seen flowering material of *U. neglecta* from further north than Westmorland. A large proportion of the recorded localities of *U. vulgaris* is in fen districts, especially in East Anglia

U. INTERMEDIA HAYNE AND U. OCHROLEUCA HARTM.

I now come to what is perhaps the most important question to be discussed in this paper. It is generally accepted by modern authorities that we have in Britain two closely allied species—*U. intermedia* Hayne and *U. ochroleuca* Hartm. This belief follows the views of Glück expressed by Druce (1911) and by Glück himself (1913). The main differences, as set out, are:—

	U. intermedia.	*U. ochroleuca.*
Terminal lobes of leaflets.	Obtuse with apical spine.	Much more acuminate.
Marginal spines.	2-10, sessile, single.	1-6, on teeth, in pairs.
Green leaves.	Without bladders.	Always bearing sporadic bladders.
Lower petal.	Longer in proportion to palate.	7-9 mm. broad × 12-13 mm. long.
Spur ("best distinguishing mark").	Equal to or shorter than lower lip, appressed, yellow like the corolla.	Half the length of lower lip, vertical to it, red-brown.

The plates and figures illustrating Glück's paper are excellent but I consider that his conclusions are faulty and not in accordance with the original descriptions of Hayne and Hartman.

U. intermedia was described by Hayne (1800) in a full diagnosis, of which the following salient points should be noted:—

"Ampullae . . . . radiculis vel cauli defoliato, numquam vero foliis, affixae.

Folia tripartita: *laciniae* . . . . margine undique setis solitariis minutissimis obsitae.

Pedunculus scapiformis, erectus, teres, bi- vel triflorus, et supra medium squama cordato-subrotunda praeditus.

Corolla . . . . sulphurea: *labium superius* subrotundum, planiusculum, deflexum; *palatum* subrotundum, striis purpureis notatum.

[Note.—Later in his account of *U. intermedia* Hayne refers to 'blutrothen Streifen' showing that to him 'purpureus' meant blood-red. The translation of this epithet as 'purple' by many authors has given a false idea of the colour of these striae.]

Calcar e corollae basi productum, conicum, labio inferiori adpressum."

Plate V shows the habit very well. The plant illustrated has two flowers, the upper of which is laciniated in a curious manner but the lower flower is well shown with flat undulate lower lip and narrow subulate spur parallel to and nearly as long as the lower lip. The plate is coloured and shows clearly that by "sulphureus" Hayne meant a bright tone of yellow, not what we understand by "sulphur-yellow." The illustration is in full accord with my view of *U. intermedia*.

U. ochroleuca was described by R. Hartman (1857) as a new species to be distinguished from *U. intermedia* Hayne. The following characters are extracted from the diagnosis of his new species:—

"Herba tota gracilis ac tenera:
gemmae [i.e. turions] globosae et magnitudine illarum *U. minoris*:
folia . . . . laciniis acutis:
vesiculae partim inter lacinias foliorum sparsae, partim ad ramos nudos affixae:
scapus . . . . una cum bracteis, pedunculis calycibusque rufo-fuscentis coloris:
corolla pallida flava vel ochroleuca, labio inferiore rotundato, lateribus deflexo, calcare descendente, conico, obtuso, rufescente."

These characters are again emphasized by Hartman in comparing his *ochroleuca* with *intermedia* Hayne, of which he gives an equally detailed description. It is to be noted particularly that he says of *U. intermedia* that the bracts and calyces are always bright green and the spur (subulate, appressed to the lower lip) is of the same colour as the corolla and very often as long as the lower lip. There can be no doubt in my opinion that Hartman correctly understood *U. intermedia* Hayne and that his *ochroleuca* differed from Hayne's species in many well-marked characters.

Now Glück in his interpretation of *U. ochroleuca* has appreciated some of the differences from *U. intermedia* but other points of great importance he seems to have overlooked. He does not appear to have realized that all the differences stressed by Hartman—the general slenderness, the size of the winter-buds, the distribution of bladders, the brownish scape and bracts, the pale flower with short spur—are differences in the direction of *U. minor*, and Hartman's diagnosis clearly indicates a plant standing in an intermediate position between *U. intermedia* and *U. minor*. Hartman's words in connection with the bladders should be particularly noted: he uses the word "partim"—"*partly* [not sometimes or occasionally but *partly*] scattered among the green leaves and *partly* fixed to the leafless branches": in other words the distribution of bladders is the same as in *U. minor*. Some weight must

also be attached to Hartman's description of the colour, because in his introductory remarks he specifically says that this character attracted his attention and he gave the name *ochroleuca* in reference to the very pale colour of the flower.

Neuman (1903) went so far as to equate *U. ochroleuca* Hartm. with *U. intermedia* Hayne × *minor* L. I cannot claim sufficient familiarity with Scandinavian material to say that this is correct but one may go as far as to say that Hartman's very detailed and clear diagnosis certainly does not entirely rule out such a possibility.

Before considering the correct identity of the British plants it is necessary to notice some other papers by Continental authorities bearing upon this matter.

Koch (1847) described what he considered to be a new species closely allied to *U. intermedia* Hayne as *U. Grafiana*. Koch attributes to this "species" obtuse apices of the terminal leaflets with more numerous marginal bristles than in *U. intermedia*, of which he gives an emended diagnosis, attributing to it acuminate leaflets with less numerous but longer bristle-bearing marginal teeth. He states that in both the colour of the flower is the same, being similar to that of *Lotus corniculatus*—"hellgelb."

Nearly 40 years later Čelakovsky (1886) described *U. brevicornis* "n. sp. (*U. intermedia* Koch in *Flora*, 1847)." This species he distinguished from *U. intermedia* Hayne by its smaller size, acuminate leaflets, occasional bladders among the green leaves, more numerous bracts on the shorter scape, emarginate concolorous upper lip, citron-yellow like the whole corolla, palate with brownish stripes and shorter spur of quite different shape. Two of these characters call for comment:—i, the more numerous bracts; according to Čelakovsky *U. intermedia* has generally only one sterile bract, which is a modification of Hayne's diagnosis in which he used the word in the singular unqualified by "generally," but in my opinion the modification is on the right lines but understated, two bracts being of frequent occurrence: ii, the concolorous upper lip, by which presumably is meant that the upper lip was not striped with brown like the palate; as will be seen presently this point is probably significant. Čelakovsky states that *U. minor* was growing with *U. brevicornis* but apparently *U. intermedia* was not present. He took the view that Koch's *Grafiana* represents the true *intermedia* of Hayne and is therefore redundant, while by "*U. intermedia*" Koch referred to the plant now named by Čelakovsky *U. brevicornis*. The argument is long, over-elaborated and unsound in my opinion, the true fact probably being that Koch described two variant forms of *U. intermedia*—corresponding to the *U. intermedia* and "*U. ochroleuca*" of those who follow Glück—and did not know the plant which Čelakovsky named *brevicornis*.

Čelakovsky evidently came to this conclusion himself later and practically admitted it in a second paper written in the following year (1887), expressing the opinion that his *brevicornis* was synonymous with *U.*

ochroleuca Hartm., which he had previously overlooked. Having called attention to but dismissed as of no consequence certain differences between Hartman's description of *ochroleuca* and his own *brevicornis*, such as the colour of the flowers, the colour of the spur which is concolorous (i.e. citron-yellow) in *brevicornis*, not red brown, and the concolorous (i.e. unstriped) upper lip in *brevicornis*, he then advances the claims of an earlier name, *U. macroptera* Brückner (1853), to replace the later *U. ochroleuca* Hartm. (1857).

This is an extremely critical question, Čelakovsky having failed after considerable efforts to trace authentic specimens of Brückner's. I think that the facts are probably as follows, that *U. brevicornis* Čelak. is a good species distinct both from *U. intermedia* Hayne, which is unequivocal, and from *U. ochroleuca* Hartm., which may be a species but is most probably a hybrid. *U. macroptera* Brückner may possibly be an earlier name for *U. brevicornis* Čelak.

Having considered shortly the names given by Continental authors to the various forms in this group, it remains to see how they fit the British plants. The first question to be answered is—Do the British plants in this group belong to one or two species? It will be recalled that among the differences between *U. intermedia* on the one hand and *U. ochroleuca* (and *U. brevicornis*) on the other are important characters of the floral parts. The shy flowering of the Utricularias already noted is especially marked in this group: although these plants occur in numerous localities in Britain, the localities in which flowers have been observed are extremely few for reasons of which we are at present ignorant. Their geographical distribution in Britain is remarkable and unusual, covering the New Forest and Wareham districts of Hants and Dorset, Norfolk, Yorkshire (Strensall Common, York only), the Lake District, and the majority of the Scottish and Irish vice-counties. In S. Hampshire (11) flowers have never been observed but in Dorset (9) the plant which has been known as *U. ochroleuca* Hartm. flowers regularly in some of its habitats.

The following description of the flowering parts in based on a detailed examination of 30 inflorescences from Hartland Moor, Dorset:—

Scape (and calyx and pedicels) pale green, not tinged with red or brown, height to summit of inflorescence 9.0-16.0 cm. (average 12.9 cm.).
Bracts pale whitish green, hyaline, not tinged with brownish-purple.
Number of flowers in inflorescence 2-flowers 8.
3-flowers 19.
4-flowers 3.
Upper lip. Length 8-10 mm. (average 8.85 mm.).
Width 7.5-9 mm. (average 8.375 mm.).
Lower lip (including palate). Length 9-11 mm. (average 10.4 mm.).
Width 13.5-16 mm. (average 14.45 mm.).
Spur. Length 5-6.5 mm. (average 5.5 mm.).

The inside of the upper lip, top and front of the palate are marked with reddish-brown lines, 10-18 on the upper lip, 8-14 on the palate.

The lines are mostly simple, some slightly branched, occasionally broken, not netted. The lines on the palate are more marked and redder in tone than those on the upper lip. In a very few specimens the veins of the lower lip are coloured also.

The spur has reddish-brown lines down the back on the outside for half its length, they then become faint as veins. The upper half of the spur is the same colour as the flower. At about half way the spur is slightly constricted. The lower half is greenish and tapers to an acute apex. The spur is slender, 1-1.5 mm. wide, ± half the length of the lower lip and parallel to it.

The colour of the flower is Lemon Chrome by Ridgway's *Colour Standards*, that is to say a bright yellow, like *Ranunculus acris*, certainly not sulphur-yellow or ochroleucous. No capsules have been seen and the pedicels after flowering are erect-patent.

There is no room for doubt that these are the flowers of *U. intermedia* Hayne: they cannot be *U. ochroleuca* Hartm. or *U. brevicornis* Celak. They were so described by E. F. Linton, *loc. cit.*

The only other British locality from which flowers have been recorded is, as far as I am aware, Roydon Common, near Lynn, W. Norfolk (28). Here W. G. Clarke found a flower of *U. intermedia* on 18th July 1910, see Clarke & Gurney (1921). The corolla is there described as pale yellow, not so pale as *minor*, lip boldly striped with orange, palate slightly striped [" lip " therefore presumably means upper lip], spur conical ⅜ in. long appressed to palate. The flowering of three plants in the same locality on June 17th, 1921, is described by Gurney (1922). I attach little importance to the descriptions " pale yellow " and " orange ": the most accurate observers are extremely vague about colours.

Apart from these recorded occurrences the following botanists have described to me their discovery of flowers:—

Mr A. J. Wilmott, with Miss M. S. Campbell, Mr F. Druce, and Mr N. D. Simpson, have seen flowers at Kerrysdale, W. Ross (105). Three of the party describe the colour of flowers as bright yellow (" the colour of *Ranunculus acris*—A. J. W."): Mr Simpson's description, " pale yellow," illustrates the fact—and it is a fact—that the same colour appears differently to different eyes. Photographs, and specimens in Hb. Mus. Brit. and Hb. Simpson make it certain that this plant is identical with the Dorset plant.

Mr N. Y. Sandwith has seen flowers in a bog at the foot of the Sow of Atholl, Mid Perthshire (88), and describes them as similar to those seen in Dorset.

Mr C. Leighton Hare and Mr A. McClintock in 1934 saw flowers near Ballinafad, W. Galway (H. 16) and describe the colour as " bright lemon yellow."

So far as the question of flowers is concerned I am satisfied that all the above were those of one species only and that species is *U. intermedia* Hayne.

This leaves for decision the question whether there is any evidence from the foliage characters that we have more than one species. In this connection there are two characters to be considered said to be specific for "*U. ochroleuca* Hartm.," i, the occurrence of sporadic bladders among the leaves; ii, the more acuminate leaflets with marginal bristles set on teeth.

Clarke and Gurney (1921) state that in Norfolk sporadic bladders among leaves are not infrequent in undoubted *intermedia* and occur at all times of year. They state that *U. ochroleuca* was only recorded once from Norfolk, *teste* Bennett, who so identified plants from Foulden Common, collected by C. W. F. Newton in September 1914. Specimens from Foulden, 19th October 1912, however, were submitted to Glück, who named them *intermedia* with many transitional leaves with acute and serrate lobes. Thus it appears that the occurrence of "*ochroleuca*" in Norfolk is at best doubtful but there is no doubt as to the occurrence of sporadic bladders. Clarke and Gurney sum up the position as to leaf-shape as follows:—"if *intermedia* and *ochroleuca* can be separated at all in Norfolk (which is doubtful), the only practicable distinction is that in *U. intermedia* SOME leaves are blunt at the ends and lateral processes are USUALLY absent, whereas in *U. ochroleuca* the leaves are ALL pointed and with lateral processes."

In my experience specimens agreeing absolutely with Glück's criteria as to foliage for *U. intermedia* are rare. Such plants occur in the New Forest, as for instance at Denny Bog, where flowers have never been observed. This plant agrees with the extreme broad-lobed *U. Grafiana* Koch but in this locality the plant is semi-terrestrial and it is probable that we have here a parallel to the terrestrial f. *platyloba* Meister of *U. minor*. I have never seen bladders among the leaves in this locality. At Hartland Moor, Dorset, the locality from which I have described the flowers, the leaf-segments are acute as described for "*ochroleuca*," but I have seen no sporadic bladders and flowers are frequent. Near Scotland Farm the plant grows, not in stagnant shallow pools as at Hartland, but in deeper water in a flowing runnel. Here occasional sporadic bladders occur but flowers are scarce. On Morden Heath, in a deep ditch the leaf-segments were longer, bladders more frequent and flowers absent. In Lake District specimens in both semi-terrestrial specimens and deep-water specimens bladders are frequent, the form of leaf-segment being that of "*ochroleuca*" in each case, longer and more slender in the deep water. In the case of flower-production there are probably climatic and chemical factors which at present are not understood. In the case of inter-foliar bladders I suggest that the semi-terrestrial forms having a horizontal habit may be able to assimilate more nourishment through their green leaves than those plants which grow in deep water with a vertical habit giving a proportionately lesser area of leaf and consequently having a greater need for bladders with which to obtain nutriment.

An examination of numbers of specimens shows a large proportion with foliage of mixed character: this is especially true of material

gathered early or late in the season, when the plant is developing from or forming winter-buds. Glück clearly admits the frequent occurrence of foliage of an intermediate character while Čelakovsky (1887) modifies very considerably the views expressed in his first paper. After examining Danish and Palatinate material he came to the conclusion that " one must distinguish between two varieties of *U. intermedia*: the one, certainly more generally distributed, with broader and more obtuse leaf-segments, with more numerous and closer bristles generally placed on indistinct teeth may be called var. *Grafiana* (*U. Grafiana* Koch); the other, apparently less frequent . . . . could be designated var. *Kochiana*." The latter is the form which has been confused with *U. ochroleuca* Hartm.

I am therefore of opinion that the leaf-characters attributed to the false " *ochroleuca* " are not specific and further I do not consider that the extreme forms are deserving of varietal rank, since they are but extremes of a continuous sequence and their characteristics are induced by edaphic factors. We have already seen that in floral characters the British plants are conspecific and I therefore propose that for the British plants the name *U. intermedia* Hayne should alone be used. I would not deny categorically the occurrence of *U. ochroleuca* Hartm. in Britain. If this plant is indeed a hybrid, it might occur in this country but I can only say that I have seen no material agreeing with Hartman's description.

The distribution of U. intermedia in Britain.

Druce (1932: 228) under *U. intermedia* and *U. ochroleuca* combined gives records from 32 vice-counties but records from 4 other vice-counties (85, 93, 95, 111) published in *1st Supplement to Topographical Botany* (1905) were overlooked. Records from three more vice-counties are referred to on p. 109 above. Of the total of 39 English and Scottish vice-counties I have so far seen herbarium material from all except nine (26, 59, 67, 85, 91, 93, 95, 103, 111). The species should be found in 94, 109, and perhaps other Scottish vice-counties. Praeger (1934: 521) records 23 Irish vice-counties. The distribution as at present recorded is therefore: —

39. H. 23.

9, 11, 26-28, 59, 60, 62, 67, 69, 70, 72-74, 85, 87-93, 95-108, 110-112. H. 1-3, 7, 9, 10, 15-20, 23, 25-28, 30, 33-35, 39, 40.

It is possible that H. 21 should be added on the evidence of a scrap of material in Hb. Smith wrapped in a piece of paper marked in pencil, " Specimen wild from near Dublin, D. Turner," and " near Dublin, Dr Scott." A locality in Co. Wicklow might however be described as " near Dublin."

The distribution of U. intermedia abroad.

According to Hegi (1918) the general distribution of *U. intermedia* is " almost all Europe, Siberia, N. America (Connecticut)," while the

distribution of "*U. ochroleuca* Hartm." he gives as "Great Britain, Ireland, Hebrides, France, Holland, Germany, Bohemia, West Galicia, Denmark, Norway, West Greenland," with the main centre of its distribution in the Scottish Highlands. It is quite certain that Hegi has followed Glück's misinterpretation of *U. ochroleuca* Hartm., with which he considers *U. brevicornis* Čelak. to be synonymous. Recent material from the Black Forest show that present day German botanists still have the same misunderstanding. In fact all modern Continental botanists appear to follow Glück in this matter but Höppner (1913) in his account of *U. ochroleuca* Hartm. combines the views of Glück with a description of the plant from Köningsveen familiar to himself and known to German and Dutch botanists as *U. ochroleuca*.

From the accounts of Continental authorities it is clear that *U. intermedia* and "*U. ochroleuca*" are just as rarely found in flower abroad as in this country. Two localities however are mentioned in which "*U. ochroleuca*" is said to produce flowers freely, Köningsveen, near Nijmwegen, on the Lower Rhine and the Lac du Longemer in the Vosges. It was obviously very desirable to compare material from these localities with Dorset material and through the good offices of Mr P. Vermeulen and Mr Joh. Jansen I was able to obtain both dried and fresh material from the Köningsveen. This proved to be distinct from anything seen from Britain and the following data from fresh material should be compared with the data given for Dorset *U. intermedia* ("*ochroleuca*") given earlier in this paper.

Foliage very slender with numerous bladders: the bladders on specialized branches relatively much smaller than in *intermedia*.
Scape, calyx and pedicels. Reddish-brown, scape 8-9.5 cm., slender.
Pedicels. Much shorter than in *intermedia*.
Bracts. Brownish-purple (as in *U. minor*), 2 or 3 on a scape.
Upper lip. Length 5 mm. × breadth 3.5 mm.
Lower lip. Length 8.5 mm. × breadth 8 mm.
Palate. Relatively larger and more prominent.
Spur. 3.5 mm., conical, divergent from lower lip, ± concolorous with corolla, apex greenish.
Colour of corolla. Between Empire yellow and Wax yellow of Ridgway, i.e. a rather duller tone than *intermedia* but a much fuller yellow than sulphur-yellow or ochroleucous.

The palate and throat of the flower, but not the upper lip, are heavily marked with a network of brown, not red, lines.

It will be clear from the above data that this plant agrees in every respect with the description of *U. brevicornis* Čelak. It does not agree so well with the description of *U. ochroleuca* Hartm. and whatever may be the case with the latter, I consider that the plant under consideration is a good species. It grows with *U. minor* but the nearest locality for *U. intermedia* is some few miles away. The shape of the flower, more especially the prominent palate, together with the distinctive

marking of the throat and palate and the unstriped upper lip, are very different from what would be expected if the plant were the hybrid *U. intermedia* × *minor*.

Since the Dutch "*ochroleuca*" proved to be so very distinct from our Dorset "*ochroleuca*" I sent some well-prepared material of the latter to Holland, where it reached the Dutch authority on this genus, Kloos. The result was interesting, since he determined a sheet from Hartland Moor as *U. intermedia* (correctly, as I think) and a sheet from the neighbouring locality near Scotland Farm as *U. ochroleuca* Hartm. f. *stagnalis* Höppner, which is the name the Dutch botanists give to the Köningsveen plant. My two gatherings were most certainly conspecific and equally certainly not identical with the Dutch plant. Perhaps he did not realize that they were from neighbouring localities, and was misled by seeing the word "Scotland" on one of the labels!

It is to be noted that in *U. brevicornis* the length of the upper lip is about 1½ times the breadth, whereas in *U. intermedia* the length and breadth are approximately equal. The ratio between the lengths of the upper and lower lips is about the same in each case but the narrower upper lip in *U. brevicornis* appears to produce the illusion, especially in dried material, that the upper lip is relatively longer than in *U. intermedia*. This may have some bearing upon *U. macroptera* Brückner in view of Čelakovsky's suggestion that this epithet was given in reference to the character given by Brückner in his diagnosis—"upper lip of the corolla twice or thrice exceeding the palate."

The plant of Lac du Longemer also appears to be *U. brevicornis* Čelak. (? = *U. macroptera* Brückn.). There is a sheet from this locality in Hb. Kew, No. 297, in F. Schultes' herb. norm., nov. ser., cent. 3, named *U. intermedia* Hayne. It appears to be identical with the Köningsveen plant: it is certainly not *U. intermedia* Hayne.

On the other hand the French gatherings from near Nantes, Lloyd, 1845, and F. G. Schultz, 501, near Deux-Ponts, are correctly named *U. intermedia*, of which I have also seen material from Switzerland, Holland, Germany, Norway, Sweden, Russia and Manchuria.

U. MINOR L. AND U. BREMII Heer.

The remaining problem is whether we have in Britain in addition to *U. minor* L. a closely related species *U. Bremii* Heer. This is a Central European species, admitted by all authorities to be extremely critical and separable from *U. minor* solely by its larger size, and larger and darker flowers with expanded subrotund lower lip.

This species was first claimed as British by F. M. Webb in *Journ. Bot.*, 1876, p. 142 et seq., on the strength of specimens collected in 1833 by the Rev. J. B. Brechan in the Moss of Inshoch, Nairnshire. The identification was accepted by F. N. Williams (1909), who also placed here gatherings from Isle of Wight (10), Titchfield Common (11) and Loch Spynie (95). He treated it as a var. of *U. minor*, following Druce (1908). Williams' description contains the inexplicable words "palato

sanguineo," a character to which I find no reference in any other authority. Bennett (1910) referred to *U. Bremii* the above-mentioned gatherings and others, e.g. those from Broadford, Skye (*McVicar*, 1895) and Colonsay (*McNeill*, 1908).

Most of the foregoing gatherings can be safely attributed to coarse examples of *U. minor*. One might say " all " were it not for unusual features presented by two sheets of material from Loch Spynie in Hb. Brit. Linn. Soc. Lond., which should be compared with a sheet of Brechan's original gathering in Hb. Kew. All three sheets are labelled *U. intermedia*. They are certainly not that species but resemble very stout examples of *U. minor* with expanded labella and thick conical spurs, short but longer than in normal *U. minor*. With regard to the floral characters given for *U. Bremii* it is to be noted that when the flowers of *U. minor* first unfold from the bud they are pale yellow, not whitish-yellow, in colour and the corolla is flat, the margins deflexing subsequently.

Glück maintained that in barren material it was impossible to separate *U. Bremii* from *U. minor* and after examining considerable British material pronounced as authentic *Bremii* one sheet only, a gathering by G. C. Druce from the Gap of Dunloe, near Killarney. The material on this sheet is worse than scrappy, it is fragmentary, but I can see in the flowers on the broken scapes nothing whatever which encourages me to see here anything but quite normal *U. minor*.

It is conceivable that in the Moss of Inshoch and at Loch Spynie we have a plant distinct from *U. minor* and indeed from all British species but the available material is meagre and very old. New material from these localities would be most valuable. In the meantime it should be assumed that *U. Bremii* Heer, like *U. ochroleuca* Hartm., is not entitled to a place in the British list.

The Distribution of U. minor in Britain.

U. minor L. is the most familiar British species. Druce (1932: 228) records it from 83 vice-counties and Guernsey. To these figures are to be added two further vice-counties (43 and 105) recorded in the *First Supplement to Topographical Botany* (1905), while as stated above there are specimens from the Isle of Man (71) in Hb. Leeds Univ. Praeger, *loc. cit.*, and Druce, *loc. cit.*, both record the species from all the Irish vice-counties except Dublin. The known distribution is therefore:—

86. H. 39. Guernsey.

1, 2, 6, 9-15, 17, 21-32, 37-54, 58, 59, 61-65, 67-77, 81, 83, 85-105, 108, 110-112. H. 1-20, 22-40.

There are some curious gaps in this distribution, some of which particularly in Scotland will no doubt be filled in the course of time. One can understand the absence of this species from E. Gloster and both divisions of Wiltshire (though it might occur in the extreme S.E. of the county) but it is surprising that it should be absent entirely from Devon

and S. Somerset. This species flowers and fruits freely in many localities: I have seen flowering material from as far north as N. Aberdeen and Argyll.

General distribution. South and Central Europe northwards to Iceland and Scandinavia (to lat. 70° 29′ N., near Hammerfest) (Hegi).

In conclusion I wish to emphasize the problem which is the real cause of difficulty in this genus—why do they flower so shyly? If the reason for this could be discovered, it might then be possible by artificial cultivation to solve some of the other problems. I commend this to the attention of a research worker.

ACKNOWLEDGMENTS.

I am glad to have this opportunity of expressing my indebtedness to a large number of helpers for their kindness and goodwill: to the owners and curators of the numerous herbaria consulted, especially Mr A. J. Wilmott of the British Museum, who besides giving much general help has in conjunction with Mr J. E. Dandy guided me (I hope) across the slippery slope of nomenclature: to many kind friends in the Kew Herbarium, who answer tiresome questions patiently and apparently with pleasure: to the officials of the Linnean Society for much courteous attention: to Professor Matthews and Mr C. Leighton Hare of Aberdeen University, Mr A. E. Wade of Cardiff, Dr W. A. Sledge of Leeds, Mr John Chapple of Oxford: to Mr R. H. Corstorphine, to whom members of the B.E.C. are so much more indebted than they realize: to Miss E. Vachell for photographs of *U. neglecta*. Finally, it gives me particular pleasure to acknowledge the help received from our Corresponding Members, Monsieur Pierre Senay, who has taken much interest in the subject, and Messrs P. Vermeulen and Joh. Jansen, who went to great trouble to supply me with Dutch material.

HERBARIA CONSULTED.

Hb. Aberdeen Univ.=The herbarium of the Dept. of Botany, University of Aberdeen.

Hb. Birmingham City=The herbarium of the Museums Dept., City of Birmingham.

Hb. Birmingham Univ.=The herbarium of the University of Birmingham.

Hb. Brit. Linn. Soc. Lond.=The Linnean Society of London's herbarium of British plants.

Hb. Cardiff=The herbarium of the National Museum of Wales, Cardiff.

Hb. Druce=The herbarium of the late G. C. Druce [with additions subsequent to his death by Mr J. F. G. Chapple] kept as a separate collection in the herbarium of Oxford University.

Hb. Exeter=The herbarium of the Exeter Museum.

Hb. Griffith=The herbarium of the late J. E. Griffith kept as a separate collection in the herbarium of the National Museum of Wales, Cardiff.

Hb. Hall=The private collection of the author.

Hb. Hiern=The herbarium of the late W. P. Hiern, the property of the Devonshire Association and kept as a separate collection in the Exeter Museum.

Hb. Kew=The herbarium of the Royal Botanic Gardens, Kew.

Hb. Leeds Univ.=The herbarium of the Dept. of Botany, Leeds University.

Hb. Linn.=The herbarium of Carl von Linné, the property of and kept as a separate collection by the Linnean Society of London.

Hb. Malvern=The herbarium of the Malvern Free Library.

Hb. Mus. Brit.=The British collection of the British Museum (Natural History), S. Kensington.

Hb. Simpson=The private collection of Mr N. D. Simpson, of Bournemouth.

Hb. Sledge=The private collection of Dr W. A. Sledge, of Leeds.

Hb. Smith=The herbarium of the late Sir J. E. Smith, kept as a separate collection by the Linnean Society of London.

Hb. Todd=The private collection of Miss E. S. Todd of Aldbourne, Wilts.

Hb. Torquay=The herbarium of the Torquay Natural History Society.

Hb. Watson=The herbarium of the late H. C. Watson kept as a separate collection in Hb. Kew.

Hb. Vachell=The private collection of Miss E. Vachell, of Cardiff.

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NOTES ON BRITISH RUMICES: I.

J. Edward Lousley.

Preliminary work on the preparation of a new account of British *Rumices* for the projected New Students' British Flora has brought to light a considerable amount of fresh information, and has at the same time revealed that a surprising proportion of published material is in need of revision. It is clear that within the few pages which can reasonably be allotted to the genus *Rumex* in a portable Flora it will be impossible to give full accounts of units below the rank of species, of hybrids, or of aliens. In addition the opportunity is being taken of making a complete revision of the vice-county records, and considerable work is being done on such questions as duration, time of germination, and ecology with a view to making the statements on these matters more accurate than would be possible using only previously published observations.

The present series of notes has therefore been commenced with a view to amplifying the condensed summary to be given in the Flora, and particularly with the following objects:—

(1) To publish conclusions arrived at by the writer, with a view to stimulating constructive criticism from as many botanists as possible. The material throughout these notes is intended to be corrected and amplified as additional information comes to hand.
(2) To indicate the questions on which further information is most urgently desired, and to stimulate interest in the group.
(3) To publish names new to the British list with adequate supporting references, and to give details when questions of nomenclature have been investigated.
(4) To give a revised distribution by vice-counties for all less widely distributed species, supported by cited herbarium material.

With such objects in view the treatment of the various species will not be uniform, and for practical reasons it is not advisable to deal with all the species and hybrids *seriatim*. In order to retain the same sequence in the instalments of these notes the numbers given in Druce's *British Plant List, Ed. II*, will be prefixed to the species, although complete rearrangement of the sequence in that List will ultimately be necessary.

COLLECTION OF MATERIAL.

For critical determination of *Rumices* the following are essential:—

(1) A panicle bearing fully matured fruits (see also below under "Description of Organs").
(2) Part of the main stem bearing the lowest leaves obtainable.

The material should be dried in some form of plant-press calculated to give even pressure over the whole specimen. Many specimens have been spoiled in the past by subjection to heavy pressure between hard unyielding surfaces, which results in the thicker parts of the plant becoming broken and squashed while at the same time the more delicate portions wrinkle and lose their shape. The writer has found that the corrugated cardboard " dryers " supplied by Messrs. Flatters & Garnett, Ltd., placed between each specimen hasten drying with a minimum of distortion, and also obviate any marks across the leaves such as sometimes result from pressure transmitted from neighbouring stems.

It will frequently be advisable in the course of these notes to warn readers against immature material, and the extent to which this warning is necessary will readily be appreciated after inspection of almost any large herbarium. *Rumices* can usually be approximately identified from the seedling stage onwards, but since the characters of the fruit which are universally used for critical determination are absent until the seed is fully ripe, it is almost always advisable to leave immature material ungathered.

A warning is also necessary against the practice of gathering leaves from plants adjacent to the one from which fruit is collected. At the time of fruiting the lower leaves of almost all Docks have decayed away, and it is then a great temptation to gather fresh leaves from adjacent younger or barren plants. This practice is liable to lead to mixed gatherings and consequent confusion, and is only permissible when the collector has studied a colony over a lengthy period and is quite certain that it is homogeneous. Even in such cases it is preferable to take material from a single marked individual in different stages of growth. Generally it is better to be content with the lowest stem leaves obtainable, even if these are not in perfect condition, rather than to run the slightest risk of a mixed gathering.

DESCRIPTION OF ORGANS.

(1) *Leaves.* Most Docks produce a rosette of leaves, which remain in good condition only so long as the individual is barren. The term *radical leaf* is applied only to the leaves of this rosette. When the flowering stem appears, it bears *cauline* (stem) leaves, which in change of shape form a continuous series from the radical leaves to those immediately below the panicle and even to the bracts within the panicle. When a separate description of stem leaves is given it refers to those about one-half to two-thirds of the way up the stem. In order to obtain descriptions of the radical leaves it has been necessary to mark down plants for observation throughout the year (see below under *Exsiccata*). Naturally it is not expected that users of the descriptions will do the same with every plant they name, but the lower down the stem that cauline leaves are collected the nearer they will approximate to the descriptions of the radical leaves, which are generally subject to least variation within the taxonomic units.

(2) *Flowers and Fruit.* The perianth of a *Rumex* is composed of six segments, three of which are arranged in an inner whorl, and three in an outer. The three inner were termed " petals " and the three outer " sepals " by Babington, while Hooker in his *Student's Flora* refers to all six as " sepals." It is proposed to refer to them as *Inner* and *Outer Perianth Segments*, or *Tepals*.

At the time of flowering there is usually extremely little difference between the two whorls, but after fertilisation the inner tepals rapidly enlarge until they greatly exceed the outer tepals which remain little changed. As the fruit matures, the inner tepals take on the characters which are of such great importance in the differentiation of species and segregates. Thus, for example, they may eventually become dentate, reticulate, or tubercled. When this process has reached its maximum development, it is proposed to call them *valves*. It is important to note that the development of the tepals cannot be presumed complete on the sole evidence that fruit is formed within, for it continues until the fruit is fully mature and ready for dispersal. In the state to which the term is to be restricted the valves are dry structures, often brown and hard. The addition of the word " mature " has been occasionally added when describing the valves, as, although in the strict sense of this definition redundant, it is employed to indicate cases where it is of especial importance that the valves should be absolutely mature. The development of the inner tepals into valves is calculated to protect the fruit within, and the variations used as characters in taxonomic botany aid in the dispersal of the fruit by various agencies.

The term " valve " has the advantages of precision and brevity, and is also easily rendered in Latin. The following are examples of the terms used in some of the more recent British works to describe the same organs: —

1. (Inner) Fruiting Sepals—Hooker's *Student's Flora*.
2. Sepals—Hayward's *Botanist's Pocket Book*.
3. Enlarged Petals—Babington's *Manual*.
4. Inner Segments of the Fruiting Perianth—Bentham & Hooker's *Handbook*.
5. Fruiting Segments—Moss, *Cambridge British Flora*.
6. Enlarged Petals in Fruit, also Fruit-Petals—Syme, *English Botany*.
7. Ripe inner Perianth Leaves—Trimen, e.g. in *Journ. Bot.*, *11*, 129, 1873.
8. Lockets—Purchas & Ley, *Fl. Herefordshire*, 251, 1889.

Tubercles are spherical or ovoid structures, which develop in many species of *Rumex* on the mid-nerve of the valves as they approach maturity. They are filled with large corky cells with big air-spaces and their function is to act as floats to water-borne fruits. The tubercle has been variously styled a " grain," " bead," or " callus " by various authors.

The fruit (*sensu stricto*), which develops within, I refer to as the *nut*, as it is a one-seeded fruit, with a woody pericarp, developed from a syncarpous ovary. The term, however, is usually applied to the product of an inferior ovary, whereas the ovary in *Rumex* is superior. Some authors have used the term " achene " for the fruit of the Docks but this is even less satisfactory, since an achene is strictly the product of an apocarpous ovary. Rechinger (1937) has described them as " nutlets " but this would appear to have little or no advantage over the word " nuts," and it has the disadvantage of being four letters longer.

It is proposed to reserve the term *fruit* for use in the wider sense—i.e. for the nut together with the enveloping valves, the receptacle and the pedicel down to the point where it breaks away from the parent plant.

RUMICES BRITANNICAE EXSICCATAE.

Owing to the inadequate representation of this genus in many public herbaria it was decided to distribute as widely as possible a series of dried material of British species, hybrids, and varieties with labels numbered under the above heading. Every care has been taken to avoid any possible mixture, and, where practical, material was gathered in various stages from pure colonies which were kept under monthly observation. Exactly 200 numbers were collected during 1938, but it was only of about 50 of these that material could be obtained in sufficient quantity to supply all the intended herbaria with the same reference number. Such a situation was bound to arise in the case of many hybrids when the same reference number was only given to material from a single individual.

Sets have been supplied to the following herbaria, the sequence indicating the relative completeness of each set:—

Natürhistorisches Museum, Vienna (Dr Karl Rechinger, Jnr.).
British Museum (Natural History), South Kensington.
Royal Botanic Gardens, Kew.
National Museum of Wales, Cardiff.
South London Botanical Institute, Tulse Hill, London.
Royal Botanic Gardens, Edinburgh.

Surplus sheets have also been distributed elsewhere.

This series is cited in the following notes as " Lousley (00)."

As much of the material as possible was collected from the five following localities, which were kept under approximately monthly observation throughout summer and winter. The details here given will assist future students in interpreting the dried material—especially that of the hybrids—and also the results of studies in life-history and ecology, which were carried on chiefly at these stations. The labels on the *Exsiccata* were printed throughout in order to avoid errors in citation by botanists not familiar with British topography, and it was necessary to describe the localities rather vaguely in the terms given first in the following list. All material so localized was collected within the narrow

limits described below. Watsonian vice-county numbers were omitted as they are often misunderstood on the Continent, but the corresponding names (e.g. Mid-Perth) were used throughout.

A. SHALFORD COMMON, 2 miles S. of Guildford, Surrey. Only the sandy portion of the Common W. of the Guildford-Bramley road was studied, together with an adjoining water meadow.

Species present: *R. crispus* L., *R. obtusifolius* L. ssp. *agrestis* (Fries) Danser, *R. sanguineus* L. var. *viridis* Sibth., *R. conglomeratus* Murray, *R. pulcher* L. ssp. *eu-pulcher* Rech. fil., *R. Acetosa* L., and *R. Acetosella* L.

Exsiccata: 1, 20, 21, 59, 60, 61, 62, 189.

pH of soil water: varied from 5 (sandy ground around roots of *R. Acetosella*) to 8 (around roots of *R. pulcher* at base of wall).

B. MITCHAM JUNCTION, Surrey. An old gravel working, most of which is now filled with a large permanent pond, close to Mitcham Junction (S.R.) station. Part of this area has recently been used as a rubbish dump.

Species present: *R. crispus* L., *R. obtusifolius* L. ssp. *agrestis* (Fries) Danser, *R. obtusifolius* L. ssp. *sylvestris* (Wallr.) Rech. pat. (rare—on dump only), *R. sanguineus* L. var. *viridis* Sibth., *R. conglomeratus* Murray, *R. palustris* Smith, *R. Acetosa* L., *R. Acetosella* L.

Exsiccata: 23, 24, 25, 26, 26a, 52, 53, 54, 55, 56, 168, 169, 198.

pH of soil water: 6.5-7.5 (-8 on some chalky rubble introduced at one spot).

C. CHISWICK, Middlesex. A triangular piece of waste ground bounded by the new Mortlake-Chiswick road, the Chiswick-Barnes Bridge railway, and the River Thames. Dumping had at various times taken place over the whole of this area.

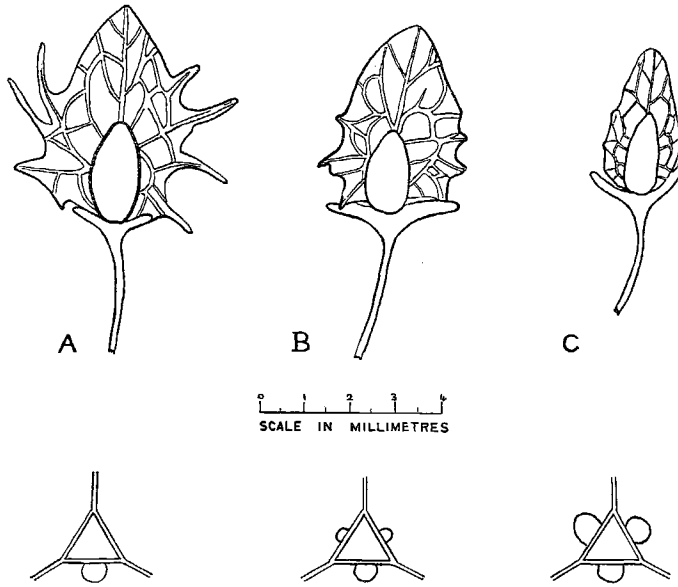
Species present: *R. crispus* L., *R. obtusifolius* L. ssp. *agrestis* (Fries) Danser, *R. obtusifolius* L. ssp. *transiens* (Simonk.) Rech. fil., *R. sanguineus* L. var. *viridis* Sibth., *R. conglomeratus* Murray, *R. Patientia* L. ssp. *orientalis* (Bernh.) Danser.

Exsiccata: 10, 11, 14, 15, 38, 39, 40, 41, 42, 44, 46, 50, 144.

pH of soil water: 7.5-8 (around roots of *R. Patientia* L.) but probably subject to local variation owing to the "made" nature of the ground).

D. ALFRISTON, E. Sussex. The Cuckmere valley as bounded to the N. and S. by the limits of the village, and E. and W. by the parallel roads. Most of this area is composed of water-meadows bounded on both sides by calcareous slopes.

Species present: *R. Hydrolapathum* Huds., *R. crispus* L., *R. obtusifolius* L. ssp. *agrestis* (Fries) Danser, *R. sanguineus* L. var. *viridis* Sibth., *R. conglomeratus* Murray, *R. Acetosa* L., and also *R. pulcher* L. ssp. *eu-pulcher* Rech. fil. in very limited quantity.



RUMEX OBTUSIFOLIUS L.—FRUITS. ×10.

A. Ssp. *agrestis* (Fries) Danser, Godalming, Surrey (*Rum. Exs. Brit.*, No. 2).

B. Ssp. *transiens* (Simonkai) Rechinger fil., Chiswick, Middlesex (*Rum. Exs. Brit.*, No. 11).

C. Ssp. *sylvestris* (Wallroth) Rechinger pat., Mitcham, Surrey (*Rum. Exs. Brit.*, No. 52).

The upper row illustrates tubercled valves, the lower row diagrammatic representations of transverse sections through the fruit to show presence or absence and relative size of tubercles on the three valves.

Exsiccata: 6, 7, 33, 148, 149, 188.
pH of soil water: 7-8.

The new Cuckmere drainage scheme destroyed several plants which were under observation before fruit could be collected.

E. HENDON, Middlesex. The sheet of water known officially as the Brent Reservoir, and popularly as the "Welsh Harp," and the meadows and slopes immediately adjoining.

Species present: *R. crispus* L., *R. obtusifolius* L. ssp. *agrestis* (Fries) Danser, *R. conglomeratus* Murray, *R. palustris* Smith (abundant), and *R. Acetosa* L.

Exsiccata: 126, 126a, 127, 128, 178, 181, 193, 194.
pH of soil water: 7-8.

SPECIES.

618/6. R. OBTUSIFOLIUS L., *Sp. Pl.*, 335, 1753.

Icones. Trimen in *Journ. Bot.*, *11*, *t.* 131, 1873. The illustrations given by Syme, Moss, and Fitch & Smith are all very unsatisfactory.

Type. Hb. Linn. No. 17 marked "H.U." (Hort. Upsala), and labelled "obtusifolius" in the handwriting of Linnaeus must be regarded as the type specimen. This is in bud only, but represents the species now known under this name. Hb. Linn. No. 18 bears a leaf and branch in good fruit, and represents an unusual form of ssp. *agrestis* Rech. fil.—perhaps from secondary growth.

Rechinger (*BBC.*, *49*, 41-65, 1932) has divided *R. obtusifolius* L. into four subspecies, of three of which he has identified British material. The great variation which occurs within the species has long been recognised and many names have been given to the variants, but Rechinger's painstaking work is the first serious attempt to study the species throughout its geographical range, and to reduce the variations and synonyms to a logical account. In the course of his work he examined many times as many specimens as are available in this country, and had the advantage of field work in many of the countries of Europe. The Docks of Central Europe and Russia are very inadequately represented in the British public collections, and very few of the *exsiccata* cited by Rechinger have been seen. He shows that each of his subspecies occupies a definite geographical area, and that where these areas overlap intermediates are most frequent. In this country only ssp. *agrestis* occurs as a native, it being practically certain that all material falling under the other subspecies is adventive. It appears that in Britain it may not be easy to draw an absolute line between ssp. *sylvestris* and ssp. *transiens*, although in well selected material they are very distinct. In view of the scanty material of these alien plants which is available, it is considered wise to follow Rechinger in retaining them both as subspecies.

The following key to the segregates of *R. obtusifolius* L. is based on the key given by Rechinger (*loc. cit.*, 44):—

1a. Valves with long teeth, most of which exceed the width of the valves ..... ssp. *agrestis* (Fries) Danser f. *subulatus*.
1b. Valves entire or toothed. Teeth, when present, at most equalling the width of the valves.
2a. Valves entire, or almost so. All three tubercles well developed, usually subequal, often occupying almost the whole width of the valve ..... ssp. *sylvestris* (Wallr.) Rech. fil.
2b. Valves toothed.
3a. Only one tubercle well developed.
4a. Valves ovate to broad ovate-triangular, more or less obtuse, *c.* 6 mm. long. Undersides of leaves and petioles usually hairy ssp. *agrestis* (Fries) Danser.
[4b. Valves narrow-triangular, acute, *c.* 5 mm. long. Plant usually glabrous ..... ssp. *subalpinus* (Schur) Simonk.]
3b. All three tubercles well developed.
5a. Valves rather narrow, ovate-triangular. Teeth very short (*c.* 0.5 mm.) ..... ssp. *transiens* (Simonk.) Rech. fil.
5b. Valves broadly ovate-triangular. Teeth long (1-3 mm.) ..... ssp. *agrestis* (Fries) Danser f. *trigranis*.

It must be remembered that for the certain distinction of the four subspecies absolutely ripe fruit is usually essential. Even in the common ssp. *agrestis* the tubercles and teeth on the inner perianth segments do not develop until the fruits are completely ripe. Specimens on which the perianth segments have enlarged, containing formed but immature fruit, have frequently been gathered before development is complete, and mistaken for the subspecies which have entire valves.

Subsp. AGRESTIS (Fries) Danser, *Ned. Kruid. Arch.*, *1925*, 424, 1926; *R. obtusifolius* L. var. *agrestis* Fries, *Novit. Fl. Suec.*, ed. 2, 99, 1828; *R. obtusifolius* L. a. *macrocarpa* Dierbach in Geiger, *Mag. Pharm.*, *4*, 16-21, 1826 (*teste* Rechinger): *R. Friesii* Grenier & Godron, *Fl. France*, *3*, 36, 1856: *R. obtusifolius* L. a. *agrestis* (Fr.) of Babington, *Manual*, recent eds.: *R. obtusifolius* L. b. *agrestis* of Hayward's *Botanist's Pocket Book*, recent eds.

Icones. Beck in Rchb., *Icones*, *24*, t. 181, figs. 1-3; Danser, *Ned. Kruid. Arch.*, *1921*, t. 1, figs. 2-4, 1922 (very good); Rechinger, *loc. cit.*, t. 2, fig. 16; Trimen, *Journ. Bot.*, *11*, t. 131, figs. 2a, 3a, 4a, 5a, 1873.

Exsicc. 17, Surrey; Godalming, Lousley (2)—*teste* Rechinger. 21, Middlesex; Camden Terrace (wild), Camden Town—probably the material from which the unsatisfactory *E.B.* 1999 was drawn, J. de C. Sowerby (Hb. Mus. Brit.)—also Lousley (20), (26a), (34), (56), (128), and (144).

Fruiting valves ovate-triangular, obtuse or rather so, *c.* 6 mm. long, one (rarely all) tubercled; margins with prominent teeth, which are usually about equal to or slightly shorter than the width of the valve, rarely longer than the valves are broad. Petioles and leaves usually pubescent-scabrid below.

Distribution. Native; on waste-ground, roadsides, and about buildings and gardens, field borders and hedgerows, favouring disturbed ground wherever the soil is not too deficient in organic matter or too dry. Occurs abundantly throughout the British Isles though less fre-

quent towards the extreme north (probably owing to the comparative scarcity of suitable habitats). This is the common British *obtusifolius* and there is no reason to doubt that ssp. *agrestis* occurs in every vice-county from which the species has been recorded.

Distribution abroad. Western Europe from N. Spain, Britain and France to Hungary, Central Germany, S. Sweden and Norway.

Two unimportant forms occur in Britain as follows:—

Forma PURPUREUS (Poiret) mihi, comb. nov.; *R. purpureus* Poiret, *Encyc. Méth., 5*, 63, 1804; *R. obtusifolius* L. var. *discolor* Wallroth, *Sched. crit., 1*, 168, 1822; *R. obtusifolius* L. var. *purpureus* Petermann, *Fl. Lips.*, 266, 1838.

Stem and leaf veins suffused with deep red similar in colour to that of beet. (This colour is described from dried material only.)

A mere colour form which has sometimes been confused with *R. sanguineus* L. var. *purpureus* Stokes. See Danser, *Ned. Kruid. Arch., 1921*, 209-210, 1922. There is an unlocalised, undated specimen in Herb. Smith. Extreme examples of this plant have been cultivated in botanic gardens for their foliage.

Forma PANDURIFOLIA (Borbas) Beck in Rchb., *Icones, 24*, 38, 1904; *R. obtusifolius* L. var. *pandurifolia* Borbas, *OBZ., 39*, 310, 1889.

Icones. Danser, *Ned. Kruid. Arch., 1921*, t. 1, figs. 5 and 6.

Lower leaves constricted above the base in the form of a fiddle.

Occasionally individual plants answering to the description of this form may be found in Britain and they have sometimes been confused with *R. pulcher.*

The following forms are of greater importance:—

Forma TRIGRANIS (Danser) Rechinger fil., *BBC., 49*, 46, 1932; *R. obtusifolius* L. ssp. *Friesii* (Grenier) var. *trigranis* Danser, *Ned. Kruid. Arch., 1921*, 209, 1922.

All three valves tubercled.

Rechinger (*loc. cit.*, 51) cites the following material for this form:—17, Surrey; Kew, Nicholson (1099). 28, W. Norfolk; Wells, Lomas. To which may be added:—85, Fife; Invertiel, Syme (Hb. Hanbury).

Danser's original description of this variety (*loc. cit.*, 209) also included a name for the typical subspecies and reads as follows:—

" Varietates secundum perigonii grana.

1. *unigranis* (nova var.) anterior tantum valva grano ornata. Vulgatissima varietas.
2. *trigranis* (nova var.) etiam valvae laterales grano ornatae. Rarissima varietas."

Forma SUBULATUS (Rech. pat.) Rechinger fil., *BBC., 49*, 47, 1932; *R. obtusifolius* L. ssp. *subulatus* Rechinger pat., *OBZ., 43*, 51, 1892.

Valves with long (3-4 mm.) teeth which at least equal in length the width of the valves.

Rechinger pater draws attention to the resemblance of the valve teeth of this form to those of *R. maritimus* in sharpness and length. Rechinger fil. states that the form has been confused with *R. dentatus*.

Rechinger fil. (*loc. cit.*, 47) cites the following material:—20, Herts.; Ayot Green, H. Groves (Hb. Cluj), but material has been seen in British herbaria under the same label which does not answer to the description. Groves certainly gathered several forms from this station.

Subsp. TRANSIENS (Simonkai) Rechinger fil., *BBC., 49*, 52, 1932; *R. silvestris* Wallroth var. *transiens* Simonkai, *Math. term. Közl., 16*, 119, 1881; *R. silvester* β Danser, *Ned. Kruid. Arch., 1921*, 209, 1922; *R. obtusifolius* L. var. *sylvestris* Trimen, *Journ. Bot., 11*, 131, 1873, and probably of all subsequent British authors.

Icones. Rechinger, *loc. cit.*, t. 2, fig. 17; Danser, *loc. cit.*, t. 1, fig. 8 (valve too narrow); Trimen, *loc. cit.*, t. 131 (valve too narrow and acute, teeth shorter than in typical examples).

Exsicc. 17, Surrey; between Putney and Hammersmith, on the Thames' bank, 1872, Warren (Hb. Mus. Brit.). 21, Middlesex; waste ground, Chiswick, Lousley (11)—*teste* Rechinger.

Ripe fruiting-valves ovate-triangular, obtuse or rarely somewhat acute, *c.* 5 mm. long, 2-3 mm. broad, all with tubercles, one of which is usually much larger than the other two, all margins toothed near the base, teeth up to half the width of the valve in length but often much shorter (in British material the teeth on some valves in a panicle may be extremely short). Petioles and leaf-nerves sparingly pubescent-scabrid beneath.

Distribution. In Britain an established alien known only from the vice-counties given above, where it occurs on the banks of the River Thames and in adjoining waste land from Putney to above Kew Bridge. Frequently collected in this area since its discovery in 1872.

Distribution abroad. Central Europe from Southern Sweden through Germany to Austria and Hungary, introduced elsewhere.

Subsp. *transiens* is very closely allied to ssp. *sylvestris*, from which it is best distinguished (in British material) by the larger, much broader, fruits, the very unequal tubercles, and the presence of definite teeth on the basal margins of the valves. Whereas in ssp. *sylvestris* the base of the valve tends to be cuneate with the tubercle taking up almost all the width, in ssp. *transiens* the base is truncate and owing to the greater width even the largest tubercles leave about half the width exposed.

This is the plant which was described by Trimen (*loc. cit.*) as *R. obtusifolius* L. var. *sylvestris* from material collected above Putney by Warren in 1873, and the material upon which his account is based is in Hb. Mus. Brit. Trimen's statement (*loc. cit.*, 130) that the branches of this plant make a more acute angle with the stem than do those of ssp. *agrestis* (Trimen's *Friesii*) is in general true of the colonies the writer has studied. The lower stem and rosette leaves of *transiens* (normal L/B. ratio of the lamina 8 : 6.5) are very much broader than those of *agrestis* (10.5 : 4), also the leaves of the former are much more abruptly

contracted to the apex from a relatively broader base, and the pubescence on the mid-rib on the underside of the leaf is very much less in *transiens* than in the commoner subspecies.

The characters of this plant are intermediate between those of *agrestis* and *sylvestris*, but Rechinger has given convincing reasons why it should not be considered as a hybrid between those subspecies (*loc. cit.*, 53).

Subsp. SYLVESTRIS (Wallroth) Rechinger pat., *OBZ.*, *42*, 51, 1892; *R. sylvestris* Wallroth, *Sched. crit.*, *1*, 161, 1822; *R. obtusifolius* L. a. *silvestris* Fries, *Novit. Fl. Suec.*, ed. 2, 98, 1828; *R. obtusifolius* L. *β microcarpa* Dierbach in Geiger, *Mag. Pharm.*, *4*, 16-21, 1826 (*teste* Rechinger fil.).

Icones. Rechinger fil., *BBC.*, *49*, t. 2, fig. 15; Danser, *Ned. Kruid. Arch.*, *1921*, t. 1, figs. 7 and 9, 1922; Beck in Rchb., *Icones*, *24*, t. 180, 1904.

Exsicc. 17, Surrey; Mitcham Junction, Lousley (52)—*teste* Rechinger. 20, Herts.; Stanstead St Margarets, Lousley (130)—*teste* Rechinger; Wormley, Britton (3539).

Fruiting valves narrow lingulate or narrow ovate-triangular, acute or rather obtuse, 3-4½ x 2-2½ mm., entire or with obsolescent teeth near the base; all tubercled, the tubercles usually subequal, rarely two of them smaller than the others, usually taking up over half the width of the valve. Plant completely glabrous.

Distribution. A rare alien of which I have seen only the above material from Britain. At the Mitcham Junction station only a single plant was observed, but the subspecies appears to be persistent along canal-sides in Hertfordshire.

Distribution abroad. Eastern Europe from South Sweden, Central Germany, Hungary and Austria eastwards to Poland and Russia. Introduced in a few stations elsewhere.

Wallroth's *Exsicc.* No. 18 (ex Thalleben in Thüringen) is somewhat misleading as the various sheets distributed are not absolutely uniform. There is no doubt that all those seen represent his *R. sylvestris* but some of them are not good examples of the extreme form which Rechinger regards as typical.

No material which could definitely be assigned to ssp. *sylvestris* has been seen from the banks of the Thames. Rechinger fil. (*loc. cit.*, 60) cites "Bank of Thames, Kew, Surrey (G. Nicholson)" and "By the Thames betw. Putney and Barnes (C. E. Britton)" for this subspecies, but of the first gathering he adds "Nicht typisch, Übergang zu ssp. *transiens*," and the material of the gathering of Mr Britton's which I believe to be intended (Ref. 210) is too immature to be satisfactorily determined. Until further evidence is forthcoming only *transiens* can be accepted as growing by the Thames.

From the scanty material seen it appears that the leaf-shape of this subspecies in Britain approximates closely to that of ssp. *agrestis*, and thus differs from ssp. *transiens*.

[Subsp. SUBALPINUS (Schur) Simonkai, *Enum. Fl. Transs.*, 472, 1886; *R. obtusifolius* L. a. *subalpinus* Schur, *Enum. Pl. Transs.*, 579, 1866.

Icones. Rechinger, *BBC.*, *49*, t. 2, fig. 18.

Fruiting valves narrow triangular, acute, *c.* 5 mm. long, one strongly tubercled, all with the margin toothed near the base; teeth usually three on each side, less than half the width of the valve in length. Plant usually completely glabrous.

Distribution abroad. Mountain and subalpine regions of the Carpathians, the Balkans, Persia, Caucasus and the Crimea; sporadically in Central Europe and Russia.

There is no definite evidence of the occurrence of this subspecies in Britain. On specimens of *R. obtusifolius* L. from Barry Dock, Glamorgan (163), and Avonmouth Docks, W. Gloucester (162), Rechinger wrote as follows:—"These two gatherings recall the ssp. *subalpinus* from S.E. Europe but could be quite as well an unusually small fruited form of ssp. *agrestis*." The material was gathered late and was obviously not good enough for a stable determination of a critical plant—especially as ssp. *subalpinus* is of all the four segregates of *R. obtusifolius* the one of which Rechinger has seen least material.]

618/7 and 8. R. SANGUINEUS L., *Sp. Pl.*, 334, 1753.

There can be no doubt from the diagnosis and synonymy given in *Species Plantarum* that Linnaeus had in mind the aggregate species to which this name is generally applied. The type specimen in the Linnean herbarium is labelled "2 sanguineus" in Linnaeus' handwriting, and it was most probably in his collection before 1753. This sheet bears a flowering spike and a leaf which still shows broad purple veins indicating that it belongs to the plant described below as var. *purpureus* Stokes. One would have expected therefore that Linnaeus would have made some mention in his description of such a conspicuous character, but whereas he quotes in synonomy authors who did recognise this feature, he mentions coloration only in connection with the tubercles. Neither is it possible that he made the omission deliberately with a view to the inclusion of the green-veined plant (var. *viridis* Sibthorp), which was almost certainly known to him, since the only locality cited is "Habitat in Virginia."

There is no form of *R. sanguineus* known to be native in the continent of America, though the species has been recorded by many authors as an introduction in North America. There is no necessity to suppose that Linnaeus was in error in stating that the plant grew in Virginia since at least six of his correspondents sent him botanical material from North America, and two of them (John Clayton and John Mitchell) are known to have stayed in Virginia. At the time of the publication of *Species Plantarum* the Virginian colony had been in existence for 147 years. We know that during that period *R. sanguineus* var. *purpureus* Stokes was in demand in Europe as a pot herb and for medicinal purposes (see below), and it is therefore not unreasonable to postulate that

it was grown by the Virginian colonists, and that it may even have become temporarily established as a naturalised plant. The fact that it was the purple-veined form which was sent to Linnaeus adds support to this theory.

It is proposed to follow the practice of most recent continental authors in uniting the green and purple veined segregates of the aggregate *R. sanguineus* under a single species as follows:—

Var. a. PURPUREUS Stokes, *Bot. Mat. Med.*, *2*, 302, 1812; *R. sanguineus* a. *genuinus* Koch, *Syn. Fl. Germ. et Helv.*, ed. 1, 613, 1837; *R. sanguineus* auct. angl.

Pre-Linnean synonomy: *Lapathum sativum sanguineum* Johnson in *Gerard Herb.*, ed. 2, 390, 1636; *L. sanguineum* Parkinson, *Theatr. Bot.*, 1226, 1640; *Lapathum folio acuto rubente* Morison, *Plant. Hist.*, *2*, 579, 1680-99; Ray, *Syn.*, ed. 3, 142, 1724.

Exsicc. 34, W. Gloucester; Clifton, Bristol, Lousley (164); and Hort. Streatham ex Ash ex Wilmott ex Foggitt (from Guernsey), Lousley (173).

Leaves with purple veins, stem and panicle branches often suffused with purple.

The colour of the veins of this plant has been variously described as "red," "crimson," "dark red," "dark crimson," and "blood-red" by various authors, while Stokes (*op. cit.*) states that they are "brownish purple." It is by no means an easy colour to describe in words, but to the writer's eye it is purple rather than any shade of red.

Numerous attempts have been made to find other distinctions between this plant and the one which follows, but when applied to living and dried material they have all proved completely unreliable. The excellent descriptions given by Moss (*Camb. Br. Fl.*, *2*, 145-6, 1914) of *R. sanguineus* and *R. condylodes* show differences which hold good in many specimens, but these differences are probably attributable to the fact that most herbarium specimens of the former have grown under full exposure to sun, while the latter is usually collected from the shade of woods, copses, and hedgebanks. Salmon made a praiseworthy effort to find a difference between the valves and nuts of the two species (*S.E. Nat.*, 49-50, 1928, and *Fl. Surrey*, 565, 1931), but I am unable to agree to his measurements, and Little (*B.E.C. 1931 Rep.*, 839-840, 1932) after careful examination came to a similar conclusion.

It is well known to amateur botanists that var. *purpureus* in cultivation comes up constant from seed over long periods. This fact is mentioned by Syme (*E.B.*, *8*, 42) and Druce (*Fl. Berks.*, 431, 1897), and I can confirm it from observation of the plants in the garden of the South London Botanical Institute where no variations have appeared. In "wild" stations when left undisturbed it may be equally constant —for example, I saw it in 1938 at a locality at Clifton, Bristol, where J. W. White noticed it in 1897 (*Fl. Bristol*, 514, 1912). There is no apparent reason why the plants in cultivation in botanic gardens today should not be lineal descendants of those known to pre-Linnean botanists.

The plant was first recorded for Britain in 1636 by Johnson, who states:—" This fifth kinde of Docke is best knowne unto all, of the stocke or kindred of Dockes . . . " (*op. cit.*, *2*, 390), and this is explained by his remark that it was " sowne for a pot-herbe in most gardens." Since we know that *R. sanguineus* is not native in the New World, and that it is most unlikely that it would be introduced in Virginia before the first settlement there in 1607, Johnson's statement in 1636 that it was grown " in most gardens " makes the assertion of later authors that " It migrated from Virginia to Hampstead in England " (Withering, *Arr. Br. Pl.*, *2*, 346, 1801) almost impossible.

Ray (*op. cit.*, 142) clearly indicated that he did not know the plant as a native—" Sicubi occurrat in viis publicis et ad semitas, hortorum rejectamentis originem suam debere suspicor." He gave medicinal uses for the herb.

To-day no undoubted native station for var. *purpureus* is known in any country of the world. In Britain the least suspicious locality is the island of Guernsey, where it is said to be common, but apparently restricted to roadsides and waste-places (Marquand, *Fl. Guernsey*, 161, 1901). It seems that in every place where true *purpureus* has been recorded in Britain a garden origin is probable.

It is suggested as a hypothesis that the purple-veined plant originally arose as a mutant growing in a colony of the native green-veined var. *viridis* in Western Europe. Such a striking plant would immediately attract the attention of an ancient herbalist as likely to have curative properties, and thus it became transplanted into a herb-garden. Coming true from seed, and with the character probably intensified by the greater exposure to light under garden conditions, and perhaps also owing to isolation from the green-veined plant, the plant would rapidly spread by the distribution of seed throughout the herb-gardens of Western Europe. Thence it appears that it became occasionally introduced into semi-wild habitats.

My attention was drawn by Mr Wm. Watson in 1934 to an interesting plant growing in a moist roadside copse near Brook, Witley, Surrey. In spring a small number of individuals in this colony have purple veins to all the leaves, while the great majority have the concolorous leaf-veins of *viridis*. In July and August some of the fruiting plants have narrow purple veins to the stem leaves (Lousley (22)), while the stem is green and not dark coloured as in true *purpureus*. One individual of this phenotype was transplanted to my garden and by November it had developed purple veins to the root leaves which were almost identical with those of true *purpureus* (Hort. Ash ex Wilmott ex Foggitt—Lousley (173)) in an adjoining pot. It is thought that this Witley plant may be a mutant of the same nature as *purpureus* but less extreme. In nature the shade afforded by the leafage of the surrounding trees and shrubs may prevent the full expression of the genetic character during the summer months. It may be that such a plant brought into a sun-exposed garden, and isolated from the crossing influence of

viridis, would in the course of a few generations produce individuals as extreme as the *purpureus* of present cultivation.

Var. b. VIRIDIS Sibthorp, *Fl. Oxon.*, 118, 1794; *R. condylodes* Bieberstein, *Fl. Taur.-Cauc.*, *1*, 288, 1808; *R. nemorosus* Schrader ex Willdenow, *Enum. Hort. Berol.*, 397, 1809.

Exsicc. 26, W. Suffolk; Risby, Lousley (141).

Leaf-veins and stem green or occasionally flushed with rusty red.

The fact that the forms of *viridis* with rusty red veins belong here rather than to the purple-veined *purpureus* was indicated by Moss, who described them as *R. condylodes* forma *sanguinalis* in *Camb. Br. Fl.*, *2*, 146, 1914. He was in error, however, in stating that they occurred only during the autumn months. Many of the records for *purpureus* belong to this form—such as a plant shown to me near Penzance by a local botanist in June 1934.

Normally this variety is a shade plant with thin, dark green leaves, and panicle branches often spreading at an angle of as much as 60°. Under extreme shade conditions the panicle may be little branched (Lousley (141), Risby, W. Suffolk). Plants growing in full sun exposure however have a very different appearance, and the leaves are then smaller, thicker, and narrower, and the long leafless panicle branches make an angle of less than 30° with the main stem (Lousley (69), Littleworth Common, Surrey; (55), Mitcham Junction, Surrey; (37), Pit near Burpham, W. Sussex).

Very few authors have accurately described the tubercles of *R. sanguineus* var. *viridis*, and while it is true that only one valve bears a large conspicuous tubercle, yet it is usual to find smaller though less well-formed tubercles on at least one of the other valves. This is true even on plants of the most extreme form (Lousley (141), Risby, W. Suffolk). It is therefore only when material is sufficiently ripe for the tubercles to have reached their maximum development that *viridis* can be distinguished from *R. conglomeratus* by the absence of fully-formed tubercles on two of the valves. Well-developed tubercles of *viridis* are almost globular, whereas those of *conglomeratus* are often twice as long as broad.

Danser (1922/A:200) divides *R. sanguineus* L. *sensu lato* into two varieties as follows:—

> " *trigranis*, perigonia fructifera omnino evoluta granis ternis ornata.
> *unigranis*, perigonia fructifera singulo grano ornata."

He thus recognises in Holland a trigranulate variety of the species in addition to his *unigranis*, which is the common plant.

In this country trigranulate " *sanguineus* " (by which *R. sanguineus* L. var. *viridis* Sibth. was intended) has been mentioned in print on several occasions, but I have not yet seen any specimens which I should so refer. It is true that *R. conglomeratus* Murray var. *Borreri* Trimen (see below) has some of the characters of *R. sanguineus* L. var. *viridis*

Sibth., and Trimen stated that " it might almost as well come under *nemorosus* " (*Journ. Bot.*, *14*, 4, 1876). Nevertheless in my opinion *Borreri* definitely comes under *conglomeratus* and not under the present species.

Specimens (in Hb. Mus. Brit.) distributed by Augustin Ley with labels as stated I determine as follows:—

(1) *R. nemorosus* Schrad. trigranulate variety, Traethmawr, Portmadoc, Carnarvonshire, 12th August 1886, *B.E.C. 1886 Rep.*, 158, 1887, is a small sub-simple *conglomeratus*.

(2) *R. sanguineus* L. *trigranulatus*. River beach, Sellack, Herefordshire, 6th August 1887, *B.E.C. 1887 Rep.*, 188, 1888, is *R. conglomeratus* Murray var. *Borreri* Trimen.

(3) *R. sanguineus* L. *trigranulatus*. Waste ground, Hentland, Herefordshire, 15th September 1890, is weak straggling *conglomeratus*.

(4) *R. sanguineus* L. var. *trigranulatus*. Meadow, Wilton, Herefordshire, 10th August 1892, *B.E.C. 1892 Rep.*, 384, 1893, is *R. conglomeratus* Murray var. *Borreri* Trimen.

The " trigranulate *nemorosus* " referred to by Trimen (*Journ. Bot.*, *14*, 3, and 310, 1876), of which the original specimen collected by Warren on Lewes Levels, E. Sussex, in August 1874, is in Hb. Mus. Brit., proved to be merely an abnormal secondary growth of *R. conglomeratus* from a stem which had been cut down earlier in the year.

R. sanguineus L. var. *viridis* Sibth. is a common plant of the south of England, Wales, and Ireland, becoming less frequent in the extreme north of England and in Scotland. In order to check the vice-comital distribution and frequency in Scotland material in ripe fruit is required from all parts of that country, and especially from the west coast, where unusual forms appear to occur.

617/9. R. CONGLOMERATUS Murray, *Prod. Stirp. Gotting.*, 52, 1770; *R. glomeratus* Schreber, *Spicil. Fl. Lips.*, Index 155, No. 300, 1771; *R. paludosus* Withering, *Bot. Arrangement Brit. Pl.*, ed. 3, *2*, 354, 1796; *R. acutus* Smith, *Fl. Brit.*, *1*, 391,* 1800, and *English Botany*, *11*, 724,* 1800.

Exsicc. 17, Surrey; Mitcham Junction, Lousley (168).

R. acutus L., *Sp. Pl.*, *1*, 335, 1753, is best regarded as a *nomen confusum*. His description states that the valves are toothed, which excludes any form of *R. conglomeratus*. Some of the synonomy, however, probably refers to this species, and there are two sheets pinned together in Hb. Linn., which were probably there in 1753, and are clearly *conglomeratus*. The first sheet (No. 15) bears a specimen in good fruit, and the label " *acutus* 10 " in Linnaeus' handwriting, and " Hispania 277 a Loefl." on the back. The second (No. 16) is in flower only and labelled " *Lapathum acutum minimum* Mill." on the back. Many authors have

*I have been unable to decide which of these two descriptions by Smith is the earlier—see Wiltshear in *Journ. Bot.*, *53*, 34, 1915.

supposed that *R. acutus* L. was *R. crispus* L. × *R. obtusifolius* L., but this conclusion is open to grave doubt.

Normal mature *R. conglomeratus* is easily distinguished from *R. sanguineus* var. *viridis* by the more spreading habit, the presence of leafy bracts which extend to at least halfway up the branches, the narrower and coarser leaves, the shorter peduncles of the fruit, and the presence of large well-formed elongate tubercles on all three valves.

Not having seen the type specimen I follow Trimen (*Journ. Bot.*, *14*, 3, 1876) who wrote: "The type of this species may be considered to be a straggling plant with divaricate branches, broad-based stem leaves which accompany every whorl except the very terminal ones, and small fruit." This is a frequent form of marshy meadows and is *R. glomeratus* sub-var. *divaricatus* (Thuillier) Moss, *Camb. Br. Fl.*, *2*, 143, t. 147, 1914.

In such a state *R. conglomeratus* cannot be confused with *R. sanguineus* var. *viridis*. Nevertheless *R. conglomeratus* is a very variable species, and a considerable number of intermediates between it and *viridis* occur in Britain. Identification of such intermediates often presents some difficulty, and they have led to considerable confusion in the past.

The frequent presence of tubercles on more than one valve of *viridis* has been discussed above, and it is clear that absolutely mature material is essential if the tubercle character is to be relied upon.

An additional complication arises from the fact that, whereas *conglomeratus* is normally a plant of marshy meadows, and *viridis* a plant of shady habitats, either may occasionally be found on the other's ground, when the vegetative characters are accordingly modified.

Forma SUBSIMPLEX (Trimen) mihi, comb. nov.; *R. conglomeratus* Murray var. *subsimplex* Trimen, *Journ. Bot.*, *15*, 134, 1877.

Type. Small Common near Runton, Cromer, Norfolk, August 16th, 1876, H. Trimen in Herb. Mus. Brit.

Trimen's sheet bears three specimens of a small, neat, erect form. They are almost simple, having only a few branches near the base, none of which exceeds 3.5 cm. in length. The fruits are those of normal *conglomeratus*. Although Trimen described *subsimplex* as a variety, it is labelled "*form* subsimplex" in his handwriting, and there can be no doubt that it deserves no higher rank.

The most important of the plants offering mixed characters is:—

Var. BORRERI Trimen, *Journ. Bot.*, *14*, 310, 1876 (which should be read in conjunction with Trimen, *loc. cit.*, 3).

Syn-type. Warren, Burgess Hill, Sussex, 20th August 1876, in Herb. Mus. Brit.

The type sheet bears a specimen *c.* 55 cm. tall, with erect branches making an angle of 30°-45° with the main stem. Branches leafless, or with a few leaves near the base of the larger lower ones. Leaves somewhat acute, with wavy margins.

The essential feature of this variety is that it has the general vegetative features of *viridis* combined with the typical trigranulate fruits of *conglomeratus*. The variety is far from common and, in addition to the gatherings of Ley mentioned under the preceding species, I have only seen the following examples:—

(1) Without locality, but labelled "*R. sanguineus* β Sm., somewhat leafy, approaching *R. acutus* Sm." in Hb. Borrer.
(2) Lewes, 30th July 1853, J. Woods in Hb. S.L.B.I.

Field experience of this plant is required before it can be definitely stated whether it justifies varietal rank.

It has been suggested that plants such as *Borreri*, presenting intermediate characters between *conglomeratus* and *viridis*, may be hybrids between those species. This may possibly be the case, but I am not yet convinced that such intermediates occur only when both the putative parents are within pollination range. Furthermore, the plants presenting intermediate characters are uniformly fertile, whereas definitely reported hybrids between the two species are extremely infertile. As Moss remarks (*Camb. Br. Fl.*, *2*, 146, 1914), one would expect two such closely allied *Lapathum* species, which commonly grow in close propinquity, to produce hybrids more commonly than appears to be the case. This question is one which can only be settled by the artificial production of hybrids in the experimental garden.

Distribution. *R. conglomeratus* is extremely common and widespread throughout the lowlands of England and Wales. In Scotland it is rare, and thoroughly ripe material from every part of that country is required to check the vice-comital distribution. From the scanty, and usually very immature, Scottish material seen up to the time of writing, it appears likely that unusual forms of *conglomeratus* occur towards the northern limit of its range.

618/10. R. RUPESTRIS Le Gall, *Congrès scientifique de France*, *16e session*, *Rennes*, *1849*, *1*, 143-4, 1850 (There is a manuscript copy of this description attached to a sheet from Gay in Hb. Kew. A later, but probably more generally accessible, reference is Le Gall, *Fl. Morbihan*, 501, 1852); *R. conglomeratus* Murray var. *orthoclada* Gay inedit., on herbarium sheet from Carteret, Manche, 1831, in Hb. Kew.

Icones. Trimen in *Journ. Bot.*, *14*, t. 173, 1876; Moss, *Camb. Br. Fl.*, *2*, t. 148, 1914.

Exsicc. 1, W. Cornwall; Perranporth, leg. F. Rilstone, Lousley (174). 41, Glamorgan; Kenfig Dunes, Lousley (157).

This species varies extremely little throughout its range. In Britain it occurs in two types of habitat:—(a) On cliffs, as about Polperro and Newquay in Cornwall; at the base of cliffs just above high-water mark as at Whitesand Bay, E. Cornwall; or on rocky shores as on the uninhabited islands of the Scillies. (b) In dune-slacks which are filled with water during the winter, but dry in summer, as at Perranporth, W.

Cornwall, and Kenfig, Glamorgan. In both cases the ecological conditions are very similar—an underground supply of moisture and great heat during the summer months. I am not aware of any station where *R. rupestris* has occurred at a greater distance than half-a-mile from the open sea. From garden experience it is significant that the young plants are extremely susceptible to cold weather, being cut back at the first autumn frost. The eastern limit of the species in Britain roughly approximates to the course of the January 42° mean isotherm, and it is probable that the extension of the range eastwards is limited by the inability of the juvenile plants to endure the drier colder conditions.

The *Distribution in Britain* is as follows, the first mentioned specimen being given as a voucher for the vice-county:—

1a, Isles of Scilly; Old Town, St Mary's, 1873, Beeby (Hb. Mus. Brit. and Hb. S.L.B.I.). The plant is still frequent on the shores of both inhabited and uninhabited islands.

1, W. Cornwall; Gunwalloe, Cunnack (Hb. Syme). Local, but stations scattered round the whole coast.

2, E. Cornwall; Whitesand Bay, 1877, Briggs (Hb. Mus. Brit.). Locally common throughout the length of the south coast; I have not yet seen any material from the north coast.

3, S. Devon; Bigbury Bay, 1875, Briggs (Hb. Mus. Brit.). Frequent from the western boundary along the coast to Salcombe.

4, N. Devon; Braunton Burrows, 1882, Ley (Hb. Mus. Brit.). No other material seen.

41, Glamorgan; Three Cliffs Bay near Swansea, 1859, Bentham (Hb. Kew). It also occurs in quantity in dune-slacks at Kenfig, where I have seen it on two occasions through the courtesy of Miss Vachell. The Kenfig plant is usually shorter and less strict than material from the S.W. Peninsula.

Channel Isles. Jersey; St Aubins, 1885, Ley (Hb. Mus. Brit.)—specimens also seen from Beaumont, St Peter's Marsh, and Corbière. Guernsey; Plémont, 1893, Dawber (Hb. Mus. Brit.).

Further evidence is required before the records for the following vice-counties can be accepted:—

9, Dorset. Given for this county in *Comital Flora*, but I have been unable to trace the authority.

11, S. Hants. Given on the authority of J. Woods in *Topographical Botany*, ed. 2. There is no Hampshire specimen in Hb. S.L.B.I. in which the collection of Joseph Woods is incorporated. See also Hall in *B.E.C. 1933 Rep.*, 563, 1934.

13, Sussex, W. (?). This is given in *Topographical Botany*, ed. 2, as "13 Sussex e. J. L. Warren ms.," which is ambiguous as East Sussex is v.-c. 14. The record is probably based on plants labelled "*R. rupestris* ?" gathered on Lewes Levels, E. Sussex in August 1874 by J. L. Warren (Hb. Mus. Brit.)—see *Journ. Bot.*, *13*, 337, 1875. The specimens are secondary growths of undoubted *R. conglomeratus*.

Careful search should be made for this species on the coast of Carmarthen and Pembroke, and also on the south and S.W. coasts of Ireland.

618/11. R. PULCHER L., *Sp. Pl.*, 336, 1753.

Icones. As under subspecies—but a really good plate of the species from Britain has yet to be published.

Type. Hb. Linn., No. 19, labelled " pulcher 12 " in the handwriting of Linnaeus and " H.U." (Hort. Upsala). This sheet, which bears two panduriform leaves and a small fruiting branch, is ssp. *eu-pulcher* Rech. fil. Sheet No. 20 carries a complete plant of *R. pulcher* in flower, but was not labelled by Linnaeus. The species does not occur as a native in Sweden.

R. pulcher is a well-defined species which is not easily confused when once the essential characters are understood. Too much reliance has been placed in the past on the panduriform shape of the leaves—a character which is not an infallible guide even in the native subspecies, and which is frequently absent in introduced plants. *R. conglomeratus* frequently has fiddle-shaped leaves, and occasionally they also occur in *R. obtusifolius* (f. *pandurifolia* (Borbas)). Specimens of the last species are fairly frequently misnamed as *R. pulcher* in herbaria, and this error may generally be avoided if it is remembered that the lamina of *pulcher* rarely exceeds 10 cm. in length.

When gathered in ripe fruit *R. pulcher* is not easily confused with any other species. It is characteristically of low sturdy growth, rarely more than 50 cm. tall, with spreading branches making a very wide angle with the stem (often nearly 90°). The peduncles of the fruit are thick, jointed above the middle, and shorter than the valves. The valves are coarse, all tubercled, usually with strong teeth, and reticulate with thick nerves with pits in their interstices.

Rechinger (1932: 25-41) has divided *R. pulcher* (*sensu lato*) into five subspecies, three of which have occurred in Britain. The following key is adapted from the one given by him (1932: 26):—

Valves entire, or with 1-2 teeth at the base which do not exceed ½ mm. in length ..... ssp. *anodontus* (Hausskn.) Rech. fil.
Valves with several teeth which are more than ½ mm. long.
  Valves roundish in outline, with short broad entire apex, each margin with up to 8 often cleft teeth ... ssp. *divaricatus* (L.) Murbeck.
  Valves oblong or ovate-triangular, 4½-5 mm. long, with at most four 1-2 mm. long teeth on each margin ... ssp. *eu-pulcher* Rech. fil.

Subsp. EU-PULCHER Rechinger fil., *BBC.*, *49*, 26, 1932; *R. pulcher* auct. angl.

Icones. Rechinger, *loc. cit.*, t. 2, fig. 10; Moss, *Camb. Br. Fl.*, *2*, t. 146 (leaves too pointed, margin too crisped, fruit poor); Fitch & Smith, *Illustr. of the Br. Fl.*, fig. 864 (branches too erect); Smith, *English Botany*, t. 1576 (separate fruit has inaccurate outline, veins too indistinct, and peduncle too thin).

Exsicc. 17, Surrey; Shalford Common, Lousley (1)—*teste* Rechinger. 20, Herts.; Windmill Hill, Hitchin, Little (560) (Hb. Mus. Brit.).

Panicle much branched, the branches rather slender and drooping at the ends when in flower, usually horizontally spreading and interlaced to form an entangled mass in fruit. Fruiting valves oblong- or ovate-triangular, often unequally tubercled, apex acute or obtuse, each margin with about 4 teeth which in length are at most equal to half the width of the valve. Lower leaves usually panduriform.

Distribution in Britain. Native in dry sunny situations such as commons, roadsides, the base of walls, and churchyards; often on sandy soil, less frequently on chalk or limestone. Common locally in the south of England, especially near the coast, becoming rarer northward. England south of a line drawn S.W. from the Humber, Wales in the coastal districts of the S. and N.W., Ireland on the south coast, where it is rare and perhaps introduced.

In view of the previous inclusion of records of other subspecies, failure to distinguish between records of native and introduced plants, and occasional confusion with other species, it is necessary to revise the vice-comital distribution of *R. pulcher* ssp. *eu-pulcher*. Details of the supporting specimens will be included in a future instalment of these notes. Material of the subspecies has already been seen from the following v.-cc.:—1 to 4, 6, 8-11, 14-27, 29, 30, 32-35, 37, 38, †41, 55, 56, 68, H.6.

Material from the following, from which the plant is recorded, has not yet been seen:—V.-cc. 5, 7, 12, 13, 28, 31, 36, 39, 44, 45, 47-50, 53, 54, 57, 65, 67, 70, 75, 77, 80. Some of these records are known to have been for introduced plants. All Irish material will be welcome.

Distribution abroad. Around the Mediterranean and Black Sea; Hungary and the Balkans; western Europe from Gibraltar to England.

Life History. The leaves of this plant, unlike those of most of our *Lapatha*, are fully formed and apparently active throughout the winter months. During the warmest part of the summer they tend to disappear, and there is often great difficulty in gathering leaves even from neighbouring barren plants at the time when fruiting material is collected. The adaptation of this species to Mediterranean habitats is therefore to be seen in its activity during the winter months (which probably also explains its inability to spread northwards), its dormancy during the summer drought, and its affinity for warm sunny places.

R. pulcher commences to flower in June several weeks earlier than most of the British Docks, and after flowering the leaves decay and the stem rots away at the base. The fruits are persistent and not easily detached from the branches, which form an interlaced mass. When the stem and panicle is hard and dry the whole structure is easily knocked free and dragged or kicked about on the feet of grazing or passing animals. The fruits are by this means removed from the immediate vicinity of the parent plant.

Germination, as is the case with most Docks, is not restricted to a limited period of the year. In nature it certainly takes place on a

large scale after rainy periods in September and October, but it has also been induced in cultivation in early May.

Subsp. ANODONTUS (Haussknecht) Rechinger fil., *BBC.*, *49*, 34, 1932; *R. pulcher* L. var. *anodonta* Haussknecht, *Mitt. Thür. B.V.*, *1* (*N.F.*), 34, 1891; *R. pulcher* L. f. *anodus* Beck in Reich., *Icones*, *24*, 39, 1904.

Icones. Rechinger, *loc. cit.*, t. 2, fig. 11.

Exsicc. 20, Herts.; Gravel Pit, Ware, August 1908, *B.E.C. 1909 Rep.*, 418, 1910, Druce (Hb. Druce).

Less branched than ssp. *eu-pulcher*, the branches more erect, less slender at their extremities, much less entangled. Fruiting valves triangular-oblong, margin entire or with 1-2 small teeth on each side which are at most ½ mm. in length. Basal leaves often not panduriform.

Distribution. In Britain a very rare alien. Dr Druce's specimen cited above is the only one I have seen which certainly belongs here. The two following sheets carry unripe material which probably belongs to ssp. *anodontus*, but the identification can be only tentative:—

63, S.W. Yorks; By Malt Kiln, Mirfield, 3/8/09, and Sutcliffe's alien ground, M'fd. (presumably the same station), 9/09, both ex Hb. F. Arnold Lees in Hb. Mus. Brit. as *R. pratensis* M. & K.

Distribution abroad. S.W. Asia from Persia to Asia Minor, Palestine and Syria, also N. Africa.

Subsp. DIVARICATUS (L.) Murbeck, *Beitr. z. Kenntnis d. Fl. v. Südbosn. & d. Herzeg.*, 45, 1891; *R. divaricatus* L., *Sp. Pl.*, ed. 2, 478, 1762.

Icones. Rechinger, *BBC.*, *49*, t. 2, fig. 12; Beck in Rchb., *Icones*, *14*, t. 183, fig. 3, 1904; Coste, *Fl. France*, *3*, t. 3128, 1906 (fruit only).

Exsicc. 77, Lanark; rubbish-heap near Glasgow, Grierson—*teste* Rechinger (Hb. Kew).

Habit as in ssp. *anodontus*. Fruiting valves ovate-orbicular, with entire, rounded or broadly acuminate apex; margin on each side with 4-6 (-8) teeth which at most equal half the width of the valve and are frequently much shorter; valves often unequally tubercled. Leaves rarely panduriform.

Distribution. In Britain an uncommon and transient alien, of which specimens have been seen from the following vice-counties:—

13, W. Sussex; Hove, 1877, J. L. Warren (Hb. Mus. Brit.).
17. Surrey; *Kew, Nicholson (Hb. Lund—*teste* Rechinger).
77, Lanark; Glasgow—see above.
80, Roxburgh; Kelso, 1877 and 1878, Brotherston (Hb. Syme).

A number of specimens of unripe adventive *pulcher* from other localities have also been seen. Most of these probably belong to the present

*This specimen must have been from a rubbish-dump or similar habitat, and the record should not be confused with those of ssp. *eu-pulcher*, which persisted until recently in several places at Kew.

subspecies, which perhaps seldom ripens in this country except in very warm summers. It may be more than a coincidence that two of the ripest specimens seen were gathered in 1877, and probably ssp. *divaricatus* is more frequent than the above records suggest.

Distribution abroad. Scattered through the coastal parts of most of the countries bordering the Mediterranean and Black Sea—adventive elsewhere.

618/12. R. PALUSTRIS Smith, *Fl. Brit.*, *1*, 394,* 1800, and *English Botany*, *11*, 725,* 1800 (last paragraph under account of *R. maritimus* L.); *R. limosus* auct. angl., *non* Thuillier; "Gold Dock" Petiver, *Herb. Brit.*, tab. 2, fig. 7,** (?) 1713; *Lapathum aureum* Ray, *Syn.*, ed. 3, 142, 1724; Hill, *Fl. Brit.*, 193, 1760; *R. maritimus* β Hudson, *Fl. Angl.*, ed. 2, 155, 1778.

Icones. Curtis, *Fl. Lond.*, t. 163; Butcher & Strudwick, *Further Illustr.*, t. 321 (excl. Z).

Exsicc. 17, Surrey; Mitcham Junction, Lousley (25). 21, Middlesex; Hendon, Lousley (126).

Type Specimen. St George's Fields, London, Mr E. Forster, 1800 in Hb. Smith.

It will be clear from the above that in publishing *R. palustris* in *Flora Britannica* Smith merely gave a post-Linnean name to a plant which was already well known to be distinct from *R. maritimus*. He cited "by Acle Dam, Norfolk, Mr Pitchford," and there is a specimen in his herbarium collected by that botanist there in 1781. This specimen, however, is immature, and it is considered advisable to pass it over in favour of the sheet in Hb. Smith labelled *R. palustris* Fl. Brit. in Smith's handwriting, collected by E. Forster at St George's Fields in the year of publication of the description. It is true that this plant must have been gathered later in the year than the date of the preface to Smith's work, but the fact that the specimen is a very good one from a locality which had been very well known to London botanists since the discovery of the species there in 1709 by Isaac Rand (Salmon, *Fl. Surrey*, 566, 1931), and from a locality cited by Petiver, Ray, and Curtis who were all quoted in synonomy by Smith, appears to indicate that it should be selected as the type specimen. There is one other specimen which has some claim to be considered in the nomination of the type of *R. palustris* Smith. In the Linnean herbarium there is a sheet num-

*I am unable to decide the priority of these two descriptions with certainty—see Wiltshear in *Journ. Bot.*, *53*, 34, 1915. The account in *Flora Britannica* is a full one whereas that in *English Botany* is merely an incidental note. It is therefore proposed to regard the first as the original description of the species.

**I have been unable to discover the exact date of Petiver's *Herbarium Britannicum*, and therefore give the one suggested by Trimen & Dyer in *Fl. Middlesex*, 381, 1869. Hudson quotes it as 1702 (*Fl. Angl.*, ed. 2, xxxvi, 1762), and it is certainly before 1724, being cited by Ray in his *Synopsis*, ed. 3, of that year. Most copies are bound up as No. 8 of Vol. II of a collection of Petiver's miscellaneous works under the title of "Jacobi Petiveri Opera Historiam naturalem spectantia" with a new title page dated either 1764 or 1767.

bered " 14 " which bears an immature unlocalised and undated specimen labelled " Rumex palustris Fl. Brit. 394 " and " 73. Lapathum R. Syn. 142. 10 " in Smith's handwriting. Presuming that the specimen was not added to the collection by Smith, it must have been in his hands in 1800, but there is no evidence that he had it in mind when he wrote his description, or of the lapse of time after 1800 before he added his determination. It therefore seems advisable to pass this specimen over in favour of the sheet already cited.

Two inexplicable errors were made shortly after Smith's publication. In the following year Withering (*System. Arrangem.*, *2*, 349, 1801) transposed, with some additional inaccuracy, the names *maritimus* and *aureus*, giving each the synonyms and localities of the other. Smith, although he evidently understood the plant well in 1800, passed as a plate for *English Botany*, *27*, t. 1932, 1808, an illustration which most certainly did not represent his species. The young flowering stem which comprises most of this plate was apparently drawn from a plant preserved in Sowerby's herbarium (Hb. Mus. Brit.). This specimen is certainly a hybrid, but whether it is *R. crispus* × *obtusifolius* as suggested by Syme (*E.B.*, *9*, 44, 1868) is somewhat doubtful.

Most British and many continental authors have used the name *R. limosus* Thuillier (*Fl. des Env. de Paris*, ed. 2, 182, 1799) for this species. Thuillier's description, however, fails to stress the essential differences between this plant and *maritimus*, and might equally well apply to *R. conglomeratus* × *maritimus*, which is a not infrequent hybrid. Moreover, he cites Curtis' plate 163, which is an excellent representation of *R. palustris*, as illustrating his *R. maritimus*.

Statements have been frequently made in Exchange Club reports and elsewhere that " *limosus* is a hybrid." In cases where the meaning has been that Thuillier's plant was a hybrid this is correct, but the intended inference has often been that *palustris* itself was a " hybrid-species." A lengthy paper endeavouring to prove this theory by Gillot & Parmentier (*BSB. Fr.*, *44*, 325-9, 1897) has been accepted by Rouy (*Fl. Fr.*, *12*, 79 footnote, 1910), Ascherson & Graebner (*Syn.*, *4*, 757, 1908-13), and other authorities. The theory that *R. palustris* is a hybrid between *conglomeratus* and *maritimus* was refuted in an able paper by Murbeck (1913: 201-215), who showed that *R. palustris* has all the characteristics of a good species. He also states (*l.c.*, 217) that the type of Thuillier's *limosus* now in Hb. Delessert at Geneva is a specimen of the above hybrid. Notwithstanding Murbeck's reasoned conclusions, there are a few authors who have continued to treat *palustris* as a hybrid, and it may be as well to remind readers that the plant is absolutely uniformly fertile, in many stations and even counties it occurs in the absence of *maritimus*, it remains constant over long periods in many localities, and it forms hybrids like other true species. This behaviour is in strong contrast to the usual characteristics of hybrid *Rumices*, and moreover a true hybrid between *conglomeratus* and *maritimus* is well known and very different from *palustris*.

It might possible be contended that *palustris* evolved in past ages from a hybrid between the two other species but such a conclusion belongs to the study of phylogeny. To treat it as a hybrid in a systematic account of the genus as has been done by Ascherson & Graebner merely leads to taxonomic complication and confusion. The principle carried to its logical conclusion would lead to the reduction of many of the species in the British Flora to the status of hybrids between the few remaining species. Such a result, by making the identification of plants difficult, would defeat the primary purpose of taxonomy. The writer believes that a plant should only be treated as a hybrid when there is adequate evidence suggesting that it should be so treated.

R. palustris is one of the least variable of British Docks, but certain variations occur to which it will be necessary to give attention in a later paper. The following form, however, may be disposed of here:—

Forma NANUS (Boenninghausen) mihi, comb. nov.; *R. palustris* Smith var. *nanus* Boenninghausen, *Prod. Fl. Monast.*, 108, 1824.

Exsicc. 21, Middlesex; Hendon, Lousley (126a).

Plant simple, less than 10 cm. tall when in fruit.

This form is analogous to *R. maritimus* f. *humilis*, and appears to be a short-lived annual resulting from fruit which germinated late in the season. The only specimens seen are those cited above, which occurred on a stony slope by the Brent Reservoir (" Welsh Harp "), Hendon.

Duration. There is great difference of opinion between various authors as to the duration of this species. Thus, for example, Ascherson & Graebner give it as " annual, rarely biennial," Rouy as " annual or biennial," Syme as " biennial," while in the latest editions of Babington and Hayward's *Botanist's Pocket Book*, as in Smith's original account, it is claimed as a perennial. Duration sometimes varies in different countries according to climate, and it may be that *R. palustris* is annual in Central Europe but tends to persist through the milder winters of western Europe. Observation during the past year suggests that it can probably behave as annual, biennial, or perennial in Britain, its duration varying according to the conditions prevailing in the various localities.

At Hendon abundant seedlings were observed on October 29th, 1938, also masses of fruits cast up in the " scumline " around the pond, and large rosettes of leaves on plants which had not flowered during the previous summer (21, Middlesex; Hendon, Lousley 178, 181, and 194 in Hb. Kew (Ecol.)). The progress of similar barren rosettes had been watched during previous visits, and it seems probable that at this locality seed germinates in autumn and the resulting plants flower sometimes in the first but often not until the second summer. Seed which germinates in the spring may, if the offspring flower at all the first year, produce plants of the form which is described above as *nanus*. Cultivation experiments confirm this conclusion since, although erratic germination was induced in June and July, it was much more free in early Septem-

ber. At the Mitcham locality, where conditions are less open, most of the plants appear to be definitely perennial. A few young plants were found here in August and a fair number of seedlings on November 26th, 1938.

Distribution. Owing to former confusion with *R. maritimus*, it is proposed later to publish details of the material seen from the various vice-counties. At the time of writing specimens have been seen from the following v.-cc.:—5, 6, 14, 15, 16, 17, 18, 21, 25, 27, 28, 29, 31, 32, 61.

The loan of ripe material from elsewhere will be welcomed, and especially from the following v.-cc.:—9, 11, 13, 20, 23, 26, 30, 39, 50, 52, 53, 54, 56, 59, 62, 63, 64, 65, for which the species is on record.

Flowering Date. White (*Fl. Bristol*, 514, 1912) states that on the Somerset peat-moors *R. palustris* flowers a month later than *R. maritimus*. This is not in accordance with the writer's own experience, since ripe *palustris* was collected near Shapwick on July 17th, 1933, growing in close proximity to less mature *R. maritimus*. At Mitcham *R. palustris* was in advanced flower on June 29th, 1938, and ripe fruits might have been gathered a fortnight later, and flowering both at this station and at Hendon continued until the end of November. It appears likely that White was misled by a coincidence that the visits to the peat-moors on which he observed *palustris* were later than those on which he found *maritimus*.

618/13. R. MARITIMUS L., *Sp. Pl.*, 335, 1753.

Icones. English Botany, t. 725 (enlarged fruit poor); Butcher & Strudwick, *Further Illustrations*, t. 321, fig. Z, 1930.

Exsicc. 28, W. Norfolk; Ringmere near Thetford, Lousley (138).

Type. Hb. Linn. No. 13 (labelled " 8 maritimus " by Linnaeus).

This species remains extremely uniform throughout a very wide geographical range and the only variations observed in British material are those of luxuriance as indicated by the forms given below. On purely taxonomic grounds these names are not worthy of retention, but since, as will be shown, they appear to have a wider biological significance it is convenient to have names for purposes of reference and to indicate the range of variation.

Forma HUMILIS (Petermann) mihi, comb. nov.; *R. maritimus* L. var. *humilis* Petermann, *Fl. Lips. Exc.*, 267, 1838.

Plant erect, subsimple, less than 10 cm. tall. Leaves few, linear, acute.

Exsicc. 28, W. Norfolk; Ringmere near Thetford, Lousley (138a).

These plants were collected from the sandy margin of a Breckland mere, where this dwarf form has been known to me since 1934 (see also Little in *B.E.C. 1927 Rep.*, 416, 1928). Specimens were gathered in which the whole plant above ground was less than 2 cm. tall but, while the bulk of the population was small, plants as tall as 30 cm. occurred where shelter was afforded by rushes.

Forma RAMOSUS Zapalowicz, *Consp. Fl. Galic. crit.*, *2*, 112, 1908.

Fruiting plants tall (½-1 metre); stem leafy, much branched above; branches elongate, arcuate-ascending forming a dense, broad panicle. Lamina of lower leaves *c.* 35 × 6.5 cm.

Exsicc. 18, S. Essex; Wennington, Lousley (170).

These specimens were collected from plants growing in rich mud on the margin of a somewhat shaded pool. Owing to their top-heavy condition most individuals were sprawling, so that the very exceptional height was not always apparent. On September 3rd, 1938, most plants were only in immature fruit, but ripening was so rapid that a week later much of the fruit was dropping.

Duration. The duration of *R. maritimus*, like that of *R. palustris*, would appear to be little understood, and it has been variously stated as annual, biennial, and perennial. For example, in current editions of British Floras, Syme (*E.B.*), Hooker (*Student's Flora*) and Moss (*Camb. Br. Fl.*) all agree that it is biennial, Druce (*Hayward's Botanist's Pocket-Book*) asserts that it is perennial, while Babington (*Manual*) states that is is perennial or biennial. The following notes on localities where periodical observations were made during 1938 throw some light on the question:—

(a) Ringmere, near Thetford, W. Norfolk. Most careful search was made here on April 22nd for leaves or seedlings at the exact spot which the species was known to favour, without any trace of the Dock being found. Mr E. C. Wallace, who was with me on the occasion of the first search, visited Ringmere again on June 26th and saw no signs of *R. maritimus*. On August 14th the plant was seen in good quantity on the ground formerly searched, being still in the seedling stage close to the margin of the pool, but in flower and fruit at higher levels. At this station I believe the plant to be definitely annual, first germinating in June and early July. Those plants which grow close to the margin of the pool must germinate and fruit in the interval between the fall in the water level and the incidence of autumn frost.

(b) Near Charlston Pond, E. Sussex. No trace was to be found on April 10th, but young leaves were seen on July 9th, and plants were in over-ripe fruit on August 21st. On October 28th the old leaves were ragged and appeared to be decaying, and no trace of marked plants remained on January 8th, 1939. At this station it appears to be annual, but it is not easy to be certain. It may be mentioned here that the fact that, say, a dozen marked plants all die during the winter cannot be regarded as absolute proof that the species at a locality is not behaving as a perennial, since it might happen that the selected plants were all perennials or biennials which had reached the end of their life. At Charlston crowded vegetation made mass observation difficult, at Ringmere and Wennington limited areas were populated almost exclusively by *R. maritimus*.

(c) Wennington, S. Essex. In flower and early fruit September 3rd, and in mature fruit September 10th. On December 18th the old flower-

ing stems had decayed, but there were abundant green fresh leaves which appeared to grow from their base embedded in thick ice. These leaves had not increased in size or decreased in number by March 12th, 1939. At this station *R. maritimus* appears to be perennial, and its late flowering may be due to shaded conditions.

In cultivation the plant behaves as a short-lived annual, as is shown from the following examples:—

1. Seed gathered the previous year was sown at Norwood on February 22nd, 1907, and a fruiting specimen over 40 cm. tall was pressed on August 15th, 1907 (W. H. Griffin in Hb. S.L.B.I.).
2. Seed was sown at Kew in the spring of 1930, and in June the ground was dutch-hoed so that any earlier growth would have been destroyed. On August 26th, 1930, good fruiting specimens were pressed (E. Nelmes in Hb. Kew (Ecol.)).

From the facts given above, and observations in the field elsewhere it appears likely that *R. maritimus* behaves as an annual of brief duration when it grows in an open association, such as on the margins of pools, on mud thrown out from dykes, and in bare places trodden out by cattle on ditch-sides. The extreme annual form is that described as f. *humilis*. The annual condition may enable it to persist in places where the winter climate is too cold for the tender shoots of the perennial form, and therefore it may be more frequently annual in Central than in Western Europe.

The perennial form probably occurs chiefly in more or less sheltered spots in places where the winter climate is not too severe, and as a perennial the plant can exist in almost closed associations in which opportunities for germination are less common. The extreme perennial form is that described as f. *ramosus*.

In cultivation it was found that the fruits of *R. maritimus*, like those of many other *Lapatha*, exhibit delayed or intermittent germination to a very marked degree. About 60 seeds were sown in March 1938, and seedlings appeared at intervals from April 28th until October 1st. Abundant seedlings were observed at Wennington on September 10th, and it is probable that it is only at such sheltered spots, and where they are not liable to long winter submergence under water, that they are able to exist throughout the winter. Thus the perennial (and biennial?) states arise mainly from late seedlings, since many of the earlier ones would be smothered by the extensive growth of the parent plants. In the annual form, on the contrary, it is only the seedlings which germinate early which come to maturity, the later ones dying on the rise of the water level or onset of winter.

Distribution. For the reason given under *R. palustris* it is considered advisable to prepare a new account of the distribution of this species, citing undoubted herbarium material for each vice-county so far as that may be possible. Such material has to date been seen from the

following v.-cc.:—5, 6, 9, 12-14, 16-20, 22-24, 27-32, 34, 37-40, 53-56, 59, 61, 62, †66, H.5, H.12, H.22. Jersey.

Specimens in good fruit from other districts will be appreciated on loan, but especially from the following for which the species has been recorded, v.-cc.:—2, 10, 11, 15, 21, 25, 26, 33, 35, 41, 42, 49, 50, 51, 57, 58, 60, 63, 64, 65, 67, 69, 70, H.2, H.8.

Both *R. maritimus* and, to a less marked extent, *R. palustris* are very variable in quantity at many of their stations from year to year. It is proposed to deal with this subject later when more data have been accumulated.

618/20. R. PATIENTIA L., *Sp. Pl.*, 33, 1753.

A tall (100-170 cm.) erect perennial plant. Basal leaves with ovate- or oblong-lanceolate lamina (40-50 cm. × 12-15 cm.), their base truncate or sub-cuneate (rarely sub-cordate), apex acute. Secondary veins making an angle of 45°-60° with the mid-rib. Mature valves roundish-cordate, entire or with a few short denticulations, or crenulate, one bearing a large (2-2.5 mm. × 1-1.25 mm.) tubercle, the other two naked or with minute tubercles.

Exsicc. and *Icones* as under sub-species.

This species has only become established in Britain within recent years, but it is now completely naturalised at a number of stations and must be regarded as a permanent unit in our flora. The abundance of this fine plant as it occurs at the Chiswick and Grays localities must be seen to be believed. On the Middlesex side of the Thames, at Chiswick, it extends over a large piece of waste-ground, by pathsides, on both sides of an adjoining railway embankment, and along the stone river embankment almost continuously for ¾ mile. On the opposite Surrey side of the river it is to be found at intervals from Barnes Bridge (where I first noticed it in 1933) past Mortlake almost to Kew Bridge. All these plants belong to the ssp. *orientalis* (see below) and perhaps arose from a single introduction, but above Kew Bridge there is a small isolated colony of ssp. *eu-Patientia*. In S. Essex, again as ssp. *orientalis*, it occurs in the utmost profusion, forming great thickets on waste-ground by the Thames for ¾ mile between Grays Thurrock and Tilbury. I was directed to this station by Mr Iolo A. Williams, who tells me that he first noticed the plant here about 1933. The Dagenham colony of ssp. *eu-Patientia* was no less remarkable since the Dock occurred at intervals for 1¾ miles. The centre of this colony has been destroyed by the construction of a factory, but the plant still grows at both ends of its range.

R. Patientia has been recorded from a few vice-counties additional to those from which specimens are cited below. As many records as possible have been assigned to the appropriate sub-species but for various reasons this has not proved possible with the following gatherings:—

19, N. Essex; Virley, 1920, G. C. Brown (Ref. 1775), with a note that the plant had been known since 1909 or 1910 (Hb. Druce); Varley

(the same locality), 1921, Druce (Hb. Druce). The species thus persisted here for at least 11 years, but Mr Brown informs me that it has now disappeared (*in litt.*, April 25th 1938).

34, W. Gloucester; Redland, Bristol, 1926, Roper (Hb. Druce).

39, Staffs.; Burton-on-Trent, 1929, Druce (Hb. Druce).

In this country *R. Patientia* has been frequently mis-identified in the past. Material from Hitchin (ssp. *eu-Patientia*) and Virley was first labelled and recorded as *R. longifolius* DC. (*R. domesticus* Hartman), but the presence of tubercles on the valves should have prevented confusion with the grainless northern species, which is a smaller plant with fastigiate panicles. Other specimens have been sent out as *R. Hydrolapathum* and *R. viridis*—quite inexcusable errors. Of the native British species, *R. Patientia* is most closely allied to *R. crispus*, from which it may be distinguished by its much greater size, larger less undulate leaves, and larger (7-8 × 7.5-9 mm. as against 3.5-5 × 3.5-5 mm.) valves.

Rechinger (1933A) has published an exhaustive monograph of the subsection *Patientiae* of *Rumex*, based on considerable field experience of these plants. The herbarium material available in Britain is not sufficient to check fully his distinctions and distribution, and much of the material which follows is adapted from Rechinger's work.

Of *R. Patientia* (*sensu stricto*) he gives three subspecies, two of which occurring in Britain are keyed as follows:—

a. Stem usually purplish or reddish-brown, Valves 5-6 mm. broad, only one bearing a tubercle ... *R. Patientia* ssp. *eu-Patientia*.
b. Stem usually pale, very tall and robust, Valves 8-10 mm. broad, two further tubercles sometimes discernible ..... *R. Patientia* ssp. *orientalis*.

These two subspecies are described below:—

Subsp. EU-PATIENTIA Rechinger fil., *Fedde Rep.*, *31*, 246, 1933.

Icones. Beck in Reichb., *Icones*, *24*, t. 164, 1904; Coste, *Fl. France*, *3*, t. 3134, 1906; Rechinger, *op. cit.*, t. cxxxvi, fig. 1.

Exsicc. Kerner, *Fl. Exsicc. Austr.-Hung.*, No. 3072 (Hb. Kew) 17, Surrey; Bank of Thames nr. Kew Bridge, Lousley (13) (*teste* Rechinger).

Basal leaves ovate- or oblong-lanceolate with truncate or sub-cuneate (rarely subcordate) base. Mature valves 6-8 × 5-6(-7) mm., entire or minutely dentate or crenulate, rotund-cordate, only one bearing a globose or oblong tubercle *c.* 1.5 mm. long.

Distribution. An uncommon alien in Britain, persistent at a few stations.

16, W. Kent; Stone Marshes, 1903, Griffin—as *R. sanguineus* var. *viridis* (Sibth.) (Hb. S.L.B.I.); Stone Marshes, 1923, St John Marriott (Hb. Druce). It thus appears to have persisted in this station for at least 20 years.

17, Surrey; Kew Bridge (as above).

18, S. Essex; Dagenham, 1927, Druce (Hb. Druce). Still persisting (see above), and it has therefore been established for at least 11 years.

20, Herts.; Walsworth, Hitchin, 1920, Little (Hb. Druce); Nr. Gas Works, Hitchin, 1927, Little (723), *B.E.C. 1927 Rep.*, 587, 1928 (Hb. Druce, etc.); Nr. Gas Works, Hitchin, 1932, Little (983), *B.E.C. 1932 Rep.*, 449, 1933. It thus persisted here for at least *12 years.

34, W. Gloucester; Cranbrook Rd., Bristol, 1928, White, *B.E.C. 1928 Rep.*, 925, 1929 (Hb. Kew, *teste* Rechinger).

Distribution abroad. Native in Austria, Hungary, Bulgaria, southern Russia to Transcaucasia, Syria and Kurdistan. Formerly cultivated throughout Europe, and now naturalised here and there.

Subsp. ORIENTALIS (Bernhardi) Danser, *Ned. Kruidk. Arch, 1923*, 281, 1924. *R. orientalis* Bernhardi apud Schultes fil., *Syst. Veg., 7*, 1433-4, 1830.

Icones. Rechinger fil., *Fedde Rep. 31*, t. cxxxvi, fig. 3, 1933. Heukels, *Plantenatlas*, t. xxxvii, 11, 1925.

Exsicc. 22, Middlesex; Chiswick, Lousley (10). 18, S. Essex; Grays, Lousley (27), both *teste* Rechinger.

Basal leaves with oblong-lanceolate lamina (40-50×12-15 cm.) with truncate base. Mature fruiting valves (6-8×8-10 mm.), rotund-cordate, margin usually minutely erose- or crenulate-dentate, rarely almost entire, one valve bearing a prominent ovate, 2-3 mm. long tubercle, the others naked or sometimes bearing small tubercles.

Usually a taller (1-2 metres) more robust plant than ssp. *eu-Patientia*, with pale green stem, more deeply cordate bases to the leaves, and larger broader fruiting-valves.

Distribution. In Britain a very well established alien at the following localities:—

17, Surrey; Bank of Thames near Barnes railway bridge, 1933, Lousley (Hb. Lousley), *teste* Rechinger 1933. 18, S. Essex; 22, Middlesex. —as above.

Distribution abroad. Native in S. Hungary, E. Balkans, S. Russia, and Asia Minor.

Biology. The life history of this Dock is of considerable interest. It is the first to flower of all the *Lapathum* species which occur in Britain, and good fruit may be found by the third week in June. By early July 1938 almost every plant had passed into fruit and the basal leaves had decayed. From the end of July until the end of September the great majority of the plants in the two colonies, which were periodically examined, remained dormant, practically no green leaves being visible,

*This still persists in the gardens of recently erected houses near the Gas Works, Walsworth, Hitchin: thus giving a known history at this station of 19 years. —J. E. L., April 30th, 1939.

and the stems being dry and crowned with brown fruits. Seedlings were seen at Chiswick at the end of August, and at Grays on September 3rd, 1938—in the garden they germinated at the beginning of September from fruit matured a few weeks earlier. In October fresh green leaves appeared in the wild stations on the plants which had flowered earlier in the season, and these remained apparently active throughout the winter. Although these observations were made on colonies of ssp. *orientalis*, it is probable that they apply equally to ssp. *eu-Patientia* in Britain. It appears, therefore, that the species is adapted to withstand a greater summer drought than is usual in this country, but not to endure severe winter conditions. From the distribution given it will be observed that the countries where the species is native do enjoy considerable summer heat combined with a low rainfall, but the winter climatic conditions are more extreme than one would expect from the behaviour of the plant.

618/20(2). R. GRAECUS Boissier & Heldreich in Boissier, *Diagn.*, *Ser. 2*, fasc. 4, 80, 1859; *R. orientalis* var. *graecus* Boissier, *Fl. Orient.*, *4*, 1009, 1879.

Icones. Rechinger fil., *Fedde Rep.*, *31*, t. cxxxvi, fig. 7, 1933.

Exsicc. 41, Glamorgan; roadside east of Cardiff, Lousley (177), *teste* Rechinger.

A woody perennial closely allied to *R. Patientia* L. Stem erect, 60-200 cm. tall. Basal leaves with ovate-lanceolate or ovate-oblong lamina (20-30 × 10-15 cm.) with cordate base and acute apex. Secondary leaf-nerves making an angle of 60°-70° with the mid-rib. Valves of fruit (6-8 × 6-7 mm.) cordate, with frequent and acute but irregular teeth on both sides, these teeth at most 1 mm. long. Valves usually all tubercled, one bearing a large (2-3 mm. long) globose or ovate-globose tubercle, the other two tubercles often small and sometimes absent.

Distribution. Alien in Britain, appearing to be well established near Cardiff.

41, Glamorgan; as above.

Distribution abroad. Native in S. Balkans, W. Asia Minor and Cyprus.

[618/28. R. GIGANTEUS Aiton, *Hort. Kew.* ed. 2, *2*, 323, 1811; Hillebrand, *Fl. Hawaiian Islands*, 377, 1888.

The inclusion of this species in Druce's *British Plant List*, ed. 2, 1928, is apparently based solely on plants collected by Dr Druce at Marston, near Oxford. The plant first found here by him in 1918 (*B.E.C. 1918 Rep.*, 307 (1919)) was said to have originated from the Oxford Botanic Gardens, and Mr Chapple informs me that it persisted until about 1930. In Hb. Druce it is represented by three sheets bearing leaves and parts of a panicle in bud dated 1918, and two undated sheets, one of which shows ripe fruit. These specimens show quite

clearly that the Marston plant has nothing whatever to do with *R. giganteus*, of which the type specimen is in Hb. Mus. Brit. Aiton's species is a very remarkable Dock with a climbing habit which enables it to ascend to a height of 40 feet in the forests of the Sandwich Isles, where it occurs as a native, and the axillary panicles are quite unlike those of any European species of *Rumex*. Druce apparently visited Marston to see the plant at intervals over a period of about twelve years, and yet it seems that he had no suspicions as to the accuracy of the determination, for he repeated his original record in *Fl. Oxon.*, ed. 2, 369, 1927.

R. giganteus Aiton must be deleted from the *British Plant List* and, if it is considered worth while to include a plant known only as an outcast from a Botanic Garden, which failed to spread from or persist in its single station, the following should be substituted:—]

618/28 (substituted). R. CONFERTUS Willdenow, *Enum. Plant. Hort. Reg. Bot. Berol.*, 397, 1809; *R. alpinus* var. *subcalligerus* Boissier, *Fl. Orient.*, *4*, 1007, 1879.

Icones. Beck in Reichb., *Icones*, *24*, t. 159, 1904.

Exsicc. Kerner, *Fl. Exsicc. Austro-Hungarica*, No. 3074 (Hb. Kew).

A tall (? 1-2 metres) coarse plant allied to *R. alpinus*. Basal leaves (20-27×15-24 cm.) broad cordate-ovate, obtuse, broadest near their base, hairy below when young. Stem leaves narrower, usually somewhat triangular in outline. Panicle large, dense. Valves large (*c.* 8×11 mm.), roundish-cordate, broader than long, entire or with a few small obtuse teeth or crenulate, at least one bearing a tubercle.

As is well shown by a leaf of the Marston plant gathered in July, 1918, in Hb. Druce, the basal leaves of *R. confertus* bear considerable resemblance to those of *R. alpinus* but are slightly less rotund and obtuse. The stem leaves, however, might lead to confusion with *R. Patientia*, from which they may be known by their more deeply cordate bases and presence of short hairs on the nerves below when young. The much broader and larger valves should likewise prevent confusion of *R. confertus* with *Patientia*.

Distribution. 23, Oxford; Marston Brickfields, Druce as *R. giganteus* Aiton (Hb. Druce)—the only recorded station for Britain. Native from Siberia through Mid and S. Russia to the Caucasus, Crimea and Galicia.

618/31. R. STENOPHYLLUS Ledebour, *Fl. Altaica*, *2*, 58, 1830; *R. biformis* (Menyhárth) Borbas in Kerner, *Fl. exs. Austr.-Hung.*, 1883, *Schedae 3*, 130, No. 1014, 1884; *R. odontocarpus* Sandor apud Borbas, *OBZ.*, *37*, 334, 1887. The two descriptions of Borbas are based on earlier references of 1877 and 1879 respectively in Magyar publications which I have not been able to verify.

Icones. Ledebour, *Icones Plant.*, *cent. 4*, t. 399, 1833 (but see below); Beck in Reichb., *Icones*, *14*, t. 182, 1904; Heukels, *Plantenatlas*, ed. 2, fig. xxxvii, 17, 1925.

Exsicc. Kerner, *Fl. exs. Austr.-Hung.*, No. 1014, as *R. biformis* Menyhárth (Hb. Kew).

34, W. Gloucester; Avonmouth Docks, Lousley (159).

Stem 100-150 cm. tall. Lower leaves oblong, often truncate at the base, apex rather obtuse, margin undulate; the upper leaves lanceolate. Panicle dense with ascending branches and usually leafy below. Valves light green in early fruit becoming reddish-brown when mature, rather small (4-5 × 4-5 mm.), rotund with a short triangular apex, with 4 to 6 short (< 5 mm.) broad-based teeth on each side; all bearing small oblong tubercles near the base.

Ledebour described and illustrated a plant with linear leaves which is superficially very different in appearance from the form familiar to most European botanists, though the fruit would appear to be identical. The vegetative difference may well be due to differences in habitat conditions, and I have, therefore, followed Rechinger in accepting Ledebour's name for the species. A useful note on this plant by Rechinger pater will be found in *OBZ.*, *41*, 402, 1891.

R. stenophyllus recalls *R. crispus* in the shape of the leaves, but the undulate rather than crisped margins, and the presence of rather pretty serrations on the valves should prevent confusion. The rather dense panicle somewhat suggests that of *R. domesticus* though it is less fastigiate and less leafy than in that species, and the presence of tubercles on the serrate valves offers a ready mark of distinction. Abroad *R. stenophyllus* has been most often confused with *R. crispus* × *obtusifolius* (sub nom. *R. pratensis*); from this hybrid it may be known by the uniform fertility, and more regular serrations on the rotund valves.

Distribution. In Britain only known with certainty from Avonmouth Docks, where it seemed well established in August 1938. Native from Central Asia and Siberia to S. Russia, Austria and Hungary.

It is quite probable that now attention has been directed to this plant it will be found elsewhere as an alien in Britain, especially as it appears to be a comparatively common adventive in Holland. There is a flowering plant in Hb. Druce from Sharpness Docks, W. Gloucester, which, although too young to name with certainty, might well be this species. A likely explanation of the puzzling record of *R. domesticus* × *obtusifolius* found in 1908 at Portishead Docks (*B.E.C. 1932 Rep.*, 357 (1933)) may be that *R. stenophyllus* was the plant actually found.

HYBRIDS.

Hybrids occur in the *Lapathum* section of *Rumex* with exceptional frequency. In the *Acetosae*, on the contrary, they are exceedingly rare, if indeed they occur at all. A partial explanation of this very striking contrast may be found in the fact that dichogamy is the rule with the *Lapatha*, while the common species of *Acetosae* are apogamous (Roth, *Bonn. Verh. nathist. Ver. 1906*, 327-360, 1907).

Fortunately, it is possible to recognise almost all Dock hybrids as such at sight owing to the prevalence of partial sterility. Normal

uncrossed *Rumices* pass regularly out of flower from the base to the summit of the panicle, so that when the lower whorls are passing into fruit those at the top of the panicle are still in flower. Eventually all whorls regularly set fruit. Hybrids as a rule behave very differently. The great majority of the flowers fail to set fruit at all, and dry off and fall without any appreciable enlargement of the three inner perianth-segments. A few here and there are usually fertile and set fruit, the inner perianth segments enlarging in varying degrees. Thus the panicle acquires a ragged irregular appearance, and in most of the whorls will be found (1) stumps of the peduncles where flowers have dropped off, (2) shrivelled remains of perianths which have failed to develop, (3) partially enlarged perianth segments, and occasionally (4) matured valves containly apparently good fruit. Often such hybrids are conspicuously flushed with red.

The partial sterility of *Lapathum* hybrids is also usually revealed by the pollen-grains, and the value of this test, which often proves extremely convincing, was first demonstrated for *Rumices* by Murbeck (1913: 206). If pollen from a pure species is examined under the microscope practically all the grains will be found to be of the same size, and at the most 5% of them noticeably smaller than the others and abortive. Pollen taken from hybrid plants generally reveals grains of various sizes, a considerable proportion being very much smaller than the remainder and abortive. The test is most easily applied to fresh material, but it can also be utilised for herbarium specimens. Gum Chloral Mountant has been used to make permanent mounts of the pollen grains of a few plants, and if these prove successful it may be possible to make greater use of the test.

It is clear that the most representative hybrid Docks often make very poor herbarium specimens owing to their ragged appearance. This has led many collectors in the past to ignore them in the field, with the result that they are not nearly so well represented in our public herbaria as one would expect from their frequency.

Although these general rules for the recognition of hybrids from their partial sterility are nearly always true, there is good reason to believe that this may not be universally so. A few undoubted hybrids may occasionally produce quite a high production of well formed nuts—this, for example, is sometimes the case with *R. crispus* × *obtusifolius*. In addition, plants are known which have intermediate characters between two species, and yet bear uniform fully formed fruits. Such intermediates have been seen in Britain between *crispus* and *domesticus*, *Patientia*, and *rupestris*, and also between *obtusifolius* and *pulcher*. Thus it is probable that in *Rumex* fully fertile hybrids may rarely occur in spite of the fact that in two of the above combinations other intermediates conspicuous for the predominance of sterility have been noted.

Many hybrids in the genus take on a fairly regular form capable of taxonomic description, and indeed several of these have proved sufficiently uniform to pass for a time as species (e.g. *R. maximus* auct.

angl. = *R. Hydrolapathum* × *obtusifolius*, and *R. pratensis* Mert. & Koch = *R. crispus* × *obtusifolius*). Secondary hybrids doubtless occur as a little viable fruit is usually produced by the primary hybrids. But such secondary crosses are probably comparatively rare since (1) the writer has been unable to find in any locality a series of intermediates conecting two parents, and (2) if secondary hybrids were more common the difficulties in the way of framing descriptions would be even greater than they are.

Further evidence is required before the existence of triple hybrids in the genus can be accepted (*cf.* Fritsch: 1918), those recorded in the past having been based either on doubtful determinations or arising through a plant which is now regarded as a good species being considered as a hybrid. As an example of the last class *R. palustris* (see *ante*) is treated by Ascherson and Graebner as *R. conglomeratus* × *maritimus*, and if we accepted this view *R. obtusifolius* × *palustris* would become *R. conglomeratus* × *maritimus* × *obtusifolius*. Since no such "hybrid-species" are accepted for the genus by the writer, it may be stated that triple hybrids are unknown amongst the British *Rumices*.

It is anticipated that full accounts of all *Rumex* hybrids accepted for Britain will eventually appear in these Notes. Since the next instalment will probably be entirely taken up with the discussion of some of the remaining species, it seems advisable to include here a list of hybrids distributed in *Rumices Britannicae Exsiccatae* in 1938 as a guide to their relative frequency and a stimulus to the collection of additional material. The reference numbers are those under which they have been issued in the above set of Exsiccata, and the addition of "Rech." indicates that Dr Rechinger fil. has agreed to the identification of a sheet of the gathering which is retained in his herbarium in Vienna.

[Those hybrids printed in heavy black type are additions to *Br. Pl. List*, ed. 2.—Ed.].

R. HYDROLAPATHUM Huds.

× *obtusifolius* L. 26, W. Suffolk; West Stow, 139 (Rech.).

× *obtusifolius* L. ssp. *agrestis* (Fries) Danser. 14, E. Sussex; Landport, Lewes, 146 (Rech.). 22, Berks.; Sandford Mill, Loddon, 167 (Rech.).

R. DOMESTICUS Hartm.

× *obtusifolius* L. 104, Skye; Broadford, 85 (Rech.) and 86.

× **obtusifolius** L. ssp. **agrestis** (Fries) Danser. 66, Durham; near Middleton-in-Teesdale, 102 (Rech.). 85, Kinross; Loch Leven, 99 (Rech.).

R. CRISPUS L.

× *domesticus* Hartm. 81, Berwickshire; Quarry near Burnmouth, 78. 85, Kinross; Crook of Devon, 97 (Rech.). 104, Skye; Broadford, 86a.

× *obtusifolius* L. 17, Surrey; Thames' Bank, Mortlake, 45 (Rech.).

× **obtusifolius** L. ssp. **agrestis** (Fries) Danser. 14, E. Sussex; Alfriston, 33 (Rech.). 17, Surrey; Thames' Bank, Mortlake, 43 (Rech.) and 49 (Rech.); Mitcham Junction, 26 (Rech.) and 169 (Rech.). 21, Middlesex; Chiswick, 42 (Rech.). 29, Cambs.; Engine Drain, Ely, 137; near Sutton Gault, 135 (Rech.). 88, Mid-Perth; banks of Tay below Perth, 94 (Rech.). 90, Angus; roadside, Rescobie, 92 (Rech.).

× **Patientia** L. ssp. **orientalis** (Bernh.) Danser. 18, S. Essex; Grays, 28 (Rech.).

× **pulcher** L. ssp. **eu-pulcher** Rech. fil. 17, Surrey; Shalford Common, 189.

R. OBTUSIFOLIUS L. ssp. AGRESTIS (Fries) Danser.

× **palustris** Sm. 17, Surrey; Mitcham Junction, 54. 21, Middlesex; Hendon, 127 (Rech.).

× **Patientia** L. ssp. **orientalis** (Bernh.) Danser. 17, Surrey; Thames' Bank, Mortlake, 47 (Rech.). 21, Middlesex; Chiswick, 38 (Rech.).

R. CONGLOMERATUS Murray.

× *crispus* L. 17, Surrey; Littleworth Common, 70 (Rech.). 29, Cambs.; near Earith Bridge, 131 (Rech.). 34, W. Gloucester; Avonmouth, 161 (Rech.).

× **Hydrolapathum** Huds. 14, E. Sussex; Alfriston, 149 (Rech.).

× *maritimus* L. 13, W. Sussex; Patching Great Pond, 186. 18, S. Essex; Wennington, 171 (Rech.). 23, Oxon.; Binsey Common, 150 (Rech.), 151, and 152 (Rech.).

× *obtusifolius* L. 13, W. Sussex; near Houghton Bridge, 32.

× **obtusifolius** L. ssp. **agrestis** (Fries) Danser. 14, E. Sussex; Alfriston, 148 (Rech.). 17, Surrey; Godalming, 64 (Rech.); Thames' Bank, Mortlake, 48 (Rech.).

× **pulcher** L. ssp. **eu-pulcher** Rech. fil. 17, Surrey; Littleworth Common, 67 (Rech.); Shalford Common, 59 (Rech.) and 60 (Rech.). 35, Monmouth; Castle Dell, Chepstow, 154 (Rech.).

R. MARITIMUS L.

× **obtusifolius** L. ssp. **agrestis** (Fries) Danser. 29. Cambs.; Roswell Pits, Ely, 134 (Rech.).

The notes included in this paper cover less than a third of the material accumulated to date, and serve to give some indication of the interesting problems encountered in the group, and the amount of work still necessary before our knowledge of the British *Rumices* may be considered at all exhaustive. The study of Docks in this country has been seriously

neglected since the time of Trimen, Warren and Syme, and the knowledge of British plants has not kept pace with the advances made abroad by Beck, Murbeck, Danser and Rechinger. These remarks apply not only to our native *Rumices*, but also to the long list of recorded aliens, in which very many alterations will be necessary. In order to make the present revision as complete as possible it is hoped that botanists will co-operate by forwarding fresh material of interesting plants during the summer months, and dried material from their herbaria for examination during the winter. In general, all mature specimens of the following will be especially useful:—

1. All species from Scotland gathered in August or later.
2. Any plants known to be adventive.
3. Plants from vice-counties from which it is stated in these notes that no material has been seen.

Communications should be addressed to the writer at 7 Penistone Road, Streatham Common, S.W.16.

Finally, I wish to acknowledge my great indebtedness to Dr Karl Rechinger, jun., of Vienna, for his assistance with the identification of specimens and for his help so very freely given in many other ways, to Dr Danser for a complete list of his publications, to the custodians of the herbaria listed below for facilities for studying the material in their charge, to Dr W. B. Turrill for advice and references, to Mr E. Nelmes for notes on *R. maritimus*, and to Messrs A. J. Wilmott and J. F. G. Chapple for assistance in various ways. Appreciation is also due to Dr R. C. L. Burges, Mr E. C. Wallace, and other companions on my "Dock-hunts" for their patience at times when my studies may have appeared rather protracted, and to Mr P. M. Hall for editorial help in preparing this paper for the press.

HERBARIA CONSULTED.

[In order to facilitate reference separate abbreviations have been used for herbaria kept apart from the general collections].

Hb. Borrer.	Royal Botanic Gardens, Kew—separate collection of Wm. Borrer (1781-1862).
Hb. Corstorphine.	Private collection of R. & M. Corstorphine, Arbroath.
Hb. Druce.	University of Oxford, Dept. of Botany—separate collection of G. C. Druce (1850-1932).
Hb. Hanbury.	British Museum (Natural History)—separate collection of F. J. Hanbury (1851-1938).
Hb. Hayward.	Private collection of Miss Ida M. Hayward, Galashiels—alien *Rumices* sent on loan to the writer.
Hb. Kew.	Royal Botanic Gardens, Kew. The separate Ecological and Genetical collections are distinguished by the addition of "(Ecol.)" and "(Gen.)" respectively.
Hb. Linn.	Linnean Society of London, Burlington House—the herbarium of C. von Linné (1707-1778).

Hb. Linn. Soc.	Linnean Society of London, Burlington House — a collection of British plants acquired from various botanists during the early history of the Society.
Hb. London.	London Natural History Society — a collection of British plants from various sources maintained at the headquarters of the Society.
Hb. Mus. Brit.	British Museum (Natural History). This reference includes material in the British and European (including Standard and General) Herbaria.
Hb. S.L.B.I.	South London Botanical Institute, 323 Norwood Road, S.E.24.
Hb. Smith.	Linnean Society of London, Burlington House—the collection of Sir J. E. Smith (1759-1828).
Hb. Syme.	British Museum (Natural History) — the separate collection of J. T. I. Boswell-Syme (1822-1888).
Hb. Wales.	National Museum of Wales, Cardiff.
Hb. Wallace.	Private collection of E. C. Wallace, Sutton.
Hb. Watson.	Royal Botanic Gardens, Kew—separate collection of H. C. Watson (1804-1881).

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ABSTRACTS FROM LITERATURE.

Compiled by the Hon. Editor with the collaboration of the following helpers:—Mr R. A. Blakelock, Mr A. A. Bullock, Mr A. K. Jackson, Dr R. Melville, and Mr A. E. Wade.

GENERAL.

(A) MORPHOLOGY.

LEAF PETIOLES.—The comparative anatomy of leaf petioles can be used, according to Dehay (1938), as a basis for general lines of classification in the same way as wood anatomy has been used by Burtt Davy and Chalk. Excellent characters are furnished indicating the affinity of the Euphorbiales with the Morales and also with the Malvales by way of the Sterculiaceae.

EPIDERMIS.—The epidermal characters in some species of *Verbascum*, *Rhododendron* and *Sedum* are shown to be as specific as internal structure or floral morphology.—Lavier-George (1937).

(B) GENETICS.

FRAGRANCE.—The inheritance of fragrance is analysed by McLean (1938).

(C) BIOLOGY.

GROWTH AND TRANSPIRATION.—The effect of artificial wind on growth and transpiration in the case of *Setaria italica* is described by Rao (1938).

SEED DISPERSAL.—A general illustrated account of seed dispersal mechanisms is given by Molinier and Muller (1938), with an analysis of the part played by plants possessing different types of dispersal mechanism in various plant communities; a bibliography with 97 titles is included.

(D) ECOLOGY.

TRANSPLANT EXPERIMENTS.—The results of periodic records of the six species now in position on the various soils for the years 1936 and 1937 are embodied in the Fifth Report of the British Ecological Society's Transplant Experiments at Potterne by Marsden-Jones and Turrill (1938 C). A summary of the results for the ten years 1928-37 is given in a separate report.

AQUATIC PLANTS.—The distribution of aquatic plants in the English Lakes with particular regard to the physical and chemical characters of the substratum has been studied by Misra (1938).

BRECKLAND.—The origin and development of a Festuco-Agrostidetum is described by Watt (1938) from an area of infertile sand in the south-west corner of Lakenham Warren.

PASTURE-LAND: *Treading*.—Davies (1938) finds that *Lolium perenne*, *Trifolium repens* and *Poa annua* are the most abundant species of heavily trodden verges and pathways in Britain. Under conditions of lower soil fertility the most abundant species are *Agrostis tenuis*, *Poa annua* and the fine-leaved Fescues.

Bates (1938) concludes that the cryptophytic life-forms of the dominant footpath plants, *Poa pratensis*, *Lolium perenne* and *Trifolium repens*, are an important factor in their resistance to treading.

SALT-MARSHES.—Chapman (1938) concludes that Norfolk marshes can be divided into upper and lower sections each exhibiting different conditions of submergence and exposure and gives a table showing the distribution of plant species in relation to these sections. The influence of the tides on the water-table is also discussed.

EFFECT OF SALT SPRAY.—It is shown that repressed sloping forms of seaside shrubs ("wind forms" of the literature) are not due directly to wind but to the killing action of salt spray on the young growing shoots. It is suggested that the dominants of the ocean dune community are dominant because of their resistance to salt spray.—Wells and Shunk (1938).

ROOTING SYSTEMS: *Heath Plants.*—The results of some observations on the rooting systems of various heath plants on a stretch of Upland Heath in Somerset are given by Heath and Lucknill (1938). They conclude that the peat habitat favours the replacement of a main tap-root and laterals by an adventitious system developed on an elongated rhizome.

Soil-binding Grasses.—A quantitative study of the roots and root-hairs of Oats, Winter Rye and Kentucky Blue-grass was made. Oats would expose a surface of 15 square inches per cubic inch of soil, Rye 30, and Blue-grass about 65 square inches. There would be 150,000 root hairs per cubic inch of soil in the case of oats, 300,000 for Rye and about 1,000,000 for Bluegrass. The last is therefore the most valuable as a soil binder.—Dittmer (1938).

THE CALCICOLE HABIT.—The results of a comparison of the flora of an area of calcareous sand on the Lower Greensand in Surrey with that of an area of typical acid greensand soil and an area of chalk grassland are given by Simpson (1938): he concludes that the factors determining the calcicole habit are chemical.

INVESTIGATION OF SOIL-CHANGES.—An investigation of the changes in soils produced by the breakdown of organic matter and a simple technique for investigating these changes by measuring the electrical potential of soils is explained by Pearsall (1938). This technique is used in the examination of various soils upon which characteristic plant communities occur in the north of England.

(E) MISCELLANEOUS.

USE OF INFRA-RED PHOTOGRAPHY.—An infra-red photograph of a wide landscape in Arctic Lapland taken by Southern and Lewis (1938) shows the main vegetation area. Ecologists might use this method for making rough surveys in a short time.

(F) NOMENCLATURE.

HAWORTH'S "SUPPLEMENTUM PLANTARUM SUCCULENTARUM."—The date of publication of this work, in which many new species were described, has been established by Stearn (1938: 114) as May, 1819.

NYMAN'S "CONSPECTUS FLORAE EUROPAEAE."—This work was published in 4 parts between 1878 and 1892 with two supplements dated by Nyman "1883-4" and "1889-1890" respectively as well as an unofficial supplement by Ernst Roth dated "1886" on the title page (preface "Nov. 1885"). The dates of the four original parts and of the three supplements have now been established by Stearn (1938: 113-114).

VENTENAT'S "CHOIX DE PLANTES."—The dates of ten parts, each containing six plates, issued between 1803 and 1808 are tabulated by Exell (1938).

(G) TAXONOMY.

"ALPHA" AND "OMEGA" TAXONOMY.—The development of present-day or "alpha" taxonomy, based entirely or essentially on morphology, in the direction of a perfect or "omega" taxonomy, in which organisms will be described and classified not only in terms of morphology as at present but also in terms of other branches of biology such as cytology, ecology, and so on, is recommended by Turrill (1938). To attain this object it is suggested that, while the fundamental principles of "alpha" taxonomy should be retained, subsidiary classifications based on a very limited number of attributes should be used in all cases where they are likely to be useful for a special purpose, and experiments should be continually made in incorporating new kinds of data in taxonomy.

TYPE-SPECIMENS.—The establishment of a central repository for type-specimens is urged by Fosberg (1938). Such an institution is desirable in view of the existence or threat of war in many parts of the world and should be established in some place likely to remain peaceful and at the same time enjoying a temperate climate, such as a sparsely inhabited area in the southern Rocky Mountains: it would ultimately be expanded to house a working reference collection and library, with a self-supporting photostating service.

(H) PHYTOGEOGRAPHY.

E. CANADA.—The dynamic nature of floras is strongly stressed by Marie-Victorin (1938) in a study of the phytogeographical problems of Eastern Canada. Numerous species native in the British Isles are mentioned and, since ecological relationships vary somewhat between the two continents, the paper is of distinct interest to British botanists from this point of view.

(I) TOPOGRAPHY.

BRITISH ISLES: CORNWALL.—Observations on Cornish forms in some critical groups (*Viola, Veronica, Thymus, Ulmus, Orchis* and *Agrostis*) are made by Rilstone (1938 A).

NORFOLK.—The ecology of Norfolk salt marshes is studied by Chapman (1938).

CHESHIRE AND LANCASHIRE: *Liverpool District.*—An account is given by Stansfield (1938) of plants of the Liverpool district in the herbarium

of John Shepherd (1764-1836). The list includes ten species not mentioned by T. B. Hall, *Flora of Liverpool*, 1839. Seven species, which are new records for v.-c. 59, are enumerated in " Plant Records " below. The identifications have been checked at Kew.

The Herbarium of Thomas Velley (1748-1806) like that of John Shepherd is now housed in the Botanical Department, Free Public Museums, Liverpool. Velley's specimens were beautifully prepared by ironing and are still in a good state of preservation. The herbarium is especially rich in Marine Algae but also contains a general collection of British Phanerogams: unlike Shepherd's these were not collected in the Liverpool district but this note is placed here for convenience as the two collections are now housed together.—Blackler (1938).

YORKSHIRE: *East Riding*.—The adventive plants of the East Riding, including all those previously published by J. Fraser Robinson in the *Flora of the East Riding of Yorkshire* as well as many recent records, are listed by Wilson (1938). New records and additions to *Comital Flora* are enumerated below in " Plant Records."

Craven in Wharfedale.—The posthumous publication in the *North Western Naturalist* of the account by the late F. A. Lees of the vegetation of this district is continued in four instalments covering Compositae (*Arctium*) to Filices (*Pteris*).—Lees (1938).

ENGLISH LAKES.—The distribution of aquatic plants with particular regard to the physical and chemical characters of the substratum has been studied by Misra (1938).

SCOTTISH ISLANDS.—The Roses of Bute (100); Mull, Tiree and Coll (103); North Ebudes (104); Handa (108); and Outer Hebrides (110) are described by Harrison and Bolton (1938).

OUTER HEBRIDES.—A total of 206 species of flowering plants and ferns is listed by Clark (1938) from Mingulay and Berneray (Barra Head), the southernmost of the group known as the Barra Isles. Mingulay is approximately 3 miles long by 1½ miles wide, rising to a greatest height above sea-level of 891 feet at Carnan, while Berneray is only 2 miles long by ¾ of a mile wide, with a greatest height of 628 feet. The geological formation is almost entirely gneiss, and the islands therefore consist for the most part of bare moorland. Of the total of 206 species 83 were restricted to Mingulay and 9 to Berneray. None of the species found were new to v.-c. 110, but some of the absentees are of interest. *Vaccinium Myrtillus*, *Empetrum nigrum* and *Myrica Gale* are entirely absent, while *Calluna vulgaris* is very scarce, especially on Mingulay.

An ecological survey of the Isle of Pabbay and other islands in the Sound of Harris with special reference to mammals and the evidence of former woodland was made by Elton (1938). The submerged forest described by Martin in 1703 was found to consist of *Betula alba* and remains of *Corylus Avellana* were found under peat in the centre of Pabbay. There is much evidence of submerged woodland in the Harris Sound region and of the survival into historical times of Birch and Hazel woods on the mainland of Lewis.

SYSTEMATIC.

25/1. CHELIDONIUM MAJUS L. The development of the embryo is described by Souèges (1936 A).

87/1. HELIANTHEMUM GUTTATUM (L.) Mill. The development of the embryo is described by Souèges (1937 C).

88. VIOLA L. Notes on some Cornish plants in the Nomimium Section are made by Rilstone (1938 A: 135).

96/1. SILENE MARITIMA With. Two plants of *S. maritima* were crossed together. The seed-parent had much anthocyanin in all parts, except the stigmata, while the pollen-parent was devoid of anthocyanin in all parts. The F_1 plants uniformly showed much anthocyanin in all parts, except for segregation in the stigmata. The F_2 families showed segregation for colour in all organs. Complementary and inhibiting genes are both found to be involved in the presence and absence of colour. One set of genes is probably basically responsible for development of anthocyanin wherever it occurs in the plant. The genetic inheritance of habit, leaf-shape, calyx-shape, overlapping of petals and segments, sex, fruit-shape and sculpturing of testa is also considered.—Marsden-Jones and Turrill (1938 A).

96/9. SILENE OTITES (L.) Wibel. Kleopov (1936) gives an analytical study of the group *Silene Otites* and recognizes 16 elementary species, 6 of which are new.

124/1. RADIOLA LINOIDES Roth. The embryo of *Radiola linoides* may be considered typical of the *Linaceae*.—Souèges (1937 B).

An illustrated account of the anatomy of the testa is given by Créte (1937); the presence of thick walled cells and absence of mucilage cells distinguish it from *Linum*.

132. OXALIS L. After the rupture of the capsule the seeds are shot out in rapid succession by the explosive rupture of their outer integuments; the histology of the seed coats (illustrated) is investigated and explanatory theories discussed by Sougy (1938).

153/3. MEDICAGO SATIVA L. The cause of self-incompatibility is investigated by Brink and Cooper (1938).

178. LATHYRUS L. Chromosome number determinations on 35 species indicate that all are diploid ($n = 7$, $2n = 14$) with the exception of *L. venosus* Muhl., which is tetraploid ($n = 14$, $2n = 28$). Attempts to produce interspecific hybrids proved to be abortive. The section *Clymenum* DC. is sharply defined cytologically as well as morphologically.—Senn (1938).

181/1. PHASEOLUS VULGARIS L. Starch grains originate in the vacuole-like central region of young plastids, and grow outwards. —Young (1938).

185. RUBUS L. Riddelsdell (1937) gives the distribution of *Rubi* in Gloucestershire.

194/5. ROSA STYLOSA Desv. See note by Boulenger (1937) on the use of this name.

199. SAXIFRAGA L. Further experimental studies have been carried out by Marsden-Jones and Turrill (1938 B) in connection with interspecific *Saxifraga* hybrids. By employing three species, *S. granulata* L. (Sect. *Nephrophyllum*), *S. hypnoides* L. (Sect. *Dactyloides*), and *S. tridactylites* (Sect. *Tridactylites*), it is shown that hybridization can occur between species belonging to different taxonomic sections of the genus.

211. SEDUM L. Lavier-George (1937) shows that in some species epidermal characters are as specific as internal structure or floral morphology.

213. DROSERA L. The capture of a Meadow Brown Butterfly by *D. rotundifolia* and *D. longifolia* growing together at Ashcott, Somerset, is recorded by Thompson (1938).

225/1. CIRCAEA LUTETIANA L. The flowers are pollinated by small *Apidae* and by *Syrphidae*, not by Hover-flies: it is doubtful whether there are any flowers specially adapted for pollination by Hover-flies.—Kugler (1938).

275/1. ARCHANGELICA OFFICINALIS Hoffm. An account of British occurrences, particularly in the Liverpool District, is given by Dallman (1938 B).

284/1. HEDERA HELIX L. For ecological anatomy see Makarova (1936).

370/4. CHRYSANTHEMUM LEUCANTHEMUM L. A biometrical study of the capitulum is made by Guffroy (1938).

423. TARAXACUM Zinn. The Estonian Taraxaca are dealt with by Marklund (1938).

435/8. CAMPANULA PATULA L. The development of the embryo is discussed by Souèges (1936 B).

438. VACCINIUM L. Farenden (1938) deals with the distribution and fruits of the British species.

438/2. VACCINIUM MYRTILLUS L. The food value of Blaeberry for grouse and sheep is discussed by Thomas (1938). It appears that the plant has substantial feeding value and where occurring in quantity bulks largely in the diet of both grouse and sheep.

440/1. ARBUTUS UNEDO L. A tree at Killarney measuring 9½ feet in girth is mentioned by Nicholson (1938).

460/2. PRIMULA VULGARIS Huds. A short general account of the Primrose is given by Pervival (1938 A).

59. Gentianaceae. The validity of Menyanthaceae as distinct from Gentianaceae is supported by the comparative anatomy of the two groups.—Lindsey (1938).

481/1. MENYANTHES TRIFOLIATA L. With the phyllotaxy of *Menyanthes trifoliata* L. as an illustration, it is considered that arithmetical and geometrical calculations in phyllotaxy have only a relative value owing to the influence of extrinsic factors. The sparse-ternate and partial or total symphyllous arrangements are derived from the opposite-decussate, which is fundamental in both the Dicotyledons and the Monocotyledons.—Ponzo (1937).

509/2. ECHIUM PLANTAGINEUM L. The development of the flower in relation to pollination is described by Camu (1937). The flowers are protandrous.

511/1. CALYSTEGIA SEPIUM R. Br. An account of the behaviour of the nucleole in somatic cell-division is given by Percy (1936).

515. CUSCUTA L. The cytology of the genus is discussed by Fogelberg (1938).

527. VERBASCUM L. Lavier-George (1937) shows that in some species epidermal characters are as specific as internal structure or floral morphology.

532/26. LINARIA CYMBALARIA (L.) Mill. An illustrated account of the histology at all stages of development of the curiously ribbed seeds is given by Humbert (1938).

543. VERONICA L. Notes on Cornish forms are made by Rilstone (1938 A: 135).

543/4. VERONICA CHAMAEDRYS L. The flowers are pollinated by small *Apidae* and by *Syrphidae*, not by Hover-flies: it is doubtful whether there are any flowers specially adapted for pollination by Hover-flies.—Kugler (1938).

553. PINGUICULA L. The British species vary in the state in which they pass the winter. In *P. vulgaris* and *P. grandiflora* a winter-bud is formed in the heart of the rosette, the leaves of the rosette decay and the winter-bud is left unattached until in the spring a new rosette and roots are formed. In *P. grandiflora* two winter-buds are sometimes formed and also "it may produce rows of tiny budlets along the line of insertion of the inner leaves of the old rosette." In *P. lusitanica* no winter-bud appears to be formed and the rosette-leaves survive the winter.—Blackburn (1938 B).

561. THYMUS L. Notes on Cornish forms are made by Rilstone (1938 A: 135).

581/2. LAMIUM MACULATUM L. Abnormalities in the flowers are described and figured by Nobécourt (1937).

593/1. HERNIARIA GLABRA L. An illustrated account of the embryology is given by Souèges (1938); on account of the linear tetrad this indicates an affinity with the Caryophyllaceae rather than with the Polygonaceae as suggested by Hutchinson.

596. AMARANTHUS L. The development of the embryo in *Amaranthus* shows the closest analogy with that of *Chenopodium Bonus-Henricus* and the Solanaceae.—Souèges (1937 A).

618. RUMEX L. The North American species are monographed by Rechinger (1937).

626/1. VISCUM ALBUM L. The mythology and folk-custom connected with the Mistletoe is described by "M.E." (1938).

Mistletoe occurs only on Conifers in N. Greece and is said to increase the yield of milk when used as fodder.—Balls (1938).

633. ULMUS L. Notes on Cornish forms are made by Rilstone (1938 A: 135).

634/1. HUMULUS LUPULUS L. For ecological anatomy see Makarova (1936).

642/1. BETULA ALBA L. The submerged forest in Pabbay, Outer Hebrides, described by Martin in 1703 was found by Elton (1938) to consist of this species and there is evidence of the survival into historical times of Birch woods on the mainland of Lewis.

645/1. CORYLUS AVELLANA L. Variation in the period of flowering of the pistillate flowers and of pollen-production and variation in first-flowering dates are discussed by Rilstone (1938 B): individual bushes appear to flower relatively at the same time from year to year.

Remains of this species were found by Elton (1938) under peat in Pabbay, Outer Hebrides, and there is evidence of the survival into historical times of Hazel woods on the mainland of Lewis.

646. QUERCUS L. A brief general account of *Q. Robur* L. ("*Q. pedunculata*") and *Q. petraea* Liebl. ("*Q. sessiliflora*") and their varieties is given by Bean (1938). Some well-known British specimens are mentioned. *Q. petraea* appears to be immune from attack by the *Tortrix* moth.

Chromosomes of *Quercus Robur* L. $2n = 24$. *Q. petraea* Liebl. $2n = 24$. *Q. Ilex* L. $2n = 24$.—Natividade (1937).

669. ORCHIS L. Notes on Cornish forms are made by Rilstone (1938 A: 136).

669/1. ORCHIS PURPUREA Huds. $n = 21$ in Danish specimens.—Hagerup (1938). $n = 21$, $2n = 42$ in Swiss specimens.—Heusser (1938: 581).

669/2. ORCHIS MILITARIS L. $n = 21$ in Danish specimens.—Hagerup (1938). $n = 21$, $2n = 42$ in Swiss specimens.—Heusser (1938: 580).

669/3. ORCHIS SIMIA Lam. $n = 21$, $2n = 42$ in Swiss specimens.—Heusser (1938: 580-581).

669/4. ORCHIS USTULATA L. $n. = 21$ in Danish specimens.—Hagerup (1938). $2n = 42$ in Swiss specimens.—Heusser (1938: 578).

669/5. ORCHIS MORIO L. $n = 18$ in Danish specimens.—Hagerup (1938). $n' = 18$, $2n = 36$ [+ or − 1 exceptionally] in Swiss specimens.—Heusser (1938: 582).

669/6. ORCHIS PARDALINA Pugsl. Under the heading "*Orchis praetermissa* ssp. *junialis* mihi (=*O. latifolia* ssp. *junialis* mihi olim = perhaps also *O. pardalina* Pugsley)" Vermeulen (1938) gives $2n = 80$ in Dutch specimens. [This chromosome-number should not be accepted for British *O. pardalina* on this evidence.—P.M.H.]

669/7. ORCHIS LATIFOLIA L. (*sec.* Pugsley). Under the name *O. incarnatus* Hagerup (1938) gives $n = 20$ in Danish specimens. Heusser (1938: 567) gives $2n = 40$ in Swiss specimens.

669/7b. ORCHIS LATIFOLIA L. (*sec.* Pugsley) var. OCHROLEUCA (Boll.) Pugsl. Under the name *Orchis ochroleuca* Boll. (=*Orchis incar-*

natus var. *stramineus* Rchb.) Heusser (1938: 567) gives $2n = 40$ in Swiss specimens.

669/7×9(2). ORCHIS LATIFOLIA L. (*sec.* Pugsley) × MAJALIS Reichb. Swiss material of " *O. incarnata* L. × *latifolia* " gave $2n = 60$.—Heusser (1938: 569).

669/8. ORCHIS PRAETERMISSA Druce. Vermeulen (1938) gives $2n = 80$ (probably from Dutch specimens but not definitely stated).

669/9. ORCHIS PURPURELLA T. & T. A. Stephenson. Vermeulen (1938) gives $2n = 80$ (British specimens).

669/9(2). ORCHIS MAJALIS Reichb. Under the name *O. latifolius* Hagerup (1938) gives $n = 40$ in Danish specimens. Heusser (1938: 568) gives $2n = 80$ (" without exception ") in Swiss specimens. Vermeulen (1938) gives $2n = 80$ in Danish specimens.

669/9(2)b. ORCHIS MAJALIS Reichb. ssp. OCCIDENTALIS (Pugsl.) Pugsl. Vermeulen (1938) gives $2n = 80$ for Irish specimens collected by him in 1937.

669/10. ORCHIS MACULATA L. (*sec.* Druce). Hagerup (1938) gives $n = 40$ for " *O. maculatus* var. *genuinus* and var. *helodes* " (Danish). All Swiss material from woodland, moorland and alps except that from one locality (Schuls) gave $2n = 80$.—Heusser (1938: 569).

669/11. ORCHIS FUCHSII Druce. Hagerup (1938) gives $n = 20$ for " *O. maculatus* var. *Meyeri* " (Danish): see also p. 28 above. Material from one Swiss locality only (Schuls) gave $2n = 40$. Dutch material gives $2n = 40$.—Vermeulen (1938).

669/14. ORCHIS MASCULA L. $n = 21$ in Danish specimens.—Hagerup (1938). $2n = 42$ in Swiss specimens.—Heusser (1938: 575).

669/17. ANACAMPTIS PYRAMIDALIS (L.) Rich. $n = 18$, $2n = 36$ in Swiss specimens.—Heusser (1938: 595).

669/18. HIMANTOGLOSSUM HIRCINUM (L.) Koch. $n = 18$, $2n = 36$ in Swiss specimens.—Heusser (1938: 596).

671/1. ACERAS ANTHROPOPHORUM (L.) R. Br. $2n = 42$ in Swiss specimens.—Heusser (1938: 593-594).

672. OPHRYS L. Swiss material of *O. muscifera* Huds., *O. sphegodes* Mill., *O. arachnites* Lam. and *O. apifera* Huds. gives in each case $n = 18$, $2n = 36$.—Heusser (1938: 596-598).

673/1. HERMINIUM MONORCHIS (L.) R. Br. $n = 20$, $2n = 40$ in Swiss specimens.—Heusser (1938: 592).

674/1. GYMNADENIA CONOPSEA (L.) R. Br. Swiss material gives $n = 40$, $2n = 80$ in the " hill "-form (flowering in June), $n = 20$, $2n = 40$ in the " swamp "-, " moor "- and " alpine "-form (flowering in July).—Heusser (1938: 584-585). [It seems that the diploid plant corresponds to what in this country is known as var. *densiflora* (Wahl.) Lindl., while the tetraploid corresponds to what we are accustomed to call typical *G. conopsea* (L.) R. Br. of chalk downs, etc., but the question needs much further study.—P. M. HALL.]

674/3. GYMNADENIA ALBIDA (L.) Rich. $2n = 42$ in Swiss specimens.—Heusser (1938: 590).

674/4. COELOGLOSSUM VIRIDE (L.) Hartm. $2n = 40$ in Swiss specimens.—Heusser (1938: 590).

674/6. PLATANTHERA CHLORANTHA (Cust.) Reichb. $2n = 42$ in Swiss specimens.—Heusser (1938: 591).

674/7. PLATANTHERA BIFOLIA (L.) Rich. $n = 21$, $2n = 42$ in Swiss specimens.—Heusser (1938: 591).

681. GLADIOLUS L. The inheritance of fragrance is analysed by McLean (1938).

711/1. GAGEA LUTEA (L.) Ker-Gawler. Fruiting and seed-production is very exceptional, at least in Britain. Dallman (1938 A) describes the discovery of fruiting capsules in W. Yorks and suggests that the fruiting was the result of favourable conditions during March and early April 1938.

727. LEMNA L. A short account of the morphology of the British species is given by Percival (1938 B).

740/1. ZOSTERA MARINA L. The dying out of *Zostera marina* L. in Portugal is noted.—Taborda de Morais (1937 A).

745. HELEOCHARIS Lestib. The species of *Heleocharis* occurring in the Rocky Mountain region are described and their distribution given by Beetle (1938). The following species which occur in Britain are dealt with: *H. pauciflora* (Lightf.) Link; *H. acicularis* (L.) Roem. & Schultes; *H. palustris* (L.) Roem. & Schultes; *H. palustris* var. *major* Sonder.

753/44. CAREX SALINA Wahl. The varieties of *Carex salina* Wahl. subsp. *cuspidata* Wahl. are discussed by Saxen (1938).

106. Gramineae. An attempt to give a precise morphological basis for Schellenberg's derivation of the Gramineae which is accepted by Wettstein and supported by serological investigations is made by Ziegenspeck (1938). Morphological and a few anatomical characters are employed and the conclusions summarised by a phylogenetic diagram.

756/1. SETARIA ITALICA (L.) Beauv. The effect of artificial wind on growth and transpiration is described by Rao (1938).

780. AGROSTIS L. Notes on Cornish forms are made by Rilstone (1938 A: 136).

794. AVENA L. The genetics of the genus are briefly discussed by Taborda de Morais (1938 C).

794/7. AVENA SATIVA L. The natural hybrids are discussed by Taborda de Morais (1937 B).

827. BROMUS L. Back crossing of the hybrid *B. madritensis* × *sterilis* with *B. sterilis* gave a single plant with characters identical with *B. sterilis* var. *velutinus* auct. named ×*B. Fischeri* f. *persterilis* Cugnac & Camus in 1931.—Cugnac (1937).

829. LOLIUM L. According to Jenkin and Thomas (1938) " at least six general *Lolium* types, or groups, are sufficiently distinct to rank

as independent species." These are *L. perenne* L. and *L. italicum* A. Br. (non-annual; wind-pollinated): *L. rigidum* Gaud. (annual; wind-pollinated): *L. loliaceum* Hand.-Maz. (of Australian origin), *L. remotum* Schrank, and *L. temulentum* L. (annual; self-pollinated). From six species fifteen interspecific hybrids are possible, of which eleven have been produced by hand-pollination. All six parent species are diploids (n = 14) and details are given of the successful crosses with special notes on anther dehiscence, pollen production and behaviour in meiosis.

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NOTE.—This bibliography refers not only to the Abstracts from Literature but to the contents of the Report in general, except such papers as have their own bibliographies.

ABBREVIATIONS OF TITLES OF PERIODICALS

additional to lists previously published in *B.E.C. 1935 Rep.*, 153-155 (1936), *B.E.C. 1936 Rep.*, 383 (1937), and *B.E.C. 1937 Rep.*, 631 (1938).

AB.Fenn.=Acta Botanica Fennica.
Amer.M.Nat.=American Midland Naturalist.
B.Jard.bot.Brux.=Bulletin du Jardin botanique de l'Etat, Bruxelles.
BSSN.S. et O.=Bulletin de Société de Science Naturelle de Seine et Oise.
CR.Acad. des Sc.Paris=Compte rendu hebdomaire des Séances de l'Académie des Sciences, Paris.
JIB.Ukr.=Journal de l'Institut Botanique de l'Academie Scientifique de la RSSR. d'Ukraine.
JM.Agric.=Journal of the Ministry of Agriculture.
PNAS.U.S.A.=Proceedings of the National Academy of Sciences of the U.S.A.
PU.Durham PS.=Proceedings of the University of Durham Philosophical Society.
TBS.Edin.=Transactions of the Botanical Society of Edinburgh.
U.Wyoming Publ.=University of Wyoming Publications.

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