THE BOTANICAL SOCIETY AND EXCHANGE CLUB OF THE BRITISH ISLES.

REPORT FOR 1930

(WITH BALANCE-SHEET FOR 1929),

BY THE

SECRETARY,

G. C. DRUCE, D.Sc., LL.D., F.R.S.,

HON. FELLOW, BOTANICAL SOCIETY, EDINBURGH.

VICE-PRES. BRITISH ASSOCIATION.

CORR. MEMB. SOC. BOT. GENEVE ET CZECHO-SLOVAKIA.

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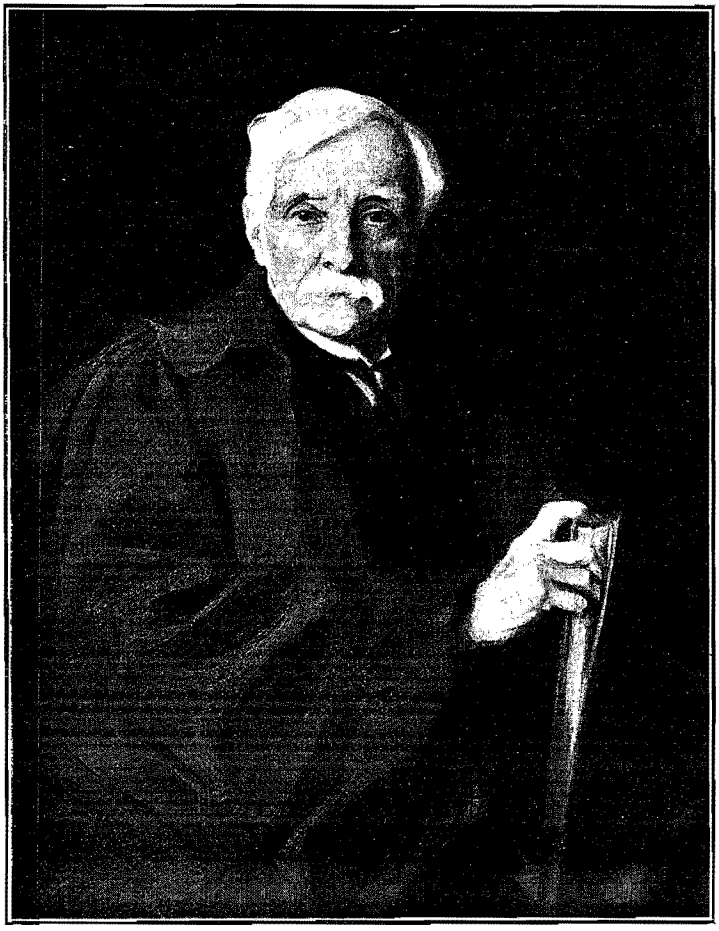

G. CLARIDGE DRUCE.

PHOTO FROM PAINTING BY P. A. DE LASZLO, PRESENTED BY THE MEMBERS OF THE BOTANICAL EXCHANGE CLUB.

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(VOL. IX. PART III).

Victoria Regina.

Floreat flora.

REPORT FOR 1930

BY THE

SECRETARY,

G. CLARIDGE DRUCE, F.R.S.,

to whom, at YARDLEY LODGE, 9 CRICK ROAD, OXFORD, the Subscription, 12s 6d per annum, and Non-Contributing Member's Subscription of 10s per annum, should be paid on and after January 1, 1931.

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CONTENTS.

PATRONESS.

HER ROYAL HIGHNESS PRINCESS MARY, COUNTESS OF HAREWOOD.

HONORARY MEMBERS.

Dr E. B. ALMQUIST, Sweden.
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THE

BOTANICAL SOCIETY & EXCHANGE CLUB OF THE BRITISH ISLES.

THE REPORT OF THE SECRETARY & TREASURER,

G. CLARIDGE DRUCE, YARDLEY LODGE, OXFORD,

FOR 1930.

BALANCE-SHEET FOR 1929.

Subscriptions received, -	£264	1	2	Printing Reports, &c., -	£179	14	0
Sales of Reports and Advertisements, - -	35	7	6	Expenses of Distribution,	2	1	0
Balance from 1928, - -	57	11	4	Critics, Typing, etc., -	16	12	8
				Postages, Carriages, etc., -	28	12	4
				Towards Publication of Fl. Northants, - - -	130	0	0
	£357	0	0		£357	0	0

PUBLICATION FUND.

Balance from 1928, - -	£45	3	4	Printing Fl. of Northants,	£231	17	6
Donations (Whitehead, £2 2/-; Henley, £1; Manfield, £1), - - - - -	4	2	0	Typing, Initial Expenses (including 10 6 for Northampton N.H.S. Reports),	5	10	6
Sales of 102 Fl. Northants to Oct. 31, 1930, - -	51	6	0	Towards Preparation of Comital Flora, - -	5	0	0
From General Account, -	130	0	0	Balance to Publication of Comital Flora, - -	146	16	11
Accrued Savings, - -	158	13	7				
	£389	4	11		£389	4	11

Balance in hand, £146 16s 11d.

BALANCES OF FUNDS IN HAND.

Life Members' Fund, £109 1s 0d. Miss Trower's Fund, £16 7s 11d.

Benevolent Fund—£59 3s 6d (less payment—In memorium, Dr Thellung, £5; grants to members, £6 10s 0d = £11 10s 0d). Balance in hand, £47 13s 6d.

Examined and found correct.—F. A. BELLAMY, F.R.A.S., 6th January 1931.

The year 1930 brought us a sad bereavement in the death of our Patroness, H.R.H. the Princess Royal, Duchess of Fife. Sir M. Abbot-

Anderson has drawn up the following short sketch of Her Royal Highness. She was a great lover of wild flowers, and made many delightful paintings of them.

H.R.H. THE PRINCESS ROYAL, DUCHESS OF FIFE.

We mourn the loss of our Patroness, H.R.H. The Princess Royal, which is shared by all, but especially by those who were fortunate enough to call her "Friend."

Hers was the true, unselfish, altruistic instinct, and many a tale of her unadvertised generosity could Prebendary Carlile unfold.

She rightly expected loyalty, but never failed to return that exquisite quality to those whom she had proved worthy of it.

Besides her home ties, the fact that she was a true nature-lover, who had "eyes to see" and saw and appreciated the beautiful, accounted in a great measure for the fact that she was so devotedly fond of her Scottish home and so much looked forward to and enjoyed her annual summer and autumn visit to Deeside. This love of nature and her family associations amongst those beautiful surroundings, where she had so endeared herself to all her dependants, completely captured her imagination.

She was blessed with a keen sense of humour and even of the ridiculous, but her generous nature invariably compelled her to gloss over any eccentricities of those of the many people that she, of necessity, was brought into contact with who unintentionally transgressed the recognised code of etiquette.

Such was her retiring modesty that few people except her intimate friends were aware of her artistic qualities, but her colour drawings of flowers were exquisite. It was during her stay at Gibraltar that she painted a great many of the wild flora of "The Rock," in which she was deeply interested. To mention only one instance, her joy at seeing and painting a beautiful little blue variety of the Pimpernel has made an everlasting impression upon me.

I have vivid recollections of driving, years ago, with the Duke and H.R.H. The Duchess of Fife and their daughters from Algeciras to a neighbouring Spanish town, when my botanical eye compelled close observation of the roadside and I espied what were to me two unknown species of *Erica*. Carried away by my own enthusiasm, I impulsively "commanded" the driver to stop, collected my specimens and returned to the carriage, with profuse apologies upon my lips for my sudden lapse of good manners. Then, with delight in her eyes and her whole face alight with amusement, Her Royal Highness bade me bring the Heaths to her on our return home. To my intense satisfaction, though not surprise, she presented me next morning with perfect colour drawings of both species. This anecdote illustrates the kindly and sweetly simple nature of this most gracious lady, whose delicate state of health compelled her to live in comparative retirement, and whose loss we all so deeply deplore.

That she should have consented to act as Patroness to our Society must always remain in our memories as one of the very many kind and sympathetic acts which filled her daily life.

MAURICE ABBOT-ANDERSON.

We are glad to be able to say that H.R.H. Princess Mary, Countess of Harewood, has kindly consented to be our Patroness. In her young days at Windsor, Her Royal Highness was keenly interested in British Wild Flowers.

The year 1930 was, on the whole, so far as weather was concerned, a pleasant one in the early months, but August was disastrously wet in Scotland and Northern England. The display of flowers in the blazing sunshine of June in Ireland is not likely to be forgotten. Among these, *Achillea Millefolium* was a mass of blossom, and there were sheets of *Trifolium repens, Silene, Helianthemum canum* in Co. Clare and *Orchis praetermissa*. In North Wales *Senecio spathulifolius* was unusually strong, as was *Silene maritima*. On the Chilterns *Habenaria Gymnadenia* was a great show, and in Oxon, Berks, and Gloster *Cerastium pumilum* was more frequent than usual. The Dandelions through the central and southern part of England were in magnificent flower.

The year was marked by an International Botanical Congress at Cambridge in August, and incidentally one of its members, Prof. M. L. Fernald, claims to have discovered *Eriophorum opacum* on Ben Eigh and *E. alpinum* Willd. in West Ross. At Kew he detected as a specimen labelled *Juncus tenuis*, the North American *J. Dudleyi*, which was gathered by Mr C. E. Salmon and Mrs Wedgwood some years ago.

On June 6th a party of our Members visited Anglesey, Galway, and Co. Clare. The weather was magnificent—indeed, in Ireland they were crying out for water. We made our headquarters at Trearddur Bay, some of us being kindly entertained by Col. the Hon. and Lady Kathleen Stanley, who accompanied us on our expeditions. As we all know, Holyhead is a rich centre for plants and, indeed, includes the only English (Welsh) station for *Senecio spathulifolius*, which was in magnificent show. It appears quite a distinct species, perhaps even from its continental ally. *Juncus capitatus*, found elsewhere only in Cornwall and the Channel Isles, Lady Kathleen showed us growing in its classic spot. *Potamogeton lanceolatus* we were unable to find at Lhwygy, but our time was short, and it was late in the day and the stream was very shallow. Our party included Lady Alethea Buxton, Hon. Mrs Guy and Miss Baring, Miss D. Cator, Miss D. Meynell, Miss Cuthbert, Rev., the Hon. Mrs and Miss Campbell, Miss Heywood-Lonsdale, the Hon. Sir George Talbot, Sir Roger Curtis, Bart., Lord Henley, the Rt. Hon. H. T. Baker, Miss Armitstead and Mr Chapple.

Round Trearddur Bay and on Holyhead Mountain there was a delightful show of plants. The sunshine induced a profuse flowering of *Helianthemum Breweri*, which sheds its petals about mid-day. This rare plant still holds its own. It was named after Samuel Brewer, a correspondent of Ray and Dillenius. It was considered by Planchon to

be a distinct species. Its bracts are sometimes absent, but, even then, its leaf characters seem distinct from those of *guttatum*. Good *Orchis praetermissa* and its hybrid with *O. maculata* were seen in several places. Lady Kathleen showed us *Ornithogalum umbellatum* near Penrhos. *Mibora* was practically over at Aberfraw, and at Coron *Elatine Hydropiper* was extremely rare. This year, however, *Potamogeton rutilus* was more frequent than usual, and near the lake I was glad to add *Caltha radicans* to Anglesey. Lady Alethea Buxton and Miss D. Meynell went out one evening and brought in a heath which for a moment I thought was *Daboecia* (*Boretta*). It was not that, so I went out with them to the mountain. There the heath had been burned the preceding year. A fresh growth had come up and much of it showed a peculiar modification of *Erica Tetralix*, var. *fissa*. The flowers were few in number, stalked and large flowered, the corolla being occasionally duplicated and split (pedunculata fissa). Miss Armitstead accompanied us to Red Wharf Bay and showed us a large field, not near houses, full of *Narcissus biflorus*. Near this place grew *Orobanche major* on Furze. In driving along the road from Menai to Beaumaris, my attention was called to a Hawkweed which was new to me. Subsequently I collected it, and Dr Zahn has identified it as *H. dentatum*, new to the British Isles. Our day on Snowdonia was unfortunate, for a hurricane of arctic coldness greeted us. It was literally dangerous to walk on the ridge, and the railway traffic was suspended for a time. Our party visited Clogwyn and collected many of the characteristic plants, but *Lloydia* was not in flower. It was gathered there ten days later in blossom. *Cochlearia micacea* was noticed in its old locality on Snowdon and a new British *Rubus—heteromorphus* at Llanberris. It was seen here many years ago. At Trearddur we found a new species of *Bursa pastoris* and *Pimpinella Saxifraga*, var. *ovata* Spr. The newly-named *Rubus laetus* was seen at Tycroes; it is the Welsh *latifolius*. We had a delightful crossing to Dublin, and thence across Ireland to Galway. The salmon coming up the Galway river afforded an interesting sight.

We motored from Galway to Ballyvaghan, Co. Clare, on a divinely beautiful day. The route round Galway Bay to the Limestone area of the Burren is a charming one. Here we saw *Helianthemum canum* in splendid blossom, and *Dryas octopetala* in enormous quantity. On the limestone pavement and in its interstices there were locally fine specimens of *Asplenium marinum* and *Adiantum Capillus-veneris*. The common form of the Herb Robert was *Geranium celticum*, which Ostenfeld and I found on the Phytogeographical visit. *Potentilla fruticosa* is still locally plentiful. Mr P. B. O'Kelly showed us *Orchis O'Kellyi*, which occurs in thousands and, with it, forms which have purplish rose-coloured corollas. Here, too, we saw *Orchis praetermissa* and its hybrids. *Sambucus Ebulus* grew near Ballyvaghan, as did *Potamogeton oblongus*, var. *lancifolius* and forma *parvifolius*, the latter found by P. B. O'Kelly. Where can there be a finer drive than that from Ballyvaghan to Glen Cahir, the scenery and the plants being splendid. The

rare *Saxifraga Sternbergii* was in beautiful flower on tabular rocks near the sea, while the limestone cliffs had their terraces covered with *Galium pumilum*, *Asperula cynanchica*, *Polygala vulgaris* type and var. *grandiflora* and fine *Hieracium iricum*.

In Glen Cahir *Potamogeton perpusillus* grew plentifully in the river, with one of its parents, *P. coloratus*. *Equisetum*, as a form of *variegatum*, was frequent. A new form of *Cirsium pratense* was also seen in the meadows, where *Orchis praetermissa* and its hybrid, *Fuchsii*, grew luxuriously. *Arabis ciliata* was local, and *Habenaria intacta* grew in several places. *Gentiana verna* was in all its beauty, forming with *Dryas* a lovely combination. I was able to confirm my discovery of a new plant to Ireland—*Callitriche polymorpha*. The following day was devoted to visiting Roundstone, etc. We motored out to Clifden, seeing on our way *Boretta* in good flower. Between Clifden and Roundstone we got *Salix pentandra*, and did a fine bit of botanising on Urrisbeg, where *Erica mediterranea* was in flower. We went to Creag a More, but it was a little too early, as *Erica Mackayi* was only coming into flower. We also saw *Utricularia intermedia*, *Castalia alba*, var. *occidentalis*, and *Juniperus nana*. Dog's Bay afforded us some delightful hours, the plants found including *Arabis ciliata* and *hirsuta*, and the deep red var. of *Orchis pyramidalis*. The hedges of *Fuchsia Riccartoni* are gorgeous there. The colouring of the flowers, the brightness of the sea and sky were delightful.

We had time next day to visit Gentian Hill, only a few hundred feet in elevation, situated about three miles from Galway, which was blue with *Gentiana verna*. *Orchis maculata*, in a variety of forms, occurred, as also did *O. Fuchsii*, *O. praetermissa* and *O. purpurella*, so that the varieties and hybrids were especially interesting. Here, too, within a few feet of sea-level, grew *Habenaria intacta*, *Polygala vulgaris*, var. *grandiflora* Bab. (not *Babingtonii*), *Thymus britannicus* and *T. neglectus*. The hill is especially interesting since both basic and acid soils intermingle.

These few days' botanising afforded plants of exceptional interest, and it will long be remembered with pleasure.

In July, with Sir Roger Curtis, the Burton-on-Trent waste grounds, with the refuse from the granaries, was visited, and 140 alien species were noted. Most of these had been seen in previous years, but *Isatis tinctoria*, *Anacyclus dissimilis*, *Echium arenarium* and *Onopordon tauricum* were among the new records. *Hieracium praesigne*, another new Hawkweed to Britain, as well as *H. arrectarium*, were gathered in 1929 at Cuckoo Lane, Staffordshire.

A delightful visit to Cambridge was made in June, as the guest of Mr Gilbert-Carter, and a pleasant excursion with the eager young Cambridge botanists to Cherry Hinton and the Durnford Mashes was taken. In these a form, var. *planiflora*, of *O. incarnata*, with flat, not recurved, labellums, was noticed with the type and with forms of *O. praetermissa*.

In July we motored to Potterne to see the Marsden-Jones and Turrill experimental gardens, where there was a wonderful show of native plants

and a mass of varieties of *Silene maritima*, *Centureas*, etc. In the village *Bursa patagonica* was obtained. We then went on by Mells and Wells, Cheddar, Weston, Clifden, where *Cerastium pumilum* was abundant, to Gloucester, Monmouth, Chepstow, Newport, and Cardiff. On the way we saw *Orchis hircina* and *Hieracium maculatum* var. (or sub-sp.) *pseudomaculatum* Zahn at Mells and Bath.

At Cardiff Docks and Barry, the aliens were not so rich as formerly, but we added to our List *Echium pustulatum* and *Andryala integrifolia*. *Scirpus Holoschoenus* has much increased.

We returned through Cheltenham, where *Ranunculus ophioglossifolius* was in larger quantities than usual. *Veronica aquatica*, var. *dasypoda*, grew with it. Miss Vachell had heard of the Flax Dodder at Bozeat in Northamptonshire, so we motored to one farm where *epilinum* was ruining the crops of Flax. It was an extraordinary sight.

In July also a party met at Bacres and explored the Dunstable Downs, where *Gentiana praecox*, *Orchis O'Kellyi*, *Habenaria viridis*, and the other local plants were seen. *Populus canadensis* is a conspicuous feature of the reservoirs near Tring.

A short visit to Denham and Iver was rewarded by seeing, quite naturalised, *Symphytum grandiflorum* at Gerrard's Cross, *Bursa viminalis* at Denham, and *Carthamus* at Langley.

Frensham and Puttenham were worked in July. Mr Clarke showed me in a hedge near Puttenham a fine bush of *Rosa multiflora*. *Orchis praetermissa* was very fine near Frensham. Mr Marks showed me *Ledum latifolium*, which he had found in considerable quantity near Normandy, bordering a large piece of water. It is now completely naturalised, though doubtless it was originally planted.

In August we motored up to Thirsk to be the guests of Mr and Mrs Foggitt. Our object was to examine the Tees-side about High Force, where one of the foreign members of the Botanical Congress thought he had found *Phippsia algida*. A minute search, however, showed that a very small form of *Agrostis pumila* had been mistaken for it. Here was *Solidago virgaurea*, var. *interrupta*. At Widdy Bank, *Juncus nodulosus* (*alpinus*) was in splendid quantity. I first found it there in 1903, then in 1909 when I showed it to Dr F. A. Lees, whom I had taken with me. In the intervening years I have seen it once or twice. Mrs Foggitt had given her Dr Lees' copy of the British Plant List. He had given this to Bennett, then it passed to Salmon, and from thence it found its way to a small bookstall, where Mrs Arber bought it. It is full of Lees' notes of additions. Amongst them was "*Juncus alpinus* Widdy Bank, Druce" (where I showed it him in 1909), "Mickle Fell, Yorks," the latter found subsequently by himself. We could not find it on the Yorkshire side of the Tees, but we did not try Mickle Fell last July. Before starting for Scotland I showed Mr Lindquist, who is studying this section, my specimens. He said that the Widdy Bank specimens of 1909 were among the best he had seen from Britain. I found it at Widdy Bank in 1903 and again in 1909 with my godson, Mr Leach, who remembers the incident distinctly,

and also the showing of it to Dr Lees. Since that date I have shown other botanists the *Juncus* at Widdy Bank. Moreover, in our Plant List of 1928, N. Brit. is given for its distribution, not Scotia, which is used when the plant is confined to Scotland. This is followed also in such similar cases as *Bartsia alpina* and *Cerastium Cerastoides*. Dr Vachell's record of it is omitted as being too uncertain. Also in the Interim Report of last October I published an account of it. *Alchemilla pubescens*, *A. reniformis* and *A. curtiloba* were obtained, the last at Langdon Beck, a N.C.R. *Hieracium obliquum* grew by the Tees in both counties. We then motored to Winton, Westmorland, where Miss Mason showed us *Linum anglicum* and the alpine form of *Senecio integrifolius*. There, too, we got *Hieracium cumbriense* and *grandidens*, *Thymus neglectus*, *Bursa trevirorum*, and at Lune Head, Yorkshire, the true *Sedum acre*.

We were then the guests of Miss Hayward at Galashiels, and of Mr and Mrs Ritchie at St Boswells. Thence to Stirling, where, at Grangemouth, we re-discovered, after twenty years, the rare hybrid, *Potamogeton Bennettii*, and growing with it *P. crispus*, var. *serratus* (Huds.). Callander was next visited, where *Solidago canadensis* is quite naturalised, and at Loch Lubnaig we found, new to the county, *Alchemilla controversa*. Killin was next worked. *Calamagrostis borealis* still remained by the Tay. Near Tyndrum we found *Cochlearia micacea* in the river-bed. Loch na Lairige we seached on a glorious day and noted 54 alpines, including *Thymus Drucei*. Near Shiehallion we got *Gentiana septentrionalis* and *Thymus zetlandicus*.

From Kenmore we went over to Glen Lyon and Tummel, and thence to the Moor of Rannoch. By Kinloch Rannoch we saw splendid *Thymus Drucei* and *Pyrus intermedia*. From Rannoch we went to Killiecrankie looking vainly for *Lathyrus niger*, which seems to have died out. At Cluñie, E. Perth, we saw some good Roses.

At Forfar, we saw my old friends, the Provost and Town Clerk. Then we were the guests of Mr and Mrs Corstorphine at Clova, but it was continuous rain for the four days that we were there. Our next journey was to Callander, thence through Edinburgh to Ayr. Here we found what is probably *Atriplex calotheca*, but it may be an adventive. It is quite unlike Bennett's *pseudo-calotheca*. From Ayr to Stranraer and the Mull of Galloway was a pleasant drive. Along the coast by Drummore is an abundance of the very distinct variety, *condensata*, of *Vicia sylvatica*, which I found there nearly 50 years ago. *Bursa laevigata* also occurred. We then went round Whithorn Point by the Glen Luce sands, which afforded *Radiola* and *Veronica officinalis*, var. In the beautiful drive from Newton Stewart through Kirkcudbrightshire to Crea Town, we noticed *Bursa laevigata* and *Limonium humile*. Our route then took us by Carlisle and Melmerby, where Mr Mason discovered *Myosotis brevifolia*, to Cronkley and Thirsk.

Mr Foggitt took us over a fine bit of country by Leyburn to Ottershaw, where we vainly sought for *Euphrasia salisburgensis*, reported from this area by Dr Arnold Lees. On another occasion we went to-

wards Halifax, and, in the canal at Salter Hebble, we found still growing the North American *Potamogeton Nuttallii* C. & S. = *pennsylvanicus*. Here, too, was *P. panormitanus* and plenty of *Impatiens glandulifera*. A new variety of *Hedera Helix* was also noticed, as well as the var. *borealis*.

From Thirsk we drove back through Market Harborough, where we got *Potamogeton compressus*, var. *major*, and *Bursa laevigata*, to Oxford.

As the guest of the Hon. Mrs Guy Baring we spent part of September at Forbury in Berkshire. It is a delightful neighbourhood. At Hampstead Marshall, *Campanula Rapunculoides* is naturalised. On and about Wilbury Camp grew *Agrimonia odorata*, a *Euphrasia* near *minima*, *Bursa belgica*, etc. At Brimpton, *Gentiana campestris*, a very rare plant in Berkshire, was seen in some quantity. On Mortimer Common, *Radiola* was in abundance, in company with *Centunculus* and a new variety of *Chenopodium polyspermum*. At Churn, Brimpton, etc., a new hybrid Thyme was gathered. Dr Ronniger connects it with the name of A. Bruce Jackson, who worked at the Thymes, but this was not one of his finds. A new *Rubus*, *R. curvispinis* Watson (first seen in 1896), was gathered at Inkpen.

The chief event for the Secretary was his eightieth birthday, which his many friends throughout the botanical world and elsewhere honoured in so marked a degree. Upwards of 800 addresses, letters, photographs, and post cards poured in, and the members gave him a reception in the Great Central Hotel, London, where nearly 200 friends assembled to greet him. The Viscount Grey of Fallodon gave a most charming address, and handed over a cheque which will go to the payment of a portrait which Mr De Lazlo has kindly consented to paint. May I say how immensely I appreciate the magnificent kindness of the members. It has been a real incentive to further work. It is true that for many years I have laboured very hard to make our Society successful, and as far as possible to do what I could for every member, but this was a pleasure in itself. Such work is not always recognised, but when it is in such an ample fashion tears of thanksgiving come unbidden to the eyes.

During February and March I visited Cyprus, and went over 1700 miles through that beautiful and interesting island, being greatly aided in my researches by Dr Unwin, who lent me Mr Qongur, one of his staff, to go with me through the island. In an appendix to the Report, I give a list of the additions I made in 1928 and 1930 to its flora.

To the authorities of the Royal Botanic Gardens at Kew and Edinburgh, and of the Natural History Museum at Cromwell Road, we are indebted for help. Among foreign botanists we are grateful to M. Patrice Riencourt de Longpré for determining the Leguminosae, Prof. O. E. Schulz for naming the Cruciferae, Dr Ronniger the Thymes, Dr Almquist the Shepherd's Purses, Dr J. Murr and Dr P. Aellen the Chenopods, Dr R. Danser the Polygonaceae, Dr Dahlstedt the Dandelions, Dr F. Jaquet the Alchemillas, Dr Probst the Adventives, Dr K. Zahn the Hawkweeds, Dr H. Schinz the Adventives, and Prof. J. Holmboe.

To Dr S. Howard Vines, F.R.S., the Rev. F. Bennett, Mr T. Gambier-Perry, and Mr R. H. Corstorphine we are indebted for literary help; and for critical examinations of British species we are very grateful for the kindness shown by Mr J. Fraser, Dr E. Drabble, Mr C. E. Britton, Mr W. H. Pearsall, Col. A. H. Wolley-Dod, Rev. H. J. Riddelsdell, Mr W. Watson, Mr D. Lumb, Mr A. E. Wade, Mr R. Butcher, Mr I. A. Williams, Mr W. O. Howarth, Mrs Gregory, and Mr P. M. Hall.

Our death roll has been heavy, and includes that fine taxonomist, Prof. C. H. Ostenfeld, Sir Arthur Dorman, Lord Melchett, Mr J. Comber, and Mr R. Grierson.

Congratulations are offered to Mr Butcher and Miss Strudwick on their completion of the companion volume to Bentham's Handbook. The drawings are excellent.

The end of the year was marked by a very serious illness, which kept me in my room for six months, a contingency which proved the advisability of the previously appointed Advisory Committee:—Rt. Hon. Harold T. Baker, Hon. Mrs G. Baring, Mr R. H. Corstorphine, Sir Roger Curtis, Mr C. E. Britton, Lady Davy, Mr and Mrs Foggitt, Mr P. M. Hall, Mr W. H. Pearsall, Miss Vachell, and Mrs Wedgwood. I am extremely interested in the future of the Society, which I hope may go on in years to come from strength to strength. I may mention that I have left my House, Herbarium, Library, Paintings, and Furniture, with an endowment and a curator, as a Botanical Institute for the use of Botanists and a help to our own Society.

Without in any way wishing to prejudice the choice of the members, may I say that it seems to me most desirable to secure the services of Mr W. H. Pearsall as Secretary, with perhaps my Curator as an assistant, and of Mr and Mrs Foggitt as Treasurers, and of Mr R. H. Corstorphine, who has seen our Reports through the press for nearly twenty years.

NEW MEMBERS.

Miss A. J. Armitstead (1931); Mr Hyatt C. Baker (1931); Mrs Balfour; Lord Henry Bentinck; Mr G. J. V. Bemrose (1931); Marchioness of Blandford (1931); Lady Birchall; Miss R. Blizzard; Dr W. M. Buchanan; Mr H. E. Bunker; Miss Ursula Duncan (1931); Mr A. E. Ellis; Mr J. N. Frankland; Mr C. S. Garnett (1931); Mrs J. A. Groves; Mrs A. D. Houstoun; Mr J. G. Lawn; Lady Legard (1931); Viscountess Lewisham; Bot. Sect. London Nat. Hist. Soc., Mr Short; Mr Compton Mackenzie, University of Michigan; Mr B. Lindquist; the Lord Macmillan; Mr E. L. M. Major; Mr C. E. Marks; Geraldine, Countess of Mayo; Marlborough College, Mrs B. Milvain; the Earl of Morley; Miss Paine (1931); Miss K. Pickard; the Lady Severn; Mr A. Smith; the Countess Spencer; Miss Stevens; Miss E. T. S. Stewart; Mr G. W. Temperley; Mrs K. B. Tindall; Mr B. T. Ward; Prof. J. A. S. Watson; Miss M. Wilkinson.

PLANT NOTES, ETC., FOR 1930.

(Mostly Plants New to the British Isles or Notes on British Species inserted here for Convenience of Reference.)

ABBREVIATIONS.—† before a name signifies the plant is not native; × = a hybrid; ± more or less; ! after a locality, that the Secretary has seen the plant there; [ ] that the plant is not British or the record is doubtful; *Ann. Bot.* = *Annals of Botany*; *Bot. Abstr.* = *Botanical Abstracts*; *Gard. Chron.* = *Gardeners' Chronicle*; *Ir. Nat.* = *Irish Naturalist*; *Journ. Bot. or J. of B.* = *Journal of Botany*; *Nat.* = *The Naturalist*; *N.W. Nat.* = *North Western Naturalist*; *Ph. Journ.* = *Journal of the Pharmaceutical Society.*

21/1. PAPAVER SOMNIFERUM × RHOEAS = P. RUPIVAGUM. Ashford, Kent, W. C. WORDSELL in *Proc. R.H.S.*, cxviii., 1930.

†45/9(2). COCHLEARIA MACROCARPA W. & K. Alien, Hungary, etc. Large capsules. Leaves with cartilaginous teeth. Liphook, Hants, Miss W. M. FOWLER.

†49/18(2). SISYMBRIUM INCISUM Engel. Alien, N. America. Formby, S. Lancs, J. F. PICKARD.

59/2(2). BURSA ALANDICA (E. At.). Welwyn, Herts, HUGH PHILLIPS.

59/24(2). B. SEGETUM (E. At.). Wymondley, Welwyn, Hatfield, Herts; Clifton, Pegsdon, Beds; Beaulieu, S. Hants, HUGH PHILLIPS.

59/28(2). B. PASTORIS, nova species. Trearddur Bay, Anglesey, G. C. DRUCE. A curious plant. It will take some time to prove.

100/5. CERASTIUM VULGATUM L., var. HANBURYENSE mihi. Thurso, Caithness, F. J. HANBURY. Differs from type in its glabrous, fleshy, shining leaves and pedicels with few glandular hairs. Keeps constant in cultivation at Potterne. Gathered at Thurso in 1915 by Mr Hanbury. The leaves were so succulent as to break in bending. G. C. DRUCE.

102/5. ARENARIA SERPYLLIFOLIA L., var GLANDULOSTRICTA Drabble. Allied to var. *stricta*. Similis sed sepalis foliisque superioribus piliis glandulifera vestita. Durdham, Bristol, H. G. WILKINSON in *Herb. Drabble*, June 11, 1885, and also found by Dr Drabble.

102/6. A. LEPTOCLADOS Guss., var. MICRANTHA Drabble in Journ. Bot., 373, 1930. Freshwater, Isle of Wight; Coffinswell, Devon; Start, Somerset, E. DRABBLE.

†115/4. ALTHAEA ACAULIS Cav. Alien, Syria, etc. Grain alien, Grimsby, N. Lincs, 1913, J. LARDER, ex F. A. LEES.

†117/13. MALVA BRASILIENSIS Desr. Alien, S. America. Lady Anne's Mill, Botley, Leeds, Yorks, F. A. LEES.

†125/7. LINUM REFLEXUM Ait. Alien. Meanwood, Yorks, F. A. LEES.

.142/2. ACER CAMPESTRE L., var. BRYONIOIDES Druce. Loddon Bridge, Berks. Leaves downy, three-lobed, the lobes cut into 3-5 rounded lobes, resembling the leaves of *Bryonia dioica*. G. C. DRUCE.

The Leguminosae have been kindly named by M. P. DE RIENCOURT.

†153/4. MEDICAGO HISPIDA Gaertn., var. BATTANDIERII Rienc. Burton-on-Trent, Staffs, G. C. DRUCE.

†153/8. ×M. VARIA Martyn, var. PROCUMBENS Fries. (Dc. 1136.) Adventive. Colchester, N. Essex, 1929, G. C. DRUCE.

155/1. TRIFOLIUM MEDIUM (L.) Huds., var. MONTANUM Rienc. (Dc. 1081.) Twinstead, N. Essex, NOTT and DRUCE.

155/2. T. PRATENSE L., var. ANGLICUM (mod. LUTESCENS) Rienc. Roade, Northants, G. C. DRUCE.

Var. AMABILE Rienc. Thornton Haugh, Cheshire, Rev. W. W. MASON.

Var. BORDERI. Huisinish, N. Harris, G. C. DRUCE.

†155/37. T. RESUPINATUM L., var. SUAVEOLENS (mod. PARVIFLORA). Burton-on-Trent, Staffs, G. C. DRUCE.

†155/40(2). T. VESICULOSUM Savi. Alien, S. Europe. Portishead, N. Somerset, N. & C. SANDWITH.

156/1. ANTHYLLIS VULNERARIA L., var. KRALIKA (CAMPANIANA). Banchory, Kincardine, 1927, G. C. DRUCE.

160/5. LOTUS CORNICULATUS L. (GRANDIFLORUS PRATICOLA ROBUSTA). Wytham, Berks, G. C. DRUCE.

160/6. L. TENUIS W. & K., var. GRACILIS VULGARIS Rienc. Long Melford, W. Suffolk, G. C. DRUCE.

166/10(2). ASTRAGALUS ODORATUS Lam. Alien, Orient. Bath, Somerset; Burton, Staffs, G. C. DRUCE. On examining this I came to the conclusion that it was not *boeticus* and sent it to M. Riencourt. He would not determine it as there were no seeds, but thought it might be American. Mr N. Sandwith has compared it with *A. odoratus* at Kew and finds they agree.

176/1. VICIA SYLVATICA L., f. HIBERNICA Rienc. White Sand Bay, Antrim, G. C. DRUCE.

176/3. V. CRACCA L., var. GALLO PROVINCIALIS Rienc., f. LUXURIANS GERARDI. Burton-on-Trent, Staffs, G. C. DRUCE.

The RUBI have been kindly named by Mr W. WATSON.

185/1. RUBUS IDAEUS × PHENICOLASIUS = R. PAXII Focke. Hall Road, S. Lancs, J. A. WHELDON. See *Journ. Royal Hort. Soc.*, 209, 1906.

185/2. R. NESSENSIS W. Hall, var. SEXTUS (Krause). Fittleworth, W. Sussex; Badby Wood, Northants, 1921, L. CUMMING. Stem bluntly angled, glaucous. Petioles channelled. Basal leaflets with stalks 2-3 mm. long. Calyx segments long, reflexed in fruit. The unfurrowed stem, armed with only very small prickles, easily distinguishes it from *R. sulcatus*.—W. WATSON.

185/7. R. NITIDUS W. & N., var. DIVARICATUS (P. J. M.). Crookham Heath, Berks, 1893, G. C. DRUCE; Snelsmore Common, Berks, W. M. ROGERS, as *nitidus*, teste BABINGTON.

185/14(2). R. INCARNATUS P. J. M. North Leigh, Bladon, Oxon; Tubney, Berks; Market Rasen, Lincs; Brickhill, Bucks, G. C. DRUCE.

185/18(2). R. VULGARIS W. & N. New to Britain. Brickhill, Bucks, 1899, G. C. DRUCE. Rogers thought it might be an abnormal *carpinifolius*. Sellack, Hereford, 1907, L. CUMMING, sent as *micans*. "Focke would merge *R. Lindleianus* with *R. vulgaris*, but I think they may be kept distinct without much difficulty. A. Ley's Aconbury *R. Salteri* (not *R. Salteri* Bab. by any means), is very near to this *R. vulgaris*."—W. WATSON; also from Sellack, Hereford, A. LEY; May Hill, Gloster, L. CUMMING.

185/18(3). R. PERARMATUS W. Watson. Caerphilly, Glamorgan, 1907, H. J. RIDDELSDELL, as *Salteri* Bab.

185/30(2). R. MUENTERI Marss. Stalmine, Lancs, 1891, J. A. WHELDON, as *Selmeri*; also from Binley Colliery and Brandon, Warwick, L. CUMMING.

185/35(2). R. RECTANGULATUS Maass. in Ascherson & Graebner's Flora des Nordostdeutschen Flachlandes (1898-9), p. 397. G. Braun Herb. Rub. Germ., No. 49 (collected by Maass.). Vide spec. auth. Near Wycombe, Bucks, July 1899, G. C. DRUCE. Det. *argentatus* P. J. M. by W. M. ROGERS.

185/45(2). R. PROPINQUUS P. J. M. Hollow below Ilsington, Dartmoor, S. Devon, 1904, W. M. ROGERS, as *argentatus*; Pengithly, Here-

fordshire, 1891, A. LEY (det. as *argentatus* by W. M. R.); Tudorville Quarry, Ross and Sellack, Hereford, 1907, L. CUMMING, as *argentatus*.

185/46(2). R. CUSPIDIFER M. & L. St Weonards, Hereford, 1891, A. LEY; road to Doddington, Lincs, 1907, L. CUMMING, as *argentatus*, teste W. M. R.; probably this from Vales wood, R XI Towns, Salop, 1892, E. F. LINTON, as *erythrinus*.

185/46(3). R. BIFRONS Vest. Forest near Micheldean, W. Gloster, 1907, L. CUMMING; Durdham Downs, W. Gloster, 1898, G. C. DRUCE, as *Lindebergii*. "Exactly matches a specimen I have from Alsace. The straight prickles in the panicle, the blunt-angled stem, and quite different truncate-based terminal leaflet distinguish it from *R. Lindebergii*." —W. WATSON. Near Perranzabuloe Church, W. Cornwall, F. RILSTONE, as *R. nemoralis*, var. *cornubiensis* Rog. & Ridd. in *Rep. B.E.C.*, 1924. "It extends across Central Europe from the Carpathians to the Rhine, the Paris Basin and the Belgian Ardennes. Apparently the continental plant exactly."—W. WATSON.

185/46(4). R. VULNERIFICUS Lef. Bladon, Oxon, G. C. DRUCE. Four Shire Stone, E. Gloster, H. J. RIDDELSDELL, as *subcarpinifolius*. See *Rep. B.E.C.*, 1920. Aberdare, Glamorgan, 1905, H. J. RIDDELSDELL, as *robustus*; Rowbottom Park, N. Somerset, Miss I. M. ROPER, as *Godronii*; Curridge, Berks, G. C. DRUCE.

185/46(5). R. NEOMALACUS Sudre. Mullion, Cornwall, W. M. ROGERS, as *thyrsoideus*.

185/46(6). R. LASIOTHYRSUS Sudre (=R. VILLICAULIS Boreau). St Peter's Barracks, Guernsey, 1907, G. C. DRUCE. "Babington recorded *R. villicaulis* in 'Primitiae Florae Sarnicae,' but Rogers could not find it. Possibly this was what Babington found."—W. WATSON.

185/47(2). R. HETEROMORPHUS Rip. Llanberis, Carnarvon, 1904, G. C. DRUCE.

185/49(2). R. CURVISPINIS Watson MS. (R. DUMNONIENSIS Rogers, p.p. non Bab. R. DUMNONIENSIS Sudre, t. 21, 1. No. 27 Brit. Rubi, p.p.). Christchurch, Hants, Coll. LINTON; Inkpen, Berks, 1894, G. C. DRUCE. "*R. curvispinis* differs from *R. dumnoniensis* Bab. (see *Journ. Bot.*, 1890), in the crimson stem, petioles and flowering axes; the shorter, unequal and more curved prickles, the roundish terminal leaflets, the long stalks of which bear crowded and much curved prickles; the gland-fringed stipules and bracts; and especially in the glabrous receptacles. The flowers appear to be pink and the carpels glabrous, but this needs verification on the living plant. *R. dumnoniensis* has milk-white flowers and pilose carpels and receptacles, and has the look of *R. adscitus* and *R. ramosus*. It is allied to *R. villicaulis*, whereas *R. curvispinis* is nearer to *argenteus* and the Discolores."—W. WATSON.

185/52(2). R. LASIOCARPUS W. Watson (R. AMPLIFICATUS Rogers, p.p. Sudre non E. Lees). Near Tintern, Monmouth; Aconbury, Hereford, 1888, A. LEY.

185/53. R. MACROPHYLLUS W. & N., var. BOULAYI Sudre. Christchurch, Milton, Branksome Park, Hordle, S. Hants; Badby Wood, Northants.—L. CUMMING.

185/64(2). R. HIRTIFOLIUS P. J. M. Saintfield, Co. Down, 1907, WADDELL; Stokenchurch, Oxon and Bucks, H. J. RIDDELSDELL, as *fuscus* forma, is probably this.

185/64(3). R. DIVERSIARMATUS W. Watson B.E.C., 1930. Tintern, Monmouth, A. LEY, as *erythrinus*.

185/68(2). R. HIRSUTISSIMUS Sudre & Ley. Oxshott, Surrey, 1922, H. J. RIDDELSDELL; Bognor Common, W. Sussex, 1914, L. CUMMING, as *R. leucanthemus*.

185/80(2). R. BANNINGII Focke. Pikes Peak, Lyndhurst, S. Hants, 1919, L. CUMMING, as *micans*.

185/83(2). R. GELERTII Frid., vera. Quarry, Uckfield, E. Sussex, 1897, E. H. FARR, as *mercicus*, var. *bracteatus*. The first seen from Britain by W. WATSON.

185/84(2). R. BADIUS Focke. Langworth Wood, N. Lincoln, 1907, L. CUMMING, as " probably *infestus*."

185/89. R. DREJERI G. Jens., var. HOMOEACANTHUS F. & G. Durdham Down, W. Gloster, 1914, J. W. WHITE, and 1910, Miss I. M. ROPER.

185/92(2). R. GENEVIERII Bor. Corfe, Dorset, L. CUMMING; Amersham, Bucks, 1924, G. C. DRUCE and H. J. RIDDELSDELL, as *uncinatus*.

185/99(2). R. HETEROBELUS Sudre. Wareham, Dorset, E. F. LINTON, as *praeruptorum*; Berewood, Dorset, R. V. MURRAY, as *praeruptorum*.

185/100(2). R. DIVERSUS W. Watson. Coomb Wood, Warwick, L. CUMMING, as *Kaltenbachii*.

185/106. R. MUTABILIS Genev., var. REGNORUM W. Watson. Witley and Farley Commons, Surrey, W. WATSON; Durdham Down, W. Gloster, 1910, Miss I. M. ROPER, as *Drejeri*; Lynch, W. Sussex, F. A. ROGERS.

185/109(2). R. INSOLATUS P. J. M. Brandon Wood, Warwick, L. CUMMING, as *Bellardi*.

185/109(3). R. HYLONOMUS M. & L. Tunbridge Wells, W. Kent; Eridge, E. Sussex. " This is the *R. hirtus*, var. *Menkei* Bab.; the *R.*

pygmaeus Bab. and the *R. praeruptorum* as cited by Boul. from Babington," teste W. WATSON.

185/142(2). R. ACULEOLATUS P. J. M. (near ROSACEUS). Boars Hill, Berks, 1914, G. C. DRUCE.

194/7. ROSA SQUARROSA Rau (DUMALIS auct.), var. BARTLETTIANA (Harrison). Wheelbark, near Stocksfield, Northumberland.

194/12. R. GLAUCA Vill., var. BERNICIENSIS K. Blackburn. Roadside hedge a few miles north of Morpeth, Northumberland. Near *denticulata* Keller. Branches dark-purple, leaf-margins strongly biserrate with gland tipped teeth. Caulis et ramorum aculei curvati falcatique; rami florentes etiam aculeis parvis et tenuibus aciculisque sparsis muniti. Folia plerumque septenata, rarius quinta; stipulae angustae, cum auriculis acutissimis, in margine glanduloso-ciliatae; foliola mediocria, ovato-elliptica (20×12 mm. usque 30×15 mm.), subtus glandulosa sed sub nervo medio setoso-glandulosa, biserrata; petioli pubescentes glandulosi; pedunculi breves, setoso-glandulosi, bracteis acutis angustisque superati; sepala pinnatifida, glanduloso-ciliata, in fructu patentia vel reflexa, denique cadentia; receptacula globosa, bene fructifera; discus planus; styli breves albo-lanati vel villosi capitulum planum formantes. Proc. Univ. Durh. Phil. Soc., vol. 8.

194/19. R. TOMENTOSA Sm., var. RICHARDSONIANA Harrison in Proc. Univ. Durham Phil. Soc., viii., 161. (35 chromosomes.) Wheelbirks, near Stocksfield, Northumberland, J. W. HESLOP HARRISON.

194/19. R. TOMENTOSA, var. DIMORPHA Dum. Ref. No. 3555. Aimes Green, Essex, 17th August 1929, C. E. BRITTON, labelled *R. omissa*, var. *Sherardi*. "It is not Davies's plant, though it might be what Continental botanists label *R. tomentosa*, var. *subglobosa* Car. Keller confirms the above name."—A. H. WOLLEY-DOD.

194/19(2). R. HURSTIANA Harrison. For several years I have had a rose under observation which agrees with none of the recognised British species. By this it is not intended to imply that the form is a microgene of some major species, but that, as far as species go amongst the Canine roses, it reaches the level of, say, *R. tomentella* or *R. micrantha*. Although I had felt certain of its true position for some time, two or three years ago specimens were submitted to Wolley-Dod in England and to Keller in Switzerland, with the result that the former was inclined to see in it some unusual *omissa* (*Sherardi*) form and the latter to assign it to *R. tomentosa* var. *foetida*. Actually Wolley-Dod's conception was much more in harmony with the facts, for Keller's views are untenable. Later, in deference to Keller's opinion, the English worker fell back on the position that the rose was some novel and strange *tomentosa* micromorph. In doing so, he felt considerable doubts.

For my part, knowing the plant from many stations and its remarkably small range of variation, I agreed with neither. Hence, to complete my studies, and to justify my stand, I transplanted half a dozen specimens from two distinct colonies to the garden, with the result that I feel that no course remains but to describe the plant as a new species lying between *tomentosa* and *Sherardi*.

ROSA HURSTIANA Harrison.

Fruticulus parvis (25 cm.—1 m. altus). Rami aculeis leviter arcuatis armati. Foliola viridia, parva vel mediocria, ± 1-3 cm. longa et ± .75-1.6 cm. lata, elliptica supra in principio disperse et adpresse pilosa, subtus adpresse pilosa, plus minusve glandulosa; serratura composita, dentes denticulis glandulosis 3-8. Flores solitarii, pedunculi breves < 1 cm. longi, glanduloso-hispidi; petala valde rosea; sepala patentia subpersistentia; receptaculum fructiferum oblongum disco plano; styli pilosi. Chromosomata 42.

Hab. Northumberland, Durham, N.E. Yorks, Bute, Perthshire, Angus, Haddington, Berwick.

Named after my friend, Dr C. C. Hurst, in recognition of his important work on roses.

In continental floras this plant runs down to *R. marginata* Wall., and with that plant it has considerable affinities.

In appearance it is a low shrub with neither the tufted appearance of *R. mollis*, the more or less arching regularity of *R. Sherardi*, nor the tall, loose arching habit of *R. tomentosa*. Actually in the garden, in habit one cannot distinguish it from *Rosa gallica* forms growing with it, and indeed, in many other characters, it suggests that species.

On seeing it one is instantly struck by its definitely green leaves, slightly lighter below, with well marked nerves. Above, the leaflets are clad with a short lax pubescence and below with a slightly more pronounced vestiture, still loose in texture. The glands are generally quite conspicuous with an odour recalling that of some *Sherardi* segregates, but still quite distinctive. The stipules are narrow and possess divergent pointed auricles.

Bushes growing alongside *mollis-Sherardi* colonies commenced to flower on July 3rd, *mollis* on June 15th, and *Sherardi* on June 16th. As true *tomentosa* is almost certainly absent from or rare in Durham, no phenological comparison is possible with that species. The fruits on *R. mollis* reddened toward the end of July, those of *Sherardi* in mid-August and the smooth flask-shaped *Hurstiana* fruits in mid-September. On October 7th no *Hurstiana* hips were quite ripe, and to-day (October 14th) some are greenish, all are hard and bear spreading sepals.

Finally, in the size of the orifice of the disc, *Hurstiana* agrees with *Sherardi*, to which otherwise its resemblance is slight.

The following key will help to differentiate the new species from its nearest allies of the Vestitae:—

1. Fruit ripening early.

Rosa mollis Sm.—Disc flat or slightly concave; its diameter two to three times that of the orifice through which the styles pass. Sepals more or less connivent and persistent until the decay of the fruit. Chromosomes 28.

R. Sherardi Dav.—Disc much the same but occasionally faintly convex. Diameter of disc 2½-3½ times that of its orifice. Sepals less persistent, more inclined to be spreading and pinnate. Chromosomes 28.

2. Fruit ripening late.

R. Hurstiana Harrison.—Disc flat; diameter three times that of its orifice. Sepals spreading, fairly persistent on the ripe fruit. Chromosomes 42. (The cytological investigations are not yet complete.)

R. tomentosa Sm.—Disc flat to quite conical with the orifice varying from the diameter of a pin to two-ninths of the diameter of the disc. Sepals rarely even subpersistent and nearly all falling on the ripening fruits. Chromosomes 35.

J. W. HESLOP HARRISON.

194/21. R. MOLLIS Sm., var. HETERACANTHA R. Kell. in sched. "An interesting variety which I have not seen in Central Europe."—R. KELLER. Moorlands near the Minera Lime Works, Denbigh, N. Wales, September 14, 1929, C. WATERFALL, ex A. H. WOLLEY-DOD.

194/23. R. SPINOSISSIMA L., var. RIVALIS Harrison. Chromosomes more or less sterile. Wheelbirks, near Stocksfield, Northumberland, J. W. HESLOP HARRISON.

194/30. R. MULTIFLORA Thunb. (teste Fraser). Alien, China and Japan. Hortal. Flowers corymbose, small, white. Branches, peduncles, and calyx tomentose. Leaves sometimes but not always hairy in the garden form; stipules pectinate. Found by Mr F. CLARKE in a hedge near Puttenham, Surrey, where he showed me this ornamental Rose with its crowds of snowy white flowers. It did not seem to have been intentionally planted.—G. C. DRUCE.

194. ROSA [Tourn.] L. Naturalist, 161, 1930. The groups treated are *Rosa glauca*, *R. coriifolia*, *R. mollis* and *R. omissa*. In passing one may say that it seems unfortunate that the name *R. coriifolia* should be used, since *R. caesia* is the older name, as was long ago pointed out by M. Crépin. Practically two groups are involved—the *glauca-coriifolia* and *mollis* and *omissa*. Harrison believes the former two are glaucous and pubescent phases of one species, and in 1926 he suggested the name for the combined group should be *R. Afzeliana* Fr.; but recent observations point to physiological distinctions between them. *R. glauca* ascends to greater altitudes, and *coriifolia* descends lower—even to the coast-dunal. He believes that *subcoriifolia* Barclay and *subcanina*

Christ are also sub-species. This does not exhaust the difficulties—for there is mixed assemblage recorded by Wolley-Dod under *coriifolia*, var. *Bakeri* and its sub-var. *Lintoni*. He believes there is little, if anything, to differentiate between the extremes of the old *coriifolia* and *R. rubiginosa* (why not *Eglanteria*?), so that no sharp division line can be drawn between them. He therefore prefers to leave *R. Bakeri* in position with *coriifolia*, as a well-marked additional sub-species, with *Lintoni* as a variety. He is not satisfied with Boulenger's identification of *dumalis* Bechst. with *glauca* Vill.; but as *R. rubicaulis* Vill. = *glauca* Pourret, 1788, and *R. glauca* Vill. are no longer available, he suggests that *glaucophylla* Winch, 1816, should replace it. He also agrees with my contention that *R. coriifolia* should be displaced by *caesia* Sm. He also unhesitatingly chooses *R. Sherardi* Dav. to replace *R. omissa* Déség. Personally I regard *R. mollis* as distinct from *Sherardi* forms, and Crépin too says it was physiologically a distinct species. The arrangement suggested by Dr Harrison is appended by the kind permission of *The Naturalist*. In passing I may say that the combinations var. *frutetorum* and *Watsoni* have been made by me in the "British Plant List."

ROSA CAESIA Smith (1811).

I.—Sub-sp. *eucaesia*, comb. nov. *R. caesia* Sm., Eng. Bot., t. 2367 (1811).
- (a) Var. *frutetorum*, comb. nov. *R. frutetorum* Bess., Enum. Pl. Vol. (1822).
  - (i) f. *implexa*, comb. nov. *R. implexa* Gren., Rev. de la Fl. des Mts. Jura (1874).
- (b) Var. *Watsoni*, comb. nov. *F. Watsoni* Baker, Rev. Brit. Roses (1864).
- (c) Var. *bovernieriana*, comb. nov. *R. bovernieriana* Lagg. et de la Soie, in Déség. Cat. Rais. (1876).
- (d) Var. *Winchiana*, var. nov. Foliola supra obscuro-viridia; subtus caesia et perglandulosa.

II.—Sub-sp. *Bakeri*, comb. nov. *R. Bakeri* Déség., Journ. Bot. (1864).
- (a) Var. *Lintoni*, comb. nov. *R. coriifolia*, var. *Lintoni* Scheutz., Journ. Bot. (1888).
  - (i) f. *setigera*, comb. nov. *R. coriifolia*, var. *Bakeri*, f. *setigera* W.-Dod, Journ. Bot. (1924).
- (b) Var. *celerata*, comb. nov. *R. celerata* Baker, Rev. Brit. Roses (1864).

III.—Sub-sp. *subcollina*, comb. nov. *R. subcollina* Chr., Ros. Schw. (1873).
- (a) Var. *subcoriifolia*, comb. nov. *R. subcoriifolia* Barclay, Ann. Scot. Nat. Hist. (1899).
- (b) Var. *incana*, comb. nov. *R. caesia*, var. *incana* Borr., ex Hook. Brit. Fl. (1835).
- (c) Var. *pruinosa*, comb. nov. *R. pruinosa* Baker, Rev. Brit. Roses (1864).

(d) Var. *obovata*, comb. nov. *R. tomentosa*, var. *obovata* Baker, Journ. Linn. Soc. (1869).

IV.—Sub-sp. *glaucophylla*, comb. nov. *R. glaucophylla* Winch, Monthly Mag. (1916).

(a) Var. *Reuteri*, comb. nov. *R. Reuteri* God., Cat. Pl. Vasc. Gen. (1861).
  (i) f. *Crepiniana*, comb. nov. *R. Crepiniana* Déség., ex Baker, Rev. Brit. Roses (1864).
  (ii) f. *transiens*, comb. nov. *R. Reuteri*, var. *transiens* Gren., Fl. Jura (1864).

(b) Var. *myriodonta*, comb. nov. *R. Reuteri*, var. *myriodonta* Chr., Ros. Schw. (1873).

(c) Var. *adenophora*, comb. nov. *R. Reuteri*, var. *adenophora* Gren., Fl. Jura (1864).

(d) Var. *orbicans*, comb. nov. *R.* (*Afz. gl.*) *orbicans* Almq., Ros. Mus. Reg. Suec. (1920).

(e) Var. *stephanocarpa*, comb. nov. *R. stephancarpo* Déség., et Rip. Mem. Soc. M. et L. (1873).
  (i) f. *Schuetzii*, comb. nov. *R. euglauca*, var. *Schuetzii* Schw., Mitt. Bay. Bot. Ges. II. (1908).
  (ii) f. *decorosa*, comb. nov. *R. euglauca*, var. *stephanocarpa*, f. *decorosa* H. Br., in Beck Fl. Niederöst. (1890).

(f) Var. *oenensis*, comb. nov. *R. glauca*, var. *oenensis* R. Kell., Syn. VI. (1900).

V.—Sub-sp. *subcanina*, comb. nov. *R. glauca*, sub-sp. *subcanina* Hayek, Fl. Steier. (1908).

(a) Var. *denticulata*, comb. nov. *R. subcanina*, var. *denticulata* R. Kell., Syn. VI. (1906).

(b) Var. *Melanophylloides*, comb. nov. *R.* var. *Melanophylloides* J. B. Keller, Deutsch. Bot. Monatsch. (1886).

(c) Var. *Kaufmannii*, comb. nov. *R. subcanina*, var. *Kaufmannii* Schw., Mitt. Bay. Bot. Ges. (1913).

(d) Var. *montivaga*, comb. nov. *R. montivaga* Déség., Mem. Soc. Acad. M. et Loire (1873).

(e) Var. *Bartlettiana*, comb. nov. *R. dumalis*, sub-sp. *subcanina*, var. *Bartlettiana* Harrison, Proc. Univ. Durh. Phil. Soc. (1930).

(f) Var. *berniciensis*, comb. nov. *R. berniciensis* Blackburn, Proc. Univ. Durh. Phil. Soc. (1929).

Turning now to the roses standing in our lists under the names *Rosa mollis* Sm. and *R. omissa* Déség., one change, long overdue, must be made at once. As the name *R. omissa* Déség. (1862) is applied to a rose only varietally separable from *R. Sherardi* Dav. (1913), the latter must replace the former as chief of the file.

Again, *R. Sherardi* and *R. mollis* agree cytologically (Blackburn and Harrison, 1921) for both have a chromosome complement of 28, and both

exhibit diakinetic figures with seven bivalents and fourteen univalents. On the contrary, *R. tomentosa* varieties reveal a somatic count of 35 with seven bivalents and twenty-one univalents at diakinesis. Clearly, in this fundamental respect, the alliance is rather between *R. mollis* and *R. Sherardi* than between *R. tomentosa* and *R. Sherardi*. Furthermore, there exists totally different and strong evidence pointing in the same direction.

In studying the growing plants in areas where both *R. mollis* and *R. Sherardi* abound, it is found that the forms of the latter approach those of the former exceedingly closely, and, moreover, accompany that rose to the limits of its range in our mountain districts. On the contrary, *R. tomentosa*, always rare with us, never ascends far, and, in fact, vanishes,* about thirty miles from the coast. *R. Sherardi* must, therefore, be severed from *R. tomentosa*, with which it has been connected by authors who have not possessed adequate facilities for studying it in nature, attached to *R. mollis* and regarded (*sens. restr.*) as specifically the same.

The question then arises as to the position of *R. mollis* itself. It is obviously a near ally of *R. pomifera* Herm., and for both the earliest possible name is *R. villosa* L. (1759), which must be restored at least in a collective sense.

However, if *R. pomifera* is maintained as distinct from *R. mollis*, and enough evidence exists to warrant that, the name *R. mollis* must be retained and applied to one of the sub-species of *R. villosa*. In that case *R. Sherardi* falls into place as a third sub-species of the same aggregate.

Our list, as far as these roses is concerned, thus reads:—

ROSA VILLOSA L. (1759).

I.—Sub-sp. *mollis* (Sm.), Rouy. *R. mollis* Sm., Eng. Bot. (1811).
- (a) Var. *caerulea*, comb. nov. *R. villosa*, var. *caerulea* Woods, Trans. Linn. Soc. (1817).
  - (i) f. *glandulosa*, comb. nov. *R. mollis*, var. *glandulosa* Wolley-Dod, Journ. Bot. (1924).
- (b) Var. *pseudo-rubiginosa* Lej., Fl. Spa. (1811).

II.—Sub-sp. *Sherardi*, comb. nov. *R. Sherardi* Dav., Welsh Bot. (1813).
- (a) Var. *omissa*, comb. nov. *R. omissa* Déség., in *Billotia* (1864).
  - (i) f. *resinosoides*, comb. nov. *R. resinosoides* Crép., ex Cott., Guide Bot. Cant. Frib. (1891).
- (b) Var. *submollis*, comb. nov. *R. submollis* Ley., Journ. Bot. (1907).
- (c) Var. *uncinata*, comb. nov. *R. tomentosa*, var. *uncinata* Lees, Rep. Bot. Ex. Club (1887).
  - (i) f. *pseudomollis*, comb. nov. *R. pseudomollis* E. C. Baker, Journ. Bot. (1892).

*Colonies of *R. mollis* and *R. Sherardi* exist on the coast sandhills and the coast dunes in both counties.

(d) Var. *Woodsiana*, comb. nov. *R. tomentosa*, var. *Woodsiana* Groves, Rep. Bot. Ex. Club.

(e) Var. *suberecta* Woods, Trans. Linn. Soc. (1817).
(i) f. *glabrata*, comb. nov. *R. suberecta*, var. *glabrata* Ley., Journ. Bot. (1907).

(f) Var. *eminens*, comb. nov. *R. eminens* Harrison, Vasculum (1916).

(g) *cinerascens*, comb. nov. *R. cinerascens* Dum., Fl. Belg. (1827).

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†195/11(2). PYRUS HUNGARICA Bornmüller in Mitteil. Thüring. Bot. Ver. N.F. 54, 1913, as forma of sub-species AUSTRIACA in Mitteil. Thüring. Bot. Ver. N.F. 54, 1913. Rocky wooded slope of Clifton Downs. W. Gloster, C. E. SALMON in *Journ. Bot.*, 174, 1930.

†196/2(2). CRATAEGUS HETEROPHYLLA Flugge. (*C. neapolitanus* Hort). Alien. Origin doubtful, probably Eastern. Introduced into Britain in 1816. One small tree by a wooded river-side near Tiverton, N. Devon, 1930, Col. G. WATTS. This interesting tree is figured in Lindley's *Botanist Register*, xiv., t. 1161, 1828; xxii., t. 84, 1836; *Ann. Mus. Nat. Hist. Paris*, xii., 423, 1808; Loudon *Arbor. Frut. Brit.*, ii., 864; vi., t. 31 Q, 1838, see p. 829; DC. *Prod.*, ii., 629. Leaves bright shining, subcoriaceous, falling off late, lanceolate-cuneate, toothed at apex, 3-cleft, segments serrate; tube of calyx fusiform, glabrous; flower one-styled; fruit narrower and longer than *monogyna*, one fruited, one seeded; stipules large, pinnatifid. Tree practically thornless, bark shining, ash-coloured. An ornamental tree.

In *Index Kewensis*, *heterophylla* is erroneously made = *Azarolus*, an entirely different species. Col. Watts wrote to me saying that several branches burst into leaf in February.

212/2. SEMPERVIVUM MONTANUM L. Alien, Europe. Frog Lane, Worcester. Established for half a century on an old wall, E. LEES, *Bot. Worc.*, 29, 1867.

†233/4. MESEMBRYANTHEMUM ATTENUATUM Haworth (det. Schinz). Africa, Australia. St Mary's Isles, Scilly Isles, August, 1885, CASTALIA, Countess of Granville.

256/1. CONOPODIUM MAJUS (Gouan) Loret & Barr., var. CONDENSATUM Druce. Sent by Mr J. F. Frankland from Horton-in-Craven, Yorks, growing in a meadow on a gravelly ridge with the type but with no intermediate forms. The small inflorescence is condensed into a globose shape, 15 mm. across; the fruits are small, about 3 mm. long, but whether they produce ripe seed is unknown. Inflorescentia parva, condensata, globosa, 15 mm.

It approaches in some ways to the race *stenocarpa* Rouy & Camus Fl. Fr., viii., 312, which has fruiting umbels contracted, with the rays "redressés," more numerous involucels, but always shorter than the fruiting pedicels; fruits longer, lanceolate-oblong, 1½-2 times longer than styles and the stylopod.

Major Batten Pooll finds specimens growing in Stoke Wood having the edges of the fruits turned in. A further note will appear in next *Report*.

284/1. HEDERA HELIX L., var. UNDULATIFORMA Druce. Salter Hebble, by the Canal, Yorks. Gathered in August last with Mr and Mrs Foggitt. It is markedly different from the ordinary Ivy, by the wavy, not flat, or simply curved surface. The leaf-outline is irregular, sometimes quite pointed, at other times ending in a trifid margin, in which the lateral lobes are pointed, the middle one as long or sometimes shorter, usually longer. The leaves of the barren branches are very variable, but never assuming the outlines of normal *Helix*. Foliis undulatis, irregularis, margine saepe trifido, G. C. DRUCE.

287/2. SAMBUCUS NIGRA L. forma. Differs from the type by the fruit-stalks being light green in colour up to the base of the ripe berry. All on the same tree had this character. Near York, H. SOWDEN. Near by was *S. nigra* L., var. *viridis* Ait.

†318/4(2). ASTER BRUMALIS Nees. Alien, N. America. In a marsh at Ascot, Berks, 1929, G. C. DRUCE, with Lady DAVY.

†318/18(2). A. DIFFUSUS Ait. Alien, N. America. In a marsh at Ascot, Berks, September 1929, G. C. DRUCE, with Lady DAVY.

†318/18(3). A. BERGERIANUS Harvey. KAULFUSSIA AMELLOIDES. Alien, Cape of Good Hope. Morfield, Leeds, Yorks, F. A. LEES, MS.

†318/18(4). A. FOLIOSUS Persoon. Alien, N. America. Waste ground, Mortimer, Berks, G. C. DRUCE.

379/1. TUSSILAGO FARFARA L., forma ALBA. Andoversford, E. Gloster, Miss L. ABELL. Growing by a stream-side for five years; the ligules are white not yellow—ligulis albis.

396/5. CIRSIUM PRATENSE (Huds.) DC., var. ANGUSTIFOLIUM (Rouy) Druce, comb. nov. Farnborough, N. Hants, G. C. DRUCE. Plant about twelve inches high, one-flowered, leaves linear, 12 cm. × 4 dm.—Rouy *Fl. Fr.*, ix., 59.

419/1. HIERACIUM PILOSELLA L., var. SUBVULGARE N. P. STRICTUM N. P. Port Meadow, Oxon; Frilford, 1929, Basildon, 1882, Berks, G. C. DRUCE.

Var. SUBPILOSUM N. P. Basildon, Berks; Porne, Somerset; Andoversford, E. Gloster, G. C. DRUCE.

419/1(2). H. MACROLEPIDIUM Norrl. Bidr. = ? PELETERIANUM Skand. Half. Hierac. Fl., 181, 1888. Chalk Cliff, Freshwater; Carisbrooke Castle, Isle of Wight, G. C. DRUCE.

419/9. H. CLAROPURPUREUM N. P. Tiverton, N. Devon, Col. WATTS.

419/11. H. ANGLICUM Fr. H. MOUGEOTII, sub-sp. ANGLICUM Zahn, var. FILIPES. Foliis subtus subpilosis, in petiolis mollifer sublonge subvillosulis—Zahn, *in litt.* Glen Fiagh, Angus; Skye; Betty Hill, W. Sutherland, G. C. DRUCE.

Var. SUBGLABRIPES. Foliis minus rigidis, minimis et brevibus, in petiolis vex densiusculis pilosis—Zahn, *in litt.* Glen Fiagh, Angus; Betty Hill, W. Sutherland, " petiolis vix pilosis;" forma, Betty Hill, W. Sutherland, G. C. DRUCE.

419/125(2). H. ACUMINATUM Jord. Gr. Jard. Gren., 12, 1849. France, Germany, N. Italy, Switzerland, Austria, etc. Asham, N. Somerset, 1929, G. C. DRUCE.

419/125(3). H. ASPERNATUM Jord. in Bor. Fl. Cent. Fr., iii., 11, 406. Zahn, t. 30, p. 380. Var. ANGLICUM (Zahn). Sapperton, E. Gloster, G. C. DRUCE. A typo involucris crassis ad 10 mm. longis, squamis latioribus ligulis magnis differt.—Zahn, *in litt.*

419/125(4). H. BREVIDENTATUM Jord. in Bor. Fl. Cent. Fr., iii., 11, 397. France, Bavaria. Nov. var. MULTIFLORUM Zahn ined. Involucris ± dense floccosis, pilis solitariis obsitis, stylis ± luteis.—Zahn, *in litt.* Huntercombe, Oxon, 1929, G. C. DRUCE.

419/125(5). H. PRESIGNE Zahn, as sub-sp. (H. DIAPHANUM, var. PRAESTANS Lint., p.p.). Burton-on-Trent, Staffs, G. C. DRUCE, teste ZAHN.

419/171(3). H. FASCICULARE Fries Epic., 100, 1862. Orme's Head, Carnarvon, 1884, G. C. DRUCE.

419/184. H. MACULATUM Sm., var. NORMALE. Sudbury, W. Suffolk; Highbridge, N. Somerset, G. C. DRUCE.

Var. SPILODERMUM Zahn in Mag. Bot. Lap., 336, 1922. Mells, N. Somerset, G. C. DRUCE.

Var. PSEUDOMACULATUM Zahn in Mag. Bot. Lap., 336, 1922. Mells, Bath, N. Somerset, G. C. DRUCE.

Var. SPILOPHAEUM (Jord. ex Bor., *l.c.*) Sudre H. Cent., 60. Zahn, 515. (*immaculatum* Zahn in A. & G. Syn., xii., ined.) Only recorded from Bergland by Zahn. Bath, N. Somerset, G. C. DRUCE.

Var. IMMACULATUM Zahn in A. & G. Syn., vi., ined. Bath, N. Somerset, G. C. DRUCE.

419/184(2). H. ARRECTARIUM Jord. in Bor. Fl. Cent. Fr., ed. iii., 11, 402. Sudre H. C., t. xviii. (GENUINUM NORMALE Zahn in titulis Syn. ined.) teste Zahn, 520. Germany, Switzerland, Austria. Cuckoo Lane, Staffs, 1929, G. C. DRUCE.

419/184(3). H. TINCTUM Jord. in Bor. Fl. Cent. Fr., iii., 11, 405. Var. INSIGNUM Sudre. France. Clova, Angus, G. C. DRUCE.

419/184(6). H. MACULATUM (Zahn, 165, sub-sp. 6, p. 516). (Sub-sp.) grex DIVISUM (Jord.) Cat. D., ii., 11, 1848. GENUINUM Sudre. Beaumaris, Anglesey, G. C. DRUCE. First time in Britain, teste Zahn. Folia basilibus interioribus, elliptica lanceolatis, cauliniis superioribus ± lanceolatis longe acuminatis, anthelia furcata, ramis erectis. Foliis leviter vel haud maculatis.

419/245. H. CROCATUM Fr., var. SUBEPILOSUM Dahlst. H. Sc., xxi., 98, 1907. In Engl., 923. Glen Lyon, M. Perth, G. C. DRUCE.

419/252. H. OBLIQUUM Jord. Woody Bay, N. Devon, 1929, G. C. DRUCE.

Var. INDOLATUM (Jord. ex Bor., *l.c.*, 385, 1857) Sudre Hierac. Centr., 18, t. 111. Pilis valde minus uninervosis. Middleton, Durham, 1929, G. C. DRUCE; Glasbury, Radnor; Bovey Tracy, Devon, G. C. DRUCE.

†420/2. ANDRYALA INTEGRIFOLIA L., cf. var. CORYMBOSA (Lam.) W.R. Barry Dock, Glamorgan, 1930, G. C. DRUCE.

428/2. TRAGOPOGON MINOR×PORRIFOLIUS. *Tragopogon porrifolius* L. has been under observation on a piece of waste ground at Gt. Yarmouth since 1924, and possibly earlier (P. E. Rumbelow, A. H. E. Brunning, and C. G. Doughty, members of Gt. Yarmouth Naturalists' Society), where it has by now increased to form a respectable colony. *T. pratensis* L. (*minus* (Mill.)) occurs with it, in plenty, though one cannot say how far back its establishment goes. In 1929 two formes (a) and (b) roughly intermediate between the above, appeared:—

(a) [Now (1930) almost as common as *porrifolius* on the site.] Seeding; but clearly to a degree sterile. Peduncle moderately thickened. Bracts of involucre usually slightly longer, varying as in *porrifolius*. Calyx: hairs and pappus. Corolla: outer florets long, copper colour, base yellow, inner florets shorter, more of yellow visible. Plant bearing the stamp of *porrifolius* in height, and dimensions of capitulum.
Saintyae E. A. E.

(b) Seeding rarely. Peduncle moderately thickened. Bracts of involucre reaching to tips of florets. Calyx: sepals green, sinuate, pappus usually dwarfed and scanty. Corolla: dull purplish copper, base pale yellow. Capitulum neither opening widely nor closing tightly; corollas not curling at edges at noon.
sterilis E. A. E.

This year twelve further forms are differentiated by variation in the quality, intensity and local distribution of colour in the florets, correlated with other distinct structural peculiarities:—

(c) Seeding; peduncle slightly or moderately thickened. Bracts of involucre as long or slightly longer than florets. Calyx: normal *Tragopogon* pappus. Corolla yellow; florets and capitulum corresponding in size to *porrifolius*. Six plants only.

(d) Seeding; peduncle moderately thickened. Bracts of involucre much as *porrifolius*. Calyx: normal *Tragopogon* pappus. Corolla light purple, base pale yellow; florets near centre of capitulum showing more pale yellow than purple. Capitulum approaching *porrifolius* in size. *Hallsi* E. A. E.

(e) Seeding; peduncle moderately or much thickened. Bracts of involucre much as *porrifolius*. Calyx: normal *Tragopogon* pappus. Corolla pale coppery purple, but dull. Size of florets and capitulum approaching *porrifolius*. *Readei* E. A. E.

(f) Seeding; peduncle slightly thickened. Bracts of involucre intermediate between *minus* and *porrifolius*. Calyx: normal *Tragopogon* pappus. Corolla copper colour; capitulum intermediate in size between *minus* and *porrifolius*. *Taylori* E. A. E.

(g) Seeding; peduncle slightly thickened. Bracts of involucre much as *minus*. Calyx: normal *Tragopogon* pappus. Corolla yellow, shortly tipped with bronze; size of florets and capitulum as *minus*.
Rumbelowi E. A. E.

(h) Seeding; peduncle moderately thickened. Bracts of involucre as in *minus*. Calyx: normal *Tragopogon* pappus. Corolla dark velvety puce; size of florets and capitulum approaching *minus*.
Pattersoni E. A. E.

(i) Seeding; peduncle slightly thickened. Bracts of involucre as in *minus*. Calyx: normal *Tragopogon* pappus. Corolla; palest yellow, almost white, with faint bluish tint discernible; size of florets and capitulum much as *minus*. *Brunningi* E. A. E.

(j) Seeding; peduncle slightly thickened. Bracts of involucre as in *minus*. Calyx: normal *Tragopogon* pappus. Corolla light purple, base pale yellow, inner florets showing more of the yellow than purple; proportions much as *minus*. *Howardi* E. A. E.

(k) Seeding; peduncle slightly thickened. Involucre as *minus*. Calyx: normal *Tragopogon* pappus. Corolla: yellow, suffused to a glow with bronze; florets and capitulum proportioned as *minus*. *Barnardae* E. A. E.

(l) Seeding rarely. Peduncle moderately or much thickened. Bracts of involucre projecting little above florets. Calyx: sepals green, sinuate, with broad base, rarely any pappus. Corolla dull purple; edges not curling inward at noon; capitulum neither opening widely nor closing tightly. Stigma lobes greatly produced. *Hurrelli* E. A. E.

(m) Seeding; peduncle slightly thickened. Bracts of involucre little longer than florets. Calyx: sepals green, sinuate, broad at base, sometimes extending beyond ligulate corolla; rarely any pappus. Corolla greenish yellow, not curling inward at edges towards noon. Capitulum neither opening widely nor closing tightly when in flower. Stigma lobes greatly produced. *Nicholsoni* E. A. E.

(n) Seeding; peduncle much thickened. Bracts of involucre twice length of florets. Calyx: normal *Tragopogon* pappus. Corolla violet, as *porrifolius*. *parviflorus* Syme.

(o) Seeding freely; peduncle slightly thickened. Bracts of involucre about twice as long as florets; corollas of outermost florets not much longer than those nearer centre. Corolla yellow; capitulum smaller than *porrifolius*. Calyx: feathery pappus. *pratensis* L., var. *minus* (Mill.).

(p) Seeding freely; peduncle much thickened. Bracts of involucre as long or slightly longer than florets. Calyx: feathery pappus. Corolla, violet; corollas of outer florets much longer than those of centre. *porrifolius* L.

A. E. ELLIS.

†435/6. CERVICINA GRACILIS (Forst.), nov. comb. (WAHLENBERGIA.) Det. Schinz. Budleigh Salterton, S. Devon, June 1930, Major R. ORME.

439/1. OXYCOCCUS OXYCOCCUS (L.) Dr. = OXYCOCCUS QUADRIPETALUS Gilib., var. Oakhanger, N. Hants, plentiful, Lady DAVY. The larger fruits make this a striking looking plant; the berries are not strictly so pyriform as those from Methven, Perth (see *Rep. B.E.C.*, 288, 1918), but they are not round, and are the largest near the stem and tapering upwards, obpyriform. They are frequently marked with streaks of dark dull purplish brown.

446/2. ERICA TETRALIX L., var. FISSA Druce, flore pleno. When the Botanical party was at Holyhead in June, Miss Margaret Campbell and

Miss Dorothy Meynell brought in from a heathy piece of ground near the South Stack Light House, Holyhead, Anglesey, a heath with large flowers, which, at a distance suggested *Boretta*, but closer examination showed it to be a form of *Tetralix*. I was conducted to the heathland, which the preceding year had been burned. Here and there about it grew this curious form. Usually it had only few flowers, 2-5. These were stalked and nearly 10 mm. long. The corolla was split to the base into 5 lobes, but the corolla was occasionally duplicated. Mr Charles Nicholson tells me he has a plant from a common near Truro, Cornwall, which has "the flowers nearly destitute of corollas, but the styles protrude beyond the calyces, which are normal."

Lady Alethea Buxton writes this account of its discovery:— In the course of a botanical expedition to Anglesey last Whitsuntide, 1930, a peculiar form of *Erica Tetralix* was discovered by Miss Dorothy Meynell. We were, for no particular reason, exploring a heathy place, on the west coast of the Island of Holyhead—this was to the left of the road which goes from Porth Dafarch to the South Stack. The place was dry, sandy, and rather barren with short grass, and patches of heather. And here it was discovered. The *Erica* . . . appeared to be a new and peculiar form of *Erica Tetralix*. There were only a few plants of it, and we found it nowhere else on the Island.

†497/8. SYMPHYTUM GRANDIFLORUM DC. Prod., x., 40. S. IBERICUM Stev. Alien, Caucasus. Hortal. In a wood at Gerrard's Cross, Bucks, Mrs PIGOTT, who showed it me there, but it had evidently come from an adjoining garden. It flowers in April.

506/10. MYOSOTIS VERSICOLOR Sm. Vestergren in Svensk Bot. Tids. Kr., 449, 1930, var. (as sub-sp.) LONGICALYX (Vester.). Caulis elongatus gracilis; calyx fructiferus viridis elongatus, laciniis angustis sublinearibus, apice acutatis elongatis tubo longioribus, pilis uncinatis longiusculis praesertim secus nervos valde prominentes armatus; corolla majusculo limbo circiter 3 mm. Tomatin, Inverness, G. SAMUELSON.

Var. (as sub-sp. FALLACINA (Jordan sp. Vester.). Humilis, saepe robustior; calyx fructiferus, atrocyaneus, brevior, circiter 4 mm. diam. longus, lacinius, latiuscula e basi latiore versus apicem, sensim attenuatis breviusculis 2 mm. longis e longitudine tubi nervis non prominulis pilis uncinatis minutis sparsis paramidis tantibus; corolla majuscula, limbo circiter 3 mm. in diam. ex luteo caerulescens Bath. C. C. Babington; Tomatin, Inverness, G. SAMUELSON.

Var. DUBIA (Arrondeau sp. Vester.). This is already in our List. Caulis elatus squarrosa hispidus. Tubus calycis acutus laciniis longior veliis demum aequilongus, secus nervos valde prominentes, pilis uncinatis robustis breviusculis crebris armatus, laciniis augustis versus apicem sensim attenuatis tubo brevioribus vel demum eo sub aequilongis; corolla minuta, limbo 1-2 mm. in diam. ex albo pallide caerulescens. Bath, C. C. Babington; Filby, Norfolk [N.182]; Montrose, Angus, G. C. DRUCE.

506/10. M. VERSICOLOR Sm., var. BREVICALYX Druce. Wicklow Sandhills, 1909; Watlington, Oxon, 1884; Teesdale, Durham, G. C. DRUCE; Abbey Wood, Kent; Bemridge Down, Isle of Wight, H. E. FOX. Calyx nearly as broad as long, sub-rotund and with lobes slightly longer, covered with strong and lengthy bristly hairs; corolla blue.

†509/1. ECHIUM VULGARE L., var. PUSTULATUM S. & S. Barry Dock, Glamorgan, 1930, G. C. DRUCE.

†509/6. E. ARENARIUM Guss. Alien, S. Europe. Burton-on-Trent, Staffs. A grain alien, G. C. DRUCE. From the Tavistock district of Devon, Miss BOGGIS.

†517/19. SOLANUM CHENOPODIOIDES Lam. ? Hayle, W. Cornwall, R. MELVILLE and R. L. SMITH.

518(2). CAPSICUM L.

†518(2)/1. C. ANNUUM L. Alien, tropics. Waste ground, Bristol, W. Gloster, C. & N. SANDWITH.

†525(2). SALPIGLOSSIS Ruiz & Pavon Prod., 94, t. 19, 1794.

525(2)/1. S. SINUATA Ruiz & Pavon. Alien, Chile. Waste ground, Exeter, S. Devon, G. C. DRUCE.

†529/4. CALCEOLARIA SINCLAIRIA Hook. Alien, New Zealand. Kirby Malzeard, Yorks, F. A. LEES MS.

†543/15. VERONICA DIGITATA Vahl. Sandal, Halifax, Yorks, F. A. LEES.

545/11. EUPHRASIA SEPTENTRIONALIS Druce & Lumb. *Planta* robusta, facie villosa, cinereo-viridis, longibracteata, parviflora, glandulosa. *Caulis* crassus, 3-8 cm. altus, satis strictus, nonnunquam simplex, saepe ramis binis oppositis nunc e basi nunc e medio nunc supra medium exorientibus, nonnunquam ubique ramosus, necnon ramis ipsis ramosis, ramis imis caulem principalem fere aequantibus, dense vestitus, pilis glanduliferis rectis subaequalibus satis paucis e cellulis binis elongatis glandulaque terminali plerumque compositis. *Spica* lata, internodiis brevibus, notis floriferis vel fructiferis plerumque paucis, nonnunquam usque 7. *Folia* inferiora ovata, obtusa, dentibus paucis satis obtusis, lobo terminali latitudine longitudinem excedente; superiora ovata, aliquantum obtusa, dentibus 3-4 magnis subacutis plus minusve acuminatis, infra valde plicato-striata, pilis longis copiose induta quorum nonnulli recti subaequales atque glanduliferi. *Bracteae* subdecussatae, patulae, nonnunquam conspicue deflexae, infra valde rugosae, indumento ei foliorum simili, late ovatae, nonnunquam longe ovatae, apice subacutae, basi latae, usque 10 mm. longae, 7 mm. latae, dentibus utroque margine 5-6 subacutis, lobo terminali longitudine latitudinem excedente, dentibus bractearum superiorum nonnunquam angustis acutisque sed haud aris-

tatis. *Calyx* bractea sua conspicue brevior, circum fructum haud accrescens, dentibus latis subacutis cum pilis multis rectis subaequalibus glanduliferis. *Corolla* parva, 5-7 mm. longa, albida, tubo haud elongato, stylo haud exserto. *Capsula* subtruncata, plerumque calycem aequans.

E. septentrionalis differt ab *E. hirtella* statura, pilis caulinis glanduliferis paucis, ramis, internodiis, bracteis, forma pilorum glanduliferorum. Ab *E. Rostkoviana* differt pilis caulinis glanduliferis paucis, forma pilorum glanduliferorum, bracteis rugosis, indumento glanduloso parciore, florum magnitudine. Ab *E. latifolia* differt bracteis basi haud sensim angustatis nec edentatis, lobo bractearum terminali, dentibus calycinis glandulosis (quod in *E. latifolia* rarissime fit).

545/14. E. ATROVIOLACEA Druce & Lumb. *Planta* parva, valde ramosa, floribus calycibus bracteisque superioribus colore atro tinctis saepe glandulosis. *Caulis* gracilis, eglandulosus, pro maxima parte bracteis occultus, 2-4 cm. altus, inferne ramosus, raro simplex. *Spica* condensata, satis lata, internodiis paucis cernendis. *Folia* inferiora minima, mox caduca, crassa, integra vel utroque margine unidentata, nunc indumento longo *E. curtae* praedita, nunc fere glabra, saepe pilis brevibus glandulosis induta; superiora minima, raro usque 5 mm. longa, infra rugosa, utroque margine bidentata, indumento simili. *Bracteae* inferiores suberectae, subacutae, circiter 5 mm. longae, infra rugosae, utroque margine plerumque bidentatae, nonnunquam tridentatae, dentibus acuminatis; superiores acutae, basi cuneatae, calycem plus duplo longiorem amplectentes, saepe pilis brevibus glandulosis indutae, nunc fere glabrae, dentibus acutis haud aristatis. *Calyx* semper bracteam suam superans, saepe copiose glandulosus, dentibus acutis vel subacutis, venis colore atro tinctis. *Corolla* circiter 6 mm. longa, tubo haud elongato, stylo haud exserto, parte superiore extra albida, ceterum solemniter atro-violacea. *Capsula* matura dentes calycinos aequans vel paullum superans.

Ab *E. curta* differt indumento plerumque minus denso, pilis glanduliferis, florum colore, bracteis parvis paucidentatis; ab *E. Lumbii* habitu, florum magnitudine necnon colore plerumque haud variabili, colore siccitate saepe nigrescente; ab *E. gracili* cum varietate ejus *primaria* habitu, magnitudine, indumento glandulifero; ab *E. brevipila* habitu, magnitudine foliorum bractearumque paucidentatarum, colore florum, caule eglanduloso; ab *E. foulaensi* nisi colore siccitate nonnunquam nigrescente toto caelo discrepat; ab *E. caerulea* habitu, magnitudine bractearum, indumento glanduloso et eglanduloso, colore florum differt.

545/17. E. LUMBII Druce, nom. nov. Rep. B.E.C., vii., 50. E. VARIABILIS Druce & Lumb, Rep. B.E.C., vii., 50, 1923, non Freyn in Kern. Sched., iv., 55, 1886. *Planta* gracilis facie depauperata, bracteis parvis, saepe subfarinacea atque glandulosa, valde variabilis. *Caulis* eglandulosus, gracilis, 2-6 cm. altus, nonnunquam simplex, saepe valde ramosus. *Spica* angusta, superne condensata, nodis floriferis vel fructiferis usque

12 sed saepe paucis, internodiis inferioribus satis longis. *Folia* inferiora mox caduca, obovato-cuneata, 7-8 mm. longa, basi anguste cuneata, utroque margine unidentata, lobo terminali longitudine latitudinem excedente; superiora ovata, basi cuneata, utroque margine dentibus 2-3 satis obtusis praedita, infra rugosa, indumento variabili vestita, pilis brevibus glanduliferis nonnunquam numerosis. *Bracteae* suberectae, plerumque satis parvae, circiter 5 mm. longae, ovatae, basi cuneatae, subtus conspicue rugosae, calycem amplectentes eoque saepe plus duplo minores, indumento ei foliorum simillimo; inferiores subacutae, dentibus utroque margine 2-3 subacutis; superiores indico tinctae, acuminatae, dentibus utroque margine 2-3 acuminatis subaristatis. *Calyx* bracteam suam semper superans, saepe copiose glandulosus, dentibus angustis acutis subaristatis, venis saepe indico tinctis. *Corolla* magnitudine valde variabili, 5-9 mm. longa, alba usque profunde lilacino-caerulea, siccitate plerumque haud ferruginea, tubo haud elongato, stylo nonnunquam exserto. *Capsula* matura dentes calycinos paullum superans.

Ab *E. campestri* differt caule eglanduloso, pilis glanduliferis brevibus, ramis, magnitudine atque colore florum variabili. Ab *E. Kerneri* pilis glanduliferis, florum colore, corollae tubo haud elongato, foliis bracteisque rugosis, crassitis; ab *E. gracili* cum varietate ejus *primaria* magnitudine florum, ramis foliis bracteisque rugosis, pilis glanduliferis, colore totius plantae; ab *E. caerulea* habitu, magnitudine bractearum, colore florum differt.

545/19. E. ROSTKOVIANA Hayne, var. MINORIFLORA Borbas. Ballyvaghan, Co. Clare, 1930, P. B. O'KELLY. Very exceptionally robust and most densely glandular. Stem nearly 40 cm. Glandular hairs often with six elongated cells.

550/3. OROBANCHE ALBA Steph., var. BIDENTATA G. Beck Mon. Orob., 211, 1890. Insula, Skye, Beck in Engler Pflanzenreich. Flores 20 mm. longi. Calycis segmenta omnium vel plurimorum flore profunde et saepe inequaliter bidentata. Bracteae flore longitudine aequales vel breviores. Filamenta infra glabra, supra parce glandulosa—pilosa vel glabra. In the type filamenta infra pilosa supra glanduloso-pilosa.

Order 67(2). PEDALIACEAE Lindl. Nat. Syst., ed. 2, 281, 1836.

†553(2). MARTYNIA Houston ex L.

†553(2)/1. M. COUSISIANA Miller. M. PROBOSCIDEA Gloxin. Alien, America. Meanwood Valley, Yorks, 1903, F. A. LEES.

563/1. CLINOPODIUM VULGARE L., var. OVATA (Briq.). Sapperton Tunnel, E. Gloster, G. C. DRUCE.

561/10. THYMUS NEGLECTUS × PULEGIOIDES, var. CHAMAEDRYS = T. JACKSONII Ronn., nov. hybr. Differences distinguishing it from *T. Pulegioides*, var. *Chamaedrys*. Stem long, procumbent; the flowering shoots raise themselves from the ground only just behind the inflores-

cences, and are not sharply quadrangular; they bear hairs in two series, rarely in four series—the lower part of the stem is also covered, even where glabrous, with minute papillae. Calyx densely villous all over. Leaves small, 5-6 mm. long, 2-3 mm. broad, ciliate in the lower third or half, rarely 9 mm. long or 5 mm. broad.

Differences distinguishing it from *T. neglectus*. The sterile shoots are less numerous, only a few being present. The leaves, which are of delicate structure, are broader than those of *T. neglectus*, and are ovate or ovate-lanceolate, the nerves not projecting. The flowering shoots frequently branched. First record: Churn, Frilford Heath, Brimpton, Berkshire, 1930, G. C. DRUCE.

Named after A. Bruce Jackson, who has studied the genus *Thymus*. See *Journ. Bot.*, xlvi., 33, 1908, Karl Ronniger.

569/6. NEPETA HEDERACEA (L.) Trev., var. MAJOR Gaud. (MAGNA Mérat). Basildon, Berks, 1929, G. C. DRUCE. Feuilles toutes reniformes; glomerules 1-2 flores; fleurs grandes; calice relativement plus long que dans var. *typica* et *heterophylla*; plante velue, souvent une fois plus grande dans toutes ses proportions que *typica* et *heterophylla*.

†577/12(2). STACHYS COCCINEA Ortega. Alien, Cuba. Martin Mere, S. Lancs, 1930, A. G. LANGDON, ex F. W. HOLDER; Liverpool Docks, 1909, *Hb. Ellis*, teste R. WAGSTAFFE.

585(2). AMETHYSTEA L.

†585(2)/1. A. CAERULEA L. Sp. Pl., 21. Alien, Siberia. Waste ground, Bristol, W. Gloster, C. & N. SANDWITH. In appearance quite unlike one of the Labiatae. Covered with a metallic, blue-green sheen.

†592/4. PARONYCHIA ARGYROMA Nutt. Alien, N. America. Fryinghall, Yorks, RHODES, ex F. A. LEES.

†596/11. AMARANTHUS ASCENDENS Loisel., vel var. POLYGONOIDES (Moq.) Thell. Alien. St Helier's, Jersey, Bro. LOUIS ARSENE.

†596/14. A. GRAECIZANS L. Alien. Yiewsley, Middlesex, 1929, R. MELVILLE.

600/15. CHENOPODIUM POLYSPERMUM L., var. (vel f.) AMARANTOIDES (Beck.). Mortimer Pond, Berks, 1930, G. C. DRUCE.

†600/18(2). C. TRIANGULARE R. Br. Alien, Australia. C. PANICULATUM Murr. Bradford, Yorks, G. C. DRUCE and J. CRYER.

†606/4. ATRIPLEX CALOTHECA Fries. A. HASTATUM Lindm. Sv. Fl. and of Fries Fl. Hall., 49. ? Ayr, 1930; Dunbar; Wigtown, 1930, G. C. DRUCE. These approach the Continental species much more closely than any others I have seen, and Dr Aellen has queried them as this plant.

It differs from *hastata* by the calyx being deeply cut into narrow segments. It is a native of Scandinavia. It may be mentioned that all Mr Bennett's records of it in *Journ. Bot.* and the *Annals of Scottish Natural History* are errors for *hastata*. More recently he has named an *Atriplex glabriuscula*—var. *pseudo-calotheca* Ar. Benn. in *Trans. Bot. Soc. Edin.*, 61, 1828, from the coast of Caithness at Reiss. I had gathered similar plants in Wigtown in the eighties, but they are quite different from the true *calotheca*. Both my plants referred to above may be of adventive origin.

651/9. POPULUS BALSAMIFERA L., non CANDICANS Ait. Det. Fraser. Alien, N. America. A few trees by the river between Killin and Crianlarich, M. Perth, August 1930, G. C. DRUCE.

652/2. EMPETRUM HERMAPHRODITUM Hag. On Y Gribin Bwlch y Ddwy Glydyr, Carnarvon, C. G. TRAPNELL; Slioch, W. Ross, G. C. DRUCE. Mr Trapnell writes:—"I am shortly sending confirmed *Empetrum hermaphroditum* Hag. and associated *E. nigrum* L., under separate cover. Dr Hagerup tells me he regards these two names as covering what are probably two groups of smaller races, *i.e.*, as two aggregate species. My *E. hermaphroditum* answers to the arctic-alpine type of North Europe and Greenland, whose characters are well marked. This Welsh site probably represents the southern limit, with the exception of the European Alps. This type is cytologically as well as morphologically distinct from the dioecious *E. nigrum* of boreal Europe."

669/7. ORCHIS INCARNATA L., nov. var. PLANIFLORA Dr. Differs from the type in the flat, not reflexed, labellum. Labellum planum, non reflexum. Durnford, Cambridgeshire, shown me by Messrs CARTER and GILSON.

669/9. O. PURPURELLA Steph. P. Vermuelen, Ned. Krindkundig Arch., January 1930, gives an account of this Orchid growing in Holland.

669/12. O. O'KELLYI Dr. Askham, Yorks, W. A. SLEDGE; Ivinghoe, Bucks, Mrs MACALISTER HALL. Very plentiful on the Burren, Co. Clare. Under this, provisionally, I put a pink-flowered plant from the Burren area, Co. Clare, which keeps uniformly distinct. Mr O'Kelly thinks it is a distinct species, but to me, with a limited means of investigation, it seems most fitting to put it under *O'Kellyi* as var. *purpurascens*. It does not resemble *Fuchsii*. Flores roseae-purpureae. Flowers small, labellum three-lobed, middle one pointed, somewhat smaller than the lateral lobes, of a purplish colour.

676/2. IRIS FOETIDISSIMA L., var. CITRINA Bromf., f. PELLOTTII Ab.-Anders. Langton Matravers, Dorset, Sir M. ABBOT-ANDERSON.

A variety with yellow seeds was sent from the Isle of Purbeck by W. VAN DE WEYER.

†676/10. I. VERSICOLOR L. Alien, N. America. Hortal. Tagbeck, Yorks, F. A. LEES, teste DYKES.

†706/7. SCILLA PERUVIANA L. Bot. Mag., t. 749. Alien, Reg. Medit. Hortal. On a hedgebank in the parish of S. Mervyn, W. Cornwall, W. WISE. Introduced into Britain in 1607. Linnaeus made an error in giving it the name *peruviana*, with which country, certainly, it has nothing to do.

718/10. JUNCUS ARTICULATUS (LAMPROCARPUS) × NODULOSUS = × J. BUCHENAUI. Teesdale, 1930, G. C. DRUCE.

718/11. J. NODULOSUS Wahl. in Britain. Under the major species *alpinus* Vill., B. Lindquist of Upsala is monographing three subspecies—*J. alpinus* Vill., which Mr Sprague (*Journ. Bot.*, 210, 1928) shows is a nomen abortivum, and holds that the valid name is the uncouth *J. alpino-articulatus* Chaix Hist., i, 378, which is based on *Juncus foliis fistulosis, articulatis, panicula simplici, glumis aristatis* Haller Hist., ii., 170, 1768. Villars (*Hist.*, ii., 233) rejected the name of Chaix and wrongly gave another—a more expressive one, *i.e.*, *Juncus alpinus*, with which name our British plant apparently has been wrongly identified.

The second plant is our British species, *Juncus nodulosus* Wahl. Fl. Suec., i., 114.

The third, *J. atricapillus*, which I have vainly sought for, is not yet known as British.

J. nodulosus is also the common plant of Sweden and Norway. The true *mucroniflorus* Clairv. also occurs there=(*alpinus* and *alpino-articulatus*). The latter I have gathered plentifully near Le Lautaret in the Dauphiny.

Juncus nodulosus was first made known as a probable British species by W. H. Beeby in *Scot. Nat.*, 92, 1887, as having been found by Mr HUTCHESON in Glen Dole, Angus, in 1870. Buchenau reported on it as being *alpinus* or one of the intermediates between *alpinus* and *lamprocarpus*. In August, 1887, Dr Buchanan White found it at Pitlochry, E. Perth, and I found it near Loch Ennich, Easterness, in the July of that year. In 1903 I found it at Teesdale, Durham, and again in 1909, when I showed it to Dr Lees. He entered it at the time in his copy of my "List of British Plants," and also added that he had afterwards found it on the N.W. slopes of Mickle Fell, Yorks. I have seen it repeatedly near Widdy Bank since that date, and specimens are distributed this year. Lindquist of Upsala, in July 1931, said the 1909 gathering from Teesdale was among the best he had seen from Britain, and that it was *nodulosus*.

Other localities are:—Vol.i., B.E.C., 387, 1892. Loch Ussie, E. Ross, E. S. MARSHALL, August 8, 1892, named by Buchenau as forma *gracilior*.

B.E.C., 423, 1893. Ben Laiogh, Argyll, at 2500 ft., as var. *genuinus*, E. S. MARSHALL, agreed to by Buchenau.

[Vol. ii., B.E.C., 398. Shore of Loch Assynt, W. Sutherland, July 1908, W. A. SHOOLBRED and E. S. MARSHALL. Not this species but form of *articulatus*.]

Vol. iii., B.E.C., 218. Loch Greenoch, Kirkcudbright, 1910, G. WEST.

Vol. iv., B.E.C.* Near Cromer, Norfolk, E. VACHELL, named by A. Bennett who (in *Top. Bot. Add.*) erroneously put the record to Glamorgan.

[Vol. vii., B.E.C., p. 899. Mail Gruaidh, M. Perth, Miss TODD. Aberfeldy, M. Perth, Hon. Mrs CAMPBELL. These are very young and possibly *articulatus*.]

In 1st Suppl. to Top. Bot. Bennett gives:—41. Glamorgan [Error. Should be 27. E. Norfolk], VACHELL. 87, 88, 89. Perth, B. WHITE. 96. Easterness. Glen Ennich, July 1887, Druce in Ann. Scot. Nat. Hist., 122, 1894. 98. Argyll, MARSHALL, 1893. Ben Laiogh, 2500 ft.! 101. Cantire, SOMERVILLE. 106. E. Ross, MARSHALL. See above. 108. W. Sutherland, MARSHALL. (Needs verification.)

In the 2nd Suppl. is added:—73. Kirkcudbright, WEST. See above. 109. Caithness, LILLIE sp.

In the Flora of Perthshire, 296, 1898, Buchanan White wrote " new to Scotland, August 1887, near Pitlochry, Killin, and Blair Atholl," Scot. Nat., iii., 182-184. He also adds: Meall na Saone 88 and Glen Shee, E. Perth 89, MARSHALL.

718/16. J. MACER S. F. Gray Nat. Arr. ii., 164, 1821. JUNCUS TENUIS Willd. Sp. Pl. ii., 214, 1799. J. BICORNIS Michx. Fl. Bor. Am. i., 191, 1803. J. GRACILIS Sm. E. B., 2174, 1810, non Roth, 1788. Tufted, rather low, bright green; culms 2-6 dm. high, commonly spreading, slightly flattened and finely striate, often stout; leaves long, one half to nearly the full length of the culm, narrow (1-1.25 mm.), lax, flat and soft, rarely slightly involute; sheaths all blade bearing, short, loose and often expanded, greenish-brown, margins and the large extended auricles (often 1.5 mm. long) very scarious; inflorescence pale green, many flowered, moderately open (1-7 cm. long); flowers somewhat aggregated near the ends of the very unequal branches; bracts 2, rarely 3, foliaceous, much exceeding the inflorescence; bracteoles triangular-ovate, acutish; perianth variable in size (3-4.5 mm. long), parts all nearly similar but the inner slightly shorter, lanceolate, very acute, green with white scarious margins, conspicuously spreading; stamens one half the length of the perianth; anthers short, oblong, much shorter than the filament; capsule thin-walled, broadly ovoid, shorter than the perianth, obtuse, very obscurely triangular above, scarcely apiculate; placentae not reaching half way to the axis; seeds (.33-.40 × .14-.17 mm.) oblong, bluntly apiculate at each end, reticulated, areoles large, transversely oblong. WIEGAND in *Bull. Torrey Club*, xxvii., 522, 1900. Dry roadsides and grassy places, Newfoundland to Florida and westward to Texas, north-westward to Oregon and Washington. The more diffuse habit, scarious auricles, many flowered inflorescence with flowers

*The exact station is uncertain. Wales, rather than Norfolk, is the more probable.

mostly near the end of the branches, spreading sepals and thin-walled, one-celled capsule make *J. tenuis* a very distinct species indeed. . . . It is, however, very variable, and future study may result in separating several more good species. *J. macer* was first recorded from Britain by George Don. He found it by the side of a rivulet in marshy ground among the mountains of Angus in 1795 or 1796. Smith, in *Eng. Bot.*, t. 2174, named it *tenuis* (a name already used by Brown and by Roth). Therefore, in *Eng. Fl.*, ii., 167, 1824, he re-named it *J. Gesneri*, overlooking or ignoring S. F. Gray's name of *J. macer* of 1821. It is represented as *J. tenuis* in Don's own private Herbarium in my possession, where he says it is limited to the Clova mountains. Fernald's statement that "most of the rare species recorded by Don have been refound" must be somewhat discounted. Many have, but not, among others, *Ranunculis alpestris*, *Potentilla tridentata*, *Tussilago alpina*, *Arenaria fastigiata*, *Phleum Michelii*, *Juncus macer* (from mountain summits), *Silene alpestris*, *Crepis pulchra*, *Hierochloe borealis*, and *Triticum cristatum*. In Don's account of the plants he found in Forfar (Headrick Agric. Forfar) he includes *J. tenuis* from the summits of the Clova mountains. My own Herbarium has specimens from:—6. Somerset, N., Leigh Wood. 14. Sussex., E., Uckfield. 22. Berks, Wellington College, MONCKTON. 34. Gloucester, W. 48. Merioneth, Barmouth, BARTON. 58. Cheshire, Sale, HOLT. 64. Yorks, N.W., High Bentham, WEST. 73. Kirkcudbright, Galloway. 76. Renfrew, Bridge of Weir, EWING. 88. Perth, M., Glen Falloch, Glenogil. 89. Perth, E. 90. Angus, Clova, DON, 1795. 97. Westerness, Loch Laggan. 98. Argyll, near Dalmally, etc., MARSHALL. Kerry, Clashganned, SCULLY. 38. Down, Belfast, WADDELL.

†718/16(2). **J. DUDLEYI** Wiegand. Pale green; stems tufted, often very large and stout, 3-10 dm. high, stiff, erect and wiry, prominently striate-grooved; leaves short, one half the length of the culm or usually less, narrow but flat, frequently involute; sheaths rather close, all blade-bearing, margins not scarious; auricles rounded, thick and cartilaginous, yellowish or reddish in colour; inflorescence small and rather dense, 2-5 (rarely 7) cm. long, few-flowered, exceeded by the short filiform 4-8 cm. long bract; flowers contiguous at the ends of each branchlet, not at all secund, green or pale-stramineous; bracteoles ovate, obtuse or acutish; perianth 4-5 mm. long, the parts firm, nearly equal, lance-subulate, acute, strongly spreading, yellowish-green with a distinct scarious margin; stamens one half as long as the perianth, anthers oblong, slightly shorter than the filaments; style very short; capsule broadly ovate-oval; ¾-⅞ the length of the perianth, rounded, apiculate and very obscurely triangular at the apex, placentae reaching half-way to the axis; seeds oblong (.37-.45 × .17-.21 mm.), apiculate at each end, coarsely areolate with 5-7 rows of transversely oblong areoles. K. W. WIEGAND in *Bull. Torrey Club*, xxvii., 524, 1900.

Damp neutral, not acid, soil in open places, from Maine and New York, westwards to the Saskatchewan, Colorado and Arizona.

The cartilaginous brown auricles, stiff stem and small contracted inflorescence with spreading calyx distinguishes this species from all others of the group. It is extremely variable in size although the floral characters are constant. In Britain it is an alien from N. America. Prof. Fernald detected it in Herb. Kew. C. E. Salmon, with Mrs Wedgwood, had collected it as *tenuis* from a marshy spot by roadside, Crianlarich, M. Perth. *J. macer* also grows there.

737/2. POTAMOGETON OBLONGUS Viv. (POLYGONIFOLIUS auct.) Carron, near Ballyvaghan, Co. Clare, sent me by P. B. O'KELLY.—G. C. DRUCE. Forma PARVIFOLIUS (sub *polygonifolius*). Folia natantia parvissima (10-25 × 5-15 mm.), W. H. PEARSALL, May 16, 1930, *in litt.* "This is very interesting. I have only once before seen a similar form with small leaves, as small and typical as these, from Perth. Forma *pygmaeus* Gaudin is a similar *natans* form, but with larger leaves than these."—W. H. PEARSALL.

Var. PARNASSIFOLIUS (Schrad.). P. POLYGONIFOLIUS, var. PARNASSIFOLIUS Gren. = var. ANGUSTIFOLIUS Fries. Carron, near Ballyvaghan, Co. Clare, 1930, P. B. O'KELLY. Named by W. H. Pearsall. Also from Zetland where I found it at Tingwall in 1922.

747/4(2). ERIOPHORUM OPACUM (Björnstr.) Fernald Rhodora, vii., 85, 1905; xxvii., 208, 1925. Lindman Svensk Fanerogamfl., 112, 1918. E. VAGINATUM OPACUM Björnst. Grunddr. af Pitea Lappm. Växtfys., 35, 1856. Fries Bot. Not., ii., 1857. E. CALLITRIX Anderss. Bot. Not., 60, 1887, not of Chamisso. (E. Siberia, N. America). In *Journ. Bot.*, 8, 1931, Prof. Fernald recounts his discovery of this plant in the wet peat along rills descending from the northern slopes of Ben Eigh. It is a more graceful plant than *vaginatum*, having tall capillary culms, and small "top-shaped" fruiting heads, growing in small tufts of one to very few culms (so does *vaginatum* in certain cases); culms terete or sub-terete, up to 7 dm. high, with the bladeless upper sheath light and scarcely inflated; flowering spike globose-obovoid, barely 1 cm. long, in fruit becoming turbinate and 1.5-2.5 cm. long, spathe lanceolate or lance-ovate, scales lead-coloured or blackish throughout (is this not often so with *vaginatum*?), anthers 1-2 mm. long. . . . pits of mature denuded rachis opening divergently outward. It seems a reproach to British botanists that this plant was not discovered before, but *callitrix* (*opacum*) is a critical species, and starved *vaginatum* plants come very near it. I have climbed Ben Eigh several times, but when I was there, it was jealously guarded by a curmudgeonly sportsman, and I only managed to be on it from the southern side by choosing a misty day—there was not much difficulty in that—and getting into a stream which flowed from the southern side, ascending by that to the summit. There I got a new variety of *Agrostis canina*, which Hackel named *scotica*, and several good *Hieracia*, but I never got on the northern slopes. I have only Swedish and Norge specimens in my Herbarium, and they are not easy to differentiate from *vaginatum*. The non-inflated bladeless upper-

sheath seems a good character. But one has to make its acquaintance and study it in the field. It is a new British species.

747/5. ERIOPHORUM ALPINUM L. In the "Extinct and Dubious Plants of Great Britain," I have thus treated it:—"Discovered by Mr Brown and Mr Don in a moss about three miles east of Forfar."—*Trans. Linn. Soc.*, ii., 290, 1794. "First found by Robt. Brown and G. Don in Aug. 1791, see spec. Now destroyed by dredging for marl and subsequent flooding. It lingered till 1813."—Arth. Bennett *in litt.* [? 1790, Teesdale in Herb. J. Dalton.] "A specimen of *E. alpinum* exhibited by Dr Balfour said to have been picked by him with Prof. Graham in Aug. 1827 at Durness, Sutherland. It had been put among specimens of *Scirpus caespitosus*."—*Bot. Soc. of Edin.*, Jan. 10, 1850. See *Bot. Gaz.*, ii., 52, 1850. Balfour was then only 19 years of age and evidently did not recognise it at the time and the specimens may have been accidentally mixed. North margin of Gurthambra Lake, three miles west of Mill Street, Co. Cork, H. J. Ryder, 1866, but A. G. More was unsuccessful in a search in 1868 and so was D. Moore in 1869. Baulinamoor, Ireland, Forbes Young in Hb. Brit. Mus. See Syme *Eng. Bot.*, x., 71.

The year 1813 seems to have been its last appearance at Restennet.

Prof. Fernald (*Journ. Bot.*, 8, 1931) records its discovery "along one rivulet on a heathy and peaty slope to the north east of the Kinlochewe Hotel, N. Ross." The specimen, after examination, was thrown away. *E. alpinum* is abundant in Newfoundland, Eastern Canada, and much of New England. We may also say it is common in some parts of Sweden, Norway, and Switzerland, where, however, it is not confined to the sides of rivulets. It cannot be very common as in my frequent visits to West Ross it would have been noticed. I have never been on the particular moor where Fernald found it, but I think Salmon worked it very carefully some years ago. I visited many acres of the Flowerdale and Torridon peat in 1928, but although I found *Carex limosa* and many other species, including heaps of *Scirpus caespitosus*, I saw no *Eriophorum* other than *latifolium* and *vaginatum*. As I have said, Salmon worked Fernald's valley, and added two or three West Ross plants from it. This discovery of Fernald's brings again under consideration the Durness locality. Certainly it is a slap in the face for me, for I have worked very hard in Ross-shire. Owing to its size and mountainous character, I acknowledge it to have been only superficially examined. It is a sad disappointment that no specimens were kept.

Prof. Fernald uses the novel name *Scirpus Hudsonianus* for this plant, but if it is worth separating from *Eriophorum*, which is its natural affinity, I should follow the Continental authorities and put it near *Scirpus* (*Trichophorum*) *caespitosus*.—G. C. DRUCE.

†754(2). ERIOCHLOA H. B. K. Nov. Gen. et Sp., i., 94, tt. 30, 31, 1815.

754(2)/1. E. VILLOSA Kunth Rev. Gram., i., 203, t. 13. Alien, Eastern Asia. Avonmouth, W. Gloster, September, C. & N. SANDWITH.

†762/2. ELEUSINE COROCANA Gaertn. Alien, N. America, Egypt. Frizinghall, Yorks, F. RHODES.

†776/24. FESTUCA BUCHTIENII Hackel in Fedde Rep., vi., 160, 1908. Alien, Bolivia. Selkirk, September 1918, Miss I. M. HAYWARD, det. Dr SCHINZ.

792/1. HOLCUS MOLLIS L., var. MINUTA Dr. Plant small, 7 cm. Panicle few-flowered, 10 mm. Spikelets 2.5 mm., two-awned. Holyhead Mountain, Anglesey. Planta minima, 7 cm., pauciflora; flores biaristata. The var. *parviflorus* Parnell is a larger plant with more numerous spikelets. It resembles *Aira praecox*.—G. C. DRUCE.

†794/5. AVENA STERILIS L., var (sub-sp.) OLEODENS (Marq.). Cardiff, Glamorgan, E. VACHELL.

824/2. POA PRATENSIS L., var. MINOR Wahl. Southport, S. Lancs, F. W. HOLDER and G. C. DRUCE, teste H. SCHINZ.

Var. MACROSTACHYA Schur. Det. E. SCHMIDT. Aberdeen Golf Links, 1928, Miss TODD.

827/19(2). BROMUS BRITANNICUS I. A. Williams. On August 18, 1929, I sowed three batches of seeds of this species, some in almost pure sand in full sun, some in sandy peat in full sun, and others in sandy peat in shade. The seedlings were all about 1¼ inches high seven days after sowing, and by the end of September were about four inches high, at which they remained during the winter. They were in full flower by the middle of June and the first seeds ripened during the first week in July. I examined a large number of these plants and found that they all showed the distinguishing features clearly. As a result of the variation in the conditions under which they were grown, those in full sun flowered much more freely, and those in sandy peat in full sun produced, on the average, larger and more branched panicles. This year (1930) I found fair quantities of this grass in the Dorset districts of Pool, Blandford, Stourpaine and Wool. From each of these all the plants examined had the specific characters well marked. L. B. HALL.

†827/30. B. ARENARIUS Labill. B. AUSTRALIS Br. Alien, Australia. Oxley, Leeds, Yorks, F. A. LEES.

†829/4. LOLIUM MULTIFLORUM Lam., var. GAUDINI (Parl.) Rouy. "Plante moins robuste; épillets 10-15 flores, rarement 5-10 flores; glume égalant la ½ long. de l'épillet." Alien, Burton-on-Trent, Staffs, 1930, G. C. DRUCE, det. Dr SCHINZ.

830/4(2). AGROPYRUM INTERMEDIUM P.B. Agrost., p. 146 (1812); A. GLAUCUM R. et Sch., Syst., 2, p. 752 (1817); Reichb., l.c., t. 21, f. 1389; G. et G. Fl. Fr., 3, p. 607; Husnot, l.c., p. 82; A. RIGIDUM Presl Fl. Cech., p. 28 (1819); TRITICUM INTERMEDIUM Host Gram. Austr., 2, p. 18, t. 22, 3, p. 23, in obs. ad T. JUNCEUM (1805), Fl. Austr., 1, p. 180; Asch.

et Fr., l.c., p. 654; T. RIGIDUM Schrad. Fl. Germ., 1, p. 392 (1806), pro parte; T. GLAUCUM (Desf. Cat. H. Paris, ed. i., p. 16, sed nomen nudum) DC. Fl. Fr., 5, p. 281 (1815), et T. RIGIDUM var. a DC., l.c., p. 282; T. TRUNCATUM Wallr. in Linnaea, 14 (1840), p. 544; T. REPENS b. GLAUCUM Celak. Prodr. Fl. Böhm., p. 55.—Exs.: Reichb., 1802; Guebh. Mold., 467; Dauph., 5693.—Souche rampante, émettant des stolons allongés. Tiges de 4-15 déc., robustes, dressées, raides, non fasciculées. Feuilles glauques, d'abord planes puis tôt enroulées-subulées, rudes et glabres à la face sup., à nervures saillantes et contigués à l'état sec chacune portant une rangée de petites pointes. Epi dressé, raide, allongé, non tétragone mais largement linéaire, ± lâche; rachis rude. Epillets grands, distiques, 3-5 flores, plus longs que les entrenoeuds mais ± espacés. Glumes dépassant la 1/2 long. de l'épillet, elliptiques, très obtuses et largement et obliquement tronquées, ordinairement mutiques, à 5-7 nervures saillantes, séparées par des sillons verts et profonds, la nervure med. atteignant seule le sommet. Glumelles égales: l'inf. lancéolée, obtuse et ordinairement mucronulée; la sup. scabriuscule sur les carènes.—Juillet-août.

Europe centrale et mérid.; Asie austro-occid. et centrale. Rouy & Fouc., xiv., 323. Near the River Colne, Colchester, Essex, 1929, G. C. DRUCE. Richter (*Pl. Eur.*, 124) puts it under *A. glaucum* (Desf.) R. & S. with Presl's *caesium*. It is near to *caesium* Presl, but differs in the absence of hairs on the rachis. It is doubtless native. G. C. DRUCE.

851/4. ASPLENIUM LANCEOLATUM Huds. Journ. Bot., 247, 1830. This well-known name must disappear. The older species name for it is that given by Viviani in *Fl. Lib. Spec.*, 68, 1844. *Lanceolatum* of Hudson, 1778, is already used by Forskal in 1775. Our plant must stand as *Asplenium obovatum* Viv., l.c. Fl. Cors., 184, emend Becherer. Then the var. *microdon* (Moore) nov. comb. must be placed under *obovatum* Viv.—G. C. DRUCE.

857/2. CYSTOPTERIS REGIA L. = C. ALPINA Desv. This has been well and clearly discussed by Dr Stansfield and others in the British Fern Gazette for 1930, p. 36. It was found at 2800 metres on the Dolomites by Schroeter, and is *alpina*, teste Paul Kestner.

Of course, it has long been extinct at Low Leyton, Essex, where it was an escape or planted. Backhouse's material is in the Kew Herbarium, but the specimens are very poor, although correctly named. The old locality was given as "Falcon Clints, between Widdy bank and Cauldron Snout." I searched for it unsuccessfully in 1903 and in 1909 with F. A. Lees. I followed the old grouping in Hayward's "Botanist's Pocket-Book," in treating it as a var. of *fragilis*, but the grades are of higher value in that work than in the more recent critical floras. The place, Dr Arnold Lees told me, was near the White Force, on the Yorkshire side of the Tees, and also in a dry valley on the east side of the Tees, but I have utterly failed in getting confirmation. I think *Dickieana* is a distinct species.

NOTES ON PUBLICATIONS, NEW BOOKS, ETC., 1930.

(Owing to exigencies of space and the erratic receipt of foreign works this is necessarily incomplete.)

ABELLEN, P. Gehört *Chenopodium suecicum* Murr der Schweizer Flora an Schweiz. Bot. Ges., xxxix., 1930.

Em Neues *Chenopodium helenense*, von St Helena. Fedde Rep., xxvii., 1930. At Longwood, St Helena, 1819, Burchell in Hb. Kew.

ALMQUIST, ERNST. Zur Arthildung in der Freien Natur. Acta Hort. Bergiani, band 9, No. 2. This gives a fuller account of *Capsella Hegeri*.

Studien über *Capsella Bursa-pastoris* (L.). ii., *l.c.*, band 7, No. 2. With sixteen photographs and descriptions of a large number of species and drawings of the fruits of new species.

APOLD, JOHS & ROLF NORDHAGEN. Neue oder seltine adventivpflanzen aus Hardanger. Bergens Mus. Arbok, No. 3, 1930. There are over 30 species chiefly from Odda, including the ubiquitous *Matricaria discoidea*. The name *Radicula islandica* supersedes that of *R. palustris*, which I too saw at Odda some years ago.

BECK-MANNAGETTA, DR GUNTHER. DAS PFLANZENREICH. Heft 96, iv. 261. Wilhelm Engelmann, Leipsic, September 1930; 55/-. OROBANCACEAE Lindl. Pp. 348, tt. 24. In this excellent work, Dr Beck-Mannagetta has described the various species of this curious family. He has given a very elaborate list of authors cited, the Characters, Vegetation, Organe, Anatomische, Verhältnisse, Bluten Verhältnisse, Bentanburg, Frucht & Same, Geographische, Verbreitung, Naturpflanzen und Kultur, etc. He divides the family into fourteen genera, of which only two are British. It may be added that *Phelypaea* is kept as a distinct genus and does not include the blue-flowered species, *O. purpurea*. 99 species are enumerated and well described. Treating of those which are British, the following notes are suggested.

1. OROBANCHE RAPUM-GENISTAE Thuill. is adopted as in the List, the name *major* L. being properly reserved for *O. elatior* Sutton. He does not give *Ulex* as a host, though it is so in Anglesey, etc., nor does he cite Anglesey, Jersey, and many counties. Pulverbach in Salop is really Pulverbatch. Seven forms are given and three varieties, the latter including *bracteosa* (Reuter) Beck, which has broader bracts, twice as long as the larger flowers. Bennett gives this for Llandovery, found by H. H. Knight, but it is not cited in the Monograph.

2. O. CARYOPHYLLACEA Sm. is chosen instead of *O. vulgaris* Poir., which was adopted by F. N. Williams, and is used in our List. Under it he has four varieties and sixteen forms, but none appear as British. A locality for *caryophyllacea* is given " In der Grafschaft Argyll, Loch Nell, Herb. Harvey," which has not been noticed hitherto in our floras.

3. O. ALBA Steph. (as in our List) = O. EPITHYMUM DC. with five varieties and twenty-two forms, our British plant being forma *rubra* (Hook.) Beck. He also gives var. *bidentata* G. Beck Mon. Orob., 211, 1890, as found in Scotia, Insula Skye, " forma *albescens*, flores 20 mm. longa."

4. O. MAJOR L. (O. ELATIOR Sutt.) as in our List. This is the plant of the Sp. Pl., 632, 1753, and is the *O. major* L. Fl. Suec., 219, 1755 (non Herb.). Many British localities are included. His Oxford " Sommerton " is really Summertown. Eleven forms are described, including our Channel Island plant *Hypochaeroides*. He does not allude to the pale yellow-flowered form which is not *Hypochaeroides*.

5. O. RITRO Gren. & Godr. is reduced to a form of *major*.

6. O. RETICULATA Wallr. is used as in our List. I first identified this as British from specimens sent from York (*Rep. B.E.C.*, 335, 1908), by Mr Craven, growing on *Cirsium Eriophorum* Scop. Mr Knight is cited for it from Llandovery. Three varieties and eight forms are described, but he does not quote England under *O. reticulata*, var. *procera* Druce, Journ. Bot., 110, 1909, nor Brecon under the var. *pallidiflora* (W. & G.), for which Dalmatia alone is cited.

7. O. HEDERAE Duby. This has been seen on a host plant not given by Beck—a *Pelargonium* species. Of this, seven forms are described. The var. (or forma) *monochroa* has been seen in Sark, etc., but it is not given for Britain.

8. O. PICRIDIS F. Schultz, with a variety and two forms.

9. O. AMETHYSTEA Thuill. This also occurs in Jersey and Guernsey, and there is no doubt it is a British plant. It is not confined to *Eryngium*, but also grows on *Daucus*. It has five varieties and four forms.

10. O. MINOR Sm. Our commonest species has a var. *concolor*, and fourteen forms, of which *conciliata* is cited. The var. *concolor* is not given as British.

11. O. SPECIOSA DC., 1815, non Dietrich. The name *O. crenata* Forsk., 1775, is adopted and Bridgwater is given as its habitat. It was abundant in Cyprus.

12. O. PURPUREA Jacq., with nine varieties and six forms, is kept among the Orobanches, *Phelypaea*, under which it is sometimes placed, being kept as a distinct species. Beeston Regis is cited for Notts, but it is in Norfolk, as is North Repps, which is correctly cited for that county. *O. arenaria* Borck., from the Channel Islands, which we disregard as British on present information, has ten forms given under it. Beck cites Babington for it and " doch halt Bennett fraglich," but it cannot be accepted.

13. O. RAMOSA L. This, which is an alien with us, includes six forms. It is now well nigh extinct in Britain as there is so little hemp cultivated.

Under LATHRAEA SQUAMARIA L. four forms are described. There is no allusion under *L. Clandestina* L. to its being naturalised in England.

The publication of this Monograph is especially welcome, since Dr Beck's Monograph in the Bibl. Bot. is now difficult to procure, and this gives his latest views on a difficult Family.

BLOM, CARL. Ullfloran vid Lachalänga i Skane. Satryck ur Medd. Fran. Goteborgs Bot. Trädg., v. 85-96, 1929. This gives a list of adventive species, 30 S. American, 11 S. African (Cape), 11 Australian, 4 N. American, 5 Tropical, 12 Cosmopolitan, and 33 from other parts of Europe. Among them are *Senecio lautus* and *Chenopodium hircinum*, as at Galashiels.

BOWER, F. O., LL.D., F.R.S. SIZE AND FORM IN PLANTS, with Special Reference to the Primary Conducting Tracts. Pp. 232, tt. 25, fig. 72. Macmillan & Co., London, 1930; 12/6. The contents of this handsome volume was given as an address to the members of the British Association by its President on the occasion of the Bristol meeting, when I had the pleasure of sitting close by him and hearing the somewhat highbrow address. The subject had already been treated of by Sachs in his Essay on Flora of 1893. The phenomena treated in this work all spring from that trend towards increase in size which is common to a greater or less degree in all living things. Anyone who knows Prof. Bower will realise how he revelled in his researches on the subject, and will understand how firmly he stepped even upon doubtful morasses, or wandered boldly into thorny thickets. It is a pleasing work to have as a memorial of his elaborate researches, linked as it is with the position of the President of the British Association to which he has eventually attained.

BRIQUET, JOHN. Recueil Synoptique au Document servir de base aux Débat de la sous-section de Nomenclature. 3me Congrès Internationale de Botanique. Pp. 142. Friedlands & John, Berlin.

BRITISH ASSOCIATION. Bristol Meeting, 1930. The President, F. O. Bower, D.Sc., F.R.S., gave an address on the Size and Form of Plants, which he has enlarged to form a separate volume. A. W. Hill, C.M.G., F.R.S., was President of Section K, and gave a vivid address, not very complimentary to the student of micro-species, as leading to a Parochial Outlook. " In the somewhat petty work no effort was made to study effects of Light and Shade or other environmental conditions." I think he ignores the great work done by critical botanists in their experiments. Probably further experiments at Potterne, to the excellent work of which Dr Hill gave due praise, may show that *Anthyllis Vulneraria* has more variations than is now admitted. (M. Patrice Riencourt de Longpré has a forthcoming paper in which many new ones are to be described.) In his treatment of cultivated plants Dr Hill alludes to the number of forms . . . showing marked differences. So, too, with some of the micro-species named by the "browsing" botanists. They may have considerable economic value, however troublesome the 2000 species of *Taraxaca* may be to the Indexer. The paper was a popular one. He received a hearty ovation at its conclusion. The excursions were very popular, and Miss

I. M. Roper is to be congratulated on her excellent and indefatigable work. The visit to Mr Hyatt Baker's beautifully situated and most interesting garden was a real pleasure, and he is to be congratulated on the large number of rarities he has succeeded in growing so well.

BRITTON, N. LORD. Nomenclature. Reprinted from Proceedings of the International Congress of Plant Sciences 2, 1569-1570, 1929. "The advantage of simplicity, with the expectation of some diversity in nomenclature, as against complexity and the futile attempt at absolute uniformity, may, therefore, claim consideration at this period of discussion. If approved, it requires allegiance to a few principles only, and, as long ago pointed out, these must neither be arbitrary nor imposed by attempted authority; otherwise they will be resented, and fail in their purpose . . . But the rejection of generic names properly typified, for the sole reason that their acceptance would change binomials in current usage is arbitrary, autocratic, and unscientific, therefore abhorrent, repellent and unwise. The abandonment of the theory nomina conservanda, as at present understood by its misguided advocates, is therefore necessary before a rational system of botanical nomenclature can be obtained. The application of the principle of rejection of hyponyms and of homonyms, should, together with the selection of type species, operate to bury enough debatable generic names to meet all actual requirements, and avoid attempted artificial conservation of names."

BRUXELLES. Bulletin du Jardin Botanique de L'Etat. Avril 1930. Vol. 8, f. 3. Robyns, Dr Waller. Monographie du genre *Tinnea*, twenty-five species being described. Graminées du Congo Belget du Ruanda urundi, *l.c.*, 210, with several new species.

R. W. BUTCHER AND F. E. STRUDWICK. FURTHER ILLUSTRATIONS OF BRITISH PLANTS. L. Reeve & Co., 1930. Most of us possess copies of the original *Illustrations of the British Flora* by Fitch and Smith, and, with the great extension of the knowledge of British species which has marked the interval since its publication, have long felt the need for a supplementary work of the same character. We welcomed, therefore, the publication of this volume and turned to its pages with much interest. We are all agreed that the drawings of the various species are excellent, and we heartily congratulate the artist on the accuracy and artistic merit of her handiwork. The correct drawing of so many, varied, and difficult plants is a great achievement, and one which renders the book highly valuable. Botanists possessing special knowledge of particular genera may possibly find some figures open to criticism, but in the majority of such cases the selection of the specimen to be drawn is the obvious root of the evil, and for this no possible blame attaches to the artist. Among such figures we regard No. 218 as a rather poor representation of *Gnaphalium norvegicum*; No. 371 does not do justice to *Juncus triglumis*; the stem of No. 367 seems doubtfully that of *Juncus effusus*, and the fruit of No. 390 is quite unlike that of *Pot.*

panormitanus. The typical mature fruit has " both sides convex " *only in its upper half*, the ventral margin has a double curve—*i.e.*, is *concave below*, giving a narrowed base to the fruit as a whole. The figure, however, agrees with the text, which is incorrect in this particular. In the Preface we note that " the illustrations are the main feature of this work," and with this we entirely agree. We are also informed that " only abbreviated descriptions have been possible," and with these we are somewhat disappointed. They are supposed to be a " summary of the main characters by which a plant may be identified," but we fear that many of them will not be found very helpful in this direction. They are much too general, often give characters commonly possessed by other species, and do not sufficiently stress the actual specific distinctions. In addition they are sometimes inaccurate in detail and, in the case of critical genera, should have been submitted to referees for revision before publication. To illustrate this, consider *Potamogeton*. The floating leaves of *P. alpinus* are described as " lanceolate, long-stalked." This would apply equally to many other species, but the floating leaves of *P. alpinus* are distinguished by being " obovate, blunt, tapering below, reddish," and this character is not given. The lower leaves, too, are more often blunt than otherwise but this distinctive feature is omitted. The fruit of *P. alpinus* is quite distinct among British species of the genus, the upper half is " subequally narrowed to a prolonged beak " giving the bottle-neck appearance fairly well shown in Fig. 383 B, but no mention of this invaluable distinction appears in the text. On the contrary the fruit is described as " medium, obovate, both sides convex, dorsal margin acutely keeled. This is almost a statement of generic rather than specific characters and could have been omitted with advantage, as it is useless for purposes of identification. In *P. Drucei* no reference is made to the exceptional character of the venation which is more beautiful than that of any other British species of the genus and at once distinguishes it. In *P. angustifolius* the leaves are not always " shortly stalked;" some of them are quite frequently sessile. The leaves of *P. panormitanus* are given as 1-5 mm. broad! Even if this is a misprint for 1.5 mm. it is still incorrect. They are narrower than those of *P. pusillus*, which are usually 1 mm. in width. *P. lacustris* is given as a " very rare plant of some " of the English lakes. It is locally frequent in " all the larger English lakes " (*Journ. Bot.*, 1921, 163) and we there gave the names of eleven of these. The apex is normally very obtuse and the veins number three. *P. trichoides* has narrower leaves than " 1 mm."—most often they are 0.5 mm., often less and only occasionally more (0.75 mm.), and they always possess three nerves. Apart from the descriptions we note several discrepancies in the text. Under *R. trichophyllus* (11) " pedicels " replaces the " peduncles " of the other species, and the submerged leaves are said to be brush-like, instead of bush-like. *Arctium minus* (228) in our experience is more often found in woodlands than in " waste places." We have *Lamium moluccellifolium* (296) in the text and *L. molluccellifolium* in the index, but neither is correct. Under *Rhinanthus* neither

R. Drummond-Hayi nor *R. borealis* is correctly cited—cf. *L.C.*, 1506 and 1507. The latter cannot be given as (Stern.), as Sterneck put the plant under *Alectorolophus*. The use of brackets indicates that the author is aware of this, yet fails to complete the citation. The foregoing are merely a few casual examples of the many similar evidences of insufficient care in revision before publication. This is to be regretted as the text suffers by comparison with the carefully-drawn figures.—W. H. PEARSALL.

The Violets. — This very helpful handbook includes six figures of Violets, of which one is *V. calcarea* Greg., in amplification of the original illustration of *V. hirta* L., while the other five constitute a modern explanation of the plant formerly called by the collective title of *V. canina* L. The illustration of *V. calcarea* Greg., fig. 51, is a good representation of the plant to which that name is attributed. Of the remaining five, three illustrations at least, those of *Vv. silvestris* Lam., *Riviniana* Reichb., and *canina* L., are disappointing, and seem to fall below the general level of excellence of the book. Figure 52 gives a poor idea of *V. silvestris* Lam., which should have long, tapering points to the leaves, straight, narrow spurs, and longer fringe to the stipule. The plant illustrated is suggestive of *V. Riviniana* Reichb., forma *nemorosa* N. W. M. rather than *V. silvestris* Lam. Figure 53 hardly does justice to the leafiness of *V. Riviniana* Reichb. and the outline of the leaves is not successful. In figure 54 the authors wisely illustrate the variety *ericetorum* Reichb. in preference to attempting to define the type of *V. canina* L. The general habit of this plant is well portrayed but the acute apices and deeply cordate bases of the leaves are misleading. Blunt apices and shallow, sub-cordate bases to the leaves are two of the principal characteristics of this species. *Vv. lactea* Sm. and *stagnina* Kit. are illustrated in figures 55 and 56 quite satisfactorily except that in the case of the former the plant illustrated is a rather untypically broad-leaved form. The drawings throughout the book as a whole are so good that it is a matter for regret that in this section of the genus, *Viola*, the details are unsatisfactory from a critical standpoint.—P. M. H.

CALIFORNIA UNIVERSITY, PUBLICATIONS OF. *Zostera marina*, Morphological and Phenological Notes on. W. Albert Setchell. Vol. xiv., n. 19, pp. 389-452, tt. 59, 1929. Includes var. *latifolia* Morong. A most useful paper. The author says that the variations within the species are var. *angustifolia* (which is not discussed for lack of experience—it may be *marina* ×*nana*), var. *typica*, var. *stenophylla* A. & G. and var. *latifolia*, which is the chief object of the paper. Of this Pacific variety many good figures are given. The question arises—Does it come from British Seas? It has greater distinctiveness and permanence than *stenophylla* (which seems to be associated with edaphic factors, such as hard bottoms), and it may be an ecad in the reversible sense of Clements or an ecotype in the fixed sense of Turesson. Vol. xi., n. 3. *Nicotiana longiflora*, Somatic Chromosomes of, Lillian Hollinghead, 1929. Vol. xi., n. 14.

N. alata, var. *grandiflora*, Chromosomal Irregularities of, Priscilla Avery. Vol. xi., n. 15. The genus *Lessingia* Cham., Systematic Study of, John T. Howell. Vol. xi., n. 16. Oriental genera of *Polypodiaceae*, Edwin Bingham Copeland, 1929. Vol. xi., n. 16. *Nicotiana Tabacum*, Inheritance in Mutation following Treatment with X-Rays and Radium, T. H. Goodspeed. Three successive monogenic mutations induced by treatment of *N. Tabacum*, var. *purpurea*, with X-Rays and Radium are described. Vol. xi., n. 17. *Nicotiana Tabacum*, Occurrence of Triploid and Tetraploid Individuals in X-Ray Progenies, T. H. Goodspeed. Vol. xi., n. 17. A new Californian species of *Sphaerocarpus*—*S. Drewei*, E. Grace Wigglesworth, 1929. Vol. xiv., n. 20, pp. 453-588, tt. 105, 1929, *Microdictyon*, The Genus, W. Albert Setchell.

CARDIFF NATURALISTS SOCIETY. Report and Transactions. Vol. lxi., pp. 112, 1928; 10/-. Includes:—River Scenery at Head of Vale of Neath, F. J. North, with excellent photographs. Some notes on the Brown and the Black Rat in the City and Port of Cardiff, Colin Matheson. These show the injury done to water pipes by rats in Cardiff. Mithraism in Wales, Vig Nash Williams. Entomological Fauna of Skoner Island, H. M. Hallett. The Kite in South Wales, J. H. Salter, D.Sc., a delightful paper, etc.

CARTER, H. GILBERT-, M.A. OUR CATKIN-BEARING PLANTS. An Introduction. Pp. 61, tt. 16. Oxford, at the Clarendon Press, 1930; 4/6 net. This small compact volume is just what was needed by the Field Botanist. In no tract of Botany was the knowledge in our text-books so inadequate and faulty. Even now, despite the publication of Elwes & Henry's "Trees," and the "Cambridge Flora," it is scarcely up to the level of flowering plants. This little volume however will give the information which is needed to identify the catkin-bearing plants. The frontispiece is occupied with an excellent illustration of *Populus serotina*, "the commonest poplar" in Britain, though it has not been longer in cultivation than a hundred years. Its spread through planting over Britain was most remarkable. The true Black Poplar, *P. nigra*, has a much older connection with Britain. These trees were for a long time confused. There is a short but very vivid description of each species. In the treatment of the Willows the author is just as happy. The photographs are in all cases good and distinctive. The two Birches are well defined. So, too, are the two Oaks. The characteristic stellate hairs of *sessiliflora* are clearly shown; in *Robur* they are simple. The Elms were, till recently, greatly confused, and even to-day the names are often wrongly applied. Our common English Elm is called *U. campestris*, but it is not the *campestris* of Linnaeus' "Species Plantarum," nor of his synonyms, figure, herbarium, or locality. So far as our English tree is concerned, it is not *campestris*, and the name should not be used for it. It is far better to face the music, and at once give to it a distinctive name, such as *U. anglica*. See plate xiii., where there is a good figure of it. P. xii. is labelled *U. nitens*, the shining Elm, which is commoner in Eastern England. Strictly speaking this is an erroneous

name. *U. carpinifolius* Borck. is much older, but it has been used in varied senses. It is the *U. campestris* L. in part, and is usually the plant so called on the Continent. The third tree he gives is also wrongly named—it is the *U. minor* Miller, which is a delightful tree with its upright branches and small leaves, under which, or closely allied to it, is the var. *sarniensis* = *Wheatleyi*, which has larger leaves, flowers earlier, and has a larger straightly notched fruit. Then comes what Carter calls *U. minor* Mill., which is, as I have just said, *stricta* Lindley. Its correct name is *U. Plotii* Druce, and it was originally described from Oxfordshire by Robert Plot. The Wych Elm is a native of Scotland certainly. It is the *U. montana* Stokes (not With.), the *glabra* of Hudson, and there are several hybrids which are extensively planted. A good feature of the book is the classical allusions. The book can be most warmly recommended.

CLOS, ENRIQUE C. Segunda Contribucion al conocinscento de los arboles y arbustos cultivando en la Argentina. Gives the descriptions and keys to the various species of *Leguminosae-Mimosideae* cultivated in Buenos Aires, with figures. Bol. Minist. de Agric. de la Nacion. Includes *Acacia Farnesiana*, *A. dealbata*, *Albizzia Jutibrissus*, etc.

CORREVON, HENRY. ROCK GARDEN AND ALPINE PLANTS. Edited by Leonard Barron, with portrait, tt. 8, coloured plates 8, pp. 544. Macmillan & Co., 1930; 25/- net. This is a handsome and well printed volume, and will assuredly be freely patronised by Rock Garden lovers. There is an appreciative foreword by Mr Barron. It is written both for English and for American readers. He pays a just tribute to Backhouse of York, W. Robinson of Sussex, Lord Redesdale of Batsford, Sir E. Loder at Leonards Lee, and Hon. C. Ellis at Frensham. He says of Miss Jekyll, Lord H. Bentinck, Miss Willmott, Sir F. Crisp, and Gerald Loder that they have made gardens to which none of the Continental ones can be compared. He says Canon Ellacombe came to see him in Switzerland when he was 85 years old. The growth of the cult in America has been extraordinary, and he gives a delightful illustration of a garden near Paolinia, Philadelphia, set in a beautiful landscape. A well written chapter deals with plants in the mountains. He says that wherever the alpine *Silene acaulis* grows it is stemless, but in the lowlands its flowers are smaller and have stems 8-10 cm. long in hybrids. Excellent material is given on acclimatisation and cultivation of Mountain Plants. Chapter iv. treats of Limestone-soil and Granitic-soil plants. *Vaccinium uliginosum* is said to be one of the plants that most hates lime. A suggestive chapter is that on the growing of Alpine plants in Sphagnum in pans and in a tourbière. All the plants of some tested were completely cleared of earth and planted in pure Sphagnum. This proved most successful with *Arnica*, Edelweiss and *Soldanella*. The construction of a Rock Garden is well explained by diagrams. Then he speaks of the conservation of the alpine flora, and describes some of those which have become established. The culture of Ferns seems to be coming into its own again, and a list of suitable species is given, but it

is a pity he does not adhere to the nomenclature of the "Index Filicum." A very interesting chapter is given on the terrestrial Orchids. Hardy Cacti are well described. Chapter xii. is a lengthy alphabetical list of suitable plants for rockeries, with valuable practical hints scattered throughout. The book should be on every gardener's shelf.

DAHLSTEDT, H. Taraxacum, De Svenska Arterna av Slaktet. VIII. Spectabilia. Kungl. Svenska Vetenskapsakademiens Handlingar, Tredje serien. Band 9, No. 2, pp. 107, with maps. In this splendid piece of work of Dr Dahlstedt's, the thirty-one species of Spectabilia which occur in Sweden are given with the forms and varieties, and sketches of the leaves and fruits. Of these we have *eximium*, *spectabile*, *faroense* (Durham, etc.), *linguilobum*, *Landmarkii*, *praestans*, *maculigerum*, *naevosum* (Berks, etc.) and *naevosiforme* (which occur in nearly all the British counties, Teesdale, Forfar, etc.), *croceum* and *Nordstedtii*, the latter is not a rare pratal plant. The distribution maps are excellent.

DEVONSHIRE TRANSACTIONS. Vol. lxii., pp. 125-133. Edited by G. T. Harris, recorder. It would have been more convenient if the boundary of the two vice-counties of Devonshire had been given and also if the two divisions of Devon had been added to the records. Many new localities are given, and it is claimed that several new county records are given. One would have liked to have seen specimens of *Orchis latifolia*, *Sorbus latifolia*, *Erophila majuscula*, and a more detailed description of the locality of *Erica vagans* which is claimed as a new record for the county. Mr Harris may be congratulated upon the energy he is throwing into his work, which we all hope to see materialise into a Devonshire Flora.

DOMIN, DR KARL. Acta Botanica Bohemica. Vol. viii., 1929. *Cerosora*, a new Fern genus with *C. chrysosorum*. *Ligusticum olympicum* Novak, a new species for the Thessalian Olympus. *Sedum Krajinae* n. sp. and its nearest allies. Acad. de Sc. de Bohem., 1929. *S. robustum* n. sp. *S. Zlatiborense* n. sp. Domin. *S. acre*, var. *Drucei*, he says, represents a British race of *acre*. *S. sexangulare* L. must be regarded as a form of the true *S. acre* L. and not as a synonym of *S. mite* Gilib. (*S. Boloniense*), as many authors regard it. Additamenta ad Cognitionem florae Russiae Subcarpaticae. Pp. 26-43. Schaedae ad Floram Cechoslovenicam exsiccatam, Cent. I. *Asplenium cuneifolium* Viv. is kept a distinct species.

DRUCE, G. CLARIDGE. THE FLORA OF NORTHAMPTONSHIRE, pp. cxlii., 304. T. Buncle & Co., Arbroath, 1930; 21/-. Rarely indeed does it fall to the lot of one person to review such an output from the same pen as the *Flora of Buckinghamshire*, the revised *Flora of Oxfordshire*, the *British Plant List*, and the *Flora of Northamptonshire*—in so short a period as four years—yet this has been my unique and pleasing privilege. In the present volume the publishers have maintained the very high standard of presentation we always associate with their publications and must be again congratulated upon the result. In the Preface we

again recognise the author's well-known acute realisation of his possible limitations but he possesses a fine sense of proportion, is deeply grateful for any assistance he has received and strongly emphasises his enjoyment of the beauties of Nature and the more permanent pleasures of the social side of his botanical labours. After all, life's greatest happiness is always that we share with others. The Introduction is somewhat lengthy (143 pp.) but of quite exceptional interest. It opens with a short but adequate description of the Topography of the county, followed by a description of its Geology by Mr Beeby Thompson. This occupies 10 pp. and is of outstanding excellence throughout. Its writer deplores the deficiency of information as to surface-deposits on existing geological maps of the county, and botanists in other counties have realised the same need. The treatment of the succeeding section—Botanical Districts—is based upon the river drainage-systems, as in the author's previous Floras, and as good maps of the physical features are readily obtainable, this is a wise choice. Particularly interesting and informative—in the writer's view—are the numerous and valuable ecological observations which permeate this section of the work. If all systematists would recognise that, apart from correlation with habitat conditions their work is relatively of little value, we should make a much greater and far more valuable contribution to the sum of human knowledge. Throughout the present volume Dr Druce has set us an excellent example in this respect. By far the most lengthy section of the Introduction is that of Botanologia—nearly 80 pp. of profoundly interesting accounts of the various botanical writers to whom we are indebted for much of our present knowledge of the county flora. Opening the book casually at page c. of the Introduction the writer imagined that he had—in error—picked up an Anthology of Verse, for here are 25 pp. of excellently chosen extracts from the poet John Clare. All of them amply justify their inclusion and many, indeed, are quite arresting in their aptness and beauty. They will be eagerly devoured by botanists whose tastes are literary. Turning to the actual text of the Flora, we find the same admirable arrangement, clearness and differentiation of type, and exhaustive detail which marked its predecessors. Critical genera have received the most liberal treatment and are brought right up to date. Interspersed with the text are more of the choice literary quotations which marked the Introduction and which greatly enhance the value of the book. The Index of Latin names seems beyond reproach and in that of English names we could only discover such trivial irregularities as Bee orchis, 225—for Bee Orchid in the text, but Butterfly Orchid is correctly given. Conversely Man Orchid and Musk Orchid occur in the Index but *Orchis* for each in the text. Not only is this volume indispensable to any botanist resident in Northamptonshire or the adjoining counties—it has 8 pp. of valuable comparison with these—but even those from more remote districts will find it of the greatest interest. Taking three casual "dips" I noticed that *Myrrhis Odorata* is now extinct in Northamptonshire although still locally abundant in Cumberland, especially near dwellings.

The housewife gathers a handful to rub down her old oak furniture—the essential aromatic oil acting as a preservative and also imparting a fine polish. She also puts the dried leaves away in her linen chest to keep out moths. On p. 47, *Impatiens Noli-tangere* is quoted as "very rare," yet one of the last sights I saw in S. Cumberland was a road "improvement" at the foot of Buckman Brow, where a gorgeous colony (possibly 200 square yards in extent) of this lovely species was being completely obliterated under tons of road-metal. Many other species familiar enough in my past experience I failed to find in the Index. Among them was *Centunculus minimus* which I always associate with Dr Druce. I had rowed him out on Esthwaite Water to see *Naias* and *Hydrilla*, and as we returned to the boat-landing he spied a damp gravelly patch on shore and was on his knees in a moment searching for the tiny *Centunculus*—which of course he found! This review is necessarily brief as I am inordinately busy in "straightening up" after my recent removal from Cumberland to Kent, but I felt that we could not allow the current *Report* to appear without some reference to so outstanding an achievement as that of Dr Druce in completing a further county Flora of such great excellence in his 80th year. We have long been lost in amazement at the author's indomitable energy and prodigious output of publication—we have an annual reminder in the Secretary's Report—and now the *Flora of Northamptonshire*, his native county! He commenced it some fifty years ago but his removal to Oxford brought other interests and it was not until after the publication of the Floras of Oxfordshire, Berkshire and Buckinghamshire that he returned to his "first love." All botanists will heartily congratulate Dr Druce on the completion of this excellent work. Throughout its pages we are conscious of his fondness for the county of his birth and he has produced a fascinating volume which must have brought him not only great joy of achievement but also the most fragrant memories. That, in addition, he has made a further substantial contribution to the sum of human happiness your reviewer gladly testifies.—W. H. PEARSALL.

EDWIN, MARIBEL. IN ENGLAND NOW. The Countryside, Week by Week. Pp. 255. The Sheldon Press, 1930; 5/-. This small book gives, under headings, most of the chief pleasures and beauties of the countryside, making a very readable volume. It is one to have near one, to look at constantly and then unconsciously be led along an easy path of knowledge. A charming little work, which will leave a fragrance of its own behind and one which we would not readily miss.

ENEVER TODD, LIEUT.-COLONEL E., O.B.E., M.A. A Short Survey of the Genus Viola, in the Journal of the Royal Horticultural Society, vol. lv., part 2, September 1930. The first part of this paper, now published, deals with the Nomimium and Dischidium Sections of the genus. Although the author does not attempt a review of all the species of the genus from a critical standpoint, this paper cannot fail

to be helpful to a student of British violets, on account of the compact and comprehensive view which it provides of the violets of the world as a whole. The arrangement followed is the same as that adopted by W. Becker in *Violae Europaeae*, which provides a more rational taxonomy for the British species than they are given either in the second edition of Druce's *List of British Plants* or in the eleventh edition of the *London Catalogue*. The following points in the paper are of interest to British botanists. The author, following Becker, retains *sepincola* Jord. as a species or sub-species of *odorata* L., contrary to the more usual practice of applying this name to one form of the hybrid *hirta* L. × *odorata* L. *V. rupestris* Schm. is referred to as "a circumpolar species" in the Riviniana group, and its range in Britain appears to be restricted by the author to the single station on Widdybank in Teesdale where it occurs as var. *arenaria*. *Vv. lactea* and *montana* are treated as sub-species of *canina* L., while the name *persicifolia* Roth is preferred to *stagnina* Kit. Speaking of *V. palustris* L., the author says: "Its place in Russia and North Asia is taken by *V. epipsila* Led. and a number of localised species, some of which reach nearly to the Arctic Circle," thus emphasising the northern and eastern distribution of *epipsila*. No mention is made of the alleged occurrence of this species in Britain. If we have a second species or sub-species in Britain allied to *palustris*, surely Mr A. J. Wilmott's suggested attribution to a species with south-west distribution such as *Juressi* is the more probable, and the range of the British "epipsila" is certainly mainly Atlantic.—P. M. H.

ENGLER, A. DAS PFLANZENREICH. 95 Heft, iv., 130. OXALIDACEAE R. Knuth. Pp. 481, Maii 11, 1930; £3 15/-. A most excellent Monograph in its descriptions, synonymy, and geographical distribution. The bibliography is very comprehensive. Our *O. Acetosella* (No. 422) is described on page 231. Under it we have var. a. *alba* (typica) Peterm. Fl. Lips., 506, 1838; var. *purpurascens* Mart. Fl. Mosq., 81, 1817 = var. *caerulea* DC. Prod., 700, 1824 = *lilacina* Lange Handb. Dansk., 395, 1851. Corolla purpureo-lilacina. Var. *subpurpurascens* DC. Prod., i., 700, 1824. Corolla ± purpurascens. Var. *violacea* Westf. Prov. Ver., v., 179, 1878 (1879). Corolla violacea vel lilacina. Var. *rosea* Peterm. Corolla rosea-purpurea venosa. Var. *parviflora* (Lejeune Fl. Spa., ii., 307, 1813) DC., *l.c.* Petala tantum duplo longiora quam calyx. Stamina minora brevissima, maiora calyce aequilonga. *O. stricta*, caulis adpresse pubescens plerumque copiose. Capsulae pubescentes. *O. corniculata*, caulis laxe pubescens diffusa et repens saepe subglaber. Capsula glabra. *O. stricta* L. (not of Robinson), p. 143. Includes as a synonym *O. Dillenii* Jacq. There are several varieties. *Navierii* (Jord.) R. Knuth is put under *stricta* as caulis humilior, et basi ramosissimus, ramis saepe ascendentibus, superne hirsutus. Known from Germany and Limoges. *O. corniculata* L. (not of Robinson), p. 146, forma *purpurea* (Parl. Fl. It., v., 271, 1872), caulis foliaque purpurei. f. *variegata* (var. Goiran) folia ± variegata. f. *Tropaeolodes* (Schlechter). *O. cornicu-*

lata, var. *rubra* Nichols Gard. Dict., ii., 540, 1886, folia subtus manifeste purpurea. Flores majores. Var. *repens* (Thunb.) Zucc. Caules pernumerosi prostrati. Folia multo minora ± glauca. Africa, Asia, America. No mention is made of var. *minor* Lange, gracilior foliis 2-3 pts. minoribus (vix ultra 4 mm. longis ciliatis ceterum glabriusculis pedunculo saepius unifloro. As there is Ecklon & Zeyher's var. *minor*, Lange's variety cannot stand. We may call it nov. var. *Langeana* Druce. Dr Knuth seems to have overlooked this Spanish plant. *O. Martiana* Zucc., 1829-30 = vice *O. corymbosa* DC., 1824. S. America, Madeira, Ascension, Kameroons, Reunion, China, Ceylon, Java, Philippines, Hawaii. *O. violacea* L. N. America, Mexico (Ital.). *O. cernua* Thunb. =*O. lybica* Viv. Cape, naturalised in Europe, N. Africa, N. America, S. Australia. *O. articulata* Savign., var. *hirsuta* Brog. = *O. floribunda* Lehm. S. America. *O. latifolia* H. B. K. Mexico, Texas, Bermuda, Haiti, S. America, Spain. *O. incarnata* L. S. & W. Africa. *O. tetraphylla* Cav. Mexico; adv., Simla.

GARDENERS' CHRONICLE. Price 6d weekly; 30/- per annum, post free. 5 Tavistock Street, London, W.C.2. P. 168, *Ulmus stricta*, var. *Wheatleyi*, with a good photograph and description of this Northamptonshire tree; unfortunately, however, it is given under a wrong specific and varietal name. The correct species name is *U. minor* Miller, see descriptions in Miller's Gardeners' Dictionary. The variety is more correctly var. *sarniensis* Loudon, popularly known as the Wheatley or Jersey Elm, so well adapted for roadsides, parks, etc. One of the best plants in the country is in Mr Buckley's garden at Richmond Tavern, where there is a tree 90 feet high. *Juglans nigra* is also recommended for planting, and it cannot be too highly praised. Mr N. E. Brown continues his Remarks on *Mesembryanthemum*. There is a photograph and a well-deserved appreciation of Mr J. Ramsbottom, O.B.E. Pp. 48 and 68, Plant Hunting on the Thessalian Olympus, by Mr E. Ingersen, gives details of that most attractive area. *Ranunculus alpestris* is figured on p. 26. There is a notice of Dr Rendle on p. 2, 1930. A beautiful illustration of the mauve New Zealand *Hymophylla* is given on p. 9. A suggestive article on p. 339 on "The Naming of Plants" is given, in which it is pointed out that it is difficult to change the name of a well adopted plant—*Diervilla* or *Weigelia*, *Sequoia* or *Wellingtonia*, or we may add *Nasturtium* and *Tropaeolum*. What advantage can there be in retaining an incorrect name? Nor can we assent to the statement that there could be no more beautiful name for a rose than Betty Uprickhum. What we must do is the best we can, knowing that even among the elect unanimity is not obtained or obtainable. 1930, July-December. Roosevelt Expedition to French Indo-China, 530, F. Kingdon Ward. *Helxine Solerolii* is known in Kent and Gloster as "Mind Your Own Business." *Viscum album* and its Hosts, 512, 1930, H. H. Warner. Comte Ernst Silva Tahouca, the well-known owner of the beautiful park at Prahonice, near Prague, has a photograph and an appreciation, p. 2. *Mesembryanthemum* (*Conophyton*) N.E.B., p.

8. *Rheum nobile*, p. 134, in Schpechuan, with good illustrations. The Ninth International Horticultural Congress, held at Vincent Square under the Presidency of G. W. E. Loder, Esq., was a distinct success. Mr Chittenden read a paper on Horticultural Nomenclature, which is based on sound lines. He would suggest that the same varietal name, *e.g.*, *pulchella*, should be used only once in a genus. It avoids confusion, and indeed I adopted it in the case of *Orchis incarnata*, because I had already established *pulchella* as a dunal variety of *O. praetermissa*, and therefore I altered my *Orchis incarnata*, var. *pulchella*, to *puchrior*, to avoid confusion. It is a beautiful plant which may be worthy of sub-specific rank. Subsequently the Horticultural Conference joined the International Botanical Congress at Cambridge after its meeting in London on August 15, over a thousand members belonging to 50 countries being represented. But as a matter of fact there are so many sections of Botany that " the liaison breaks down at its start." Six distinguished foreign botanists received a Doctorate degree—Dr J. Briquet; Prof. F. L. E. Diels, Berlin; Prof. Halle, Stockholm; Prof. L. R. Jones, Wisconsin; Prof. C. Schroeter, Zurich; Prof. F. Went, Utrecht. Yucca, p. 195, beautiful illlustrations of *Y. Whippei* in Southern California. On p. 212 " W. " writes a very pungent note on the eccentricities of the Conference. *Origanum vulgare*, with its white variety, which seems to breed true, p. 230. I saw it in fine condition on Apes Down, Isle of Wight. A new genus of *Mesembryanthemum*, N. E. Brown, p. 278. *Asphodeline lutea* loves change of habitat, p. 289. The Species Concept, Dr C. C. Hurst, a paper read at the Cambridge Congress, p. 325. He has succeeded in reducing the 6000 species to 211. Memories of Dr E. H. Wilson, p. 333, is a valuable contribution with an excellent photograph. *Hippophae Rhamnoides* and *Parnassia palustris* on sand-dunes, p. 357. Roosevelt Expedition to Indo-China, F. Kingdon Ward, p. 364. *Woodsia ilvensis* occurs at 2500 feet in Wales, p. 427. The North Gallery Kew, of which a readable account is given by W. Balfour Gourlay, p. 453.

GENEVE, BULLETIN SOC. BOTANIQUE. R. Chodat. Vol. xxi., 1929-1930. 20 fr. P. 263, C. Lacaita, Rectification à la flore des Picos de Europa. Beauverd, Gustav. Une race d'*Acer opalus* à fruits pourpres—var. nov. *corallinum* Beauv.

GLASGOW NATURALIST. The Journal of the Natural History Society of Glasgow. Vol. ix., 1919-1930, pp. 124. John Smith & Son, 57-61 St Vincent Street, Glasgow; 5/6. A most useful and excellent publication. It is pleasing to notice that Possil Marsh is now claimed as a Sanctuary. Pp. 5-46 contain a valuable list of Clyde Casuals by our late member, Mr R. Grierson. Pp. 52-100 are occupied with obituaries of deceased members. Among them stand out the names of Richard McKay, Robert Kidston, John Paterson, a valued Editor for many years, and D. A. Boyd, President of the Cryptogamic Society of Scotland and a most active President,

HARVARD, U.S.A. Contributions to Gray Herbarium. Svenson, H. K. Eleocharis Monographic Studies. The author definitely decides against the spelling *Heleocharis* and *Heliocharis*. He divides the genus into eleven series:—(1) MUTATAE. (2) PAUCIFLORAE, which includes our own *Scirpus pauciflorus* and *E. parvula* Link, 1836. (3) ACICULARES, which has our own *acicularis*, of which my forma *submersa* Fl. Berks, 524, is altered to f. *inundata*, because of a var. *submersa* H. H. Nils. (4) OVATAE. (5) MACULOSAE. (6) PALUSTRIFORMIS (PALUSTRIS, UNIGLUMAE, MAMILLATA, etc.). (7) INTERMEDIAE. (8) TENUISSIMAE. (9) SULCATAE. (10) MELANOCARPEAE. (11) TUBERCULOSAE. Fifty-four species are treated in the first five series. Fernald, M. L. *Ligusticum scothicum* [sic] L. on the North Atlantic and of the North Pacific, *l.c.*, 7, 1930. The plants of this area Fernald describes as *L. Hultenii*. Stebbings, G. L. A Revision of the North American species of *Calamagrostis*. Includes *C. neglecta*, of which its var. *borealis* is given. The authority for the species is Gaertn. Meyer & Schreb. Fl. Wett., 94, 1799, which is earlier than Beauvois. *Borealis* is a smaller plant, 1-4 dm., panicle 2-5 cm. long, callus hairs ¼-½ the length of the lemma, and inserted ⅓-½ the way up. In the type the callus hairs are ½-¾ the length of the lemma, and the hairs ¼-1/5th up the lemma. It appears to be the *Arundo groenlandica* Schrank Regensb. Denksch. ii., 8, 1818 = *C. groenlandica* Kunth Rev. Gram. i., 79, 29, and our own plant should therefore be var. *groenlandica* (Schrank) Dr., nov. comb. Fernald, M. L. *Potamogeton alpinus* and nov. sp. *P. microstachys*, *l.c.*, 76. The identity of *Juncus canadensis* and *brevicaudatus*, *l.c.*, 83.

HERKLOTS, G. A. C., Ph.D. Orchidaceae of Hongkong, with Photographs of several species. The Hongkong Naturalist. May 1930. $5 per annum.

HEGI, Dr GUSTAV. ALPINE FLOWERS. The most common in Switzerland, Austria and Bavaria. Translated by Winifred M. Deans, M.A., B.Sc. Pp. 74, tt. 38. Blackie & Son, London, 1930; 7/6. This is just the book which is wanted by anyone who is visiting Switzerland for the first time, for in this portable volume will be found the most striking and commoner flowers of the Alps. What memories they awaken as one turns over the papes, with the 250 plants its contains, all in colour, and all for so small a price. The descriptions are in simple, untechnical language. The excellent glossary and the copious drawings are all in its favour, and will command for it a large sale. It will inevitably create an Oliver Twist frame of mind—an earnest craving for something more. We await another instalment with anxiety. The stay-at-homes in England will find much to interest them in its pages and pictures, and it surely will induce them also to undertake a journey to the glories of the Alps.

HOOKER, Sir J. D. THE STUDENT'S FLORA OF THE BRITISH ISLES. Third Edition, reprinted. Pp. xxiii., 563. Macmillan & Co., London, 1930; 10/6. This excellent Flora went through three Editions during

Sir Joseph Hooker's life-time. Ed. i., 1870; ii., 1878; iii., 1884. If my memory serves me rightly 10,000 of the third Edition were printed. Even in his life-time, a new one, although there were plenty unsold, was considered to be highly desirable. While staying with him at Kew he pressed me to prepare a fourth Edition, and eventually I consented to do so. For that purpose I, for several years, annotated my copy. After some time, Sir Joseph wrote to me on September 17, 1904:— "Happening to mention the Student's British Flora to Sir W. Dyer, he greatly surprised me in saying, 'I have often thought I should like, if you are agreeable, to carry on the Student's Flora myself when I retire.' I should have thought it was the last thing that he would care to do. Under these circumstances I must reconsider the whole affair, and beg you to suppress my correspondence with you on the subject. I am letting him think the fact of there being upwards of 200 copies in hand, and last year's sale was only 110 copies, renders the vision of a new Edition far off indeed." In after years it was understood that Mr C. E. Salmon was engaged on the fourth Edition at the time of his lamented death. In the circumstances it seems that Macmillan's have chosen the wiser course and have simply reprinted the third Edition, since the experiments with Bentham's "Handbook" and Babington's "Manual" were not unqualified successes. There is no doubt that the arrangement and details of distribution, of elevation, of habitat and descriptions, as given by Hooker, are extremely good, and those who want something less expensive than Syme's "English Botany," and more comprehensive than that given by Hayward's "Botanist's Pocket Book," will find this to be a happy vade-mecum, which should be in every British Botanist's Library. But the exceptionally heavy and critical field work of 46 years, which has resulted in such a large number of additions being made to our Flora, are, of course, not to be sought for here. The additional species, not counting the hundreds of micro-species, include *Thalictrum* species, *Aquilegia alpina*, *Ranunculus sphaerospermos*, *Fumaria* species, *Sisymbrium orientale*, *S. altissimum*, *Erophila* species, *Arabis alpina*, *Cochlearia scotica*, *C. micacea*, *Bursa* species, *Viola epipsila*, *V. rupestris*, *V. tricolor* species, *Polygala alpina*, *Dianthus gallicus*, *Lychnis Preslii*, *Cerastium subtetrandrum*, *Sagina scotica*, *S. Reuteri*, *Spergularia Bocconei*, *Montia lamprosperma*, *Hypericum Desetangsii*, *Lavatera cretica*, *Lupinus*, *Alchemilla* species, *Pyrus* (*Sorbus*) species, *Saxifraga Drucei*, *Callitriche polymorpha*, *Chaerophyllum aureum*, *Galium debile*, *Matricaria suaveolens* (alien), *Senecio erraticus*, *Centaurea Jacea*, *Taraxacum* species, *Scorzonera*, *Statice planifolia*, *Limonium lychnidifolium*, *L.* species, *Centaurium Scilloides*, *Myosotis sicula*, *M. brevifolia*, *Plantago Hudsonii*, *P. Sabrinae*, *P. Edmondstonii*, *Veronica aquatica*, *Euphrasia salisburgensis*, *E.* species, *Orobanche reticulata*, *O. Ritro*, *Thymus* species, *Satureia* species, *Salvia Marquandii*, *Ajuga genevensis*, *Chenopodium opulifolium*, *C.* species, *Salicornia* species, *Polygonum calcatum*, *P. equale*, *Rumex arifolius*, *Euphorbia virgata*, *Ulmus Plotii*, *Populus serotina* (*deltoidea*), *Hydrilla*, *Spiranthes gemmi-*

para ?, *Helleborine leptochila*, *Orchis praetermissa*, *O. Fuchsii*, *O. O'Kellyi*, *O. purpurella*, *Lilium pyrenaicum*, *Juncus nodulosus*, *Luzula pallescens*, *Potamogeton Drucei*, *P. panormitanus*, *Zannichellia gibberosa*, *Eriophorum opacum*, *Carex microglochin*, *C. Pairaei*, *C. Sadleri*, *Milium scabrum*, *Agrostis verticillata*, *Calamagrostis scotica*, *Koeleria vallesiana*, *K. albescens*, *Poa Chaixii*, *P. irrigata*, *P. palustris*, *Glyceria retroflexa*, *Festuca sulcata*, *Bromus interruptus*, *B. britannicus*, and *Agropyron intermedium* and *A. campestre*. Again, a large number of plants have had their grade altered, and perhaps still more have had their names changed, and a very large number of hybrids have been recorded. Despite all this, the Student's Flora has a distinct place of its own, and we are grateful to the publishers for bringing it out in a clear type and with pleasing accessories.

HONGKONG NATURALIST. Edited by A. H. Crook and G. A. C. Herklots. $5 per annum. An excellently produced publication with seven beautifully coloured plates. There is a good and useful account of Cobra Venom, and an account of Lychee cultivation in the New Territories.

HURRY, JAMIESON B., M.A., M.D. THE WOAD PLANT AND ITS DYE. Pp. 328, tt. 16, portrait and map. Oxford University Press, 1930; 21/-. This volume was posthumously issued under the auspices of Warren R. Dawson. The work was much helped through the Press by A. R. Horwood and A. W. Exell. Dr Hurry was at one time Public Health Doctor for Reading. There he had a large garden which he stocked with medicinal plants, among which, always prominent, was the Woad. I am not certain that I did not give him his first specimens. Largely grown as it formerly was, it has now almost disappeared from cultivation in Britain. It exists under several conditions, as is evidenced in the variety of its seed pods. Two varieties are recognised as distinct—var. *canescens* Boiss. and var. *stenocarpa* Boiss. Much attention is given as to the details of its cultivation, but the annual product in Britain is only ten to twelve tons, worth about £40 a ton. It is grown chiefly in Lincolnshire. It has a wide distribution in Europe, Asia and Africa. Illustrations are given of the Woad House and Mill, and the chief tools used in preparing it. At Boston a mill had eight wheels. A magnified section of the stem is given which shows indigo in the cells. The history of the Woad in Britain is given as well as the development of the industry. The trade regulations are described and the restrictions placed against its export. The cultivation abroad is placed under Review. Its taxation in England is mentioned at some length. Dr Hurry tells us also of its use in the Fine Arts and the old Herbals are quoted on its therapeutic uses. There is an excellent Bibliography. It is gratifying to see so pleasing a memorial to Dr Hurry, whose general character we so much appreciated.

INDEX LONDINENSIS, containing Illustrations of Flowering Plants, Ferns and Fern-allies, being an emended and enlarged Edition con-

tinued up to the end of the year 1920 of Pritzel's Alphabetical Register of Representations of Flowering Plants and Ferns. Compiled from Botanical and Horticultural publications of the eighteenth and nineteenth centuries. Prepared under the auspices of the Royal Horticultural Society of London, at the Royal Botanic Gardens, Kew, by O. Stapf. Oxford, at the Clarendon Press, £5 5/- each. Vol. i., pp. xx., 547; A-C; 1929. Vol. ii., pp. 548; C-D; 1930. Vol. iii., pp. 555; E-J; 1930. Vol. iv., pp. 568; K-P; 1930. This monumental work is steadily going on. As we have said, in method of citation, typography, and ampleness of incorporation, it is an opus magnus, and will be of great service to future botanists.

IRISH NATURALISTS' JOURNAL, THE. Vol. iii. Bi-monthly; 6/- per annum. Secretary and Editor, Capt. A. D. Chase, M.C., M.A. Botanical, R. Lloyd Praeger, Prof. J. Small, and Rev. W. R. Megaw. The Phenological observations have been kept up—Mr A. W. Stelfox giving a list of plants seen in flower in the Grey Stones district about ten days before Christmas 1929. Mrs Knowles records *Cleome serratula* and *Bromus britannicus* from near Sydenham Station in Co. Down. One must congratulate Mrs Knowles upon the excellent manner in which her Department in the National Museum is kept. Mr Stelfox records *Equisetum variegatum* from the Cliff Banks of the river Liffey near Poulaphousa Fall, Co. Wicklow. Mr P. M. J. Adams, M.Sc., p. 29, Romance of the Shamrock. Grimes records the flowering of the Hawthorn at University College, Cork, on January 31. May this not be the Glastonbury Thorn, var. *praecox*, which does flower normally about that early date. There is an appreciative memoir of Nathaniel Carrothers, p. 49, by R. Lloyd Praeger. A useful paper on Grasses is supplied by Capt. Chase, with a key list to 30 common Irish grasses, and he offers two prizes, one of £3 and the other of £2, for the best collection of the 30 species mentioned in his article. Miss Fisher, p. 112, reports that *Stratiotes* is thoroughly established at Woodburn Mill Dam.

JAQUET, DR F. CATALOGUE RAISONNE DES PLANTES VASCULAIRES DU CANTON DE FRIBOURG ET DES CONTREES LIMITROPHES. Pp. 380, 1930. We congratulate our honorary member on the publication of this useful work. It is arranged according to the Engler system, beginning with the Filices, 27 species being included. *Cystopteris alpina* is placed under *C. Filix-fragilis*. The genus *Dryopteris* is widened to include *Lonchitis* and (*Polystichum*) *lobata*, but the authority Huds. should have been bracketted. *Ceterach* is merged into *Asplenium*. *Eupteris* is rightly chosen. Under *Sparganium erectum*, *S. neglectum* is put as a sub-species, as is *Potamogeton panormitanus* under *pusillus*. *Leersia* is *Oryza*. Curiously *Festuca Bromoides* is absent. *Festuca capillata* is a sub-sp. of *F. ovina*, while *Bromus racemosus* and *commutatus* are kept distinct, but *Carex lepidocarpa* and *C. Oederi* are sub-sp. of *C. flava*. Fifty-seven species of Carices are given. The 12 species of Orchids include *O. incarnatus*, *O. maculatus* and *O. latifolius*. *Ulmus*

laevis, *U. campestris* L. (*glabra* Mill.) and *scabra* Mill. are given. Surely it is time for *campestris* to be banned as a nomen confusum. There is no synonym given to explain *Spergularia campestris* Aschers. *Thalictrum minus* is wisely chosen to include *elatum*, *saxatile*, *collinum* and *pubescens*. *Papaver Lecoqii* is a sub-sp. of *P. dubium*. Fifty species of *Rubus* are mentioned, 21 Roses, and 35 Alchemillas, which shows the results of intensive study. *Circaea intermedia* (*canadensis*) is wisely kept as distinct from *alpina* or *lutetiana*. *Myosotis Scorpioides* Hill is used for *M. palustris* With. *Mentha verticillata*, *gentilis*, *dumetorum*, *villosa*, and *piperita* are all given specific rank. *Veronica Anagallis-aquatica* is alone given. Eight Euphrasias are included. The authorities cited for *Rhinanthus stenophyllus* is antedated by my own publication, but it may be held that an index name used by Schur is valid. *Matricaria suaveolens* seems also to have successfully invaded Switzerland. The Hieracia occupy numbers 1712 to 1784, the latter being the number of species recorded for the Canton, with *Lamium album* and *Orchis Simia*, which have been added since the text was written. The total is therefore 1786.

JENKIN, T. J., M.Sc. Inheritance in *Lolium perenne*. iii., Base factors C. & R. Journ. Genetics, xxii., 389, 1930. Our member's excellent investigations into the British Grasses are augmented by this paper. The occurrence of "red" plants must be well known to all field workers, but Mr Jenkin has shown that the complementary dominant factors C. & R. are concerned with the production of red base colour. In the absence of these, no red base colour is developed. No economic significance has as yet been ascertained, but the red plants appear somewhat less vigorous than the others. Perennial Red Grass at Aberystwyth. Welsh Journ. of Agric., vi., 1930. This gives the results of the cultivation of many forms of *Lolium perenne*. The greatest green weight was obtained from Station-bred pastures 156, Hawkers Bay N.2, 133, British Indigenous 120, Norwegian 109, British 100.

JOURNAL OF BOTANY, THE, 1930. Edited by A. B. Rendle, D.Sc., F.R.S. Price, 2/- monthly; 22/6 yearly. Taylor & Francis, Red Lion Court, Fleet Street; Dulau & Co., Ltd., 32 Old Bond Street, W.1. Includes Suppl. 2 to Watson's Topographical Botany. New and Rare British Galls, J. W. Heslop Harrison, p. 39. Fifth International Congress, p. 54. Dr Rendle's retirement as Keeper of the Department of Botany, British Museum, p. 64. We must heartily congratulate Mr J. Ramsbottom on his appointment to the Keepership. A variety (*Lacaillae*) of *Scilla nutans*, new to Britain, P. Senay, p. 112. An artificial cross between *Viola hirta* and *V. odorata*, R. Snow and M. M. Chattaway, p. 115. *Alchemilla tenuis* Buser in Herts, G. C. Druce, p. 121. Notes on Irish Pansies, Dr Drabble, p. 141. New records for Roses in Surrey, J. Fraser, p. 154. Notes on *Sorbus* by the late C. E. Salmon, p. 172. *Rubus laetus* Watson vice the Ty Groes *R. latifolius*, W. Watson, p. 183. *Rosa scabriuscula* Sm., Col. A. H. Wolley-Dod, p.

185. Source of the generic name *Rorippa*, T. A. Sprague, p. 219. The author ignores the oldest name *Radicula* on the untenable ground that it has since been used in Morphology, and that it was unaccompanied by a specific name, but Dillenius, who founded it, had specific names under it, and in more recent times Moench also had them. Have all Bentham and Hooker's generic names species names under them or how many of Linnaeus' generic names (*Gen. Plant.*) had specific names supplied? Fertilisation of *Ophrys fusca* and *lutea*, Col. H. M. Godfery, p. 237. Sudre and the British Rubi, Rev. H. J. Riddelsdell, p. 240. Notes on Kerry Plants, R. L. Praeger, p. 249. In this he confirms my hybrid × *P. Scullyi* = *P. grandiflora* × *vulgaris*. Pollination of the Fly Orchis, H. G. Willis, M.A., p. 280. *Rubus* records, Rev. H. J. Riddelsdell, pp. 305, 334. Bristol Meeting of the British Association, p. 321. British Representatives of *Juncus tenuis*, Prof. Fernald, p. 364. British Forms of *Arenaria serpyllifolia* and *A. leptoclados*, Dr Drabble, p. 370.

KEW BULLETIN OF MISCELLANEOUS INFORMATION. Wild Cacao in Surinam and British Guiana, J. G. Myers, with photographs. Cardanoms, I. H. Burkill. Additions to Index Kewensis. A Botanical Expedition to Persia, J. M. Cowan, at Em ra bad. The Karoo Garden, R. H. Compton. The orris-root of commerce is said to be the produce of *Iris florentina*, *I. pallida*, and to a smaller extent *I. cermanensis*, 80,000 plants going to an acre. The portrait of Sir David Prain has been placed in the Kew Herbarium. A most interesting account is given by A. D. Cotton of a visit to Kilimanjaro, where he found a new species of *Senecio*. Notes on the Flora of the near East, W. B. Turrill. A new *Carex*—*C. Troodii* is mentioned [I am asking the Forestry Department of Cyprus to gather it in a later state]. Poison Plants, F. N. Horner. Additions to the Flora of Siam. Flora of the Nearer East. Appendice i.—Gives an account of the Jardin Nutience Bidgetung. At Kew 62,000 plants have been mounted, and 78,111 incorporated in the Herbarium and Library. Appendice ii.—List of the Staffs of the Botanic Gardens of the Empire. Appendice iii.—List of Seeds.

LEACH, J. A., D.Sc. AUSTRALIAN NATURE STUDIES. A book of reference for those interested in nature-study. Pp. 525. Macmillan & Co., London, 1929; 12/6. This is a specially valuable work to those who are teaching the subject. Its 37 chapters treat not only of the Botanical but of the Zoological side of Natural History. It has an enormous number of illustrations aptly chosen for the purpose, so that the experiments can be readily followed. Seeds and their development are well described. Then come studies of Plant Foods, the Breathing of Plants, in which the student is put into closer touch with the subject than is usually the case, the Leaf, Plants and Dry Weather, and Leafless Plants. Leaf Appendages and Face of the Leaf are simultaneously treated. The Root, with its power of root-absorption, affords an interesting chapter. It has been calculated that for every pound

of dry matter in a plant it has used over 300 pounds of water, liberated as water vapour, and this chapter easily runs on to the explanation of Osmosis. In describing the stem, it is stated that in the Otway and Gipps land are found stems often measuring up to 150 feet without a break. That plants feel is shown in chapter seven. Climbing plants, Parasites and Bud studies are usefully and vividly described, as are the flower and its pollination, and fruit and seed scattering. Some of the seeds preserved by Robert Brown in the Flinders Expedition, it is said, germinated recently. Plant spreading other than by seed is explained. Then come general plant-studies, for which the Dandelion is a splendid subject. In many schools the plants are grown from seed to seed and are studied at each stage. This reveals the fact that it is sometimes self-pollinated. Wayside and common plants are chiefly adventive. Plant foes are mentioned. Among these *Hypericum perforatum* is a great pest, the roots of it may go four feet down. Ragwort, Sheep Sorrel, Capeweed, and Acaena are other pests. Then follows a similar treatment on the Zoological side, which is extremely well done. There is room for a similar work treating of British Biology, but no Briton will be disappointed with the Australian representative.

LINNEAN SOCIETY, PROCEEDINGS OF. January 1931, pp. 252. President, Sir Sidney F. Harmer, K.B.E., F.R.S. Includes his Presidential address, pp. 85-252, on Whales and the Whale Fisheries.

LINNEAN SOCIETY, JOURNAL OF THE. 14/-. A Revision of the British Euphrasiae, H. W. Pugsley.

LINNEENNE, SOCIETE DE LA SEINE MARITIME. Raoul F. Mail. Prés. M. Docteur A. Loir.

LONDON NATURALIST, THE. The Journal of the London Natural History Society for the year 1929. L. Reeve & Co., Ashford; 3/-. Birds of Middlesex since 1866, W. Clegg, 233 species being enumerated. Our member, Mr L. B. Hall, contributes notes on Some Recent Additions to the British Flora. These have appeared in our Report. It is not correct to say that *Glyceria retroflexa* is a recent addition. It was actually figured as *Poa retroflexa* by Curtis in the " Flora Londinensis " in the latter end of the eighteenth century. Mr H. J. Burkill contributes a valuable paper on British Gall Mites. Mr W. Watson supplies an excellent contribution on the Brambles of Kent and Surrey. The Botanical records of the London area are continued, and show much good work. Could the various counties or vice-counties in which they occur not be given? The Society is to be congratulated upon so excellent a Report and also upon the earnestness with which its work is carried on.

MAIDEN, J. H. A Critical Revision of the genus *Eucalyptus*. Vol. xii., pts. 61-70, Index. Part 2 (Pt. lxxii. of the whole work), 1929; 3/6. Edited by R. H. Cambage, C.B.E., F.L.S., and W. F. Blakely, the latter describing 10 additional species.

MARIE-VICTORIN, FRERE. Les Liliiflores du Quebec. Cont. Lab. Bot. Univ. Montreal 14, 1929. With 75 illustrations. Another most valuable contribution by Frère Marie-Victorin. It includes several new varieties. There is a good generic clavis. The name *Tofieldia minima* (Hill 473, 1756) Druce = *T. palustris* Huds., 1778, is used. *Juncus Dudleyi* has a wide distribution. *Juncus bicornis* Michx., 1803, has an earlier name in *J. gracilis* Sm., given for Don's plant from " Cette espèce serait donc dans les Iles Britanniques, comme *Eriocaulon*, un des derniers représentants d'autres anciennes comme aux deux continents alors réunis." *Juncus articulatus* is rightly named, but it seems that *alpinus* might be referred to *nodulosus*. A well printed, learned, and most useful work. Additions aux Cyperacées de l'Amerique du Nord. 1929; *l.c.*, n. 15. Gulf of St Laurent. *Carex vesicaria*, var. *Grahami* (Boott) Kükenth. Petites rivières Anticosti. My own feeling is that *Grahami* deserves specific rank. It occurs not only in its classic locality in Glen Phee, but also on Ben More in M. Perth. *C. Oederi*, nov. var. *Rousseauiana* Mar.-Vict. Quebec. It is taller than the type, and should be compared with the European *elatior* of Anderson. *C. disticha* Huds. and *C. nutans* L. Boncherville on the Gulf of St Laureuce, both probably introductions. *Scirpus atrovirens*, var. *georgianus*, nov. form *viviparus*. Longueil, près Montreal. There are photographs of these plants and also of the habitats of *Scirpus alpinus* on the Isles of St Génévieve and Marteau, with the collector shrouded in a muslin net to keep off mosquitos. 1930; *l.c.*, n. 16. Les Variations laurentiennes du *Populus tremuloides* et du *P. grandidentata*. 1930; *l.c.*, n. 17. Le genre *Rorippa* dans le Quebec. Includes *amphibia* (but the synonym *Radicula*, which is the older name, is omitted); *sylvestris* with a var. *stenocarpa*; *obtusa* (not european) and a variety; *palustris* (the syn. *Radicula islandica* (Oed.) Druce is omitted) which has a glabrous phase in Europe and North America (var. *glabrata*), but these are not identical, and a pubescent state also in America (var. *hispida*). The generic name was founded long before it was used in a morphological sense. Surely the latter is the one to go.

M'KERROW, JAMES CLARK. NOVIUS ORGANUM. Essays in a New Metaphysic. Pp. 277. Longmans, Green, & Co., London, 1930; 9/-. " This work outlines somewhat revoluntionary views on the subject of why we do what we do. Are we conscious performers or are we animated solely by the joint effects of the habits of the race and the habits we have formed individually in the course of the chapter of accidents that is each individual's own history? "

MARLBOROUGH COLLEGE, REPORT OF THE NATURAL HISTORY SOCIETY OF, for the year 1929. N. 78. Cambridge University Press; 5/-. The Botanical section notes 504 species and varieties. Several micro-species were additions to the Flora. *Bromus interruptus* was found at Aldbourne—it appears to be decreasing in quantity in Britain. Mr Cecil P. Hurst, F.L.S., contributes an excellent paper on the local Fungi.

There is a good list of Microlepidoptera, and Mr H. C. Brentnall supplies a useful account of Savernake Forest and of Shaw Church. We notice that Mrs Wedgwood has given some valuable Botanical Books to the Library, and she has been generous enough to give it a considerable sum of money.

MARSDEN-JONES, ERIC M. The Genetics of *Geum intermedium* and its Back-crosses, Journ. Genetics, 377, 1930, with a coloured figure and four plates of illustrations of the petal-forms. He does not mention that the hybrid was recorded in my *Flora of Berkshire* in 1897. *Rumex glomeratus* should be *R. conglomeratus* Murr. and *Alnus rotundifolia* should be *A. glutinosa*. In this wood at Bradfield the author says that the back-cross is having a marked influence, and that in the near future it will completely replace *rivale*; indeed, in the wood on the south-east side of the river it has already done so. It was Bell Salter, not Bell Slater, who crossed the two species of *Geum*. Mr Marsden-Jones finds that they do not breed true. It is an excellent paper.

MARSDEN-JONES, E. M., and W. B. TURRILL. Report on the Transplant Experiments of the British Ecological Society at Potterne, Wilts. Journ. Ecol., xviii., 352, 1930. This gives a capital account of their experiments. Large quantities of *Silene vulgaris* (*Cucubalus* and *angustifolia*) were grown, and showed a great range of variation. *Plantago major* and *Silene maritima* are exceedingly plastic, not so *Centaurea nemoralis* and *Anthyllis*. Although not mentioned in this paper, it has been stated that other Centaureas, *e.g.*, *C. Drucei*, are not constant.

MARSDEN-JONES, E. M., W. B. TURRILL, and V. E. SUMMERHAYES. Special Herbaria as Adjuncts to Modern Scientific Research. In this a strong plea is made to preserve the specimens mentioned, say, in any paper, in an ecological plant community. This is most important. I once heard a paper read, of over half an hour's length, upon a *Juncus* growth on a hillside. The reader named it *lamprocarpus*, and all the data obtained and deductions made were as if it were the species under review. The photographs to illustrate it showed that it was *J. silvaticus*. That such a Herbarium should be formed is evident, and the suggestions made seem most admirable.

MARSHALL, OTTOLINE, F.R.H.S. SOME FAVOURITE FLOWERS AND THEIR WILD RELATIONS. A Book for Children. Pp. 65. Sheldon Press; 1/6. This is a pleasing and useful book, in which a considerable amount of information is given about Roses, Violets, Chrysanthemums, Asters, Pinks, Campanulas, Columbines, Larkspurs, Geraniums, Anemones, Snowdrops, Narcissus, and Crocus. The language is clear and many interesting examples are given. Under Strawberries it is stated that "as early as the fifteenth century, wild strawberry roots were gathered by the bushel and transplanted into gardens where the rich soil and careful cultivation gradually improved the growth of the berries and

brought them to the size we know now." As a matter of fact this is quite wrong. Our British Strawberry, *vesca*, was largely cultivated in Tudor times, but although many varieties were known, there was little variation in size. That did not take place till after the discovery of America, when *F. virginiana* and, later still, *F. chiloensis* were brought in and led to crossing with these larger forms. It may be said that Otto of Roses is still largely prepared in Bulgaria from *Rosa centifolia*. Probably *Mathiola incana* is native on the cliffs of the Isle of Wight. Another slip is the statement that "Saffron is extracted from the Stigmas of the Crocus." Actually it is the dried stigmata. The volume is pleasing in appearance.

MURR, Dr J. *Cirsium Seegeriorum* = *C. arvense* × *carniolicum*, Innsbruck. Named after the Assistant in Botany at the Institute in Innsbruck. Luzulae hybridae novae, *L. multiflora*, var. *alpestris* × *L. spicata*, Arlberg, 1900 m., J. Murr = *L. Winderiae*, after Hedwig Winder, who has worked assiduously at that district.

NATIONAL TRUST FOR PLACES OF HISTORIC INTEREST OR NATURAL BEAUTY. Report, 1929-1930. 7 Buckingham Palace Gardens, Westminster. This excellent Report gives beautiful views of some of their properties—Tarn House, Monk Coniston; Housesteads, Hadrian's Wall; Broom Hill Point, Derwentwater; Runnymede, given by Lord and Lady Fairhaven and Hon. H. Broughton; Glebe Cliff, Tintagel, and Friday Street. President, H.R.H. the Princess Louise, Duchess of Argyll; Vice-President, Viscount Grey of Fallodon; Chairman of the Executive Committee, John Bailey; Hon. Treasurer, Col. Hon. Sidney Peel, D.S.O.; Secretary, S. H. Hamer. During the year, in addition to some places already mentioned, there have been added Stables Hill; Wray Castle, Windermere, and Wallow Barrow Crag; additional lands at Leigh Woods given by Melville Wills, Esq.; Crockers Potch, Waggoners Wells; Rampsholme, Derwentwater; the Treasurer's House, York, given by Frank Grey. There are some good maps of these acquisitions. Among the donations for the year are £2000 from Viscount Esher, £2000 from our member, Sir Samuel Scott, Bart., £500 from Miss Holt for Monk Coniston, £6000 from R. T. Cochrane, Esq., for Cathedral amenities.

NATURE. Edited by Sir Richard Gregory. 1/- weekly. Macmillan & Co., London. This most ably edited periodical continues its successful career with undiminished vigour. Dr Cockayne has been presented with the Darwin Medal at the Canterbury University College, New Zealand. In his speech he referred to his work on hybrids, of which he had identified 360. The Botanical Museum of the University of Zurich has voted the sum of 4000 Swiss francs, distributed over three years, towards a hydrobiological investigation of the high alpine Swiss lakes. February 6th was the centenary of the birth of Daniel Oliver, for many years Keeper of the Herbarium at Kew, where he began his work in 1858. There was an exhibition of his drawings in the Museum at Kew

during the summer. The Botanical Exploration of Krakatoa. C. A. Backer denies that the vegetation of the island was totally destroyed by the eruption, and somewhat rudely treats the views of those holding an opposite view. Present-Day Problems in Taxonomic and Economic Botany, A. W. Hill, C.M.G., F.R.S. He gave the inaugural address to the school of Pharmacy in October 1930. He paid an official visit to South Africa in the autumn of 1930.

NATURE RESERVES, SOCIETY FOR THE PROMOTION OF. Handbook, 1930. During the year a large number of effective posters have been issued urging the preservation of wild flowers. The various properties under the care of the Society have been adequately looked after, and it is satisfactory to note that the experiment of introducing the Great Copper Butterfly to Wood Walton has been successful.

NORDHAGEN, ROLF UND OLAF HANSSEN. Die Adventivflora eineger West-Norwegischen Kornmühlen in der Jahren, 1927-1928. Bergen Mus., No. 4. A list of over a hundred species. This includes *Carduus humulosus*, *Beckmannia Oyzigachne*, a Kamtchatkan species.

NORTHAMPTONSHIRE, JOURNAL OF THE NATURAL HISTORY SOCIETY AND FIELD CLUB. 1929, 1930. Editor, Beeby Thompson. An account of John Clare's Library is given by R. W. Brown. It is contained in the Local Room of the Public Library at Northampton. Mr Wallis laments the non-occurrence of *Hieracium boreale* in the London Catalogue. He will find it in my British Plant List as a heading for the eight species into which it has been sub-divided. Mr Allen records some local Plant Variations, and gives the Flora of the parish of Abington.

ONSLOW, MURIEL WHELDALE, M.A., University Lecturer in Plant Biochemistry, Cambridge. THE PRINCIPLES OF PLANT BIOCHEMISTRY. Pp. 326, pt. i. Cambridge University Press, 1931; 16/- net. In this first part, of what will be a most useful work, Miss Onslow has six chapters. The Sugars, the Cell-wall, Oxidising and Reducing Systems, the Plant Proteins, Nitrogen Metabolism, and Respiration. Each of these subjects is treated in full detail and with great elaboration. This book, which deals only with the higher plants, is intended for the student and for the beginner in research. The problems here considered are, in the main, those concerned with the biochemistry of the sugars and the nitrogen compounds; the former when they take part in cell-wall formation and in respiration, the latter chiefly in connection with the synthesis and the break-down of protein. Oxidising systems are also included, but only such as are known to be characteristic of the above-mentioned group of plants. The work is produced with the excellent type and clearness of detail which is a characteristic of the Cambridge University Press.

OSTENFELD, C. H. Mindre Meddelelser Smaa Bidragtel den Danske Flora, ix. Floristke Notitser hoved sageligfra ekskursion, i., 1928.

Trifolium repens, nov. var. *angustiflorum*, petalum imparum angustius ± plicatum album, alae roseae.

OSTENFELD, C. H., and C. SYRACH LARSEN. The species of the genus *Larix* and their Geographical Distribution. 8 maps, tt. 35, pp. 100. Det. Kgt. Vidensh. Selskab. Biol. Medd., ix., 2, 100, 1930. The genus is divided into 10 species and 3 varieties, and he choses *Larix decidua* as the name for our common plant. A group of *L. Lyalli* is photographed from the classic locality at Lake Louise, but the beauty of it must be seen on the spot, as is also the case with the Japanese Larch, *L. Kaempferi*, on Fujiyama. The authors reduce Henry's *olgensis* to a variety of *L. Gmelini*.

PACK, CHARLES LITHROP, and TOM GILL. FORESTS AND MANKIND. Pp. 250, tt. 24. Macmillan & Co., London, 1929; 12/6. This is a pleasing work treating on somewhat novel lines of the problem of Forest life and Man and the influence exerted one upon the other. The forests of the world are continually changing; nothing is static. The history of the forest from its early coniferous character is contrasted with that of to-day. Russia has the most extensive forests of any country that equals the British Empire, third comes Brazil, fourth the United States. Asia, in spite of her great forest area, possesses only 2½ acres for each of her people, while S. America has 30 acres. Foresters estimate that about 38 billion cubic feet of timber are grown yearly. The forests of the United States are unrivalled among the world's timberlands, and they are well described, the destructive influence of mankind upon them being clearly shown. Wood is proved (chapt. 2) to be the greatest gift of the Forest. Paper now is so largely obtained from woodland that the chapter on it is of great service. Eight million tons of paper are used yearly in the States, and this huge amount is bound to increase. Other gifts of the forests are shown in a readable and useful chapter. Turpentine and Sugar are especially noticeable. Forests and Wild Life. Among the forest enemies Fires stand out strongly, but Beetles and Caterpillars are by no means negligible. The war against wood-waste is clearly necessary. In an average forest about 10 per cent. of the trees are defective and are not even cut, 15 per cent. are left in the forest in the form of tops, 10 per cent. more in bark. In cutting up, 10 per cent. is wasted in sawdust, 20 per cent. more is ranked in the form of slats and edges, and finally about 30 per cent. remains as timber. Even then before it is worked into furniture, about half of this is wasted in the process of manufacture. It has been found that a ton of dry coniferous wood can be made to yield 20-25 gallons of alcohol. The exploitation of American forests is on such a scale that the country is heading towards forest bankruptcy.

PARKER, ERIC. ENGLISH WILD LIFE. With an Introduction by Stanley Baldwin. Pp. 186. Longmans, Green & Co., 1929; 3/6. As the ex-Premier says, " The choice of subject seems to me to be singularly

happy." But it is not only the subject matter that is so good, it is the delightful language in which it is conveyed that so greatly adds to its charm. I have one fault to find, and that is that the flora of England and all that that means is practically omitted from notice. The book is essentially ornithological, although there are some remarks on the mammals, including those that have become extinct since historic times, namely, the bear, the beaver, the reindeer, the wild-boar and the wolf. How curiously close to what has happened with the plants—the two ragworts, the centaury, Davall's Sedge. The pine marten among the animals is nearing its end, so, too, the alpine *Pinguicula* and the Soldier Orchid are also on the verge. The *Eriophorum alpinum*, which I put among the extinct, has been reported this year from Scotland. The author (notwithstanding his statements) and his enchanted readers may even now see that wonderful visitor, the large Copper, in its wonderful flight in an English Fen. Last year from some specimens brought from the Continent, over a hundred emerged and afforded one of the sights of the world; hardly less remarkable than that of the Imperial Blue in the swamp of a Cinghalese jungle.

PENNELL, F. W. Genotypes of the Scrophulariaceae in the First Edition of Linné's Species Plantarum. Proc. Acad. Nat. Sc. Philad., 82, pp. 9-26, 1930. The 29 genera included in the Scrophulariaceae are carefully discussed. It is shown that Linnaeus often founded his genus on a single individual, and that he did not always widen the description as new plants were put in to which the original genetic characters did not strictly apply. For example, in *Veronica*, which was founded mainly on *V. officinalis*, the characters often did not apply to the other species. Indeed, only 4 of the 27 species have fruiting characters that conform. The Genotype for the genus is *V. officinalis*, that of *Gratiola* is *G. officinalis*, of *Scoparia*, *S. dulcis*, of *Verbascum*, *V. Thapsus*. *Bartsia* is held to have been founded on *B. coccinea*, which Pennell gives as the genotype. It includes *viscosa*, *alpina* and *Trixago*, but not *Odontites*. In *Rhinanthus*, with 5 species, Pennell wisely makes the genotype *R. Crista-galli*, thus avoiding the mistaken use of *Alectorolophus*. So too with *Euphrasia*, with its genotype, *E. officinalis*, which was the *E. officinarum* of Bauhin. *Melampyrum arvense* is the genotype. *Scivalbia* and *Tozzia alpina* are not British. *Pedicularis sylvatica*, although not in the Linnean Herbarium, is the genotype, as are *Gerardia tuberosa* and *Chelone* (Dill.) L. *glabra*. *Antirrhinum majus* is the genotype in the compound genus of Linnaeus. Some misguided people wished to retain the older name for a section of a compound genus raised to generic rank which had the larger number of species—hence the Linarias would be called Antirrhinums—a reductio ad absurdum. *Scrophularia* includes 12 species, of which *S. nodosa* stands as the type. *Celsia orientalis* is adopted as it seems that the word *obtusus* is a lapsus calami for *attenuatus*. *Digitalis purpurea*, on historical and descriptive grounds, is the genotype. Others are *Halleria lucida*, *Capraria biflora*, *Selago corymbosa*, *Hebenstretia dentata*,

Erinus alpinus, Buchnera americana, Sibthorpia europaea, Limosella aquatica, but Linnaeus should have adopted Dillenius' earlier name *Plantaginella, Dodartia orientalis* and *Mimulus ringens.*

PHENOLOGICAL REPORT, THE, 1929. Edited by a Committee of the Royal Meteorological Society. 39th Report. Pp. 207-270. E. Stamford, Ltd.; 3/-. The valuable statistics are collected from 489 stations. The data include Temperature tables. There are notes on the opening of the flowers of the Hazel, Coltsfoot, Wood Anemone, Blackthorn, Dog Rose, Harebell, Greater Bindweed, Devil's-bit Scabious, and Ivy. On this one might suggest that the same species should be observed in all cases, *e.g.*, Hawthorn, Dog Rose. In the case of Ivy, it may be that the Guernsey variety is a different one from that of Orkney. In Guernsey the earliest date was given as 126, in Orkney 145. This may be a true difference, but it may be that var. *sarniensis* itself may be an earlier flowerer even if grown in a more northern latitude. There are only ten days' difference in the flowering of the Hawthorn from Guernsey and from Beauly, E. Ross, where both Hawthorns may be presumed to be the same species, but supposing *Oxyacanthoides* was the plant under observation in, say Oxfordshire, a very different result would be obtained. As a matter of fact, at Beaconsfield the Hawthorn flowered on 144, *i.e.*, 12 days later than in Guernsey. One ought to be quite sure what is *Betula alba.* Buds and insect records were also noted, and a table of dates of first day of song and migration of birds, and the first appearance of insects is also given.

PODPERA, JOSEF. Musci Insulae Rossicae prope Vladivostok. Pub. Fac. de l'Université Mazaryk, 1929. A large number of new species are described and the details are well figured.

RECHINGER, K. H. *Rumex dictyocarpus* Boiss. & Buhse, with a new hybrid = *R. Sanninensis.* Fedde Rep., xxvii., 385.

RIDLEY, H. N., M.A., C.M.G., F.R.S. THE DISPERSAL OF PLANTS THROUGHOUT THE WORLD. Illustrations by Miss M. B. Moss and the author. Pp. 744, tt. xxii. L. Reeve & Co., 1930; £3 3/-. In this handsome and portly volume, Mr Ridley has drawn from his unrivalled store of knowledge gathered from many places and during years of strenuous work. The methods of dispersal are treated of in twelve chapters. In the first, Dispersal by Wind receives proper recognition. The importance it deserves is not given to it by some botanists. In the early days the spore-bearing plants covered the greater part of the world's vegetation owing to wind agency. In the Tertiary period when Mammals came on the scene, they were accompanied by the extensive evolution of drupaceus and baccate fruits, often superbly coloured. Grasses were chiefly due to herbivorous Mammals. The Quaternary Period witnessed the advance of man, and in the course of time he assisted in the dispersal of its species. Many changes are due to cli-

matic circumstances, and of these numerous instances are given. "Competition" is a great factor in the vegetation of a country. One of the most widely distributed wild plants in the world is the common red Phragmites, which has light feathery fruits admirably adapted for aerial voyage, easily detachable rhizomes suitable for water dispersal and for a great climatical adaptability, so that it rejoices in both temperate and arctic regions. It also possesses most aggressive methods of growth, so that we see it filling up large areas of marshlands. As I have pointed out in the "Flora of Oxfordshire," it grows well in hedges on dry upland soils, to which the fruits have been blown by the wind from the reed-beds of the lowland regions. Dr Ridley holds that the vegetation of Krakatoa was practically destroyed by the great eruption, but in three years' time there had been with wind-borne or water-borne species brought as spores, seventeen species, as plumea or light-seeded plants five, and sea-borne plants six. Four bird-conveyed species came in fourteen years later, and twenty-three years later only twelve. The origin of modification for dispersal is treated of in a most illuminative manner. Indeed, throughout the work one is struck with the wealth of detail and apt illustrations, which will ensure the work the success to which it will surely attain. As regards wind-dispersal, Ridley quotes various authors who cite the long distances which stones and dust are conveyed, *e.g.*, fine dust of Quartz, 700 miles from land, and Genoa dust, 600 miles. *Calluna* and *Erica Tetralix* were blown across the Cattegat from the Swedish coast to Jutland, 110-120 kms. It seems likely that the plants of *Arenaria Sedoides* which grow on the shingle at Montrose were actually blown down from the mountains of Angus and Perth. Interesting details are given as to the Seeding powers of many species. One plant of the Shepherd's Purse yields 40,000 seeds. Its nearly universal dispersal is due to its pollification, to the readiness with which it is conveyed by animals. The Foxglove is also a profuse seeder, each plant may produce 100,000 seeds. In New Zealand it has become one of its most noxious weeds. Nor is the influence of ants left unnoticed. In Cyprus I saw Cyclamen plants, the seeds of which were being conveyed to narrow crevices in the rock by ants. In course of time the corm had to accommodate itself to a fissure $\frac{1}{8}$ inch wide, so that it became tabular as in biscuits. Tumble-weeds are those whose seeds, or young plants, detached from the soil, are blown over large tracts of country, *e.g.*, *Salsola Kali*, which has spread very widely in Australia, Chile, S. Africa, N. America, etc. In the Orchidaceae, numerous instances are given of the weight of the seeds—if weight is a proper term to be applied to such imponderable seeds. That of *Habenaria Gymnadenia* only weighs .000,008 grams. In *Orchis maculata*, 15,000 seeds weigh one gram. A plant may have thirty capsules, containing 186,000 seeds. The spore-bearing plants form an interesting chapter. The specially adapted fruits for wind dispersal are profusely and aptly illustrated, as is chapter two, which treats of Dispersal by Water—Ice, Streams, Rivers, and Floods. Here come in the two *Azollas* which Ridley gives for England, but I am not sure whether we can really

claim *caroliniana*. Some plants spread by Vegetative Reproduction, as *Elodea*. Of *Hydrilla* he says it may have been widely distributed in Europe at one time, but I think it is an arrival, not a survival. Detached Rhizomes form another method. This is seen in *Acorus*, *Phragmites*, *Sagittaria*, etc. Dispersal by Water. Other plants move in a mass in the water. The various kinds of Sudd and of its constituent vegetation are given as well as the grass lands of S. America. Other sections treated of include Floating Seeds and Fruits, and these have some good illustrations. *Polygonum Hydropiper* and *Persicaria* by the river at Kew must, he thinks, have been carried by the water for long distances. Once, years ago, in the dykes below Peterborough, the surface was covered with what, from a distance, I hoped was *Wolffia*. It was really the achenes of *Ranunculus sceleratus*, which covered the surface for more than a mile of dyke, a plank across the stream keeping them back on the surface of the slowly moving current. In the Botanical sequence of Bentham and Hooker is given a list of the plants dispersed by Rivers. Then follows a list of plants dispersed by animals, birds, reptiles, and batrachians, of which most valuable details are given, each page having something valuable. It is a magnificent compilation. Some of the illustrations are coloured. Chapter four illustrates the dispersal by simple adhesion " they are burrs they will stick," chapter seven, Adhesion by special modifications, and chapter eleven, Island Floras. The Azorean plant, *Erythraea Massonii*, is mentioned, but its correct and much older name is *Centaurium Scilloides*, of which full and fascinating details are supplied. The last chapter is devoted to the Dispersal of Orders and Genera. There is an excellent Bibliography, which, however, does not include the Adventive Flora of Tweedside, although that of Montpellier is given.

RONNIGER, Dr K. Die Thymus-Arten der Balkan Halbinsel. Ex Hayek Prod. Fl. Penins. Balcanicae. Band 2, pp. 337-382, 1930. Sixty-one species are described, of which *T. ilicianus*, *T. Kosaninii*, *T. Malyi*, *T. eximius*, *T. carstiensis*, *T. hercegovinus*, *T. Korbii* are new species. Of our British species, *T. Pulegioides* is the only one represented. There are nineteen varieties described.

ROYAL HORTICULTURAL SOCIETY, JOURNAL OF THE. September 1930. Edited by F. J. Chittenden, F.L.S. Masters Memorial Lectures, 1929 Stock: Scion Relationships, R. G. Hatton, M.A. English Garden Making under the Early Stuarts, H. Array Tipping. A most readable article, illustrated by permission of " Country Life," with some excellent photographs, those of Thorp Hall, near Peterborough, being very pleasing. The Genus *Viola*, the Nomimium and Dischidium Sections, Lt.-Col. E. Enever Todd, O.B.E. He alludes to the genus having about 500 species which possess 2000 to 2500 names, irrespective of hybrids. The Nomimium section has about 238 species, divided into 17 groups. 1. Of *V. odorata* he gives the range, delimitating its southern frontier from the Canaries westwards through Morocco, Sicily, Crete, the Crimea,

Lebanon, Caucasus and Iraq to Turkestan. North of this it is found only in Europe, excluding European Russia. Elsewhere in the world it has been introduced. An Eastern extension is given for *V. indica* Becker from North-west Frontier Province along the Himalayas to Sikkim, ascending to 10,000 feet in Kashmir. 2. *V. sepincola* Jord. is given as a full species, with no allusion to its being of hybrid origin. 3. *V. alba* Bess. 4. *V. hirta* L. The Rostrate Violets. 5. *V. mirabilis* L., under which is *V. pseudo-mirabilis* Coste. The author says it is only known from one place in France and one in Serbia, but this (teste Mrs Gregory) I have found in five British localities. 6. The American *V. rostrata*. 7. *V. silvestris* Reichb. 8. *V. Riviniana*. This is described as having pale green foliage and large lilac flowers, which suggests to me that I am colour-blind. As Col. Todd says, it is very floriferous, a single plant having over 350 flowers in a Kentish garden. It has a wide range, its area stretching from Madeira over the whole of Europe, going farther north than *silvestris*. It appears in two forms from the region between America and Japan, and is then taken across to the American continent by *V. rupestris* Schm. *V. arenaria* grows on the Karakorums at 12,000 ft. and on the Sierra Nevada, N. America, at 10,000 ft., descending to the coast in California. 9. *V. canina*. The Arosulate group. 10. *V. elatior* Fries, with which is put *V. persicifolia*. The bog Violets include *V. uliginosa* Bess., *V. libanotica* Boiss., and *V. Kusnezowiana* Bess. 11, The Bog violet, *V. palustris*, under which *epipsila* and many others are grouped. The Adnatae group has No. 12, *V. Gmeliniana*; 13, *V. Selkukin*; 14, *V. Parrinii* (a too comprehensive group); 15, *V. betonicifolia* Sm., but the later sections do not contain an European representative. To the Dischidium section he gives 9 species, of which *V. biflora* is a well-known continental species. In another page Mr Patrick M. Hall has alluded to this paper. Walnuts, H. Spence. Forty-four species are given by M. Dode. Due praise is given to *Juglans regia*, and most people will share in his regret that it is not more frequently planted instead of the ugly nondescript elms which so frequently desecrate the roadsides. In California the output is enormous, 43,000 tons of walnuts being produced in 1927. As many as 130,000 acres are occupied with their culture, but here the culture is scientific, the nuts are graded, and the best qualities are branded. The machine used is capable of marking 2000 walnuts a minute. They grow well in England, and a tree in the Thames valley in 1927 yielded a crop of 54 bushels. Good advice is given as to grafting, etc. T. Alexander Barnes—The Flora of the Equatorial Highlands of Africa, p. 266, gives some interesting details of the Island of Fernando Po, where he saw beautiful Lobelias and, in the streams, the striking Water Crinium (*Crinum natans*). St Thomas has six or seven endemic Begonias, one of which, *baccata*, grown at Wisley, reached seven or eight feet high. *Cistus gigantea* grows to 15 feet high and is common over the island, its great forked spikes weighing several pounds. A gigantic *Amorphophallus* was found on Fernando Po. It was about 4½ feet high. The Flora of the Ruwersori area proved very attractive.

SCHINZ, HANS. Festschrift. Pp. 787, 1929. Beiblatt zur Vierteljahrsschrift der Nat. Gesell. in Zurich. N. 15. With a capital photograph and an engraving of Dr H. Schinz. It contains thirty important articles, including the Flora of Maloja by Gustav Hegi. Braun Blanquet gives the Vegetation of the Atlas. C. Schroeter describes his Excursion in Ost-Java. Henri Spinner contributes à la biologie et à la phytogéographie de quelques phanerogames du Jura Neuchâtelois.

SPRATT, E. R., D.Sc., etc., and A. V. SPRATT, M.Sc., etc. BIOLOGY FOR SCHOOLS. A Text Book Suitable for School Certificates and Similar Examinations. Pp. 400. W. B. Clive, London Pictorial University Press, Ltd., 1931. This little work covers the syllabuses of London, Oxford, Cambridge, Durham, and the northern Universities School Certificate Examinations. "The work is essentially based on the observation of plants in their homes, and careful examination of their parts and functions from specimens." The book is quite useful for the class the authors appeal to. It is well arranged, crammed full of information, and is illustrated by 428 figures, the text occupying 48 chapters. The first is devoted to *Spirogyra* and *Chlamydomonas*, which illustrate life in a drop of water. Chapter two describes *Pellia*, chapter three, the Water Flower, and so on for the 138 pages which are occupied with the Botanical portion. 226 pages deal with the animal kingdom. Even the Parasites are described. A trifling error is to be seen in the title given to the plant of Dodder where Dodder is used to designate the Michaelmas Daisy. Trees are specimens treated of, but the sessile oak is misprinted *sessiflora*, instead of *sessiliflora*. There is an excellent photograph of an Oak trunk. The work can be cordially recommended. It is full of good material, and is a great improvement on many botanical text books.

STRASBURGER'S TEXT-BOOK OF BOTANY. Rewritten by Dr Hans Fitting (Bonn), Morphology; Dr Hermann Sierp (Cologne), Physiology; Dr Richard Hander (Stuttgart), Thallophyta, Bryophyta, Pteridophyta; Dr George Karsten (Halle), Spermatophyta. Sixth English Edition. Translated from the seventeenth German edition by W. H. Lang, M.B., D.Sc., F.R.S. Pp. 818, tt. 861, some coloured. Macmillan & Co., 1930; 31/6. The official plants mentioned under the natural orders are those of the British Pharmacopoeia, instead of those official in Germany, Austria and Switzerland. For assistance with these Dr Lang is indebted to W. O. Howarth. The confidence felt in this important work and its popularity among the teachers of Botany throughout the world are evidenced by the sales. Here it is no case of hashing up previously digested food, but from year to year adding new dishes, and in seeing that each article on the menu is the best obtainable. The first thing needed is to have the highest authority responsible for his section. Secondly, for English readers, to see that a competent translator is employed, and to make sure that the competency is not limited to the language but, behind that, that he has an adequate knowledge of Botany as a whole. Of these desiderata all have been acquired. Another most important matter is

to have a fitting setting, and Macmillan's have most decidedly presented us a most valuable volume in a most acceptable guise. Its typography, its bibliography, and its most profuse and excellent illustrations are all of the first order. It is needless to go into details in describing this Text-book. One can safely say in no single item is there any defect. To those who possess it, it will be a vide-mecum, and those who search it for information will not leave it with any feeling of disappointment. We have already alluded to the coloured figures which are excellent though the colouring is a little on the sombre side. One cannot speak too highly of this splendid edition.

TEMPERLEY, W. Some Cheviotland Plants, Vasculum 27, February, 1931.

TEMPLE, AUGUSTA A. FLOWERS AND TREES OF PALESTINE. With 30 illustrations by R. Marion Reynolds. Society for Promoting Christian Knowledge. Macmillan & Co., 1929. There is a short Glossary, then the commoner wild flowers and trees of Palestine are mentioned and briefly described in alphabetical order. The characteristic flowers of Palestine, the thorny plants of which are many, the trees, and much useful information are given. The coloured drawings by Miss Reynolds have already been noticed in our pages. They are characterised by very tender and graceful delicateness. No traveller through the Holy Land should be without this small and delightful volume. *Ranunculus sphaerospermos*, which grows in the Jordan, is omitted.

THOMAS, R. N. Flora of Paper-Mill Lime Waste Dumps near Glasgow, Journ. Ecol., p. 333, August 1930. The species detailed are all natives. The Willows also included the rare hybrids × *S. secernata* = *phylicifolia* × *purpurea* and *S. caprea* × *phylicifolia*, var. *bicolor*.

THURSTON, EDGAR. BRITISH AND FOREIGN TREES AND SHRUBS IN CORNWALL. Pp. 288, tt. 42. Published on behalf of the Royal Institution of Cornwall by the Cambridge University Press, 1930; 12/6 net. This is a most delightful volume in which our member has brought together a mass of useful information. The writer, with all his kindly vigour, is vividly depicted on the front page. The introduction is particularly useful, since early references are given. The mining industry and its connection with wood used for smelting is described in some detail. The references to the early botanists are very acceptable. The chapter on Evidence of Place-Names of Woods in the Middle Ages is especially useful. Mr Morton Nance supplies notes on the Cornish Names of Trees and Shrubs. He quotes from an old Cornish Vocabulary (B. M. Cott MSS. Vesp. A. 14). A short sketch is given of the chief Cornish parks and gardens. The list of trees and shrubs is in alphabetical order and occupies 210 pages, excellent illustrations being supplied. Measurements of the larger specimens of the various species are given. Under *Calluna*, the authorities for the varietal names *pubescens* and *speciosa* might have been given. Koch, in another place, is wrongly given in-

stead of Hull for the var. *pubescens*. I named the var. *speciosa*. Camellias, as might be expected, do well in Cornwall—a tree at Tiewood had 1200 white flowers. *Cotoneaster Simonsii*, as in other places, is seeding itself at Perranzabuloe. *Daboecia cantabrica* is also naturalised at the bottom of a valley from West Taphouse to Glynn Valley. The sweet smelling *Drimys Winteri* grows to nearly 50 ft. at Bosahan. There is a good figure of *Embrothium coccinium* 48 ft. high, as at Trevarrick Hall. *Erica lusitanica* is naturalised on the railway, but the locality is not mentioned. There is an array of Eucalypts. *Fuchsia Riccartoni* has naturalised itself in the Rocky Valley at Tintagel, etc. That most wonderful Hymalayan tree, *Magnolia Campbellii*, developed 500 blooms in 1921 at Bosahan. At Ludgvan, *Metrosideros lucida* flowers beautifully. *Polygonum polystachum* is another naturalised species. *Prunus communis* Huds. is said to be the wild plum, but does not *communis* = *P. spinosa* and *insititia*? I suppose *P. Padus* is only alien in Cornwall. The synonym *Pyrus domestica* should be added, or rather used instead of *Pyrus Sorbus*. At Ludgvan Rectory, the Waratah flowered splendidly as a plant 16 ft. high. There are good illustrations of the Cornish Elm, but its scientific name is *U. minor* Mill., not *U. nitens*, var. *stricta* Ait. This he holds is indigenous. The name of the Wheatley Elm is var. *sarniensis* (Loudon) = var. *Wheatleyi* Rehd. A separate chapter is devoted to the Coniferae, and good photographs of *Cryptomeria japonica* and *Sequoia* are supplied. The book is a most welcome addition to one's bookshelves, and there it will not be a stationary occupant.

WASHINGTON, UNITED STATES DEPARTMENT OF AGRICULTURE. N. 112, 1930. The constant issue of these most useful contributions continues with unbated zeal. Dr Griffith, April 1929, issues a circular of 34 pages, on the production of Hyacinth Bulbs, which is full of practical instruction.

WATSON BOTANICAL EXCHANGE CLUB, 1929-30. Forty-sixth Annual Report. Hon. Sec., H. Stuart Thompson. 2020 plants were sent in. Distributor, E. C. Wallace. J. Groves supplies a memoir of Arthur Bennett, and there is another by the Secretary of Mr C. E. Salmon.

WEISS, Prof. F. E. The Problem of Graft Hybrids and Chimaeras. Biolog. Rev., v., 231, 1930. The Bizarria Orange, *Cytisus Adami*, *Crataegomespilus* are described, and their history given. Also *Pirocydomia*, *Pirocrataegus Willei*, *Amygdalopersica*. *Solanum* and *Lycopersicon* are others well detailed. Winkler in 1909 was able to record cases of reversion of certain branches of *Solanum tubingense* to *S. nigrum*, thus bringing his newly created graft hybrids into line with *Cytisus Adami*, etc. The Pelargoniums are also discussed.

WILLIAMS, R. O. Flora of Trinidad and Tobago. Part 2, Malvales, R. O. Williams and E. E. Cheeseman. Pp. 23-164, 1929. Dept. Agric. Govt. Printer, Trinidad; 6/-. Part 3. PARIETALES—GERANIALES. Pp. 165-196. OLACALES—SAPINDALES, 1930. A very useful publication in bold clear type, with generic and specific keys.

OBITUARIES.

BORODIN, IVAN PARTHEVITCH. Born at Novgorod in Russia, 1847; died at Moscow, 1930. He was educated at the University of St Petersburg, where he was professor of botany from 1887 to 1890. He was also for 30 years a professor at the St Petersburg Forest Institute. He founded the biological freshwater station at Bologoje in 1897. Professor Borodin made botanical journeys in Siberia and the Caucasus, and wrote standard books on his science.

CARROTHERS, NATHANIEL. Born at Farmagh Lisbellaw, Co. Fermanagh, January 9, 1852; died at Belfast, April 24, 1930. He was an assiduous worker at the counties of Antrim and Down, and added the rare Orchid, *Spiranthes Romanzoffiana*, to the latter county. He paid special attention to the adventive species and made a study of the plants imported with foodstuffs or merchandise into Belfast. For 38 years he had been a valued member of the Belfast Club and for nearly as long a member of its Committee. In 1925 he was made the third recipient of their medal, which had been instituted as a recognition of distinguished services to Science. Mr Carrothers had a pleasing and modest personality and his kindly and willing services were much esteemed by his comrades.

COMBER, JOHN. Born 1869; died 1930. Son of Edward Comber of Myddleton Hall, Lancashire. For the last nineteen years he had resided at Guildford. He was a well-known archaeologist, and had written 9 volumes on Sussex families, but he was also fond of British Botany and formed an Herbarium of 2000 sheets which will find a home in the Department of Botany, Sheffield.

DORMAN, Sir ARTHUR JOHN, Bart. Born at Ashford, Kent, August 8, 1848; died 1931. In 1868 he went to the north of England as an apprentice to the iron-making firm of Richardson, Johnson & Co., South Stockton. In 1876 he entered into partnership with Albert de Lande Long, and founded the firm of Dorman, Long & Co. Here was developed an enormous trade in bridge-building, steel and wire-work. In 1899 the firm was further enlarged by incorporating Bell Bros., of Cleveland, and subsequently many other undertakings. For many years Sir Arthur was an Alderman of the North Riding County Council. He had his K.B.E. in 1918, and was made Baronet in 1923. His fine estate at Grey Towers is a home for *Lathraea clandestina* (see *Rep. B.E.C.*, 751, 1928).

ENGLER, HEINRICH GUSTAV ADOLF. This eminent botanist was born at Sagan in Silesia, on March 25, 1844, and died at Berlin, October 10, 1930. He took his Ph.D. at the University of Breslau in 1866, the thesis

being a Monograph of the genus Saxifraga, his earlier education having been at Goepperlander Fermn under Cohn. In 1871 he became Custodian of the Botanical Institute at Munich. There he began a series of important additions to Systematic Botany—among them his elaboration of Martius' portentous work, the " Flora Brasiliensis." Kiel, and afterwards Breslau, had the advantage of his services as Professor, and there he founded the " Botanische Jahrbücher für Systematik Pflanzengeschichte und Pflanzengeographie." In 1889 he was fittingly chosen to fill the chair at Berlin, on the death of Prof. Eichler. Here his great powers had full scope, and with a valued series of collaborators the " Die Natürlichen Pflanzenfamilien " came into being. This is the rival of Bentham and Hooker's " Genera Plantarum," treating of the whole of the vegetable kingdom and the natural families, which has had a very wide range of acceptance throughout Europe, and even in Britain it has made great headway. The " Syllabus der Pflanzenfamilien " went through ten editions; in that of 1924 he had the assistance of Dr E. Gilg. There is no doubt that the " Pflanzenfamilien " was written in a fuller and more attractive manner than the arid verities of the " Genera Plantarum " showed. Engler also edited and produced, with the pecuniary aid of the Prussian Academy of Science, over a hundred volumes of " Die Vegetation der Erde," and the most useful " Pflanzenreich," which has driven out of the field the De Candolleian " Prodromus." This enormous literary work did not prevent Engler from building up a great Museum and foundation of the rich Botanical Garden at Dahlem-Berlin, the latter benefitting to a very great degree from Engler's travels in the tropics and from his wide range of friends the world over, and no more worthy sepulchre could be found for so distinguished a scientist to occupy. He kindly named my Saxifrages in 1889, and determined one I gathered on the south-eastern ridge of Ben Lawers as *Saxifraga groenlandica*, a plant new to Scotland. He told me he thought *S. sponhemica* was a good species. He travelled very widely, and delighted to help his fellow workers.

GODFERY, HILDA MARGARET. Born 1871; died at Guildford, September 17, 1930. Daughter of the late Henry Simpson, M.D., of Conway. Her very beautiful paintings, which we are glad to see are to be published by the Cambridge University Press, received the Gold Medal of the Royal Horticultural Society.

GRIERSON, ROBERT, of Glasgow. Born at Clondalkin, Dublin, and educated at Armagh School; died 1930. Coming to Glasgow, he served his apprenticeship as solicitor in the office of Theyden, Strang & Girvan, and in 1886 was appointed their Procurator. He was a member of the Natural History Society of Glasgow and acted for some time as the Treasurer and member of the Council. Botany was his hobby, although he made it very much his business, and he became one of the pioneers in the study of the alien flora of the Glasgow district. As a result of his work, many new and interesting species were added to the Clyde re-

cords, among them being a moss new to science. He did valuable work in the preparation of the Clyde Card Catalogue for the visit of the British Association to Glasgow in 1928. Nearly all his gatherings passed through my hands to name. A few of these were new to our List, and notices of them from time to time were published in our annual Report. His health gave way and he went to live in Dublin, where to the last he interested himself in the flora. The paper published after his death in *The Glasgow Naturalist*, vol. ix., pp. 5-51, 1929-1930, entitled "The Clyde Aliens," is an extremely good compilation in which he gives the chief areas yielding them. Included is a Moss new to the area, *Hypopterygium atrotheca* Dixon. This grew under the Tree Ferns on the Kibble. There are a very large number of adventives included in the list.

HENRY, AUGUSTINE. Born on July 2, 1857; died in Dublin, March 23, 1930. Educated at Queen's Colleges, Galway and Belfast, he took his L.R.C.P. from Edinburgh, and became M.A. of Cambridge and the Royal University of Ireland. From 1882-1890 he was in China as an Imperial Maritime Customs Medical Officer to the Customs station at Ichang. In 1888 he explored the practically unknown district of Hupek, which afforded 20 new genera, and 500 new species. Here he found the charming tree, *Davidia*, seeds of which were afterwards sent to Veitch by Ernest Wilson. In 1890 he returned to Europe but next year he again went to Shanghai, exploring Formosa, not then in the hands of Japan. In 1896 he studied Forestry at Nancy in France, and then went as reader in Forestry to Cambridge University. With H. J. Elwes was begun the valuable work on "The Trees of Great Britain and Ireland," 1906-1913, which included many of the foreign species which have been introduced. So much was this work appreciated, that it now stands at over four times its published price. From 1913-1926, he was Professor of Forestry in the College of Science, Dublin. He travelled widely, and his journeys in China were rewarded by the discovery of many interesting species which have been successfully introduced into Great Britain. He married (for the second time) a daughter of Sir Lauder Brunton, Bart. To our pages he contributed some excellent papers, and he was always very kindly disposed to our *Report*. I think in after times we feel that his interpretation of Miller's Elms left much to be desired, but he was not willing to reopen that page, wrong though he practically acknowledged it to be. It was evident that Moss and Henry used the name *U. minor* in a different meaning, since both could not be correct. A parallel case was a specimen of *Orchis latifolia* sent to the Rev. E. S. Marshall, who said it was good *incarnata*, but Linton thought that it was typical *latifolia*. As a matter of fact, both plants were *praetermissa*. So, too, *Ulmus minor* was really *stricta* Lindley, and *U. Plotii* was a distinct species. His work on the Poplars was decidedly valuable, and he laboured—not unsuccessfully—to show the virility of the first hybrids. His cheery presence and geniality will be greatly missed, and he had that optimism which carried not only himself but many of his friends into new fields of observation.

HURRY, J. B. Born 1868; died February 15, 1930. Formerly Medical Officer of Health for Reading, he instituted a wild-flower garden at Reading in which were many medicinal plants. He was a member of our Society for some years. He was especially interested in the Woad (*Isatis*), on which he had compiled valuable material, and has recently issued a well illustrated volume.

HOLMES, EDWARD MORELL. He was born at Wendover, Bucks, pleasantly situated at the foot of the Chiltern Hills, in January 1843, and died at Sevenoaks, September 10, 1930. His father was a Congregational Minister of Huguenot descent. Edward was educated at Boston Grammar School, and subsequently at Wimborne Grammar School, where, although he won a prize for Greek, his nonconformity was held a reason for awarding it to a lower boy. When only fourteen years of age he was apprenticed to a chemist and druggist in Cheyne Walk, Chelsea, where he met the Sage of Chelsea as a customer. After a short service of two years he passed the minor examination of the Pharmaceutical Society, when he was only seventeen, the youngest graduate to that date. This was done after only one course of lectures at the Pharmaceutical Society. Holmes was essentially one of those who studied for himself, with its immense compensating advantages and yet with some inevitable drawbacks. In 1863 while at Plymouth he won the Herbarium Medal, with only fourteen fewer plants than those sent in by the Silver Medallist. In after days he himself served as examiner for the competition. Like myself, he was proxime for the Pereira Medal. His knowledge of drugs was widely recognised. He was an F.L.S., Fell. Bot. Soc. Ed., Royal Hort. Soc., Hon. Member Essex Field Club, Corresponding Member Glasgow Nat. Hist. Soc., V.-P.S.E. Union Sc. Soc., Flückiger Gold Medallist, and Hanbury Medallist, 1915. To the *Victoria County History* he contributed papers on the Cryptogamic Botany of Cornwall, Devon, Hants, Dorset and Kent. For his native county of Buckinghamshire, when I was writing the Botany for that county, he generously gave me his notes on its Cryptogamic plants; among those *Ramalina farinacea*, f. *phalerata*, was discovered by Holmes from Stowe Park. Holmes was a rapid and indefatigable walker, his quick sight detecting plants as he was racing along at five miles an hour. It was a revelation to see him wading in shallow sea-water after the algae, many new ones being added by him to the British List. In his home in Kent, his garden contained many rarities, and he took up the question of drug growing during the war with enormous, indeed, with almost too great, zeal. In the 'nineties, when I was an examiner, I saw much of him and of his work at Bloomsbury Square. Rarely had a Museum a more useful Curator, and his services received a public thanks by the Council. His wife, Catherine Appleford, who survives him, was a worthy help-mate, and herself was a very competent Lepidopterist. A few years back Holmes was knocked down by a motor car and his foot had to be amputated, but although this and his painful arthritic troubles limited his walking powers he continued to the last in full pos-

session of his faculties, and his love for his Sevenoaks garden knew no diminution. He had the consolatory thought that his ready and eager services have been given so generously to a wide and sympathetic circle of Pharmacists throughout the world. He was honoured by many foreign Societies. When I began collecting specimens he helped me in naming them, albeit not always correctly. I remember *Anthoxanthum* was wrongly identified as *Agropyron repens* and my specimen of *Conringia orientalis* was labelled *Brassica*.

MOSS, CHARLES EDWARD. Born 1872; died 1931. The son of a Nonconformist minister, he was born near Stockport, on February 7, 1872. He became a teacher under the Halifax Education Committee, and later a student at the Old Yorkshire College where, with Dr W. G. Smith, he mapped the vegetation of the Yorkshire moors in 1903. He had also frequently contributed to, and assisted in editing, the Halifax Naturalist. Then he became Science Master at Sexeys School, Bruton, for two years, and in 1907 published "The Vegetation of the Bath and Bridgwater District." In order to obtain his doctorate in 1906-7 he went to Manchester. There he published his studies of "The Peat Moors of the Pennines," and in 1913 this appeared as a separate volume, enriched with copious ecological details. In 1910, in collaboration with W. M. Rankin and A. G. Tansley, a valuable paper on "The Woodlands of England" was prepared. His next move was to Cambridge, to which he went as Curator of the Herbarium, and, as is not unusual with such Institutions, at a totally inadequate salary, but the appointment bore promise of future rewards. At Huntingdon, a retired solicitor, E. W. Hunnybun, had for some time been making drawings of our English plants. They were quite charming as drawings but were defective in detail. He offered them to me in order that the Delegates of the Clarendon Press might publish them as a new Sowerby. This they were not willing to do, nor could I strongly advise them to publish such inadequate drawings. They were shown to Moss, and he thought them worthy of reproduction, and his vivid personality induced the Cambridge University Press to undertake the work. At that time we were in close relationship, and in a very large number of ways I helped him. His first idea was that we should jointly prepare the text. This he afterwards thought should be brought out in his name alone as he considered it might bring him a College Fellowship, but he supplied a long list of Families which he wished me to write for the Flora. Notwithstanding his methods I prepared the genera *Montia* and *Cerastium* for the second volume, but as the material for it had already taken up the allotted space they did not appear until the third volume. The first volume had been postponed. It is generally admitted that, notwithstanding the large amount of excellent worth he had put into it, the Flora was not a success. It was on a too pretentious scale, and the action taken by the Cambridge Press, of ceasing the publication, especially after the rancorous expressions in the preface to the last volume, was distinctly wise. This preface was written at a time when he had serious domestic

trouble and the tone displayed was, perhaps, due to overwork and worry. Later he went to South Africa and became Professor at the South African School of Mines and Technology at Johannesburg. Here he did good work, especially at the Taxonomic side of Botany, and for ten years made an intensive study of the Flora of the Transvaal and adjacent territory. There is no doubt that if his life had been prolonged he would, with his incisive mind, have made most substantial additions to our knowledge of the flora of that country. His premature and regrettable death was caused by a lung hemorrhage at the early age of 58. There is a very good and appreciative memoir of him by Mr J. Ramsbottom in *Journ. Bot.*, 20, 1931.

OSTENFELD, Prof. CARL EMIL HANSEN. Born 1873; died 1931. In 1911 he came to Britain with the International Phytogeographical Excursion, travelling with us for nearly six weeks round Great Britain, when he was certainly one of the most active of the field workers. He had an excellent knowledge of North European plants. He it was who showed us the white water-lily, *Castalia alba*, var. *occidentalis* (which was at first thought to be *candida*). He also pointed out the *albescens* form of *Sonchus oleraceus*; the yellow-berried form of *Pyrus Aucuparia*; the hybrid of *Erica Mackayi*, which he named × *E. Praegeri* Ost., and *Alchemilla acutidens*. His paper in our *Report* was a very valuable one. He confirms *Euphrasia minima* as British, and in this he is supported by Dr Wettstein. He was also a visitor to the British Association meeting at Dundee. He went to Australia with the British Association, but he broke his ankle on the outward voyage, so he was prevented from attending most of the meetings. With his wife he was present at the Botanical Congress at Cambridge in 1930, and he delivered the Master's Lectures in 1927, the subject being "The Present State of Knowledge on Hybrids between Species of Flowering Plants." He also has published notes on the Cytology in *Hieracia*, etc. When I was at Copenhagen, I visited the fine Herbarium at the Botanic Gardens, and we spent some time in looking at the Palmate Orchids, which are well represented in it. He fully agreed with me as to the distinction of *Orchis maculata* and *Fuchsii*. He wrote the Taxonomy for Warming's "Flora of the Faroes," which is an excellent piece of work. He contributed special papers to the Reports of the Phytogeographical Society. On our long journey together through Britain one became greatly attracted to him, and one could give him whole-hearted affection and gratitude for his excellent field-work. The Society suffers the loss of one of its most useful Honorary Members.

ROBERTSON, ARCHIBALD, The Very Rev. the Lord Bishop of Exeter, D.D., LL.D. He was born at Sywell Rectory, Northants, June 29, 1853, and died at Oxford in March 1931. He was educated at Bradfield College, Berks, and then came to Trinity College, Oxford. He took a first class in Lit. Hum. in 1876, and became Dean of his College in 1879-1883. He was greatly interested in the local flora, and in my second year at

Oxford I made his acquaintance and together we scoured the countryside pretty thoroughly, another Trinity Don, Franklin T. Richards, often being one of the party. Mr Armstrong, of Queen's College, and Dr Robertson, added *Phegopteris Dryopteris* to the County of Bucks from Bollard's Wood. I remember vividly the task of rediscovering the small patch of it in that large wood. He was also one of the last of Oxford botanists to see *Ophrys Sphegodes* near Burford. In 1883 he went with me to Scotland, and in order to be near the mountains of Aberdeen and Angus we slept at a keeper's cottage in Glen Callater. I had told him that there we should meet one of the great ladies of Britain. "What, in a keeper's cottage as a keeper's wife," he said. Here we enjoyed the kindly housekeeping of Mrs Michie. A few days after leaving Callater he said, "You were quite right; she is a great lady." As a young girl she had been for some time coffee-room maid at Balmoral, and this lonely keeper's cottage was frequently made use of by Queen Victoria, where she would do her sketching, and Mrs Michie would prepare tea for the party, but whether to the Queen or to her Minister, the Duke of Richmond, or to more humble folk, she kept her head with an unflurried dignity. I can still in my mind's eye see the fireplace with its dark glossy crimson earthenware tea-pot put there to "draw," and very strong was its contents, carrying with it the strong flavour of cloves to give an added pungency. In this small cottage she brought up a large family. They were six or seven miles from Braemar, and in winter time there was severe privation. Once they were snowed up for a fortnight, and it was three days before they could get food supplies to the dog kennels. It was a grand view that opened out from the door-way, with the foreground occupied by the long level of Loch Callater. Corrie Kander lay nearly at its head. The waterfall coming from its upper rock marks the habitat of many a rare alpine, but it is not an easy climb. Tolmount, the mountain which is the water-parting of Aberdeen and Angus, fills up the view at the southern end. From Callater we climbed all those splendid hills—Lochnagar, Tom Buidhe, Glasmeall, Tolmount, leading to Glen Dole, Glen Fiagh, the magnificent Glen of Caenlochan and Little Culrannoch, the home of *Lychnis alpina*, and what a gathering of rarities we made. Passing through Blair Athol on our homeward way, he found a letter awaiting him offering him the Principalship of Bishop Hatfield's Hall, Durham, which he held with distinction from 1883 to 1897. Then he became Vice-Chancellor of the University of London from 1897-1903. From that date he was Lord Bishop of Exeter, 1903-1916, an office which he filled with dignity and with a steady purpose which had a greatly beneficial influence upon that Diocese. He was made Hon. D.D. of Durham in 1892, and LL.D. of Glasgow in 1901. He published many able and thoughtful theological works. In 1916, owing to a distressing attack of paralysis, he resigned his Bishopric and took up his residence at Oxford where, during the fourteen years of failing powers, he kept up his love of Botany. I used to show him the new discoveries of British plants, even when a bath-chair was his mode of locomotion. He liked to know all about them.

ROBINSON, WILFRED. The son of J. Fraser Robinson, the author of the "Flora of the East Riding of Yorkshire," he was born in 1884, and died at Aberystwyth in 1930. He was a research student at Manchester, where he became Lecturer in Economics, and Senior Lecturer in Botany. In 1926 he was appointed Professor of Botany at Aberystwyth University College. He was specially interested in the physiology of the Marine Algae. His premature death is greatly to be regretted.

WATT, Sir GEORGE, C.I.E., LL.D. Born at Meldrum, Aberdeen, 1851; died at Lockerbie, Dumfries, April 2, 1930. He was educated at Aberdeen and Glasgow. He was elected as the first Professor of Botany in the University College, Calcutta, in 1873. His great work was the "Dictionary of Economic Products of India," in nine volumes. For his services in organising the Delhi Exhibition of India he received the honour of Knighthood. In 1907 he published "The Wild and Cultivated Cottons of the World," and, in 1908, his handbook of the "Commercial Products of India." He also wrote a Monograph of the Primula.

WILSON, ERNEST H., V.M.H., M.A., D.Sc. Born at Campden, Gloucestershire, England, February 15, 1876; killed in a motor accident with his wife near New York, October 15, 1930. He was an Honorary M.A. of Harvard; D.Sc. of Trinity College, Connecticut, and Fellow of the American Academy of Arts and Science. He was educated at the Royal College of Science, then he went to the Botanic Gardens at Edgbaston and Kew. In 1899, under the auspices of Messrs Veitch, Wilson went to China and collected assiduously. In 1905 he published "Leaves from My Chinese Note-Book," and what a set of choice plants he discovered and brought home. The lovely *Rosa Moyesii* and its var. *rosea*, *Buddleia Davidii*, var. *magnifica*, *Berberis Wilsonae*, *Dipelta floribunda*, *Hydrangea Sargentiana*, *Salix magnifica*, are only a trifle of the wood perennials we owe to him. Sargent in "Plantae Wilsonianae," enumerates 705 new species and varieties, representing 429 genera, four of the latter being new. When Wilson and Rehder began the task of arrangement they were faced by 50,000 herbarium sheets which were gathered for Harvard University. His Rhododendrons have been mostly raised at Warley Place and Caerhays Castle, and a magnificent set they form. He was not less fortunate in his discovery of herbaceous plants, especially *Lilium regale* (probably the most popular Lily in North America, to which country he introduced it), *Paeonia Willmottiana*, *Thalictrum dipterocarpum*, *Aconitum Wilsoni* and *Hemsleyanum*, *Astilbe grandis*, *Buddleia Davidii*, *Artemisia lactiflora*, *Senecio clivorum*, *S. Wilsoni*. Very many Primulas were additions, including the almost unique *Cockburniana*. In addition to the magnificent *Lilium regale*, he added many other species, which are mentioned in his Monograph of the Lilies of Eastern Asia. His second visit to China resulted, at no small cost to himself, in securing the grand *Lilium regale* and the glorious yellow Poppy, forerunner of the blue genus. These and other treasures helped to make the Arnold Arboretum—aptly termed America's greatest garden—the

rich home of rare and beautiful trophies culled in many lands. His published works were many, but he had not the literary style of Farrer to make them so easily readable. They included "A Naturalist in Western China," 1913; "Plant Hunting," 1928, which has been reviewed in these pages (it included the results of his tour through S. Africa, India, Ceylon, Australia, Tasmania and New Zealand, and forms one of the most readable of his works); "The Romance of Our Trees," 1920; "America's Greatest Garden," 1925, which gives a good account of the Arnold Arboretum; "Aristocrats of the Garden," 1916; "More Aristocrats of the Garden," 1928; "The Conifers and Taxas of Japan," 1915; with Rehder, a "Monograph of Azaleas," 1921; "Cherries of Japan," 1915; "Lilies of Eastern Asia," 1925. He received the Victoria Medal of Honour, the Veitch Memorial Medal, and the G. R. White and Hilaire Medals. In 1919 he became assistant to Sargent at the Arnold Arboretum, and on his death in 1927, Wilson became its Keeper. On October 15, 1930, as he and his wife were motoring back from visiting their daughter, the car skidded on some wet leaves, shot across the footpath and through a wooden fence at the top of an embankment 40 ft. high. The car then turned over in the air and, plunging downwards, landed bottom upwards against the mill wall at the foot of the bank, pinning the two occupants under the body. Mrs Wilson (née Ellen Ganderton of Edgbaston), was killed outright, and Mr Wilson died shortly after he had been taken to the adjacent Worcester Hospital. Their dog leapt from the car in its downward flight and escaped unhurt. Wilson was a frequent contributor to the *Gardeners' Chronicle*. His second expedition to China was in 1914, and in 1919 he went to Korea and Formosa. It will be remembered that owing to a landslide when searching for *Lilium regale* he broke his leg. His funeral was very largely attended by prominent horticulturists, and the floral tributes were numerous and beautiful.

WREN, RICHARD CRANFIELD, J.P., F.L.S. Born in 1861; died at Westcliff-on-Sea, July 24, 1930. He was a member for a few years, but his interests were not Botanical. He entered the firm of Potter and Clarke in 1883, becoming a partner in 1896, and subsequently a Director of that firm, which specialised in drugs. He wrote for the "Potter's Cyclopedia of Botanical Drugs," which went through three editions, the last one having been prepared with the assistance of E. M. Holmes. Mr Wren in later years visited South and West Africa and Canada.

NEW COUNTY AND OTHER RECORDS.

ABBREVIATIONS.—*Rep. B.E.C.=Report of the Botanical Society and Exchange Club; Trans. Bot. Soc. Edin.=Transactions of the Botanical Society of Edinburgh; Wats. B.E.C.=Report of the Watson Botanical Exchange Club; Devon. Tr.=Transactions of Devonshire Association of Science, &c.; Journ. Bot.=Journal of Botany; Nat.=Naturalist; N.W. Nat.=North Western Naturalist*, ed., A. A. Dallman; *W.F. Mag.=Wild Flower Magazine*, ed., Mrs Dent; *Fern Gaz.=British Fern Gazette*, ed., F. W. Stansfield; *Rep. Marlb.=Report of the Marlborough College Natural History Society; R.I.C.=Journal of the Royal Institute of Cornwall; Rep. Winton.=Report of the Natural History Society of Winchester College;* †=Adventive; *=New County Record (in the case of adventive plants this is only rarely added); ! placed after a plant signifies that the compiler has seen a specimen; ! placed after a locality that the compiler has seen it there; × placed between two scientific names or before a binomial means that the plant is a hybrid; 52, &c., numbers following a county, refer to the Vice-county in *Topographical Botany*; [] enclosing a record mean that confirmatory evidence is needed.

We have to thank the Director of the Royal Botanic Gardens, Kew; Mr J. Fraser, Mr W. O. Howarth, Prof. C. H. Ostenfeld, Prof. O. E. Schulz, Dr Probst, Dr Ronniger, Dr J. Murr, Dr E. Almquist, Dr H. Schinz, M. Jaquet, Dr Aellen, Dr Drabble, Mrs Gregory, Mr C. E. Britton, Dr Dahlstedt, M. Patrice de Riencourt de Longpré, Col. A. H. Wolley-Dod, Mr I. A. Williams, Dr Zahn, Mr W. H. Pearsall, Mr H. W. Pugsley, Mr A. R. Horwood, Mr W. Watson, Mr D. Lumb, Mr C. V. Marquand, Rev. H. J. Riddelsdell, and others who have rendered critical assistance.

1/1. CLEMATIS VITALBA L. Canal-side, Berwyn, Denbigh, WEBB.

2/4. THALICTRUM MAJUS Jacq. Yaton Sluice, S. Northumberland, HESLOP HARRISON in *Vasculum*, 118, 1929.

6/4. RANUNCULUS AURICOMUS L., var. RENIFORMIS Kittel. Newton Longville, Bucks, DRUCE.

6/6. R. LINGUA L., var. GLABRATUS Wallr. Freshwater, Isle of Wight, P. M. HALL.

6/7. R. FLAMMULA L., var. ANGUSTIFOLIUS Wallr. Widdy bank, Durham, DRUCE; Thursley, Surrey, J. G. LAWN.

Var. OVATUS Pers. Near Kingthorpe Pickering, N. Yorks, FLINTOFF.

6/10. R. SARDOUS Cr. Tidford, E. Cornwall, THURSTON. The type.

6/12. R. OPHIOGLOSSIFOLIUS Vill. In considerable quantity this year in Gloster, and seeding freely, DRUCE.

6/13. R. PARVIFLORUS L. Near Gotham, Notts, BULLEY.

6/19. R. FALCATUS L. Wool-waste, Wheatley, Halifax, LEES MS.

(The BATRACHIA have been named by W. H. PEARSALL.)

6/20. R. FLUITANS Lam., var. CAMBRICUS (Ar. Benn.) Dr. In Llyn Coron (locus classicus), but in smaller quantity than formerly, 1930, DRUCE.

6/23. R. DROUETII F. Schultz. Grangemouth, Stirling, DRUCE.

6/24. R. HETEROPHYLLUS Weber, var. SUBMERSUS Bab. Tobber, Co. Clare, O'KELLY.

6/26. R. PSEUDO-FLUITANS B. & F. River Ely at St Faggans, Glamorgan, Miss VACHELL.

6/28. R. BAUDOTII Godr., var. MARINUS (A. & F.). Moat of Cardiff Castle, Glamorgan, Miss VACHELL.

6/29. R. TRIPARTITUS DC. St Mewan, E. Cornwall, TRESIDDER (an interesting new locality); Bilstone, Devon, Rev. W. KEBLE MARTIN in *Dev. Rep.*

6/33. R. FICARIA L., var. (or sub-var.) ALBIFLORA Druce. Marlborough, Wilts, Mrs WEDGWOOD; Helston, Cornwall, known for over forty years since which from a single plant it has increased now to 40-50 plants, showing its permanence. Found by Mr R. Kempthorne. "Petalis albis," 1931, G. C. DRUCE.

*7/2. CALTHA RADICANS Forster. Near Llyn Coron, Anglesey, DRUCE.

†9/2. HELLEBORUS FOETIDUS L. Walmer Shrubbery, E. Kent, CASTALIA, Countess of GRANVILLE.

†13/3. DELPHINIUM AJACIS L., flore pleno. Hillside, S. Lancs, HOLDER and WAGSTAFFE.

20/1. CASTALIA ALBA (L.) Link, var. OCCIDENTALIS (Ost.). Mallaig, Morar, Westerness, WEBB.

21/2. PAPAVER RHOEAS L., var. CAUDATIFOLIUM Fedde. Flowers pale pink. Brighton Downs, E. Sussex, Miss ROBINSON.
†Var. WILKESII Druce. Pixey's Mead. Hortal, Oxford, DRUCE.

21/4. P. LECOQII Lam. In great abundance near Cothill, Berks, DRUCE; near Hitchin, Herts, Mrs MACALISTER HALL. We both noticed independently that while the fresh plant has the yellow sap, in a few

hours after being picked it loses the yellow tint. In my case it was so marked that I had to go back the next day to see if I had not picked *dubium* by mistake.

21/6. P. HYBRIDUM L. Bristol, W. Gloster, C. & N. SANDWITH. By an accident it is omitted from the Northants Flora. "First record, Rev. M. J. Berkeley, Oundle. Stone Pits, Yardley Hasting, ROGERS."

28/1. ESCHSCHOLZIA DOUGLASII Walp. Pixey's Mead. Hortal on refuse, Oxford; waste ground, Grangemouth, Stirling, DRUCE.

32/4. FUMARIA PURPUREA Pugsl. Beaumaris, Anglesey, 1930, DRUCE.

32/9. F. BASTARDI Bor. *Axbridge, N. Somerset, C. & N. SANDWITH; Holyhead, Anglesey; Drummore, Wigtown, DRUCE.

35/2. RADICULA SYLVESTRIS (L.) Dr. Ringwood, S. Hants, L. B. HALL.

†39/6. CARDAMINE TRIFOLIA L. Underby, Westmorland, Mrs LAURENCE DRUMMOND.

*43/4. DRABA MURALIS L. Bosahan, Cornwall, Miss CLARICE VIVIAN.

*44/1. EROPHILA MAJUSCULA Jord. Bishop's Teignton, Honiton, Devon, Rev. W. KEBLE MARTIN.

45/4. COCHLEARIA MICACEA E. S. Marshall. In the river-bed between Tyndrum and Crianlarich, Perth, DRUCE; at 2500 ft. on Micklefell, Yorks, LEES.

45/6. C. SCOTICA Druce. Loch Ness, Easterness, 1921, WEBB.

†46/1. TETRACME QUADRICORNIS Bunge. Alien. Wool-waste, 1890, *Halifax Fl.*, 305, 1904.

†49/3. SISYMBRIUM ALTISSIMUM L. Beaumaris, Anglesey, etc., Miss ARMITSTEAD; Grangemouth, Stirling, DRUCE.

†49/4. S. ORIENTALE L. Near Burton-on-Trent, Derby, DRUCE.

49/6. S. OFFICINALE (L.) Scop., var. LEIOCARPUM DC. Burton-on-Trent, Staffs; Grangemouth, Stirling, DRUCE.

†51/1. CONRINGIA ORIENTALIS (L.) Dum. Tresillian, Cornwall, in garden ground, C. NICHOLSON; Gallows Point, Penros, Beaumaris, Anglesey, Miss ARMITSTEAD.

†54/20. BRASSICA GALLICA (Willd.) Dr. Bristol, W. Gloster, C. & N. SANDWITH; Grangemouth, Stirling, DRUCE.

†55/2. DIPLOTAXIS MURALIS (L.) DC. Rhosniger, Beaumaris, Anglesey, Miss ARMITSTEAD.

(The BURSA have been kindly determined by Dr E. ALMQUIST.)

59/2. B. ABSCISSA (E. At.). Hitchin, Herts, H. PHILLIPS.

59/4. B. BATAVORUM (E. At.). Pegsdon, Beds; Hitchin, Herts, H. PHILLIPS; Forbury, Berks; Logan, Wigtown, DRUCE.

59/5. B. BELGICA (E. At.). Forbury, Berks, DRUCE.

59/6. B. BREMENSIS (E. At.). Pampisford, Cambs, H. PHILLIPS.

59/7. B. BRITTONII (E. At.). Clifton, Beds, H. PHILLIPS; Burton-on-Trent, Staffs; Drummore and Logan, Wigtown, DRUCE.

59/8. B. CONCAVA (E. At.). Waste heap, Welwyn, Herts, H. PHILLIPS; Walton, Lancs, TRAVIS.

59/9. B. DRUCEANA (E. At.). Hitchin, Herts, H. PHILLIPS; Trearddur Bay, Anglesey; Market Harborough, Leicester; Devizes, Wilts, DRUCE.

59/10. B. GALLICA (E. At.). Callander, W. Perth; Drummore, Wigtown; Loddon Bridge, Berks, DRUCE.

59/12. B. GROSSA (E. At.). Hitchin, Herts, H. PHILLIPS.

59/16(2). B. LAEVIGATA E. At. Netherton, S. Lancs, TRAVIS; Garston, Berks, Miss TODD; Market Harborough, Leicester; Loddon Bridge, Berks; Killin, M. Perth; Creetown, Kirkcudbright; Drummore, Wigtown, DRUCE.

59/17. B. MEDITERRANEA (E. At.). Hitchin, Herts, H. PHILLIPS; Sapperton, E. Gloster, DRUCE.

59/20. B. PATAGONICA (E. At.). Hitchin, Herts, H. PHILLIPS; Devizes, Wilts; Oxford, DRUCE. This is the Burgh St Margarets, Norfolk, plant of Rev. R. J. Burdon. See *Rep. B.E.C.*, 222, 1929.

59/20(2). B. PERGROSSA (E. At.). Waste heap, Welwyn, Herts, H. PHILLIPS.

59/24. B. ROBUSTA (E. At.). Welwyn, Herts, H. PHILLIPS.

59/26. B. TREVIRORUM (E. At.). Hitchin, Welwyn and Wymondley, Herts, H. PHILLIPS; Wilbury Hill, Beds; Denham, Bucks; Barras, Westmorland, DRUCE.

59/27. B. TURONIENSIS (E. At.). Hitchin, Herts; Brandon, E. Norfolk, H. PHILLIPS; Grangemouth, Stirling, DRUCE.

59/28. B. VIMINALIS (E. At.). Denham, Bucks, DRUCE.

†60/1. CORONOPUS DIDYMUS Sm. Gallows Point, Beaumaris, Miss ARMITSTEAD.

†61/3. LEPIDIUM DRABA L., var. SUBINTEGRIFOLIUM Mich. Ilkeston, Derby, BULLEY; type increasing near the beach, Llanddona, Anglesey, Miss ARMITSTEAD.

†61/8. L. PERFOLIATUM L. Birkdale, S. Lancs, HOLDER and WAGSTAFFE.

66/1. TEESDALIA NUDICAULIS (L.) Br. Plentiful near Gainsborough, N. Lincs, H. B. WILLOUGHBY-SMITH.

†68/1. ISATIS TINCTORIA L. Burton-on-Trent, Staffs, DRUCE and CURTIS.

†79/1. ERUCARIA HISPANICA (L.) Dr. Splott, Cardiff, Glamorgan, R. L. SMITH.

†82/2. CHORISPERMUM TENELLUM Br. Bristol, W. Gloster, C. & N. SANDWITH; Burton-on-Trent, Staffs, DRUCE.

†83/1. CLEOME SERRATULA Pursh. Sydenham Station, Co. Down, C. D. CHASE in *Ir. Nat.*

†85/1. RESEDA ALBA L. Bude, Cornwall, Rev. J. H. ADAMS.

†85/5. R. STRICTA Pers. Splott, Cardiff, Glamorgan, R. L. SMITH.

88/3. VIOLA SILVESTRIS Lam., var. PUNCTATA Druce. Andoversford, W. Gloster, Miss ABELL; Riever Wood, Berks, and N. Wilts, DRUCE.

88/4. V. RIVINIANA Reichb., var. DIVERSA Greg. The Lizard, Cornwall; Stonesfield, Oxon, DRUCE; Knebworth, Herts, small form, H. PHILLIPS.

Var. NEMOROSA Neum. Knebworth, Herts, H. PHILLIPS; Bix, Oxon; Bradenham, Bucks, DRUCE.

Var. MINOR Greg. Br. Viol., p. 63. Woodborough, Notts, BULLEY.

×SILVESTRIS = INTERMEDIA Reichb. Albury, Herts; Shefford Woodlands, Berks, DRUCE.

88/5. V. RUPESTRIS Schmidt, var. GLABRESCENS Becker. Ogmore Downs, Glamorgan, Miss VACHELL.

88/6. V. CANINA L., var. PUSILLA Bab. Hitchin, Herts, H. PHILLIPS.

×LACTEA Sm.=PUMILIFORMIS R. & F. Gower, Glamorgan, MRS DAVID.

88/7. V. LACTEA Sm. Gower, Glamorgan, Mrs DAVID.

×RIVINIANA=V. CURNOWI Druce. The Lizard, Cornwall, 1929, DRUCE.

×RIVINIANA=var. DIVERSA. The Lizard, Cornwall, DRUCE, det. P. M. HALL.

×CANINA. Hatchett's Pond, S. Hants, P. M. HALL.

88/8. V. ODORATA L., var. IMBERBIS (Leight.) Hensl. Cothill, Berks, DRUCE.

Var. DUMETORUM (Jord.). Tidbury Ring, near Bullington, S. Hants, P. M. HALL.

Var. SUBCARNEA Jord. With above.

88/9. V. HIRTA L., var. FOUDRASII (Jord.) R. & F. Farley Mount, S. Hants, P. M. HALL.

Var. INCONCINNA J. Briq. Stonesfield, Oxon, DRUCE.

Var. PROPERA (Jord.) Gillot. Farley Mount, S. Hants, P. M. HALL.

Var. VARIEGATA Greg. Farley Mount, S. Hants, P. M. HALL.

×ODORATA. Stonesfield, Oxon, DRUCE; Tidbury Ring, S. Hants, P. M. HALL.

88/12. V. EPIPSILA × PALUSTRIS = R. RUPRECHTIANA Borb. Caerphilly Mountain, Glamorgan, Miss VACHELL, teste Mrs GREGORY.

(The PANSIES have been kindly determined by Dr ERIC DRABBLE.)

88/15. V. VARIATA Jord., var. SULPHUREA Drabble. Highdown, Herts, H. PHILLIPS.

88/19. V. LEJEUNEI Jord. Mayfield, Sussex, Miss PICKARD.

88/22. V. AGRESTIS Jord. Hambledon, Bucks, DRUCE.

88/23. V. SEGETALIS Jord. Weed in Botanic Garden, Oxford, DRUCE; Walmer, E. Kent, CASTALIA, Countess of GRANVILLE.

88/25. V. LATIFOLIA Drabble. Tiverton, N. Devon, Col. WATTS in *Dev. Rep.*

88/27. V. ANGLICA Drabble. Walmer, E. Kent, CASTALIA, Countess of GRANVILLE; Hennoch, S. Devon, Miss LARTER.

88/28. V. DESEGLISEI Jord. Highdown, Herts, H. PHILLIPS.

89/2. POLYGALA VULGARE L., var. GRANDIFLORA. Gentian Hill, Galway; Blackhead, Co. Clare, very near to *Babingtonii*, DRUCE.

89/4. P. DUBIUM Bellynck. Hayle, Cornwall; Holyhead, Anglesey, DRUCE. This group needs further study. Wayting Hill, Beds, with intermediates, LITTLE.

Var. DUNENSE Dum. Near Port Talbot, Glamorgan, SMITH and MELVILLE.

92/2. DIANTHUS DELTOIDES L. Frilford Golf Course, Berks, Hon. Mrs GORE. Perhaps introduced with grass-seeds, since Col. Dr Smith found *Silene nutans* there also. Near Gomshall, Surrey, Mrs FARRANT, ex F. CLARKE.

†95/5. SAPONARIA ORIENTALIS L. Hull, S.E. Yorks, WATERFALL, teste LEES.

96/1. SILENE MARITIMA Sm. Farne Isles, Northumberland, T. R. GODDARD. Luxuriant specimens.

96/2. S. ANGUSTIFOLIA S. & T. Crinan Canal, Argyll, Mr RENNIE.

†96/2(2). S. COMMUTATA Guss. Alien, S. Europe. Shipley, Yorks, LEES MS.

†96/3. S. CONICA L. Burton-on-Trent, Staffs, DRUCE.

†96/5. S. ANGLICA L. Burton-on-Trent, Staffs, specimen approaching *S. gallica*, but having the small corolla of *anglica*, DRUCE.

†96/7. S. GALLICA L. Burton-on-Trent, Staffs, DRUCE.

98/1. LYCHNIS FLOS-CUCULI L. A pretty double-flowered form from Martham Broad, E. Norfolk, LEWIS R. LLOYD.

98/3. L. ALBA × DIOICA. Penalt Ferry, Glamorgan, Miss VACHELL.

98/4. L. DIOICA L. A much more variable species than is generally supposed. Miss Vachell sends from Glamorgan several forms. One is an autumnal state in which the plant has been cut over and the newer growth shows a much branched stem with numerous small flowers.

†98/10. L. CORONARIA (L.) Desr., var. OCULATA Lindl. Meanwood, Eaglestone [7874], LEES MS.

100/1. CERASTIUM ERECTUM (L.) Coss. & Germ. Gallows Point, Penrhos, Anglesey, 1930, Miss ARMITSTEAD.

100/3. C. ALPINUM L. Loch na Lairige, M. Perth, 2800 ft., typical, DRUCE.

100/5. C. VULGATUM L. (vel TRIVIALE), forma HANBURYENSE Druce. Leaves fleshy, glabrous, breaking readily. Stems with bifarious hairs, petals very slight, exceeding sepals. Found by Mr F. J. HANBURY near Thurso, and grown by him at Brockhurst for many years. At Potterne, too, it has retained its characters unchanged, DRUCE.

100/7. C. PUMILUM Curt. Plentiful and luxuriant this year, as on Durdham Downs, W. Gloster; Churn Downs, Berks, DRUCE.

100/9. C. TETRANDRUM Curt. South Stack, Anglesey, Miss VACHELL. Its luxuriant and semi-glabrous fleshy leaves and pentamerous state at first puzzled one, but it comes under my *luxurians*.

†100/12. C. TOMENTOSUM L. Grassington, Yorks, LEES !. A garden straggler.

101/3. STELLARIA MEDIA Vill., var. APETALA (Ucria). Bournemouth, S. Hants, L. B. HALL.

101/7. S. GRAMINEA L. A broad-leaved, short-petalled form, on the border of Llyn Coron, Anglesey, DRUCE.

†102/17. ARENARIA LARICIFOLIA Lapeyr. Hutton Conyers, Yorks, 1861, LEES.

103/1. SAGINA NODOSA (L.) Fenzl, with the var. (?) MONILIFORMIS Lange. Common in flower this year, Winton, Westmorland; Widdy bank, Durham; Conistone, Yorks; Glen Luce, Wigtown, DRUCE.

103/4. S. SAGINOIDES Karst. Loch na Lairige, M. Perth, DRUCE.

103/5. S. SCOTICA Druce. Loch na Lairige, M. Perth, DRUCE; Cuchullin, Skye, SLEDGE.

103/7. S. CILIATA Fr. Glynde, E. Sussex, Miss PICKARD.
Var. FILICAULIS (Jord.). Belfry wall, etc., Llandaff, Cardiff, Glamorgan, Miss VACHELL.

104/2. SPERGULA SATIVA Boenn. Charterhouse, Mendip, Somerset N., N. SANDWITH.

†108/1. CLAYTONIA SIBIRICA L. Walsall, Staffs, R. CURTIS; Newton Stewart, Wigtown, Miss YOUNG.

†108/2. C. PERFOLIATA Donn. Potterne Cemetery, N. Wilts, R. G. GWATKIN; Beaumaris, Anglesey, Miss ARMITSTEAD.

111/1. ELATINE HYDROPIPER L. Llyn Coron, Anglesey, an old locality, in very small quantity and poor condition. Seems to have gone from Ham Pond, Surrey, and from the pond near Sandhurst and near Mortimer, Berks, DRUCE.

112/13. HYPERICUM DESETANGSII Lam., var. IMPERFORATUM Bonnet. Askham Wood, N. Somerset, DRUCE. Dr Drabble so names this specimen.

112/14. H. PERFORATUM L., var. ANGUSTIFOLIUM Gaud. Near Charleston, Cornwall, TRESIDDER.

112/15. H. HUMIFUSUM L. An aberrant form, Holmbury, Surrey, CASTALIA, Countess of GRANVILLE.

116/1. LAVATERA ARBOREA L. Poole, Dorset, L. B. HALL.

117/1. MALVA MOSCHATA L., var. ALBA. Railway-side, Valley, Anglesey, GERALDINE, Countess of MAYO.

†117/7. M. NICAEENSIS All. Burton-on-Trent, Staffs; Didcot, Berks, Druce.

†119/3. WISSADULA TRILOBATA Rose, var. ACUMINATA Rose. (ABUTILON TRILOBATA Hams). Alien. Martin Mere, Southport, S. Lancs, A. G. LANGDON, ex F. W. HOLDER.

†122/1. HIBISCUS TRIONUM L. Splott, Cardiff, Glamorgan, R. L. SMITH.

124/1. RADIOLA RADIOLA (L.). Sands of Glen Luce, Wigtown; Mortimer, Berks, very fine, DRUCE.

*125/2. LINUM ANGLICUM Mill. Winton, Westmorland, Miss MASON, who kindly showed it to me.

†126/1. TRIBULUS TERRESTRIS L. Dover Harbour, Kent, 1848, J. D. HEATON.

*127/1. GERANIUM SANGUINEUM L., var. LANCASTRIENSE (Mill.). Inner Worms Head, Glamorgan, P. S. JEWELL, ex J. A. WEBB.

†127/5. G. PHAEUM L. Wiston, Surrey, CASTALIA, Countess of GRANVILLE; near Budge Woods, Beaumaris, Anglesey, Miss ARMITSTEAD.

127/7. G. PYRENAICUM Burm., f. With pale pinkish flowers, Cherry Hinton, Cambs, shown to me *in situ* by J. GILBERT-CARTER; Bailey Gate, Dorset, L. B. HALL.

127/12. G. PUSILLUM L. Burton-on-Trent, Staffs, DRUCE.

128/3. ERODIUM CICUTARIUM L'Hér., var. NEGLECTUM (B. f. & S.). Holyhead Mountain, Anglesey, DRUCE; Kenfig, Glamorgan!, Miss Vachell.

Var. TRIVIALE (Jord.). Burnham, N. Somerset, DRUCE.

Var. PIMPINELLIFOLIUM (Sibth.). Loddon Bridge, Berks; Girvan, Ayr, DRUCE.

†132/5. OXALIS CORYMBOSA DC. Dartmouth, S. Devon, F. M. DAY.

133/1. IMPATIENS NOLI-TANGERE L. Studley, Yorks, CASTALIA, Countess of GRANVILLE.

†133/3. I. PARVIFLORA DC. Michelmarsh, S. Hants, Miss SALMON.

†133/4. I. GLANDULIFERA Royle. Canal-side, Salter Hebble Bridge, Yorks, DRUCE and FOGGITT; Whitney, Hereford; Norton, E. Gloster, J. L. HAINES; Barrowden, Rutland, SOWTER.

†140/2. VITIS HEDERACEA L. On rubbish, Charleston, Cornwall, TRESIDDER.

142/2. ACER CAMPESTRE L. Deeply lobed leaves, Normandy, Surrey, DRUCE.

149/1. ULEX EUROPAEUS L. With dark cream-coloured flowers, near Corfe Castle, Dorset, W. VAN DE WEYER.

149/2. U. GALLII Planch. Haleworth, E. Suffolk, J. VAUGHAN; Trelleck Bog, Monmouth, AMHERST.

150/1. CYTISUS SCOPARIUS (L.) Link. Pale yellow flowers at Norden Castle, Dorset, W. VAN DE WEYER.

151/3. ONONIS SPINOSA L., var. PROCURRENS Wallr. Charlbury, Oxon [D.037], DRUCE, det. RIENCOURT.

†152/9. TRIGONELLA M. PROCUMBENS Reichb. Burton-on-Trent, Staffs, DRUCE.

†152/13. T. CAELESYRIACA Boiss. Avonmouth, W. Gloster, C. & N. SANDWITH. A pretty plant.

†153/1. MEDICAGO FALCATA L. Shoreham beach, Sussex, A. E. ELLIS; Long Melford, W. Suffolk, DRUCE.
Var. TENUIFOLIOLATA Vuyck. Hayle, Cornwall, A. L. STILL.

†153/2. M. SYLVESTRIS Fries. Gulvat, Cornwall, THURSTON; Kingston, near Southwick, Sussex, Miss A. COTTIS.

†153/4. M. APICULATA Willd. Ware, Herts [Dc.1073, 1080], DRUCE; Burton-on-Trent, Staffs [Dc.28/11], DRUCE.

†153/4. M. LAPPACEA Desr. Ludvan, Cornwall [Dc.1094], C. W. NICHOLS; Burton-on-Trent, Staffs [Dc.1102], DRUCE.

†153/8. M. VARIA Martyn. Colchester, N. Essex, DRUCE.

†153/19. M. TUBERCULATA Willd. Burton-on-Trent, Staffs [Dc.1123], DRUCE.

†153/29. M. CILIARIS Krocker. Cardiff, Glamorgan, DRUCE.

†154/2. MELILOTUS ALBA Desr. East Shelton, Leicester, SOWTER; Didcot, Berks, DRUCE.

†154/7. M. SULCATA Desr. Bristol, N. Somerset, C. & N. SANDWITH.

*155/3. TRIFOLIUM OCHROLEUCON Huds. St Saviours, Jersey, L. ARSENE, ? native; †Burton-on-Trent, Staffs, DRUCE.

155/8. T. MARITIMUM Huds. Newhaven, E. Sussex, E. PAYNE.

†155/15. T. HYBRIDUM L., var. ELEGANS (Savi). Grangemouth, Stirling, DRUCE.

Var. ELEGANS-CONSPICUUM. Burton-on-Trent, Staffs [Dc.1125], DRUCE.

155/16. T. REPENS L., var. RUBESCENS Ser. Beaconsfield, Bucks, Mrs WEDGWOOD.

†155/44. T. NIGRESCENS Viv. Burton-on-Trent, Staffs, DRUCE.

†160/1. LOTUS SILIQUOSUS L. Close to the road that leads down to the bathing huts, in cultivated ground, West Mersea, N. Essex, Miss CAMPBELL.

160/5. L. CORNICULATUS L., "f. GRANDIFLORA PRATICOLA ROBUSTUS." Wytham, Berks, DRUCE, det. RIENCOURT.

*160/8. L. ANGUSTISSIMUS L. South-west of Blackheath, Surrey, J. G. LAWN.

†166/6. ASTRAGALUS BOETICUS L. Avonmouth, N. Somerset, C. & N. SANDWITH.

†166/7. A. STELLA DC. Avonmouth, N. Somerset, C. & N. SANDWITH.

†170/1. CORONILLA VARIA L. Exeter, S. Devon, Col. WATTS in *Dev. Rep.*; Staverton, S. Devon, *Dev. Rep.*

†170/3. C. SCORPIOIDES Koch. Avonmouth, N. Somerset, C. & N. SANDWITH.

171/2. ORNITHOPUS PERPUSILLUS L. Baglan, Glamorgan, rare here, R. L. SMITH.

176/1. VICIA SYLVATICA L., var. CONDENSATA Druce. In quantity and uniform on the shingle on both sides of the Mull of Galloway, Wigtown, 1930, DRUCE.

†176/5. V. VILLOSA Roth agg. Birkdale, S. Lancs, HOLDER and WAGSTAFFE.

†176/6. V. DASYCARPA Ten. Potterne, N. Wilts, R. G. GWATKIN; Burton-on-Trent, Staffs, DRUCE.

176/7. V. BITHYNICA L. Poole, Dorset, L. B. HALL.

†176/17. V. PSEUDO-CRACCA Bert. Burton-on-Trent, Staffs, DRUCE.

†176/21. V. CALCARATA Desf. Bristol, W. Gloster, C. & N. SANDWITH; Burton, Staffs, DRUCE.

†176/26. V. PANNONICA Crantz. Southport, S. Lancs, HOLDER and WAGSTAFFE.

†176/27. V. MELANOPS Sibth. & Sm. Poole, Dorset, L. B. HALL.

176/35. V. TETRASPERMA (L.) Moench, var. TENUISSIMA Druce. By a pond-side near Inley, N. Hants; Hampstead Marshall, Berks, DRUCE.

†178/1. LATHYRUS LATIFOLIUS L. Garden escape, Hambleden, Bucks, DRUCE.

†178/3. L. TUBEROSUS. Barry, Glamorgan, R. L. Smith and R. MELVILLE.

†178/17. L. ANNUUS L. Bristol, W. Gloster, C. & N. SANDWITH.

†178/18. L. CICERA L. Bristol, W. Gloster, C. & N. SANDWITH.

†178/21. L. CLYMENUM L. Bristol, W. Gloster, C. & N. SANDWITH.

†178/22. L. OCHRUS L. Burton-on-Trent, Staffs, DRUCE.

183/2. PRUNUS PADUS L. Marlborough Scop, New Forest, S. Hants, L. B. HALL.

183/4. P. CERASUS L. Clattercutt, Oxford, DRUCE.

†183/8. P. CERASIFERA Ehrh. Near Bradfield, Berks (a recent introduction), MARSDEN, JONES and TURRILL.

†184/5. SPIRAEA DOUGLASII Hook. Abersoch, N. Wales, WAGSTAFFE.

(All the RUBI have been kindly determined by WM. WATSON.)

185/1. RUBUS IDAEUS L., var. ASPERRIMUS Lees. Frilford Hermitage, Berks, DRUCE.

Var. FLAVUS Dr. Glen Roy, Westerness, J. A. WEBB.

185/2. R. NESSENSIS W. Hall. Brandon, Warwick; Bognor, Fittleworth, W. Sussex (as *plicatus*, 1914, W. M. Rogers); Retford, N. Lincs, CUMMING; Badby Wood, Northants, CUMMING and RIDDELSDELL; Bodmin, Cornwall; Brickhill, Bucks, DRUCE; Holmbury, Surrey, CASTALIA, Countess of GRANVILLE.

185/3. R. FISSUS Lindl. Salton, Warwick; Keswick, Cumberland; Teesdale, Durham; Ullapool, W. Ross; Clova, Angus; Phitulais, Easterness; Baddeslest, Llanberris, Carnarvon; Bladon, Oxon; Brickhill,

Bucks, DRUCE; Binley Colliery, Brandon and Mathorp, Warwick; Retford, N. Lincs, CUMMING; Hounds Street, N. Somerset, J. W. WHITE; Test, Merioneth, BARTON; Biddulph, Staffs, PAINTER; Norbury, Staffs, BENNETT; Garve, W. Ross, 1909, MARSHALL; Mold Soughton, Flint, 1845, Hb. DRUCE.

185/4. R. ROGERSII Lint. Bodmin, Cornwall; Boars Hill, Berks, DRUCE; Vales Wood, Rugton XI Towns, Salop, LINTON, as *opacus*.

185/5. R. SULCATUS Vest. Whitchurch, Glamorgan, 1909, DRUCE, as *plicatus*; Bognor Common, W. Sussex, CUMMING.

185/6. R. PLICATUS W. & N. Brandon, Warwick; Fittleworth, W. Sussex; Forest of Dean, W. Gloster; Langworth, Lincs, CUMMING; Sandhurst, Riseley, Berks; Dalmally, Argyll, 1898, DRUCE.

Var. BERTRAMII (G. Braun). Lodge Green, Hereford; Stauntou Cover, N. Lincs; Micheldever, S. Hants, as *hemistemon*, CUMMING; Maentwrog, Merioneth, 1922, BARTON, as *plicatus*.

Var. PSEUDO-HEMISTEMON Focke. Lyonshall Park, Hereford, as *nitidus*; Lyonshall Park, Hereford, 1905, as *plicatus*, var. *hemistemon*, A. LEY.

Var. AMBLYPHYLLUS (Boul.) Sudre. Royal Common, Elstead, Surrey, CUMMING.

185/7. R. NITIDUS W. & N. Elstead, Surrey; Lyndhurst, S. Hants; Bishop Wood, Hereford, CUMMING; Whistley Wood, Northants, DRUCE.

Var. ANGLICANUS Sudre. Pensford, Shapwick, N. Somerset, J. WHITE, 1913, as *opacus* Focke; Great Langdale, Westmorland, A. LEY, 1905, as *opacus*; Muckross, Kerry; Hamworthy, Dorset, DRUCE.

185/8. R. OPACUS Focke. Bognor Common, W. Sussex, CUMMING, as *nitidus*.

185/9. R. AFFINIS W. & N. Brickhall, Retford, N. Lincs; Wareham Road, Corfe, Dorset; Vron, Radnor, CUMMING; Tidenham Chase, W. Gloster, RIDDELSDELL; Alphamstone, N. Essex, G. C. BROWN.

Var. BRIGGSIANUS Rogers. St David's, Pembroke; Tycroes, Anglesey, A. LEY.

185/10. R. SUBINTEGRIBASIS Druce, comb. nov., British Pl. List, 30, 1928 = R. INTEGRIBASIS Rogers, not of P. J. Mueller. Alum Chine, Isle of Wight; Bournemouth, S. Hants; Royal Common, Elstead, Surrey; Walling Down, between Hordle and Fratton, Southbourne, S. Hants, ROGERS; Royal Common, Elstead, Surrey, CUMMING; Stoborough Common, Dorset, DRUCE.

Var. SUBOPACUS (Sudre) Dr. Bodmin, Cornwall, DRUCE; Royal Common, Elstead, Surrey, CUMMING.

185/11. R. CARIENSIS R. & G. Bournemouth, S. Hants, 1890, R. V. MURRAY, as *dumnoniensis*; Tetford, Crediton, Devon, HIERN; Bodmin, Cornwall; Girvan, Ayr; Cuswell, Glamorgan; Fliquet Bay, Jersey, DRUCE.

185/12. R. HOLERYTHROS Focke. Witley, Elstead, Surrey; Goudhurst, Kent, CUMMING; Fleet, N. Hants, DRUCE.

185/13. R. LAETUS Watson. (R. LATIFOLIUS Rogers, non Bab.). Tycroes Station, Anglesey, GRIFFITH, 1893, as *latifolius*; Bangor, Carnarvon, 1899, DRUCE (possibly *gratus*, teste Focke; Rogers thought the more likely suggestion was *latifolius*); near Llanuwchllyn, Merioneth, 1928, RIDDELSDELL, as *latifolius* Bab. "I am very glad to see the remark 'very much like *gratus*,' which fact struck me also, and led me to suggest that its proper place is next to *R. gratus*. *R. latifolius* Bab. is a Corylifolian."—W. WATSON. Lane near Callestick, W. Cornwall, 1925, RILSTONE, as *R. latifolius* Bab. [Ref. No. 385].

185/14. R. IMBRICATUS Hort. Doward, Bishops Wood Estate, Hereford, CUMMING; Corfe Castle, Dorset, ROGERS; Perranarworthal, Cornwall, DAVY, as *nemoralis*.

Var. DISCOLOR Sudre. Molland, N. Devon, DRUCE.

Var. LONDINENSIS Rogers. Perranarworthal, Cornwall, DAVY; Kea Downs, Cornwall, DRUCE.

185/16. R. CARPINIFOLIUS Weihe. Harleston, Northants, 1878, as *rhamnifolius* (See *Fl. Northants*, 61); Brickhill, Bucks; Highbridge, N. Somerset, DRUCE; Market Rasen, N. Lincs; Brandon, Warwick; Elstead, Surrey, CUMMING.

185/17. R. INCURVATUS Bab. Aymestrey, Hereford, CUMMING; Peppard (first record, 1886; see *Fl. Oxon*, 133); Tackley, 1919, Oxon; Glen Luce, Wigtown, 1898; Ullapool, W. Ross, 1893 (see Fl. 21); Toomebridge, Derry, 1898, DRUCE; near Valley, Holyhead, Anglesey, 1895, GRIFFITH, as *thyrsoideus*.

Var. SUBCARPINIFOLIUS R. & R. IV. Shire Stone, E. Gloster, RIDDELSDELL, as *incurvatus*; Mynydd-lach, Shirenewton, Monmouth, 1892, SHOOLBRED, as *Lindleianus*; Cwm Nees, Radnor, CUMMING; Harleston, Northants; Sandhurst, Berks, 1895, as *holerythros*, DRUCE; Shotover Hill, Oxon, 1925, DRUCE and RIDDELSDELL, as *holerythros*.

185/18. R. LINDLEIANUS E. Lees. Naphill, Bucks, 1897, DRUCE, det. as *calvatus* Blox. by FOCKE.

185/19. R. ARGENTEUS W. & N. Tamerton Foliott, Tor Cross, S. Devon, DRUCE, as *erythrinus*, teste ROGERS.

185/19b. R. LONGICUSPIDATUS Sudre. Woolard, N. Somerset, 1891, J. W. WHITE, as *argenteus*; Durdham Downs, W. Gloster, Miss I. M.

ROPER; Heanton Punchardon, N. Devon, 1892, PAINTER, as *erythrinus*; Waters Meet, N. Devon, DRUCE.

185/20. R. CRYPTADENES Sudre. Tilehurst, Berks, as *erythrinus* Rogers (see *Fl. Berks*, 168); Coggs Wood, Oxon; Sunningdale, Berks, DRUCE; Perranzabuloe, W. Cornwall, RILSTONE, as *argenteus*; South Tawton, N. Devon, BARTON, as *argenteus*; Minstead, ? Hants, as var. *bipartitus*; Godalming, Surrey, 1921, as *imbricatus*, MARSHALL; Llanfechangel, Cardigan, as *argenteus*; Heanton Punchardon, N. Devon, 1892, as *erythrinus*, W. H. PAINTER; Fox's Wood, Brislington, N. Somerset, 1892; near the Avon, Hanham, W. Gloster, 1892; St Weonards, Hereford; Leigh Downs, N. Somerset; Washford, S. Somerset, J. W. WHITE, all as *erythrinus*; Durdham, W. Gloster, J. W. WHITE, as *argenteus*; Wentwood, Monmouth, 1890, A. LEY, as *erythrinus*; Bognor Common, W. Sussex; Lyndhurst, Branksome, S. Hants; Hill Morton Road, Brandon, Warwick, CUMMING.

Var. BIPARTITUS B. & R. Minstead, Hants; Godalming, Surrey, 1921, as *imbricatus*, MARSHALL; IV. Shire Stone, E. Gloster, RIDDELSDELL; Shapwick, N. Somerset, MURRAY, as *nemoralis*.

185/21. R. OPLOTHYRSUS Sudre. Tamerton Foliott, Woodbury Common, S. Devon; Hungerford, Berks, DRUCE; Hurstmonceax, Sussex; Littleworth Common; Burton Common, as *argenteus*, CUMMING.

185/22. R. DURESCENS W. R. L. Shirley, Derby, 1888, LINTON, as *calvatus*, teste FOCKE.

185/24. R. OXYANCHUS Sudre. Branksome Park, Dorset, 1899, ROGERS, as *nemoralis* P. J. M.

Var. SILURUM (Ley). Sellack, Hereford, A. LEY; Piddle Wood, Sturminster, Dorset, CUMMING, as *nudicaulis*; Llandrindod, Radnor, PURCHAS, as *nitidus*.

Var. VIRIDICATUS Sudre. Boars Hill, Berks, 1899; Llanberris, Carnarvon, DRUCE.

185/25. R. CARDIOPHYLLUS L. & M. Torquay, S. Devon; Coggs Wood (as *Scheutzii*); Tackley, Tadmarton, Oxon; Brickhill, 1900 (as *rhamnifolius*); Iver, Bucks; Bearwood, 1897; Newbury, 1895; Cothill, 1895 (as *rhamnifolius*, det. W. M. R.); Greenham, 1894, Berks, DRUCE; Clifton Down, W. Gloster, 1907, WHITE, as *rhamnifolius*; Witley, Surrey; Epping Forest, Essex, CUMMING; Tunbridge Wells Common, W. Kent, 1898, ROGERS, as *rhamnifolius*; Halland Moss, S. Derby, 1889, LINTON, as *polyanthemos*; Hart Hill, Cheshire [620], RIDDELSDELL, as *Bakeri*; Middlewick, Colchester, N. Essex [2077], G. C. BROWN, as *imbricatus* Hort, cf. by RIDDELSDELL; near Bodorgan, Anglesey, 1889, as *rhamnifolius dumosus*; near Bodorgan Station, Anglesey, 1893, GRIFFITH, as *rhamnifolius*, var.

× LINDLEIANUS. Limpsfield, Sussex, FOX, as *Colemanni*.

185/26. R. Scheutzii Lindeb. Doddington, S. Lincs, Cumming and Ley.

185/27. R. Bakeri F. A. Lees. Ham Common, Surrey, 1894 [502], Wolley-Dod, as *rhamnifolius*; Holt Edlard, Derby, as *rhamnifolius*; Brailsford, S. Derby, 1888 (as near *leucandrus*, det. Focke, and *polyanthemos*, det. Riddelsdell), Linton; Corfe, Dorset, L. Cumming; Sheen, Jackson.

185/28. R. dumnoniensis Bab. Coggs Wood, Oxon; Stranraer, Wigtown, 1898, Druce, det. *argentatus* by Focke and Rogers.

185/29. R. polyanthemos Lindb. Carrick, Galway, Druce; Twycross, Leicester, Bloxam, as *carpinifolius*; Shopham, Little Totham, N. Essex, Cumming.

185/30. R. Maasii Focke. Great Langdale, Westmorland, Ley, as *opacus*; Lower Hill, Morton Road, Warwick, Cumming, as *rhamnifolius*.

Var. glabratus (Bab.). ? Llanberris, Carnarvon; Aber, Anglesey, as *ammobius* Focke, named by himself, Druce; Bangor, Carnarvon, Griffith; Portmadoc, Merioneth and Carnarvon [1003], Barton and Riddelsdell, as *cariensis*, var. *integribasis* Rog.; Crieff, M. Perth, 1894 [4219], Bailey, as *pulcherrimus*; near Builth, Brecon, 1898, A. Ley, det. as near *durescens* by Rogers.

185/30(2). R. Muenteri Marss. Stalmine, Lancs, 1899, Wheldon, as *villicaulis*; wood by Binley Colliery, Brandon, Warwick, Cumming; Watson has seen it from Dorset and Hants.

185/31. R. Lindebergii P. J. M. Durdham Downs, W. Gloster, J. W. White; Saintfield, Co. Down, 1903, C. H. Waddell, as *argentatus*, var. *robustus* (P. J. M.), fide Rogers; Bodorgan, Anglesey, Griffith; Dunchurch, Warwick, Cumming; Mangotsfield, Gloster, Miss Roper, as *mercicus*; Sandhurst, Bearwood, Berks, Druce.

185/33. R. mericus Bagn. Biddulph, Staffs, Painter; Rudyard, Staffs, Cumming, as *Maasii*.

Var. chrysoxylon (Rogers). Bryn Llwyd, Carnarvon, Griffith, as *pulcherrimus*.

Var. bracteatus Bagn. Windsor, Bearwood, Berks; Loch Ryan, Wigtown, 1898, Druce; Anstey, Warwick, 1887, Bagnall, as *Maasii*; Market Rasen, N. Lincs, 1907, Cumming.

185/34. R. chlorothyrsos Focke. St Briavels, Hereford, Ley; Greenham, Berks, Druce.

185/35. R. villicaulis Koehl., vera. Hungerford, Bearwood, Berks, 1894; Hell Copse, Bucks; Woodcote, Oxon, Druce; Royal Common, Elstead, Surrey, Cumming, as *Colemanni*; Howle Green, Hereford, 1891, A.

LEY; Firley Heath, CUMMING, as *infestus*; an interesting variety from Elstead, Surrey, CUMMING.

Var. INSULARIS (Aresch.) Lange. Howle Green, Hereford, 1891, A. LEY, as *devoniensis*; Shirley, Derby, LINTON; Lungworth Wood, Lincs, 1907, CUMMING, as *Lindebergii*; Bangor, Carnarvon, 1899; Sandhurst, Berks; Gerrard's Cross, Bucks, 1900; Broxbourne, Herts; Golspie, E. Sutherland, 1907 (det. as typical *villicaulis* by ROGERS), DRUCE.

185/37. R. SELMERI Lindeb. Hayes Common, Kent, 1888, EYRE DE CRESPIGNY, as *R. rhamnifolius*, a var. intermediate with *Maasii*; Ashopton, N.E. Derby, 1893, LINTON, as *villicaulis*; near Cuerham, Bangor, Carnarvon, 1891, GRIFFITH, as *erythrinus*, fide Focke; Nash, Bucks, 1912, DRUCE, as *rhamnifolius*, det. ROGERS.

185/39. R. SAMPAIANUS Sudre. Halland Moor, Derby, LINTON; May Hill, Gloster, CUMMING, as *polyanthemos*; possibly this, Malwood, S. Hants, CUMMING.

185/40. R. RHOMBIFOLIUS Weihe. Forres, Elgin, DRUCE.

185/41. R. GRATUS Focke. Heath, Bucks, 1898, DRUCE, as *latifolius*.

185/41(2). R. SCIAPHILUS Lange. Bearwood, Berks, Druce.

185/43. R. RAMOSUS Briggs. Yate Common, W. Gloster, 1894, J. W. WHITE, as *dumnoniensis* Bab.; Branksome Park, Dorset, 1893, ROGERS, as *dumnoniensis*; Bethesda, Carnarvon; Shotover, Oxon, DRUCE.

185/44. R. THYRSOIDEUS Wimm. Hook Norton, 1918, RIDDELSDELL; Kilsby, Northants, CUMMING.

185/45. R. WINTERI Focke. Badby Woods, Northants, 1921, RIDDELSDELL, as *robustus* P. J. M.; Badby Wood, Northants, 1913 and 1914, CUMMING, as *robustus* P. J. M., forma; between Yeaveley and Stydd, Derby, 1889, LINTON, as *macroacanthus* Blox., det. as *argentatus*, var. *robustus*, by W. M. R.; Tubney Wood, Berks, 1892; North Leigh, Shotover, Oxon (as *argentatus*), DRUCE.

Var. CLIVICOLA (Ley). Godalming, Surrey, CUMMING.

185/45(2). R. PROPINQUUS P. J. M. Tudworth Quarry, Ross, Sellack, Hereford, 1907, CUMMING, as *argenteus* and *argentatus* Moyle Rogers; Lizard Downs, Cornwall; Dartmoor, S. Devon, ROGERS, as *argenteus*.

185/45(3). R. PSEUDO-BIFRONS Sudre. Firth Hill, Godalming, Surrey, CUMMING; Wimbledon Common, Surrey, 1921, BARTON, as *Godronii*.

185/46(2). R. CUSPIDIFER M. & L. Ruglan XI. Towns, Salop, 1892, LINTON, as *erythrinus*; St Weonards, Hereford, A. LEY; Larkton Hills, Cheshire, 1907, WOLLEY-DOD, as *Godronii*, var. *foliolatus*; Mortimer, Berks, DRUCE, as *argenteus* W. M. R.

185/47. R. ULMIFOLIUS Schott. With white fruit, in a field near Coventry, Warwickshire, where there were many bushes, CHITTENDEN in *Proc. R.H.S.*, cxiii., 1930.

Var. CONTRACTIFOLIUS Sudre. Poleworth, Warwick, DRUCE.

× *?*. Long Buckby, Northants, DRUCE.

× *?* ADSCITUS. Tumbledown Hill, Glamorgan, RIDDELSDELL, as *robustus* × *rusticanus*.

185/49. R. HEREFORDENSIS Sudre. Howle Hill, Ross, Hereford, CUMMING.

185/52. R. LENTIGINOSUS Lees. Lyndhurst, S. Hants, CUMMING.

185/53. R. MACROPHYLLUS W. & N. Badby Wood, Northants, CUMMING; Sandhurst, Silchester, Ambarrow, etc., Berks; Hornstock, Northants, 1900, DRUCE.

185/55. R. DANICUS Focke. Brandon, Willenhall, Warwick, CUMMING.

185/56. R. SCHLECHTENDALII Weihe. Woodford, Badby, Northants, 1910, DRUCE.

Var. MACROPHYLLOIDES (Genev.). Elstead, Surrey, 1908, as *villicaulis*; Badby Wood, Northants, CUMMING; Nuneham, Shotover, Oxon, DRUCE; Colwyn Bay, Denbigh, PAINTER.

Var. ANGLICUS Sudre. Church Stretton, Salop, PAINTER; Coombe Wood, Coggs Wood, Oxon; Sutton Park, Warwick; Greenham, Berks, DRUCE.

185/57. R. QUESTIERII L. & M. Foxholes Wood, Bailey Gate, Dorset, 1915, CUMMING.

185/58. R. SALTERI Bab. Fittleworth, Sussex, CUMMING, as *lentiginosus*.

185/59. R. COLEMANNI Blox. Wood Walton, Hunts, DRUCE.

185/62. R. SUBINERMOIDES Druce. Howle Hill, Ross, Hereford; Coombe Common, Surrey; Ham Rough, Forest of Dean, W. Gloster, CUMMING, as *pubescens*.

185/63. R. ADSCITUS Genev. Boars Hill, Berks, DRUCE; Biddulph, Staffs, PAINTER.

185/64. R. MELANOCLADUS Sudre. Micheldean, W. Gloster, 1907, CUMMING, as *hirtifolius*.

185/66. R. PYRAMIDALIS Kalt. Bagley Wood, Berks, 1861, W. HOLLIDAY, as *carpinifolius*; Stanton, N. Lincs, CUMMING; Aymestrey, Hereford, LEY, as *Schlechtendalii*; Henwood, Berks, Nuneham, Oxon, DRUCE.

? × DISCERPTUS. Twelve O'clock Drive, Warwick, 1920, CUMMING, as *Sprengelii*.

185/73. R. EGREGIUS Focke, type. Boars Hill, Berks, 1925, DRUCE, det. as *R. mercicus*, var. *bracteatus*, by RIDDELSDELL. "The felted panicle, felted calyx, and 3-nate tomentose adult leaves distinguish it from *R. mercicus*, var. *bracteatus*.—You must have *R. egregius* Focke type at Boars Hill, and *R. egregius*, var. *effiminatus*, at Shotover. In *Fl. Berks.* you say that Rogers was at first inclined to regard it as a forma of *R. pulcherrimus*. Friderichsen puts *R. egregius* beside *R. pulcherrimus* in *Egregii*. Focke thought it recalled *R. mucronatus* rather. The broad 3-nate mucronate leaves certainly do recall that bramble."—W. WATSON.

Var. EFFIMINATUS Focke. Shotover, Oxon, DRUCE.

185/74. R. CRINIGER (Lint.) Rogers. West Bergholt, N. Essex [699], 1915, G. C. BROWN, as *Drejeri*, teste W. M. ROGERS.

185/79. R. CINEROSUS Rogers. Tilehurst, 1888, Aldworth, Berks, DRUCE.

185/81. R. MUCRONATOIDES Ley. Cwm Nees, Radnor, 1908, CUMMING.

185/82. R. AMPLIFICATUS (Lees). Coggs Wood, Oxon; Boars Hill, Berks, 1907, as *pallidus* var., DRUCE; Radyr, Glamorgan, RIDDELSDELL.

185/83. R. ALTERNIFLORUS M. & L. Banstead Heath, Surrey, 1923, BARTON and RIDDELSDELL, as *argenteus* W. & N.; Wimbledon Common, Surrey, 1921, RIDDELSDELL and BARTON, as *argenteus*, forma *glandulosa*.

185/84. R. APICULATUS W. & N. Pontyclum, Glamorgan, RIDDELSDELL, as ? *scaber*.

185/85. R. FURVICOLOR Focke. Foxholes Wood, Bailey Gate, Dorset, 1915, CUMMING, as *Sprengelii*; St Ouen's, Jersey, 1923, DRUCE.

185/86. R. VIRGULTORUM Ley. Brickhill, Bucks [24], DRUCE; Lincoln, 1907, A. LEY; Woodford to Preston Capes, Northants, 1918; Stockton, Warwick, 1902, CUMMING.

185/88. R. DENTATIFOLIUS (Briggs). Lustleigh, Devon, 1908, A. LEY.

185/89. R. DREJERI G. Jens., var. DUNENSIS (Rogers). Clonbur, Galway, 1922, DRUCE.

Var. LEYANUS (Rogers). Shipham on Mendip, N. Somerset, 1918, Miss I. M. ROPER; Barton Common, S. Hants, 1917; South Wood, Ross, Monmouth, 1915, CUMMING.

185/90. R. RADULA Weihe, type. Gorseley, Hereford, 1907, CUMMING and LEY, as *setulosus*.

Var. ECHINATOIDES (Rogers). Doddington, S. Lincs, 1907, CUMMING, as *infestus*, det. W. M. R.

185/92. R. ECHINATUS Lindley. Coombe Wood, Warwick, 1921; Lilbourne, Northants, 1918, CUMMING, as *Sprengelii*.

185/92(2). R. GENEVIERII Bor. Corfe, Dorset, CUMMING, as *Boraeanus*; Amersham, Bucks, DRUCE.

185/93. R. RUDIS W. & N. Aldworth, Berks, HARVEY, teste H. J. RIDDELSDELL.

185/98. R. GRIFFITHIANUS Rogers. May Hill, Gloster, 1908, as *Borreri*; Godalming, Surrey, 1908, det. as *ericetorum* by W. M. R.; Shillingstone, "Sussex, 1911," as *Borreri* (? if in Dorset), CUMMING.

185/108. R. BLOXAMII Lees. Wigginton, Oxon, RIDDELSDELL, as *fuscus*; Lady's Mile, near Rugby, Warwick, 1908, CUMMING.

185/108(2). R. THYRSIFLORUS Weihe. Doward Wood, Hereford, 1907, CUMMING, as *longithyrsiger*.

185/110. R. FUSCUS Weihe. Sturminster, Dorset, 1915; Queen's Wood, ? Warwick, 1907, CUMMING, as *regillus*.

Var. HYPOSERICEUS Sudre. Queen's Wood, ? Warwick, 1907; Church Lane, Okehampton, S. Devon, 1915; Badby, Northants, 1914, det. as *scaber* by W. M. R., CUMMING; Buckholt Wood, Cranham, E. Gloster, RIDDELSDELL.

185/112. R. PALLIDUS Weihe. Coombe Wood, Warwick, 1921, CUMMING, as *fuscus*.

Var. LEPTOPETALUS Rogers. Lyndhurst, S. Hants, 1908, CUMMING.

185/113. R. MONACHUS Jens. (GLAREOSUS Rogers). Milford, Surrey, MARSHALL, as *anglosaxonicus*; Coombe Wood, Warwick, 1908, as *pallidus*; Milford, S. Hants, 1908, as near *Koehleri*; Bognor, W. Sussex, 1914, CUMMING.

185/118. R. LONGITHYRSIGER Bab. Abbey Wood, Okehampton, S. Devon, 1926, CUMMING, as *scaber*; Ilfracombe, N. Devon, 1918, RIDDELSDELL, as *foliosus*.

185/123. R. HYSTRIX Weihe. Brandon, Warwick, DRUCE.

185/126. R. FOLIOSUS, var. SALTUUM Focke. Stanway, N. Essex [1094], G. C. BROWN, as *foliosus*, det. W. M. R. and H. J. R.; Queen's Wood, ? Warwick, 1907; Doward Wood, Hereford, 1907, CUMMING.

185/127. R. HOSTILIS P. J. M.; nov. var. NUDIFOLIUS Sudre, as *Bellardi*. Twelve O'clock Drive, Warwick, CUMMING.

185/146. R. SPINULIFER M. & L. North Wood, Market Rasen, N. Lincs, 1908, CUMMING, as ? *botryeros*, det. W. M. R.

185/149. R. DUMETORUM W. & N., var. FEROX (Weihe). Bloxham, Oxon, 1922, RIDDELSDELL, as *Godronii*, var. *clivicola* Ley.

185/151. R. CORYLIFOLIUS Sm. Burford Downs, Oxon, DRUCE, det. as *argenteus* ? by ROGERS.

189/8. POTENTILLA PROCUMBENS Sibth. Port William, Wigtown, DRUCE.

†189/13. P. RECTA L. Hoar Cross, Stafford, Miss MEYNELL.

*190/1. ALCHEMILLA PUBESCENS Lam. Ingleborough, Yorks, DRUCE.

190/2. A. PRATENSIS Schmidt. St Boswells, Roxburgh; Middleton-in-Teesdale, Yorks and Durham; Cronkley, Yorks; Blackhead, Co. Clare, DRUCE; Cave Hill, Antrim, Mrs WEDGWOOD.

*190/3. A. CURTILOBA Buser. Langdon Beck, Durham, DRUCE.

190/4. A. MINOR Huds. Melmerby, Cumberland; Redbournbury, Herts, DRUCE.

190/5. A. PASTORALIS Buser. Middleton-in-Teesdale, Durham and N.W. Yorks; Cave Hill, Antrim, DRUCE.

190/6. A. SUBCRENATA Buser. Cave Hill, Antrim, "mais peu normale," F. Jaquet.—N. CARROTHERS, ex Mrs WEDGWOOD.

190/8. A. ALPESTRIS Schmidt. Loch Lubnaig, Lochearnhead, M. Perth; Cluny, E. Perth; Wharfedale, Yorks, DRUCE; Bolton, Yorks, CASTALIA, Countess of GRANVILLE.

*190/8(2). A. CONTROVERSA Buser. Loch Lubnaig, M. Perth, August 1930, DRUCE.

*190/11. A. RENIFORMIS Buser. Wharfedale, Yorks, DRUCE. New to England.

191/1. AGRIMONIA EUPATORIA L. Fermain Bay, Guernsey, a very rare plant in the island, Mrs HICHENS.

191/2. A. ODORATA (Gouan) Mill. Faccombe and Coombe, N. Hants, DRUCE.

194/2. ROSA ARVENSIS Huds., var. LAEVIPES Gren. Hinksey, Berks, DRUCE.

194/5. R. STYLOSA Desv., var. DESVAUXIANA Ser. Near Headley, Surrey, FRASER.

194/6. R. CANINA L., var SPURIA W.-Dod (INSIGNIS). Boars Hill, Berks; Godstow, Oxon, DRUCE.

194/7. R. SQUARROSA Rau. Market Harborough, Leicester, August 1930, DRUCE.

Var. CLADOLEIA (Rip.), comb. nov. = LEIOSTYLA. Greenham Common, Berks, DRUCE.

Var. SPHAEROIDEA (Rip.), comb. nov. Charlbury, Oxon, DRUCE.

Var. MEDIOXOMA (Déség.), comb. nov. Poole Bottom, Oxon, DRUCE.

Var. SYLVULARUM Rip., comb. nov. Frilford, Berks, DRUCE.

194/8. R. ANDEGAVENSIS (Bast.), var. WOLLEY-DODII (Sudre). Stokes Heath, WOLLEY-DOD; Telegraph Inn, Surrey, FRASER.

194/9. R. BLONDAEANA (Rip.), var. LATEBROSA (Déség.) Kingston Vale, Cooper's Hill, Runnymede, Surrey, FRASER.

194/10. R. DUMETORUM Thuill. Market Harborough, Leicester, 1930, DRUCE.

Var. ERECTA W.-Dod. Shepperton, Middlesex, GROVES, as *implexa* ?; Wytham, Berks, DRUCE.

Var. GABRIELIS (F. Ger.). Ford Brook, E. Sussex, BAILEY.

Var. SEMIGLABRA (Rip.). Market Harborough, Leicester, DRUCE.

Var. RAMEALIS (Pug.). Port William, Wigtown, DRUCE.

194/12. R. GLAUCA Vill., var. COMPLICATA (Gren.). Clunie, E. Perth, DRUCE.

Var. SUBCOMPLICATA Hayek. Winton, Westmorland, DRUCE.

194/14. R. MICRANTHA Sm. Hampstead Marshall, Berks, 1896, DRUCE.

194/20. R. SHERARDI Davies. Clunie, E. Perth, DRUCE; Clawton, Devon, HARVEY.

Var. RESINOSOIDES (Crep.) Dr. Clunie, E. Perth, DRUCE.

194/21. R. MOLLIS Sm., var. GLANDULOSA (W.-Dod). Clunie, E. Perth, DRUCE.

194/23. R. SPINOSISSIMA L. Inland in a hedge at Broughton, S. Hants, a taller bush with whiter flowers than the dunal plant, Miss SALMON.

†194/25. R. VIRGINIANA Mill. Pont Erwyd, Dr SALTER; near Ripley, Yorks, Hon. Lady INGILBY.

†194/26. R. RUGOSA Thunb. Rock, Cornwall, quite naturalised, Rev. W. W. MASON.

195/2. PYRUS COMMUNIS L. * ? var. DESEGLISEI (R. & C.). Near Ross on Wye, Hereford, Rev. E. M. REYNOLDS.

195/5. P. AUCUPARIA (L.) Ehrh. Garlieston, Wigtown, DRUCE.

†195/9. P. INTERMEDIA Ehrh. Several large trees near Dunan, Kinloch Rannoch, M. Perth, DRUCE.

195/14. P. LATIFOLIA (Pers.). Ashwater, N. Devon, Rev. H. H. HARVEY. "Is this not the variety?"—DRUCE.

†200/1. TELLIMA GRANDIFLORA Br. Garden escape near Guildford, Surrey, since 1922, F. CLARKE.

203/2. CHRYSOSPLENIUM OPPOSITIFOLIUM L. Near North Court, Eastry, Kent, H. E. H. RICE.

†207/2. RIBES NIGRUM L. River-side, Burton-on-Trent, Staffs, DRUCE.

211/1. SEDUM PURPUREUM Link. Clunie, E. Perth; Bay of Luce, Wigtown, DRUCE; Birchanger, N. Essex, Mrs SHELDRAKE, ex G. C. BROWN.

*211/6. S. ACRE L. The continental form, on a wall near Lune Head, N.W. Yorks, DRUCE.

213/3. DROSERA ROTUNDIFOLIA L. Tiptree Heath, N. Essex, Miss CLYTIE BROWN. Not seen there since 1881.

217/2. CALLITRICHE OBTUSANGULA Le Gall. Bibury, E. Gloster, DRUCE.

*217/4. C. POLYMORPHA Lönn. Near Lisdoonvarna, Co. Clare, 1929, DRUCE. New to Ireland. Also sent by P. B. O'Kelly in 1930.

220/5. EPILOBIUM TETRAGONUM L. Drayton, Middlesex, DRUCE.

220/7. E. OBSCURUM Schreb. Freshfield, S. Lancs, HOLDER and WAGSTAFFE.

220/8. E. ROSEUM Schreb. Grangemouth, Stirling, DRUCE; Wold Fell, West Riding, Yorks, 1835 ft., J. FRANKLAND.

220/14. E. PALUSTRE L., var. PUBESCENS Coss. & Germ. Littlesea, Dorset, DRUCE.

†220/15. E. NUMMULARIFOLIUM R. Cunn. Misedale reservoir, Garstang, Lancs, H. G. BUNKER; Coniston, L. Lancs, E. W. MAGOR; by the river Esk below Arncliffe Wood, N.E. Yorks, S. P. ROWLANDS in *N.W. Nat.*, 251, 1930.

†223/1. OENOTHERA BIENNIS L. Lympne, Kent, Miss E. BIRCHALL.

†223/5. O. AMMOPHILA Focke. West Wittering, W. Sussex, J. GILMOUR.

225/2. CIRCAEA CANADENSIS Hill. High Force, Durham, DRUCE.

225/3. C. ALPINA L. Tyndrum, M. Perth, DRUCE.

†239/1. ERYNGIUM CAMPESTRE L. † Barry dock, Glamorgan, DRUCE; Maresfield, Sussex, CURTIS.

†245/6. BUPLEURUM LANCIFOLIUM Hornem. Tiverton, N. Devon, Col. WATTS in *Dev. Rep.*

247/5. APIUM INUNDATUM (L.) H. G. Reichb. Rhosgoel, Radnor, J. L. HAINES.

†249/1. AMMI MAJUS L. Birkdale, S. Lancs, HOLDER and WAGSTAFFE; Knighton, Leicester, SOWTER; Burton-on-Trent, Staffs, DRUCE.

†252/1. PRIONITIS FALCARIA (L.) Dum. Barry, Glamorgan, R. L. SMITH and REYNOLDS.

255/2. PIMPINELLA SAXIFRAGA L., var. POTERIIFOLIA Koch. Walmer, E. Kent, CASTALIA, Countess ~~of~~ GRANVILLE.

Var. DISSECTA With. Walmer, E. Kent, CASTALIA, Countess ~~of~~ GRANVILLE; Little Rollright, Oxon, Miss A. WILKINSON.

Var. OVATA Sprengel. Holyhead, Anglesey, DRUCE.

261/1. CHAEREFOLIUM SYLVESTRE (L.) S. & T., var. ANGUSTISECTA Druce. Anglesey; Tiverton, N. Devon; Port Logan, Wigtown; Creeside, Kirkcudbright; Girvan, Ayr; Carstairs, Lanark; near Corstorphine, Midlothian; Linlithgow town; Grangemouth, Falkirk, Stirling, DRUCE.

261/2. C. ANTHRISCUS (L.) S. & T. Parkstone, Dorset, L. B. HALL.

†263(2). FERULA species. Barry, Glamorgan, 1930, R. L. SMITH, MELVILLE and REYNOLDS. The leaves only appearing, undeterminable.

274/1. ANGELICA SYLVESTRIS L., var. DECURRENS Lallem. Bolton, Yorks, CASTALIA, Countess of GRANVILLE; Loch na Lairige, M. Perth, 2700 ft.; Port Logan, Wigtown; Girvan, Ayr; Jedburgh, Roxburgh; Galashiels, Selkirk; Peebles; Linlithgow; Falkirk, Stirling; Winch Bridge, Durham and Yorks; Glen Cahir, Co. Clare, DRUCE.

†276/4. PEUCEDANUM GRAVEOLENS L. Burton-on-Trent, Staffs, DRUCE.

277/2. HERACLEUM SPHONDYLIUM L. Ten feet six inches high, inflorescence three feet six inches across, by Lough Tue, Cork, *Irish Nat.*, 135, 1930. This suggests *Mantegazzianum*, DRUCE.

†279/1. CORIANDRUM SATIVUM L. Bath, N. Somerset, C. & N. SANDWITH.

†281/2. ANIDRUM TESTICULATUM (L.) O.K. Winchmore Hill, Middlesex, L. B. HALL.

284/1. HEDERA HELIX L., var. BOREALIS Druce. Hopton Wafers, Salop, Miss TODD.

287/3. SAMBUCUS EBULUS L. Ballyvaghan, Co. Clare, DRUCE.

296/4. GALIUM HERCYNICUM Weig., var. TRANSIENS (Rouy) Dr. Trearddur, Anglesey, DRUCE.

296/5. G. PUMILUM Murray. Conistone, Outershaw, Yorks, DRUCE.

296/7. G. WITHERINGII Sm. Trearddur Bay, Anglesey, DRUCE.

*†296/15. G. VALANTIA Weber. Burton-on-Trent, Staffs, DRUCE.

†298/4. ASPERULA GALIOIDES M. Bieb. Shinfield skinworks dumping ground, Yorks, LEES.

†298/5. A. ARVENSIS L. Bristol, W. Gloster, C. & N. SANDWITH.

†301/5. VALERIANA PHU L. Alien, E. Europe. In some plenty south of Tiverton, N. Devon, Col. WATTS.

304/3. VALERIANELLA DENTATA (L.) Poll. Potterne, N. Wilts, GWATKIN; Cinderhill, Notts, R. BULLEY.
Var. MIXTA (L.). Warepit, Dorset, L. B. HALL.

308/1. SCABIOSA COLUMBARIA L. Surrey Down. Flowers heliotrope-coloured, bred true, FRASER.

312/1. SOLIDAGO VIRGAUREA L., var. INTERRUPTA Druce. Tees-side, Winch Bridge, N.W. Yorks, DRUCE; Holmbury, Surrey, CASTALIA, Countess of GRANVILLE.

†312/3. S. LANCEOLATA L. Chadstock, S. Devon, Brig.-Gen. FIRTH in *Dev. Rep.*

†213/5. S. SEROTINA Ait. Brightlingsea, N. Essex, G. C. BROWN.

†312/6. S. CANADENSIS L. Callander, M. Perth, DRUCE.

314/1. BELLIS PERENNIS L. Hen and Chicken variety, Foxcote, E. Gloster, Miss ABELL.

†317/1. CALLISTEMMA HORTENSE Cass. Mortimer Common, Berks, with other aliens, Druce.

†318/4. ASTER NOVI-BELGII L. Garlieston, Wigtown, DRUCE; Headington, Oxon, Miss PAYNE.

318/19. A. TRIPOLIUM L., var. GLABER Bolz. The marshes, Shellness, E. Kent, CASTALIA, Countess ~~of~~ GRANVILLE; Grangemouth, Stirling, DRUCE.

†320/8. ERIGERON SPECIOSUS (Lindl.) DC. Maplethorpe, Lincs, LEES MS.

326/1. ANTENNARIA DIOICA (L.) Gaertn., var. HYPERBOREA (D. Don) DC. In a rocky shelf at the base of Ben Slioch, W. Ross, Prof. FERNALD in *Journ. Bot.*, 8, 1931. It is known from Skye.

†333/1. INULA HELENIUM L. Amre, W. Gloster, J. L. HAINES.

†335/1. BUPTHALMUM SPECIOSUM (Schreb.) Dr. Glen Isla, Angus, CORSTOPHINE.

†341/1. XANTHIUM STRUMARIUM L. Bristol, W. Gloster, C. & N. SANDWITH; Cardiff and Barry, Glamorgan, Miss VACHELL and R. L. SMITH.

†341/2. X. SPINOSUM L. Bristol, W. Gloster, C. & N. SANDWITH.

†341(2)/1. SIEGESBECKIA ORIENTALIS L. Frizinghall, Yorks, 1910, F. RHODES, ex LEES.

†346/1. LEPACHYS COLUMNARIS Torrey & Gray. Bristol, W. Gloster, C. & N. SANDWITH.

†353/4. BIDENS PILOSA L. Bristol, W. Gloster, C. & N. SANDWITH.

†354/1. GALINSOGA PARVIFLORA Cav. Fetcham, Surrey, BURKILL.

†356/1. HEMIZONIA PUNGENS Torrey & Gray. Burton-on-Trent, Staffs, DRUCE and CURTIS.

†364/4. ANACYCLUS DISSIMILIS Pomel. Burton-on-Trent, Staffs, DRUCE.

365/1. ACHILLEA MILLEFOLIUM L., var. LANATA Koch. Near Lumsden, N. Aberdeen, with the rose-coloured flowers (var. *rosea*), W. WILSON.

Var. CONSPICUA Druce. Near Stamford, S. Lincs; near Grantham, N. Lincs; Newark, Notts; near Thirsk, Yorks [61]; Middleton-in-Teesdale, Durham; Alston, Cumberland; Winton, Westmorland; Falkirk, Stirling; Tyndrum, M. Perth; Blairgowrie, E. Perth, DRUCE.

†368/8. ANTHEMIS RUTHENICA M. Bieb. Near Bristol, W. Gloster, C. & N. SANDWITH.

†370/13. CHRYSANTHEMUM PARTHENIUM (L.) Bernh. Grangemouth, Stirling, DRUCE.

†370/17. C. CORONARIUM L. Burton-on-Trent, Staffs, DRUCE.

†371/3. MATRICARIA SUAVEOLENS (Pursh) Buch. Sandhills, Kirkinner, Wigtown; Clunie, E. Perth; Grangemouth, Stirling, DRUCE.

†378/8. ARTEMISIA ABROTANUM L. Hedge-bank, Mull of Galloway, Wigtown, DRUCE.

†378/16. A. BIENNIS Willd. Glynde, E. Sussex, Miss PICKARD.

383/6. SENECIO ERUCIFOLIUS L. A form with narrowly cut leaflets, and very numerous flowers, Wallington, Surrey, A. L. STILL.

383/8. S. VISCOSUS L. Salter Hebble, Yorks; Grangemouth, Stirling, DRUCE; Pennon, the Castle, etc., Anglesey, Miss ARMITSTEAD; Loughborough, Leicester, BEMROSE (det. SCHINZ).

383/10. S. VULGARIS L., var. LANUGINOSUS (Trow). Bournemouth, S. Hants; Highbride, N. Somerset, L. B. HALL.

383/32. S. INTEGRIFOLIUS (L.) Clairv., var. VULGARIS DC. Winton, Westmorland, Miss MASON, who kindly showed me the station for this very rare form on the Northern slope of a rather steep hilly pasture. It may be distinct from the plant of De Candolle.

383/33. S. SPATHULIFOLIUS DC., var. MARITIMUS Syme, which is probably a distinct form from the Continental plant. It was in splendid flower on the Anglesey coast in June.

393/2. ARCTIUM NEMOROSUM Lej. Sandhills, Wigtown; Creetown, Kirkcudbright, DRUCE.

†395/1. CARDUUS NUTANS L., var. MACROCEPHALUS (Desf.). Bristol, W. Gloster, C. & N. SANDWITH.

†395/3. C. PYCNOCEPHALUS L. Burton-on-Trent, Staffs, DRUCE.

396/4. CIRSIUM ACAULE (L.) Weber, var. CAULESCENS (Pers.). Walmer, E. Kent, CASTALIA, Countess of GRANVILLE; Avebury, Wilts; Coombe, N. Hants, DRUCE.

†396/8. C. INCANUM (Ledeb.). Newhaven, Sussex, DRUCE.

†397/1. ONOPORDON ACANTHIUM L. Breakback Ridge, Bromsgrove, Worcs, Miss WILKINSON.

†397/2. O. TAURICUM Willd. Burton-on-Trent, Staffs, 1929, DRUCE.

405/2. CENTAUREA JUNGENS Gugl. Southwick, Sussex, E. PAYNE.

405/3. C. ANGUSTIFOLIA Gugl. Avebury, Wilts, DRUCE.

405/8. C. OBSCURA Jord. Widdy bank, Durham; Winton, Westmorland; Alston, Cumberland; Glen Luce, Wigtown, DRUCE.

405/11. C. NEMORALIS Jord. Avebury, Wilts; Stamford, S. Lincs; Teesdale, Durham; Winton, Westmorland, DRUCE.

†405/25. C. DIFFUSA Lam. Bristol, W. Gloster, C. & N. SANDWITH.

†405/28. C. MACULOSA Lam. Bristol, W. Gloster, C. & N. SANDWITH.

†405/31. C. SOLSTITIALIS L. Little Mongeham, E. Kent, CASTALIA, Countess of GRANVILLE.

†405/32. C. MELITENSIS L. Burton-on-Trent, Staffs, DRUCE.

†405/33. C. NICAEENSIS All. Burton-on-Trent, Staffs, DRUCE.

405/35. C. CALCITRAPA L. Lockerly, S. Hants, Miss SALMON.

†405/37. C. SALMANTICA L. Southwick, Sussex, E. PAYNE.

†405/40. C. IBERICA Trev. Bristol, W. Gloster, C. & N. SANDWITH.

†407/1. CARTHAMUS LANATUS L. Colchester, N. Essex, 1928 [2429], G. C. BROWN, as *C. dentatus* Vahl; Avonmouth, N. Somerset; Bristol, W. Gloster, C. & N. SANDWITH.

†407/3. C. TINCTORIUS L. Charleston, Cornwall, TRESIDDER; Brighton Downs, E. Sussex, Lady ALETHEA BUXTON; Langley, Bucks, DRUCE.

409/1. CICHORIUM INTYBUS L., var. GLABRATUM (Presl). Newhaven, E. Sussex, DRUCE.

†416/4. CREPIS NICAEENSIS Balb. Colchester, N. Essex, DRUCE.

416/5. C. CAPILLARIS (L.) Wallr., var. ANGLICA Dr. & Thell. Sandhills, Wigtown; Ayr; Grangemouth, Stirling; near Carstairs, Lanark; Jedburgh, Roxburgh; Dumfries; Winton, Westmorland; Melmerby, Cumberland; Skipwith, Yorks. The common British plant. It is probably a distinct species from *capillaris*: indeed, Dr Murr has named it *C. Druceana*.

416/10. C. TARAXACIFOLIA Thuill. Near Llanddona, Anglesey, Miss ARMITSTEAD.

†419/9. HIERACIUM CLAROPURPUERUM N. P. Tiverton, N. Devon, Col. WATTS.

*419/38. H. NIGRESCENS Willd. Leverborough, S. Harris; Ulladale, N. Harris, DRUCE.

419/45. H. CUMBRIENSE Hanbury. Above Winton, Westmorland, DRUCE.

419/50. H. SCHMIDTII Tausch. Teesdale, Durham, 1889, J. WHELDON; Craig y Maes, Montgomery, SALTER.

419/56. H. LEVI Hanbury. Blain Ingherin, My hirin Gard, Plinlimmon, 1500 ft., SALTER.

419/69. H. ARGENTEUM Fr. Craig y Morei, Plinlimmon, 1750 ft., SALTER.

*Var. SEPTENTRIONALE Hanbury. Ulladale, N. Harris, DRUCE.

*419/83. H. PELLUCIDUM Laest. (MELANOLEPIS Almq.). Winch Bridge, Durham, DRUCE.

†419/86. H. POLLINARIUM Hanbury. Steeple Aston, Oxon, DRUCE. Perhaps brought in with plants for the garden.

*419/89. H. SUBLEPISTOIDES Zahn. Newhaven, E. Sussex, 1929, teste Zahn; Stroud, E. Gloster, DRUCE.

419/92. H. CRASSICEPS Dahlst. Glen Fiagh, Glen Dole, Angus, 1882, DRUCE, teste ZAHN.

*419/93. H. MORULUM Dahlst. Cheddar, N. Somerset, DRUCE, teste ZAHN.

419/95. H. GRANDIDENS Dahlst. (Le Han, Belgium, 1920, DRUCE). Carig y Mais, Montgomery, 1926, SALTER, teste DAHLSTEDT; Winton, Westmorland, DRUCE.

*419/108. H. KILLINENSE Zahn. (H. MICRACLADIUM F. N. Will.). Whitewell, Belfast, 1865, Hb. DRUCE, teste ZAHN. New to Ireland.

419/119. H. EXPALLIDIFORME Dahlst. Linn of Dee, S. Aberdeen, 1878; Ben Lawers, Ben Laiogh, M. Perth, 1898, DRUCE, teste ZAHN.

419/121. H. RIVALE Hanbury, var. DASYTHRIX (W. R. L.). Loch na Lairige, M. Perth, DRUCE.

419/122. H. DIAPHANOIDES Lindeb. Glasbury, Radnor, DRUCE.

*419/123. H. MEGAPODIUM Dahlst. Craig y Furton, Tregannon, SALTER.

*419/140. H. PRAESIGNE Zahn. (PRAESTANS Lint., non D.). Burton-on-Trent, Staffs, DRUCE.

419/239. H. STRICTUM Fr. Cader Idris, Merioneth, SALTER.

419/241. H. UMBELLATUM L. Bethesda, Carnarvon, DRUCE.
Var. CORONOPIFOLIUM Bernh. Isle of Wight, STRATTON; Knighton, Leicester; Melmerby, Cumberland, MASON; Teesdale, Durham, DRUCE.

423/10(2). TARAXACUM RUBICUNDUM Dahlst. Walney Isle, Mrs WEDGWOOD.

423/17. T. BRITANNICUM Dahlst. For "Steeple," read "North Aston." Add "one of the most characteristic British species." *Rep. B.E.C.*, 1929.

*423/28. T. NAEVOSUM Dahlst. Near Loch Ryan, Wigtown; Thirsk, S.E. Yorks; Grangemouth, Stirling, DRUCE.

423/37. T. ALATUM Lindb., f. For "Northants," read "North Hants," in *Rep. B.E.C.*, 1929.

425/1. LACTUCA VIROSA L. Parkstone, Dorset, L. B. HALL.

425/2. L. SERRIOLA L. East Shelton, Leicester, SOWTER.

425/4. L. MURALIS Fres. Cadnant, Anglesey, Miss ARMITSTEAD.

†428/1. TRAGOPOGON PORRIFOLIUS L. In a field at the Downs School, Colwall, Hereford, F. M. DAY.

†434/1. PHYTEUMA SPICATUM L., var. CAERULEUM Rouy. Banks of the Teviot, Jedburgh, Roxburgh, Lady MARGARET KERR, sent by Mr JUSTICE TALBOT. Perhaps brought down by the river from a garden.

435/1. CAMPANULA GLOMERATA L. With deeper lobes, Ewelme, Oxon, Lady SEVERN.

435/3. C. TRACHELIUM L. Holmbury, Surrey, CASTALIA, Countess of GRANVILLE. This is the rare type plant with glabrous calyces.

435/4. C. RAPUNCULOIDES L. Hampstead Marshall, Berks, Hon. Mrs G. BARING.

438/2. VACCINIUM MYRTILLUS L. Linwood Warren, N. Lincoln, a rare species in the county, Miss J. GIBBONS.

446/1. ERICA CINEREA L., var. SPLENDENS (Vig.) Dr. Tadley, Berks, and N. Hants, DRUCE.
Var. RENDLEI L. B. Hall. Near Moreton, Dorset, L. B. HALL.

446/7. E. VAGANS L. This is reported in *Trans. Devon Bot. Rep.* for 1930. Can its history be obtained?

†450/1. KALMIA ANGUSTIFOLIA L. Ranworth End, Rufford Forest, Notts, SOWTER.

†451/2. LEDUM GROENLANDICUM Oeder. (L. LATIFOLIUM Ait.). Found near Henley Park, Normandy, Surrey, by C. E. MARKS. Through his kindness I was enabled to see the specimens growing. The habitat was on the very wet margin of a large piece of water. Rhododendrons were planted along the same lake. The *Ledum* was growing freely there, and had flowered well. Since that time Mr MARKS found it on an island on another piece of water. From the water's edge to about six feet back is one solid mass of it all around the island.

453/1. PYROLA ROTUNDIFOLIA L. From the old locality at Newham, Northumberland, E. GRAY and A. PALMER.

457/2. LIMONIUM HUMILE Mill. Abundant by the Cree, Kirkcudbrightshire, DRUCE; Conway side, Denbigh, A. WILSON.

*457/6. L. TRANSWALLIANUM Pugsl. Ballyvaghan, Co. Clare, gathered by Mr T. FOGGITT in 1898 (see Pugsley, *Journ Bot.*), but P. B. O'Kelly had collected specimens in 1891 or 1892, as *Statice angustifolia*, var. *intermedium*, from Blackhead, Co. Clare.

463/1. LYSIMACHIA THYRSIFLORA L. Near Muirkirk, Ayrshire, DRUCE.

†473/1. VINCA MAJOR L. Near Port Logan, Wigtown, DRUCE.

†473/2. V. MINOR L., var. FLORE PUNICEA. White Hill, Owlesbury, Hants, P. M. HALL.

†474/2. BUDDLEIA DAVIDII Franchet. Gore Cliff, Blackgay, Isle of Wight, MARQUAND in *Journ. Bot.*, 377, 1930; at 500 ft. above North Nibley, Gloster, C. TRAPNELL; Avon Gorge, W. Gloster, C. & N. SANDWITH.

*478/7. CENTAURIUM CAPITATUM (Willd.) Dr. Cliffs beyond Overton Gower, Glamorgan, Prof. McLEAN.

480/9. GENTIANA CAMPESTRIS L. Plentiful in two Commons near Brimpton, Berks, a new habitat for a rare plant in the county, DRUCE and CHAPPLE.

482/1. NYMPHOIDES NYMPHOIDES (L.) Dr. (N. PELTATUM Gmel.). In Sherrard's Green, near Malvern, Worcester, new to the Malvern district, F. M. DAY.

†485/2(2). GILIA CONGESTA Hook. Between Apperley and Calverley, W. Yorks [733], LEES FL.

†487/2. NEMOPHILA MENZIESII Hook. & Arn. (N. ATOMARIA Fisch.). Burton-on-Trent, Staffs, CURTIS.

†493/2. LAPPULA LAPPULA (L.). Parc, Ventnor, Cornwall, BARRATT, ex THURSTON.

†494/1. ASPERUGO PROCUMBENS L. Field near Cherry Hinton, Cambs, shown me by Mr GILBERT-CARTER; near Lockerly, S. Hants, Miss SALMON.

†496/2. BENTHAMIA LYCOPSIOIDES Lehm. Beaumaris, Anglesey, Miss ARMITSTEAD.

†496/4. B. INTERMEDIA (F. & M.) Dr. Parc, Ventnor, Cornwall, 1929, BARRATT, ex THURSTON.

†496/5. B. MENZIESII (Lehm.) Dr. Folkestone, E. Kent, H. WALKER; Burton-on-Trent, Staffs, DRUCE.

†497/4. SYMPHYTUM PEREGRINUM Ledeb. By the Cree, Kirkcudbright, DRUCE.

†500/1. ANCHUSA SEMPERVIRENS L. Henelyn Los, Anglesey, Miss ARMITSTEAD.

†503/4. PULMONARIA SACCHARATA Miller. Alien, Europe. Hortal, introduced in 1817. Wood near Ranmore, Surrey, BURKILL. A well known garden plant.

†506/7. MYOSOTIS SYLVATICA (Ehrh.) Hoffm. Parc, Ventnor, Mullino, Cornwall, BARRATT, ex THURSTON.

†510/2. CERINTHE MINOR L. Burton-on-Trent, Staffs, DRUCE.

511/1. VOLVULUS SEPIUM Medik., var. COLORATUS Lange. Near Sandhills and Garlieston, Wigtown, DRUCE.

†513/3. CONVOLVULUS TRICOLOR L. Burton-on-Trent, Staffs, DRUCE.

†515/1. CUSCUTA EPILINUM L. Found by Miss E. VACHELL at Bozeat, Northants. The information was obtained through the kindness of the Official Seed Testing Station at Cambridge. I went over to the farm belonging to Mr Bowers. The Flax-seed was obtained from a grower of the seed at Kirby-le-Soken, Essex. At Bozeat, three fields of Flax of about 50 acres were practically ruined by this destructive parasite.—DRUCE. Miss PICKARD also found it on Flax at Glynde, E. Sussex.

†517/9. SOLANUM TRIFLORUM Nuttall. Bristol, W. Gloster, C. & N. SANDWITH.

527/3. VERBASCUM THAPSUS L. Garlieston, Wigtown, DRUCE.

551/1. LATHRAEA SQUAMARIA L. Hungerford, Berks, rare in the county, Miss LAWBRIDGE.

552/1 and 2. UTRICULARIA VULGARIS L. and U. MAJOR Schmidt. *The Flora of Glamorganshire* (1911) states " There is only one modern record for any *Utricularia* in Glamorgan " (*U. vulgaris*). " In August 1929 and again with Miss E. Vadish in September 1930 I visited Oxwich Bay where *Utricularia* plants were seen in plenty, but owing to the almost complete absence of flowers (only one flowering specimen was seen in 1929 and none in 1930) determination is difficult. It is considered that both species (*vulgaris* and *major*) may be present. The matter is under investigation."—FRANCIS DRUCE.

553/2. PINGUICULA VULGARIS L. Sandhills, Baglan, Glamorgan. Within reach of the highest spring tides, Miss E. VACHELL, MELVILLE and SMITH.

†557/1. ELSHOLTZIA PATRINI Garcke. Bristol, W. Gloster, C. & N. SANDWITH.

558/1. MENTHA ROTUNDIFOLIA Huds. Two forms from the Merthyr Canal, Glamorgan, Miss E. VACHELL. One with very small and dark coloured flowers and narrow panicle. Mr J. Fraser gives it no special name, but thinks it has been drawn up and starved by tall vegetation.

558/2. M. ALOPECUROIDES Hull. Leicester, BEMROSE.

558/3. M. LONGIFOLIA (L.) Huds., var. WEINERNIANA (Opiz) Briq. Great Bentley, N. Essex [2439], G. C. BROWN, teste (as with the other Menthae) J. FRASER.

558/6. ×M. PIPERITA L. Compton Abdale, E. Gloster, J. L. HAINES.

558/7. M. AQUATICA L. Silchester, N. Hants, DRUCE.
Var. SUBGLABRA (Baker). Slapton, Devon, Miss LARTER.
Var. LOBELIANA Becker. Hitchin, Herts, PHILLIPS.

†558/9. × M. VERTICILLATA (L.), var. OVALIFOLIA (Opiz) Briq. Gerrard's Cross, Bucks; luxuriant type at Callander, W. Perth, DRUCE.

558/10. M. GENTILIS L. Batheaston, N. Somerset, C. SANDWITH.

558/13. M. ARVENSIS L. Forbury, Berks; Melmerby, Cumberland, DRUCE.
Var. PARIETARIIFOLIA Beck. River-side, Sellack, Hereford, as *sativa subglabra*, 1899, A. LEY.
Var. HIRTIPES (Fraser). Ascott-under-Wychwood, Oxon, 1930, DRUCE.

558/14. M. PULEGIUM L. Britten's Pond, N. Hants, Mrs WILLAN and Lady DAVY.

559/1. LYCOPUS EUROPAEUS L., var. GLABRESCENS Schmid. Glen Luce, Wigtown, DRUCE.

(All the THYMES have been kindly determined by Dr RONNIGER.)

561/1. THYMUS PULEGIOIDES L. (T. OVATUS Mill.). Hambledon Hill, Berks, DRUCE.

561/2. T. GLABER Mill. (T. CHAMAEDRYS Fr.). Churn, Greenham Common, Forbury, Berks, DRUCE.
Forma GRACILICAULE Ronn. Cothill, Berks, DRUCE.

561/4. T. SERPYLLUM L., var. LINNEANUS Gr. & Godr. Shiehallion, M. Perth; Widdy Bank, Durham, DRUCE.

561/8. T. DRUCEI Ronn. Loch na Lairige, M. Perth, DRUCE.

561/9. T. ZETLANDICUS Ronn. & Dr. Shiehallion, M. Perth, DRUCE.

561/10. T. NEGLECTUS Ronn. Ventongimps, W. Cornwall, RILSTONE; Llanberris, Carnarvon; High Force, Durham; Avebury, N. Wilts; Gentian Hill, Galway; Trearddur Bay, Holyhead, Anglesey; Garlieston, Wigtown; Outershaw, N.W. Yorks; Girvan, Ayr; Winton, Westmorland; near Langholm, Dumfries, DRUCE.

561/11. T. BRITANNICUS Ronn. Sand dunes, Perranporth, W. Cornwall, RILSTONE, as *serpyllum* agg.; Mildenhall, Suffolk, H. PHILLIPS; Gentian Hill, W. Galway; Holyhead, Anglesey, DRUCE.

562/5. SATUREIA ASCENDENS (Jord.) Dr., var. BRIGGSII (Syme) Dr. Near Charleston, Cornwall, TRESIDDER.

566/1. SALVIA PRATENSIS L. Trewsbury, E. Gloster, Miss DIANA CATOR.

†566/7. S. AETHIOPIS L. Burton-on-Trent, Staffs, DRUCE.

†566/17. S. VERTICILLATA L. Bristol, W. Gloster, C. & N. SANDWITH.

573/1. PRUNELLA VULGARIS L., var. NEMORALIS Bég. Canal-side, Market Harborough, Leicester; a tiny form of the type at 3000 ft. on Loch na Lairige, M. Perth, DRUCE.

573/2. P. LACINIATA L. Near Crab Wood, S. Hants, Rt. Hon. H. T. BAKER.

†575/1. SIDERITIS MONTANA L. Bristol, W. Gloster, C. & N. SANDWITH.

†577/2. STACHYS GERMANICA L. Bristol, W. Gloster, C. & N. SANDWITH.

577/4. S. AMBIGUA Sm. Askham Wood, N. Somerset; Garlieston, Wigtown, DRUCE; Tarleton, S. Lancs, HOLDER and WAGSTAFFE.

578/1. GALEOPSIS SPECIOSA Mill. Lumsden, N. Aberdeen, W. WILSON; Blairgowrie, E. Perth, DRUCE.

†588/2. PLANTAGO CYNOPS L. Parkstone, Dorset, L. B. HALL.

†588/19. P. TENUIFLORA W. & K. Halifax, Yorks, LEES.

600/1. CHENOPODIUM RUBRUM L., var. KOCHIIFORME Murr. Avonmouth, N. Somerset and W. Gloster, C. & N. SANDWITH.

600/2. C. CRASSIFOLIUM Horn., var. DEGENIANUM Aellen. (C. BOTRYODES Sm.). Shornesshead Fort, E. Kent, WOLLEY-DOD, as *Botryodes*; Gravesend, Kent; Yarmouth, E. Suffolk, 1904, DRUCE; ditches in Salsmouth, near Yarmouth, Suffolk, 1859, J. A. KNIGHT; Selion Island, Guernsey, BARTON; Pegwell Bay, Kent, 1867, SYME. *C. crassifolium* is an older name than *Botryodes*.

600/5. C. URBICUM L. (VULGARE). Brading, Isle of Wight; Ridge, Dorset; Aberthaw, Glamorgan, DRUCE.

Var. INTERMEDIUM (M. & K.) Moq. Winchelsea, Sussex; Bradford, Yorks, DRUCE; She Bridge, S. Hants, Canon J. VAUGHAN; Epping, S. Essex, EYRE DE CRESPIGNY; Walton-on-the Naze, N. Essex, 1867, BOSWELL SYME; Cobham, Surrey, 1866, WATSON.

†600/7. C. OPULIFOLIUM Schrad. Southsea, S. Hants, C. E. PALMER; Bristol, W. Gloster, G. PARRY; Malpas, Cheshire, WARREN; Fazackerley, S. Lancs, 1912, WHELDON, as *opulifolium* × *serotinum*; Grandpont, Berks; Botley, Oxon, 1891; Watton, W. Norfolk; Muirfield, Yorks; Aintree, S. Lancs; Radyr, Glamorgan, DRUCE.

600/8. C. ALBUM L., var CYMIGERUM. Slough, Bucks, DRUCE; Dedham, N. Essex, 1922, BROWN; Hovingham, N. Yorks, DRUCE.

Var. SUBFICIFOLIUM (Murr) Dr. Colchester, N. Essex; Dundee, Angus; Galashields, Selkirk; Cannock, Staffs, DRUCE.

Var. LANCEOLATIFORME (Murr) Dr. Halworthy, N. Devon, HARVEY; Kennington, Berks; Hovingham, N. Yorks; Oxford, DRUCE.

Var. VIRIDE (L.) Gray. Farnham, Surrey, 1867, WATSON; Symond's Yat, Avonmouth, W. Gloster; Odiham, N. Hants; Osney, Oxon; Colchester, N. Essex; Brill, Bucks; Ipswich, E. Suffolk; Peakirk, Northants; Hamworthy, Dorset, DRUCE.

Var. GLOMERULOSUM (Reichb.). Dedham, N. Essex, G. C. BROWN.

Var. BERNBURGENSE (Zschacke) Dr. Bradford, Yorks, DRUCE.

×ZSCHACKEI=SUBCUNEATUM Murr. Swanage, Dorset, DRUCE.

600/8. C. SUECICUM Murr. (C. ALBUM × OPULIFOLIUM Murr Mag. Bot. Lap. i., 1902, S. 341, t. iii., fig. 10. = ALBUM, sub-sp. PSEUDOPULI-

FOLIUM (J. B. Scholz); C. ALBUM, f. PSEUDO-OPULIFOLIUM J. B. Scholz in Oster. Bot. Zeitsch. 4, S. 97, 1900). Salmonby, Boston Docks, N. Lincs; Colchester, N. Essex; Osney, Oxford; Galashiels, Selkirk, 1912, DRUCE.

600/12. C. FICIFOLIUM Sm. Clapton, N. Somerset; Iver, Bucks, DRUCE.

600/13. C. GLAUCUM L. Four Mile Bridge, Anglesey; Burton-on-Trent, Staffs, DRUCE.

†600/24. C. ZSCHACKEI Murr. Brislington, N. Somerset; Southampton, S. Hants; Byfleet, Surrey; Colchester, N. Essex; Burton-on-Trent, Lichfield, Staffs; Cardiff, Glamorgan; Swanage, Dorset; Didcot, Berks, DRUCE.

Var. LATIFOLIUM (Ludv.) Aell. Symond's Yat, W. Gloster, 1929, DRUCE.

†600/29. C. AURICOMIFORME Murr & Thell. Tweedside, Selkirk, Miss HAYWARD; Bradford, Yorks, CRYER.

†600/31. C. FOETIDUM Schrad. Bradford, Yorks, CRYER.

606/5. ATRIPLEX HASTATA L. This is the *A. tatarica* from Cotgrave, Notts, in *Rep. B.E.C.*, 237, 1929, R. BULLEY.

†606/11. A. TATARICA L. A broad-leaved form from Galashields, Selkirk, DRUCE and Miss HAYWARD.

†607/1. AXYRIS AMARANTOIDES L. Near the Dyke, E. Sussex, Miss PICKARD.

611/3. SALICORNIA DOLICHOSTACHYA Moss. Coast of Glamorgan, Miss E. VACHELL.

611/9. S. DISARTICULATA Moss. Coast of Glamorgan, Miss E. VACHELL.

612/1. DONDIA (SUAEDA) FRUTICOSA Dr. Near Cardiff, Glamorgan, looking certainly native and known from there for many years, Miss E. VACHELL.

613/1. SALSOLA KALI L. Cop Saltney, Flint, F. G. DODD-THOMAS.

615/11. POLYGONUM MINUS × PERSICARIA = P. BRAUNIANUM F. Schultz. Binsey, Oxford, DRUCE, agreed to by DANSER.

†615/24. P. PLEBEJUM R. Br. Leith Docks, H. A. WEBBER.

618/3. × RUMEX ACUTUS L. Near Devizes, S. Wilts, DRUCE.

627/1. THESIUM HUMIFUSUM DC. Barry, Glamorgan, Miss E. VACHELL and R. L. SMITH.

628/8. EUPHORBIA AMYGDALOIDES L. With variegated foliage, Selborne Common, Hants, Miss BARRATT.

628/15. E. EXIGUA L., var. RETUSA DC. Ewelme, Oxon, Lady SEVERN.

642/3. BETULA NANA L. Moor of Rannoch, Argyll, DRUCE.

646/2. QUERCUS SESSILIFLORA Salisb. Creeside, Kirkcudbright, DRUCE.

650/1. SALIX PENTANDRA L. Near Port Logan, Wigtown, DRUCE.

650/2. ×S. ALOPECUROIDES Tausch. Kirkmabreck, Kirkcudbright, Mrs BLAIR IMRIE, ex C. WATERFALL.

650/4. S. TRIANDRA L., var. DISCOLOR Anders., f. LATIFOLIA Anders. Ascott-under-Wychwood, Oxon, 1930, DRUCE.
Var. CONCOLOR Anders. Cinderhill, Notts, R. BULLEY.

650/5. S. PURPUREA L. Near Glen Luce, Wigtown; Beals, Staffs, DRUCE.
×VIMINALIS = S. RUBRA Huds. Near Garlieston, Wigtown, DRUCE.

650/8. S. CAPREA × VIMINALIS = S. MOLLISSIMA Sm. Rycote, Oxon, 1930, DRUCE.

650/9. S. AURITA × CINEREA = LUTESCENS A. Kern. Port Logan, Wigtown, DRUCE.

650/12. S. ANDERSONIANA × PHYLICIFOLIA = S. FRASERII Druce. Killin, M. Perth, DRUCE.

653/2. CERATOPHYLLUM DEMERSUM L. Grangemouth, Stirling, DRUCE.

663/2. LISTERA CORDATA (L.) Br. Kinloch Rannoch, M. Perth, Hon. Mrs WILLIAMSON.

664/3. SPIRANTHES ROMANZOFFIANA Cham. (as S. STRICTA, A. J. Wilmott in Journ. Bot., 346, 1930). Col. M. J. Godfery, F.L.S., in the *Orchid Review*, 291, 1930, contends that the Southern and Northern *Spiranthes* are both *Romanzoffiana*, the same species, in opposition to the view of Mr A. J. Wilmott, who held they were distinct. Col. Godfery brings good evidence in support of his view, which is also corroborated by Prof. Fernald. It is quite evident that Rydberg's *S. stricta* will have to be degraded from specific if not from varietal rank, which was all I gave it in the *List*. The Northern and Southern plants do not appear to me to vary more than the Eastern (fen) and Western (dunal) form of *Liparis*. Viscountess STRATHCONA found it in the island of Colonsay (see *Journ Bot.*, 346, 1930). I have little doubt that it is the

"*Spiranthes autumnalis*" recorded by Mr J. B. Simpson from the island of Coll; see *Rep. B.E.C.*, 213, 1923, where I then suggested that it was *Romanzoffiana*.

667/3. CEPHALANTHERA LONGIFOLIA (Huds.) Fritsch. Ashford Common, Hants, B. L. M. SYRINGE, ex P. M. HALL.

668/3. HELLEBORUS LEPTOCHILA (Godf.) Dr. A small form of this Owlesbury, Winchester, S. Hants, G. W. PIERCE.

669/1. ORCHIS PURPUREA Huds., var. PSEUDOMILITARIS Dr. Near Staplehurst, Kent, STANLEY; Quenvais, Jersey, Lady DAVY. The Jersey plant has a wonderful labellum of the outline of *O. maculata* L. vera, but has wonderful markings of dark dull crimson.

669/5. O. MORIO L., var. CHURCHILLII Dr. Brightstone, Isle of Wight (labellum 19 mm. broad), E. DRABBLE; fields near Didcot, Berks, Miss PORTER.

669/6. O. LATIFOLIA L. Mr R. WAKEFIELD, Elmett in Horton, N. Devon, *Dev. Rep.* One wonders what this is.

669/7. O. INCARNATA L. Fullerton, Hants, GWATKIN; Durnford, Cambs, typical plants, DRUCE.

Var. PULCHRIOR Dr. Durnford, Cambs, DRUCE; Hanxton, Cambs, GILSON; distinct from type *incarnata*, and of a remarkably beautiful colour, Bowne, Holmsley Bog, S. Hants, P. M. HALL.

×PRAETERMISSA. Hanxton, Cambs, GILSON; "growing with both parents, Winton, Hants," P. M. HALL.

669/8. O. PRAETERMISSA Dr. Cutmills Pond, Surrey; Culeaze, Dorset, typical; Gentian Hill, Roundstone, W. Galway; Blackhead, Co. Clare; Watterston Bog, Cefn Bryn, Glamorgan, J. A. WEBB.

Sub-var. BRACTEATA Dr. With bracts much longer than flowers, 1 in. or more long. Cutmills Pond, Surrey, DRUCE.

Var. PULCHELLA Dr. Valley, Tycroes, etc., Anglesey, DRUCE; Killean, Argyll, Mrs MACALISTER HALL, who says "the *latifolia* types are growing in peaty pastures here with various intermediate forms—side by side with dark *maculata* type."

669/10. O. MACULATA L., vera. Killean, Argyll, Mrs MACALISTER HALL, with forms approaching the var. *macroglossa*; Gentian Hill, W. Galway; Blackhead, Co. Clare; Holyhead Mt., Anglesey; Snowdon, Carnarvon; Moor of Rannoch, M. Perth (variable in colour, from nearly white to rosy purple), DRUCE; Austwick, N. Yorks, in a bog called Lawkland Moss, J. FRANKLAND.

Var. vel forma GRACILIS Dr. Upper sepals very narrow, middle lobe of labellum longer than large side lobes, spur short and slender. Cardiff, Glamorgan, Miss E. VACHELL, growing with *O. maculata*, var. *macroglossa* Dr.

×PRAETERMISSA=HALLII Dr. Killean, Argyll, Mrs MACALISTER HALL; Blackhead, Co. Clare; robust full flowering plants of rich colouring (some with unspotted leaves), Gentian Hill, Galway, DRUCE.

669/11. O. FUCHSII Dr., var. BRACTEATA Dr. Andoversford, Gloster, Miss ABELL. A tall robust plant with typical flowers, but having long leafy bracts an inch long; type plants at Killean, Argyll, Mrs MACALISTER HALL. Ivinghoe, Bucks, very abundant; Blackhead, Co. Clare; Gentian Hill, W. Galway, DRUCE; on basic soil, Watterston Bog, Cefn Bryn, Glamorgan, WEBB.

Forma OVALIS. Leaves roundly oval.

×MACULATA=O. TRANSIENS Dr. Gentian Hill, W. Galway; Blackhead, Co. Clare; Ivinghoe, Bucks, DRUCE.

×PRAETERMISSA=O MORTONII Dr. Gentian Hill, W. Galway, leaves scarcely spotted; Glynde, E. Sussex, Miss PICKARD; Micheldever, Owlesbury, Southwick, S. Hants, P. M. HALL.

669/12. O. O'KELLYI Dr. Askham, York, SLEDGE.

669/14. O. MASCULA L., var. ALBA. Near Tenby, Pembroke, Mr ARNOTT; near Staplehurst, Kent, H. D. STANLEY.

669/18. O. HIRCINA Crantz. Morestead, near Whitchurch, S. Hants, Mrs LAURENCE DRUMMOND, v.sp.; Owlesbury, S. Hants, PIERCE; near Holton, N. Lincs, Miss J. GIBBONS; in a new locality near Folkestone, E. Kent, H. WALKER.

672/2. OPHRYS SPHEGODES Mill. *Near Owlesbury, S. Hants, PIERCE; Winspit, Dorset, Sir M. ABBOT-ANDERSON.

672/3. O. APIFERA Huds., × FUCIFLORA = BOTERONI Chodat. E. Kent, H. WALKER.

Var. FLAVESCENS Rost. Newport, Isle of Wight, WHITE, ex P. M. HALL.

674/1. HABENARIA GYMNADENIA Dr. Killean, Argyll, Mrs MACALISTER HALL.

×ORCHIS FUCHSII. Cheesefoot Head, S. Hants, R. L. SYRINGE.

Var. DENSIFLORA (Wahl.). Southwick, Hants, P. M. HALL.

674/4. H. VIRIDIS (L.) Br. Near Dover, E. Kent, H. WALKER.

Var. VAILLANTII (Ten.) Fern. Loch na Lairige, M. Perth, DRUCE.

674/5. H. INTACTA Benth. On Gentian Hill, W. Galway, apparently a new locality, DRUCE.

674/7. H. BIFOLIA (L.) Br. Gentian Hill, W. Galway, DRUCE.

†678/6. CROCUS ZONATUS J. Gay. Still appearing at Shackleford, Surrey, F. CLARKE.

†683/1. TRITONIA CROCOSMIFLORA Nich. Milford Water, Hartland, G. T. HARRIS.

†684/3. NARCISSUS BIFLORUS Curtis. Copeland Isle, Donaghadee, in considerable quantity and showing no sign of being introduced, F. STOREY; I have grown some bulbs in my garden and they undoubtedly belong to this plant. In great abundance in some pasture fields near Llanddona above Red Wharf Bay, Anglesey, shown us by Miss ARMITSTEAD, DRUCE.

†685/1. GALANTHUS NIVALIS L. Abundant near Hartland, N. Devon, R. P. CHOPE in *Dev. Rep.*

689/1. RUSCUS ACULEATUS L. With yellow fruits near Dartmouth, S. Devon, R. M. MILNE in *Dev. Rep.*

702/4. ALLIUM VINEALE L., var. BULBIFERUM Syme. Henfield, E. Sussex, E. PAYNE.

†702/16. A. ROSEUM L. Vale Pond, Guernsey, Mrs HICHENS, not previously recorded from the island; near Brighton, Sussex, appears naturalised, E. PAYNE.

703/1. MUSCARI RACEMOSUM Lam. & DC. In the grass on a hedge-bank, beside a farm-cart road near Lockerly, S. Hants, known there for some years, but it has never been grown in the nearest garden, Miss SALMON.

*707/1. ORNITHOGALUM PYRENAICUM L. Near Marwell, N. Wilts, a single plant, G. W. PIERCE, ex P. M. HALL.

†707/2. O. UMBELLATUM L. Quite naturalised near Holyhead, Anglesey, Lady KATHLEEN STANLEY; Bournemouth, S. Hants, L. B. HALL.

716/1. PARIS QUADRIFOLIA L. Stourpaine, Dorset, L. B. HALL.

718. JUNCUS BICORNIS Michx. This, and not *J. tenuis* Willd., is the N. American plant which appears sporadically in Britain. Prof. Fernald has recently identified a specimen in the Kew Herbarium labelled *J. tenuis* by Mr C. E. Salmon from Crianlarich, N. Perth, as *J. Dudleyi* described by Wiegand in *Bull. Torrey Bot. Club*, 524, 1900. Both *Dudleyi* and *bicornis* are of American origin. G. C. DRUCE.

718/6. JUNCUS BALTICUS Willd. Birkdale, S. Lancs, "one stem in flower had six stamens as stated in your *Hayward*, ed. 1929; I saw a plant with three, the number stated in Hooker's *Student's Flora*," F. W. HOLDER.

718/11. JUNCUS NODULOSUS Wahl. (J. ALPINUS auct. brit.). A rush which has been much misunderstood is the super-species *J. alpino-arti-*

culatus Chaix. It includes at least three minor species—(1) *Juncus alpino-articulatus* Chaix (*mucroniflorus* Clairv.), a name which is older and supplants *J. alpinus* Vill.; (2) the *J. nodulosus* Wahl., which is our British form; (3) *J. articapillus* Drej., not known as British. *J. nodulosus* was reported by W. H. Beeby (*Scot. Nat.*, 92, 1887) as having been found by Mr Hutcheson in Glen Dole, Angus, in 1870. Buchanan White found it at Pitlochry in 1887, and in that year I got it near Loch Ennich, Easterness (see *Scot. Nat.*, 122, 1894). In 1903 I found it in some plenty on Widdy Bank, Durham, when I showed it to Dr F. A. Lees in 1909, who records it in a copy of my List. He also says that he found it on the stony slopes of Mickle Fell, N.W. Yorks. This year (1930) I again found it in considerable quantity near Langdon Beck, but failed to find it on the Yorkshire side of the Tees I have also found a hybrid of *articulatus* × *nodulosus* = *J. Buchenaui* Dorfl. G. C. DRUCE.

718/12. J. BULBOSUS L. Langevat, Harris, DRUCE.
Var. FLUITANS (Lam.) Dr. Glen Cahir, Co. Clare, DRUCE.

721/1. TYPHA LATIFOLIA L. Port Logan, Glen Luce, Wigtown, DRUCE.

721/2. T. ANGUSTIFOLIA L. Baglan, Glamorgan, E. VACHELL and R. K. SMITH.

722/2. SPARGANIUM RAMOSUM Huds. × SIMPLEX Huds. Flowers stalked, not branched. Capitule racemosely stalked, and even the lower heads variously coarser and without the yellow-green tint of *simplex*. Old Holder Bed, Yorks, LEES MS.

*727/2. LEMNA POLYRHIZA L. Wood-pit, Grangemouth, Stirling, with *L. minor* and *trisulca*, DRUCE.

729/1. ALISMA PLANTAGO-AQUATICA L., var. LANCEOLATUM (With.). Littlesea, Dorset, Miss E. VACHELL and Mrs KNOWLING.

†733/1. DAMASONIUM DAMASONIUM (L.) Dr. Pond, Stone-ferry, Hull, S.E. Yorks, LEES.

736/1. SCHEUCHZERIA PALUSTRIS L. "I have before me a dried specimen which was gathered four or five years ago in Northumberland. It was growing within a few hundred yards of the sea."—T. H. ARCHER HIN, Newton Abbott, 12th February 1889, in a letter to *The Standard*, to which Mr Temperley has recently directed my attention.

737/9. POTAMOGETON GRAMINEUS L. In Loch Kinnardochy, 1260 ft., M. Perth, DRUCE.

737/11. P. NITENS Weber. River Freshney, near Little Coates, N. Lincs, ex Rev. W. W. MASON.

737/17. P. CRISPUS L., var. SERRATUS (Huds.). Grangemouth, Stirling; Market Harborough, Leicester, DRUCE; Freshney River, Little Coates, N. Lincs, Rev. W. W. MASON.

Var. ACUTIFOLIUS Fieber. Lexden, N. Essex, G. C. BROWN, teste PEARSALL.

×MUCRONATUS = × LINTONI (Fryer) Dr. In a branch of the Trent at Burton-on-Trent, Staffs, flowering freely, DRUCE. Pearsall says it is a sound example of this hybrid.

×PUSILLUS = × P. BENNETTII Fryer. See *British Pondweeds*, t. 33. This rare hybrid was found in the wood-pond at Grangemouth, Stirling, where it does not appear to have been found for many years. After a persistent search, Mr CHAPPLE and I found it in small quantity in the classic locality last August.—DRUCE.

737/18. P. COMPRESSUS L. (P. ZOSTERIFOLIUS Schum.). Robust specimens, the *latifolius* Gray, in the Canal near Market Harborough, Leicester, DRUCE.

737/24. P. RUTILIS Wolfg. More plentiful this year in Llyn Coron, Anglesey, DRUCE.

*737/25. P. PANORMITANUS Biv.-Bernh. In the Elland Canal, Yorks, DRUCE.

†737/32. P. PENNSYLVANICUS C. & S. In the Canal between Elland and Salter Hebble, Yorks. Only the early leaves, which suggests that the floating leaves appear the following year.—DRUCE.

740/1. ZOSTERA MARINA L., var. ANGUSTIFOLIA Hornem. Kimmeridge, Dorset, Hon. Mrs CAMPBELL.

*740/2. Z. NANA Roth. Near Holyhead, Anglesey, DRUCE.

744/1. CYPERUS LONGUS L. Mideford, S. Hants, W. H. K. HOWARD.

746/2. SCIRPUS MARITIMUS L. Port William, Wigtown, DRUCE.

Var. COMPACTUS Hoffm. Compact heads of rather large sessile spikelets. St Helier's, Jersey; Newquay, Cornwall; Braunton, N. Devon; Wareham, Dorset; Bemridge, Isle of Wight; Christchurch, Hayling Isles, S. Hants; Tilbury (Bishop GOODENOUGH), Great Holland, S. Essex; Southwold, E. Suffolk; Arthog, Merioneth; Holm Cullum, Cumberland; Ince Blundell, Ainsdale, Southport, Freshfield, S. Lancs; Girvan, Ayr, DRUCE.

Var. MACROSTACHYS (Willd.). Kennack, Cornwall; Walmer, E. Kent, CASTALIA, Countess of GRANVILLE; Haddiscoe, Norfolk; Oxlode, Cambs, 1884, FRYER; Hammersmith, Middlesex, Lady DAVY; Helsby, Cheshire, WATERFALL; Dunbar, Haddington, Miss TODD; Ramsey, Hunts; Loch Duich, W. Ross; Shannon Shore, Limerick (the two latter not extreme examples), DRUCE.

527/4. V. VIRGATUM Stokes. Nailsea, Tickenham, N. Somerset, C. & N. SANDWITH.

527/7. V. FOLIOSUM in Rep. B.E.C. 128, 1929. Dr W. B. Turrill has now seen the *Verbascum* in question, and determines it as *V. longifolium* DC. He had not seen this before. I do not think Mr Fraser could ever have seen it, as the only specimen I sent away was to Germany. Dr Turrill has also re-affirmed his determination (*Rep. B.E.C.* 31, 1929) of the Windmill Hill *Verbascum* as *V. longifolium* DC.

†527/12. V. SPECIOSUM Schrad. Burton-on-Trent, Staffs, DRUCE.

†529/2. CALCEOLARIA CHELIDONIOIDES H. B. K. Lostwithiel, Cornwall, THURSTON.

532/1. LINARIA LINARIA × REPENS = SEPIUM (Allm.). Baglan, Glamorgan, R. L. SMITH.

†532/2. L. PURPUREA Mill. On a wall near Burton Point, Cheshire, DALLMAN in *N.W. Nat.* 251, 1930.

†535/1. SCROPHULARIA VERNALIS L. Sliffkey, Norfolk, H. L. GREEN.

†535/7. S. SCOPOLII Hoppe. Goatshorn, Poole Harbour, Dorset, W. VAN DE WEYER.

†537/1. MIMULUS GUTTATUS DC. Kirkinner, Wigtown, DRUCE.

†537/2. M. MOSCHATUS Dougl. Naturalised on Caerphilly mountain, originally a garden escape, in quantity on a moorland bog, Miss E. VACHELL.

539/1. LIMOSELLA AQUATICA L. *(type). Kenfig, Glamorgan, in a small pond, Dr GLUCK, Miss VACHELL, and Miss TODD.

543/8. VERONICA ANAGALLIS-AQUATICA L. Hambleden, Bucks; Wigton, Cumberland, DRUCE.

Var. AMBIGUA (Krosche). Walmer, E. Kent, 1879, CASTALIA, Countess of GRANVILLE.

Var. DASYPODON Uechtr. Badgwith, Gloster, DRUCE.

543/9. V. AQUATICA Bernh. Near Lechlade, E. Gloster, DRUCE.

543/19. V. AGRESTIS L. Hamworthy, Dorset, L. B. HALL.

Var. GARCKIANA P. Fourn. Stromness, Orkney; Fetlar, Zetland [1458], H. H. JOHNSTON. So named by C. E. BRITTON.

543/20. V. DIDYMA Ten., var. THELLUNGIANA (Lehm.). Walmer, E. Kent, 1878, CASTALIA, Countess of GRANVILLE.

545/2. EUPHRASIA BOREALIS Wettst. Holyhead, Anglesey, DRUCE.

545/3. E. BREVIPILA Burnat & Gremli. Ballyvaghan, Co. Clare, P. B. O'KELLY; Tyndrum, W. Perth. A remarkable form from Callander, Perth, DRUCE. With exceptionally tiny flowers, thin texture of foliage, long bracts, equalling, and the lower often much exceeding the calyx teeth; bracts very spreading even arcuate-recurved; very slender habit —few short slender branches; sparsely supplied with short, stout, glandular hairs on calyx and occasionally on leaves.—PEARSALL.

545/5. E. NEMOROSA Pers. Cotgrave, Notts, 1929, R. BULLEY; Loch na Lairige, M. Perth; Outershaw, Yorks; High Force, Durham, DRUCE.

Var. CILIATA Drabble. Limestone soil, Hitchin, Herts, H. PHILLIPS; Garlieston, Wigtown, DRUCE.

545/15. E. MICRANTHA Reichb. Ballyvaghan, Co. Clare, P. B. O'KELLY; Langholm, Dumfries-shire; Inchdowrie, Glen Clova, Angus; Brecon Beacon; Teesdale, Durham, DRUCE.

545/18. ? E. MINIMA Lam. & DC. Coombe and Wilbarrow, Berks and Hants, DRUCE.

545/19. E. ANGLICA Pugsl. Ebernoe, W. Sussex, LITTLE.

545/21. E. KERNERI Wettst. Walmer, E. Kent, 1879, CASTALIA, Countess of GRANVILLE; Cotgrave, Notts, R. BULLEY; Conistone, Yorks, DRUCE.

545/22. E. SALISBURGENSIS Funck. "Cam, Ottershaw, and on exposed table-limestone to Conistone Cold," LEES MS. in Druce's *List of Brit. Plants*, ed .i., in the possession of Mrs Foggitt. Specimens are in *Hb. Br. Mus.* Needs confirmation. A protracted search on two occasions with Mr and Mrs Foggitt failed to find it. Ballyvaghan, Co. Clare, P. B. O'KELLY.

546/4. BARTSIA VISCOSA L. Parkstone, Dorset, L. B. HALL.

548/1. RHINANTHUS MAJOR Ehrh. Near Lumsden, N. Aberdeen, W. WILSON.

548/5. R. STENOPHYLLUS Schur. Bridford, S. Devon, R. WAKEFIELD in *Dev. Rep.*

548/7. R. BOREALIS (Stern.) Dr. Loch na Lairige, M. Perth, DRUCE.

550/10. OROBANCHE MINOR Sm. Near Hove, Sussex, on *Crepis capillaris*, var. *anglica* Dr. & Thell., Miss L. ABELL.

550/11. O. RAPUM-GENISTAE Thuill. Fine specimens on Furze on a hill above Red Wharf Bay, Anglesey, DRUCE.

Var. MONOSTACHYS Meyer. Bar Sands, Key Haven, S. Hants, J. COMBER; Southend, S. Essex, WOLLEY-DOD; Dersingham, W. Norfolk; Church Bay, Glamorgan; Fleetwood, Lancs; Aultbea, W. Ross, DRUCE; Portbury, N. Somerset, N. SANDWITH.

746/4. S. TABERNAEMONTANI Gmel. Rycote Pond, Oxon, Lady DAVY. I think this has come in since 1882, when I worked this piece of ornamental water, on which large numbers of water-fowl congregate. Another locality of old standing in the county—Ambrosden—is a few miles away. At Rycote there is a considerable quantity on the western side of the water, DRUCE.

746/10. S. HOLOSCHOENUS L. Five good sized tufts of it at Barry, Glamorgan, DRUCE.

†746/12. S. FILIFORMIS Savi. Wool alien, Meanwood, Yorks, LEES.

746/13. S. FLUITANS L. Walney Isle, SLEDGE.

746/15. S. RUFUS (Huds.) Schrad. With the so-called var. BIFOLIUS (Wallr.), Four Mile Bridge, Tycroes, Anglesey, DRUCE.

748/1. RYNCHOSPORA FUSCA (L.) Ait. Glen Nevis, Westerness, WEBB; spec. non vidi.

753/4. CAREX VESICARIA L. Ballyvaghan, Co. Clare, DRUCE.

[753/10. C. PENDULA L. Stavros, Cyprus, DRUCE. New to the island.]

753/14. C. CAPILLARIS L. Approaching the so-called var. *major*, Loch na Lairige, 3000 ft., M. Perth, DRUCE.

753/15. C. BINERVIS Sm., var. ALPINA Drej. Loch na Lairige, M. Perth, 2600 ft., DRUCE.

753/17. C. DISTANS L. Valley, Tycroes, Anglesey, DRUCE.

753/19. C. FULVA Host. Glen Cahir, Co. Clare, DRUCE.

753/23. C. EXTENSA Good. Valley, Holyhead, Anglesey, DRUCE. [Larnaca, Cyprus, DRUCE. New to the Island.]

753/26. C. ORNITHOPODA Willd. Scout Scar, Kendal, Westmorland, J. B. FOGGITT.

753/32. C. PILULIFERA L. Broughton Wood, Lincs, Rev. W. W. MASON.

753/38. C. LIMOSA L. East Burton, Dorset, L. B. HALL.

753/41. C. ATRATA L. Loch na Lairige, M. Perth, DRUCE.

753/46. C. GRACILIS Curt., var. Fruit narrowed above and below, shorter than the bracts. By the Tees, on the Yorkshire side near Winch Bridge. In *Fl. N. Yorks*, it is only given at 200 ft. alt.—DRUCE.

753/61. C. PAIRAEI F. Schultz. Near Helston, Cornwall (locus classicus, where I added it to the British Flora in 1906), THURSTON.

*753/63. ×C. BOENNINGHAUSIANA Weihe. Glynde, E. Sussex, Miss PICKARD.

753/74. C. PULICARIS L. Splendid flowering specimens on Blackhead, Co. Clare; Gentian Hill, W. Galway, DRUCE.
Var. MONTANA (Pugsl.). Loch na Lairige, M. Perth, DRUCE.

†754/2. PANICUM CAPILLARE L. Bristol, W. Gloster, C. & N. SANDWITH.

†754/10. P. SANGUINALE L. Bristol, W. Gloster, C. & N. SANDWITH.

†756/2. SETARIA VIRIDIS (L.) Beauv., var. WEINMANNI (R. & S.) Dr. Wilton Rectory, Wilts, Hon. Mrs CAMPBELL.

758/3. SPARTINA TOWNSENDII H. & J. Groves. "I do not know whether this should be included as an alien, but it has lately arrived in small patches on the mud in the Channel, beyond the actual docks at Avonmouth but in the dock area. Presumably it has come from Berkeley, W. Gloster, where it was planted. I have not the actual date or record, but it was interesting to find it establishing itself at Avonmouth, W. Gloster, this year.—C. & N. SANDWITH.

†761/1. BECKMANNIA ERUCIFORMIS (L.) Host. Bristol, N. Somerset and W. Gloster, C. & N. SANDWITH.

†762/1. ELEUSINE INDICA Gaertn. Bristol, W. Gloster, C. & N. SANDWITH.

†765/3. PHALARIS AQUATICA L. Bristol, N. Somerset, C. & N. SANDWITH.

†765/6. P. BRACHYSTACHYS Link. Bristol, N. Somerset, C. & N. SANDWITH.

770/3. ALOPECURUS MYOSUROIDES Huds. Beaumaris, Anglesey, Miss ARMITSTEAD.

770/4. A. BULBOSUS Gouan. Wivenhoe, N. Essex, [2343], BROWN, June 26, 1926. Sent as a form of *geniculatus*.

777/1. PHLEUM PRATENSE L., det. E. Schmidt. Didcot, Berks, 1929, DRUCE, teste SCHINZ. (Determined at Kew as *P. alpinum* forma.) Snowdon at 3500 ft., Carnarvon, DRUCE.

Var. NODOSUM (L.) Schreber. Purn, N. Somerset; Holyhead, Anglesey, DRUCE; Orme Head, Carnarvon, J. W. FRANKLAND.

†778/1. MIBORA MINIMA (L.) Desv. Found on a gravel path at Stewart's Nurseries, Ferndorne, Bournemouth, S. Hants, Mrs PHELPS, ex Mrs FOGGITT.

780/2. AGROSTIS ALBA L., var. SYLVATICA (Host). Delamere Forest, Cheshire, WATERFALL.

780/3. A. PUMILA L. One of the foreign visitors to the Botanical Congress visited Teesdale and told me he thought he had found *Phippsia algida* there. His specimens were not available, so I motored up to the exact spot by the Tees where he thought he had gathered it. We found the place without difficulty, and there we saw—what he had evidently mistaken for *Phippsia*—a considerable quantity of *Agrostis pumila*, even smaller than usual. The habitat was not suitable for *Phippsia*. The station is in Durham.—DRUCE.

†782/5. POLYPOGON LINEARIS Trin. Oxley, Leeds, Yorks (as *lineatus*), LEES, teste HACKEL.

783/4. CALAMAGROSTIS NEGLECTA (Ehrh.) Beauv. Castle Howard Woods, Yorks, in *Hb. F. J. Hanbury*, teste AR. BENNETT in *Nat.*, 95, 1915. Lees says " it is not like his gathering."

791/1. DESCHAMPSIA CAESPITOSA (L.) Beauv., var. ALPINA Gaud. (non L.). Ben Lawers, M. Perth, Hon. Mrs CAMPBELL.

791/4. D. FLEXUOSA (L.) Trin., var. MONTANA (L.) Hook., f. Loch na Lairige, M. Perth, DRUCE.

792/2. H. LANATUS L., var. ALBOVIRENS Reichb. Cothill, Berks, DRUCE.

†794/5. AVENA STERILIS L. Cardiff, Glamorgan, Miss E. VACHELL.

795/1. ARRHENATHERUM ELATIUS (L.) M. & K., var. PAUCIFLORUM (Baenitz) Dr. Mount Sorrel, Leicester, SOWTER.

Var. BIARISTATUM (Peterm.) Dr. Wool, Wareham, Dorset; Bournemouth, S. Hants, L. B. HALL.

795/2. A. TUBEROSUM (Gilib.) Dr. Hambleden, Bucks; Marlborough, N. Wilts; Mells, N. Somerset; Fairford, E. Gloster; High Force, Durham; Port Logan, Glen Luce, Wigtown; Girvan, Ayr; Linlithgow; Falkirk, Stirling; Callander, W. Perth; Lichfield, Staffs; Ufton, Warwick, DRUCE.

802/1. PHRAGMITES PHRAGMITES (L.) Dr., var. FLAVESCENS (Cust.) Dr. Sandown, Kent, CASTALIA, Countess of GRANVILLE.

Var. SUBUNIFLORA (DC.) Dr. Port William, Wigtown, DRUCE.

†808/1. CYNOSURUS ECHINATUS L. Brighton Downs, E. Sussex, Miss ROBINSON; Fetcham, Surrey, 28 inches high, BURKILL; Rhosniger, Beau-

maris, Anglesey, Miss ARMITSTEAD; Langley, Bucks; Burton-on-Trent, Staffs, DRUCE.

809/3. KOELERIA BRITANNICA (Domin). Calne, Wilts; Cahir, Co. Clare, DRUCE; Lincoln, ex Rev. W. W. MASON.

*809/4. K. ALBESCENS DC. Kynance Downs, W. Cornwall, DRUCE.

†809/6. K. PHLEOIDES Pers. Bristol, N. Somerset, C. & N. SANDWITH.

†815/2. ERAGROSTIS ERAGROSTIS (L.) Dr. Bristol, W. Gloster, C. & N. SANDWITH; Splott, Cardiff, Glamorgan, R. L. SMITH.

†816/1. SPHENOPUS DIVARICATUS (Gouan) Reichb. Guernsey, 1927, Lady DAVY. A very striking species which is an addition to the adventive Flora of Guernsey. I saw it near Larnaca, Cyprus, this year.—DRUCE.

†819/2. DACTYLIS HISPANICA Roth. Burton-on-Trent, Staffs, DRUCE.

824/2. POA PRATENSIS L., var. ANGUSTIFOLIA (L.). High Force, Durham, DRUCE.
Sub-var. COLLINA Schur. Sands, W. Ross; Burnham, N. Somerset, DRUCE.

*824/4. P. IRRIGATA Lindm. Llanddona, Anglesey (new to Wales); near Winch Bridge, Durham, DRUCE.

824/8. P. BALFOURII Parn. Loch na Lairige, M. Perth, DRUCE.

824/10. P. COMPRESSA L. Bournemouth, S. Hants, L. B. HALL.

825/7. GLYCERIA BORRERI Bab., det. E. Schmidt. Shoreham, W. Sussex, Miss PICKARD; Cardiff, Glamorgan, DRUCE.

826/1. FESTUCA RIGIDA (L.) Kunth. Plymouth, S. Devon, Dr WILLOUGHBY-SMITH.

826/5. F. SYLVATICA Vill. Winch Bridge, Durham, DRUCE.

826/9. F. OVINA L., var. HISPIDULA Hack. Swanage, Dorset; Kingston Vale, FRASER.
Var. FIRMULA Hack. Kingston Vale, FRASER.

826/11. F. LONGIFOLIA Thuill. (DURIUSCULA L.). Littlestone, E. Kent, DRUCE.

826/12. F. CAPILLATA Lam. Loch na Lairige, 2700 ft., M. Perth; Holyhead Mountain, Anglesey, DRUCE.

827/6. BROMUS RAMOSUS Huds., var. EU-RAMOSUS (A. & G.). Silk Willoughby, Lincs, 1926, Rev. W. W. MASON.

827/17. B. PRATENSIS Ehrh. Burton-on-Trent, Staffs, DRUCE.

827/19. B. HORDEACEUS L., var. LEPTOSTACHYS (Pers.) Beck. Potter Heigham, E. Norfolk [2438], 1928, G. C. BROWN; Riever Wood, Berks, DRUCE.

*827/19(2). B. BRITANNICUS Williams. Sydenham Station, Co. Down, C. D. CHASE; Stourpaine, Blandford, Wool, and near Poole, Dorset, L. B. HALL.

827/21. B. INTERRUPTUS Dr. Bristol, W. Gloster, C. & N. SANDWITH.

†827/26. B. MACROSTACHYS Desf. (=B. OXYODON Schrank). Frizinghall, Yorks, RHODES.

836/3. ELYMUS EUROPAEUS L. Edge of a wood, W. Gloster, Hon. Mrs CAMPBELL.

†836/4. E. CAPUT-MEDUSAE L. Bristol, N. Somerset, C. & N. SANDWITH.

844/1. EQUISETUM MAXIMUM Lam. Glen Cahir, Co. Clare, DRUCE.

844/3. E. SYLVATICUM L. Near Girvan, Ayr, DRUCE.

849/1. BLECHNUM SPICANT (L.) With., var. BIFIDUM Wollaston. Trevannick, St Austell, Cornwall, L. T. MEDLIN, ex THURSTON.

851/7. ASPLENIUM RUTA-MURARIA L., var. PSEUDO-GERMANICUM Heuf. Wall near Llyn Coron, Anglesey, DRUCE.

854/1. POLYSTICHUM SETIFERUM (Forsk.) Woynar, var. AMBILOBUM. Trewsbury, E. Gloster, DRUCE.

856/1. DRYOPTERIS FILIX-MAS (L.) Schott., var. LINEARIS. Achill Island, W. Mayo, DRUCE.

856/5. D. AEMULA Kuntze. The Rivals, Carnarvon, Miss E. VACHELL.

867/1. PILULARIA GLOBULIFERA L. Walney Isle, N. Lancs, SLEDGE.

872/2. NITELLA OPACA Ag. Loch Lubnaig, M. Perth; Letterkenny, Donegal, DRUCE.

876/5. CHARA HISPIDA L. Stackpole, Pembroke, Hon. Mrs CAMPBELL.

876/7. C. CONTRARIA Kuetz. Llyn Coron, Anglesey, DRUCE.

876/16. C. FRAGILIS L. Glen Cahir, Co. Clare, DRUCE.

876/17. C. DELICATULA Ag. Ballyvaghan, Co. Clare, P. B. O'KELLY; near Loch Lubnaig, M. Perth; Byfield, Northants; Lizard Downs, Cornwall, DRUCE.

NOTES ON POTAMOGETON.

WILLIAM HARRISON PEARSALL.

II. THE LARGER BRITISH SPECIES.

In our previous paper (*Rep. B.E.C.*, 1929) we dealt with the linear-leaved species only, and as a revision of all the British species of *Potamogeton* is long overdue, we propose to include the remaining species in the present communication. Botanists anxious to take up the study of these interesting plants are greatly handicapped by the brief and inadequate descriptions available in our ordinary Floras. Many of these have remained (unaltered) during nearly half a century of great progress in the critical study of the genus and, moreover, still retain names long since discarded. Our present aim is, therefore, to give adequate descriptions of the various species, more important varieties and hybrids, given in the *London Catalogue* of 1925—emended where necessary—and especially to emphasise the characters which distinguish them from others. Nomenclature will be given in sufficient detail to enable all the older names to be placed under their modern equivalents and the authorities for these will be quoted at length. In the case of the rarer forms references to the original sources wherein full descriptions may be found will be given, and we shall be pleased to supply these to anyone unable otherwise to procure them. A residence of over thirty years in the English Lake district has afforded us exceptional facilities for studying these plants in their natural habitats, and largely as a result of this we were privileged to enjoy a long correspondence with the late Mr Arthur Bennett and also with Dr J. O. Hagström, to both of whom we are very greatly indebted. Quite incapable of being adequately expressed is the writer's high appreciation of the collaboration of his son—Dr W. H. Pearsall—who shares a common interest in these plants and who has undertaken valuable cultural experiments on their growth under varying conditions.

Conflicting opinions have been advanced as to the value of the study of *Potamogeton* species under cultivation, Fryer and Bennett attaching to it the utmost importance while Hagström considers its value overrated and strongly advocates the study of the plants under natural conditions. We support the latter view, so far as cultivation under artificial and fixed conditions is concerned, as results are thus frequently obtained which would be impossible under the constantly changing conditions of Nature. To take one instance only, Fryer cultivated *P. Drucei* for years and found it to "produce fruit freely." Under natural conditions it behaves as most *Potamogeton* hybrids do, normally producing only abortive fruits and occasionally—under exceptionally favourable conditions as to light intensity and carbohydrate synthesis —yielding a few mature fruits but never producing fruit freely. On the other hand, we attach the greatest possible value to the compara-

tive results obtained by the cultivation of a species under varying conditions of light, soil and water, especially when the cultural experiments are undertaken after long experience of the plant's variations under natural conditions—see under *P. perfoliatus*.

There is still a vast amount of field-work to be done in observing and noting the ecological conditions under which the various species grow. Collectors rarely give any details as to depth of water, its clearness or turbidity, the nature of the bottom—gravel, sand, mud, silt, limestone or other rock—or record the names of any other *Potamogeton* species growing in the same water. These data are of prime importance, especially in dealing with hybrids, and both Dr Hagström and Mr Arthur Bennett repeatedly deplored our lack of reliable information on these points. We trust, therefore, that students of the genus will in future make an effort to add to the value of their gatherings by giving as many details of these habitat conditions as possible.

Any attempt to draw up a Key to the various species of *Potamogeton* is more than ordinarily difficult owing to their extreme variability under different ecological conditions. When both floating leaves and mature fruits are present there should be little difficulty in determining the plant from descriptions, but as it is far more usual to collect plants possessing neither of these characters, the following Keys contain no reference to fruits and little to floating leaves as a basis of classification. The first Key deals with the leaves as a whole—both floating and submerged—and should enable the student to refer a plant to its correct group, after which the detailed descriptions should be consulted. The second Key is an attempt to classify the plants into groups by the shapes and average sizes of the submerged leaves only. Here again the full descriptions are necessary for final elimination.

A word of warning as to the use of these descriptions appears to be necessary. Students too often fail to differentiate between the description of a species and that of a hybrid, although there is the greatest difference between them. In the case of a species the characters, though variable, are more or less fixed between narrower limits. They have been long established and are therefore more stable. They have been so frequently and fully described that errors of description have been largely eliminated and the plant usually "fits" its description. On the other hand the characters of hybrids vary between the widest limits, these including the extremes of each of two dissimilar species. Moreover, these characters are much less stable, are still in process of evolutionary change, are less well known and therefore more imperfectly described. As a consequence no description of a hybrid can be relied upon in every case; frequently a specimen very nearly approaches in character one of its putative parents, while another (even from the same water) may have been more strongly influenced by the other parent. The literature of *Potamogeton* is inordinately full of the conflicting opinions of authorities who have failed to realise the fact that all hybrid forms vary between the extreme limits of two species, either of which may have exerted the dominant influence upon the characters

of the resultant hybrid. One result of this has been the establishment of many so-called "species" which have subsequently proved to be mere forms of a variable hybrid. To give one example only—that of the hybrid *P. nitens*—this includes *P. salicifolius* Wolfg. ex Schultes (which is the *P. decipiens* var. *salicifolius* Ar. Benn.), *P. salignus* Fryer, *P. falcatus* Fryer and *P. involutus* Fryer. These greatly differ from each other but none of them possesses any character not included among those of *P. nitens*—*i.e.*, among the aggregate characters of *P. gramineus* and *P. perfoliatus*. Many similar examples will be found in the text.

I. KEY TO THE LEAVES OF THE MORE COMMON BRITISH SPECIES.

A. ALL LEAVES SESSILE. All are submerged (exc. 6) and similar.

(a) Stipules free from the leaf.

1. P. PRAELONGUS. *Apex always hooded*—splits when flattened. Leaves long (to 10 in.), broadest near the rounded base, narrowed upward, blunt.
2. P. PERFOLIATUS. *Leaves obviously clasping.* Very variable in shape on different plants—oval to lanceolate, cordate-amplexicaul—but similar on the same plant.
3. P. DECIPIENS. Broadly elliptical, obtuse, not hooded nor amplexicaul. All submerged, rounded at base, 3 in.-4¾ in.; resembles *P. lucens* but is much smaller and possesses no stalked leaves.
4. P. CRISPUS. Lanceolate or linear-lanceolate, margins finely serrate and usually undulate and crisped. Leaves 1½ in.-3½ in.
5. P. COOPERI. Leaves semi-amplexicaul, much broader than 4, ovate or lanceolate, strap-shaped with rounded base and blunt apex—not crisped nor serrate but margins always provided with microscopic denticles. Rare.
6. P. NITENS var. SUBPERFOLIATUS. Leaves lanceolate, rounded-cordate at the base, margins with minute denticles. The only species in (a) occasionally producing floating leaves, also sessile.
   (When lacking floating leaves—which is often the case—the following species are included here, *P. nitens*, *P. gramineus*, *P. lanceolatus*—see C. (a).)

(b) Stipules adnate or axillary to the leaf-base, sheathing.

7. P. PECTINATUS. Leaves all submerged, alternate, linear, tapering to a keen point usually, rarely blunt. Stipules axillary, sheathing.
8. P. FILIFORMIS. Leaves longer, narrower, *hair-like*, never gradually tapering to a keen point, usually quite rounded and blunt, occasionally with a tiny mucro.—as seen under the microscope. Stipules adnate, sheathing.

(c) Stipules absent (except to the involucral leaves).

9. P. DENSUS. Leaves opposite, or nearly so.

B. ALL LEAVES STALKED.

(a) Floating leaves and submerged leaves of different shapes.

1. P. NATANS. Very common species, fruiting freely. Known at a distance by its involute emerged leaves. Petiole "jointed" a little below the blade. Submerged leaves bladeless (phyllodes), leafless petioles only. Floating leaves large, thick, coriaceous, opaque, elliptical or ovate.
2. P. POLYGONIFOLIUS. Floating leaves less opaque, subcoriaceous, no "joint" below the blade and no phyllodes. Submerged leaves pellucid, narrowly lanceolate, often very long, gradually tapering into the petiole. Lowest occasionally with a narrowly linear-lanceolate lamina, but is not a phyllode.
   (Four rare and critical hybrids not producing fertile fruits.)

3. P. CRASSIFOLIUS. (*P. angustifolius* × *natans*)? Cambridgeshire only. All leaves thick and fleshy when fresh, very thin when dried. Floating leaves like *P. natans*, petioles not longer than blades. Submerged leaves linear or gradually narrowed to the petiole, soon decaying. Many examples so labelled are *P. lucens* × *natans* (see 6).
4. P. SPARGANIFOLIUS. (*P. gramineus* × *natans*) = (*P. Kirkii* Syme). Three English and two Irish counties. Floating leaves narrowly lanceolate, occasionally oblong, usually narrower than the floating leaves of 6, with petioles longer than the blades which are not (or only shortly) cuspidate. Submerged leaves extremely long (6 in.-15 in. or more) and very narrow.
5. P. BILLUPSII. (*P. coloratus* × *gramineus*). Very rare Fenland form. Floating leaves with very slender stalks greatly exceeding the thin oblong-elliptic blades. Submerged leaves lanceolate or variable, blade longly decurrent.
6. P. STERILIS. (*P. lucens* × *natans*) = *P. fluitans* Roth. Surrey, Sussex, Huntingdon and Cambs. Floating leaves few, broadly lanceolate, subcoriaceous, narrowed at each end, apex strongly cuspidate. Submerged leaves narrowly lanceolate insensibly narrowed into a long petiole.

(b) Floating leaves and submerged leaves of the same (or similar) shape. (Both species of beautiful venation.)

7. P. COLORATUS, a plant of stagnant peaty water, common in the Fens. All leaves with short stalks and fine transparent reticulation. Upper leaves elliptical or oval, rounded below, usually obtuse at the apex and shorter than 8. Lower leaves tapering to the base, ± lanceolate.
8. P. DRUCEI. R. Loddon, Berks, and R. Avon, at Bath, only. All leaves with long stalks, blades 4 in.-7 in. × 1½ in.-2 in., very uniform in shape, narrowed at each end. The most beautiful foliage of any British species of the genus.

(c) No floating leaves.

9. P. LUCENS. The largest British species. Leaves apparently sessile but always shortly stalked—up to 8 in. × 2⅜ in., usually 1½ in.-2 in. wide—oblong-lanceolate, glistening, with long cusp and finely serrulate margins.

C. SOME LEAVES STALKED, OTHERS SESSILE, ON THE SAME PLANT.

(All species in this section are frequently found lacking floating leaves and therefore more difficult to determine.)

(a) Floating leaves stalked, submerged leaves sessile.

1. P. GRAMINEUS. Floating leaves narrowed at each end with lamina usually shorter than the petiole. Submerged leaves linear-lanceolate with *tapering bases* and serrulate margins. A dense mass of submerged vegetation at the base of the stem; var. *graminifolius* (Fr.) is less branched and has very long submerged leaves.
2. P. NITENS, vars. *subgramineus* and *subintermedius*. Floating leaves acute, with long tapering bases. Submerged leaves lanceolate, *rounded-cordate at the base*, margins with small and very fugacious denticles.
3. P. LANCEOLATUS Smith. (*P. alpinus* × *pusillus*). Anglesea and Cambridge only. Floating leaves small, narrow-lanceolate, blunt or subacute. Submerged leaves linear-lanceolate, *entire*, with *smooth margins*.

(b) Floating leaves stalked—some submerged leaves sessile, others shortly stalked, on the same plant.

4. P. ALPINUS. Floating leaves *obovate*, *blunt*, with *sloping base* and *petioles* shorter than the laminæ. Submerged leaves lanceolate, narrowed at both ends, subsessile or shortly stalked, *blunt*, usually tinged with red or purple, 6 in.-8 in.

5. P. ANGUSTIFOLIUS. (*P. Zizii* M. & K.). All leaves ± alike on the same plant—oblong-lanceolate, narrowed below, sessile or shortly stalked, *minutely denticulate on the margins and always cuspidate*, gradually or suddenly (see description). Floating leaves are occasionally produced and these possess longer stalks, which are, however, never longer than the blades.

II. KEY TO THE SHAPES AND SIZES OF SUBMERGED LEAVES ONLY.

1. Broadly elliptical, oval or ovate.
   (a) *P. coloratus*, blade to 5 in. with short stalk.
   (b) *P. Drucei*, blade 4 in.-7 in. × 1½ in.-2 in. with long stalk.
   (c) *P. perfoliatus*, oval or suborbicular, clasping.
2. Broadly oblong, base and apex ± rounded.
   (a) *P. decipiens*, normally 3 in.-4½ in. long, but var. *longifolius* may be 6 in.-8 in. × ¾ in.; apex not hooded.
   (b) *P. praelongus*, 2 in.-10 in. long, tapering upward to the *hooded apex*.
   (c) *P. Cooperi*, usually about 2 in.-3 in. but may be less or more; semi-amplexicaul, apex blunt.
3. Broadly lanceolate, tapering above and below, greatest width usually over 1½ in.
   (a) *P. coloratus* (see above), known by its venation.
   (b) *P. lucens*, the largest British species, up to 8 in. × 2⅜ in.—usually 1½ in.-2 in. broad (*P. angustifolius* is rarely over 1⅛ in. broad), *apparently sessile, but very shortly stalked.*
4. Lanceolate, tapered above and below, greatest width usually not exceeding 1 in.
   (a) *P. angustifolius*, up to 6 in. × 1⅛ in. but usually narrower, sessile or shortly stalked, *margins finely denticulate, apex cuspidate.*
   (b) *P. polygonifolius*, 6 in.-8 in., often absent in shallow water forms, and very long in deep water. Petioles moderately or very long. Margins entire, apex not cuspidate.
   (c) *P. alpinus*, 6 in.-8 in., sub-sessile or shortly stalked, reddish in colour, *apex blunt, margins entire.*
   (d) *P. perfoliatus* var. *gracilis* Cham. et Schl., relatively long and narrow, obtuse leaves 2 in.-4 in. long and ± ½ in. wide, *clasping.*
   (e) *P. Billupsii*, a very rare Fenland hybrid with longly decurrent laminæ to the long petioles of its extremely variable leaves, is included here—see description.
5. Narrowly lanceolate or linear-lanceolate, tapered above and below, normally ¼ in.-½ in. wide (often less, very rarely more).
   (a) *P. gramineus*, 1 in.-6 in., *narrow tapering bases*, serrulate margins and sharp apex.
   (b) *P. nitens*, 3 in.-6 in., very similar to the preceding and commonly confused with it. All branch-leaves *rounded-cordate at the base*, margins with very small fugacious denticles.
   (c) *P. crispus*, 1½ in.-3½ in., shortly tapered base, apex usually blunt and margins serrulate and crisped.
   (d) *P. densus*, leaves short, rarely over 1¼ in., *amplexicaul* and *opposite.* Stipules absent from most.
   (e) *P. sparganifolius* (*P. Kirkii*), very long, 6 in.-15 in. or more, and very narrow, ⅜ in. or less; lamina passing insensibly into the petiole; entire and persistent.
   (f) *P. sterilis* (*P. fluitans*)—difficult to separate from the preceding—leaves long, entire, longly petiolate, lamina similarly narrowed into the petiole but usually broader and more variable than in *P. sparganifolius*, but equally persistent.
   (g) *P. crassifolius*, submerged leaves few, fleshy, distant, long, soon decaying. **Cambs. only.**
   (h) *P. lanceolatus*, long, nearly parallel-sided, sessile, entire, apex obtuse or sub-acute. **Anglesea and Cambs. only.**

6. Narrowly linear, parallel-sided, under ¼ in. (6 mm.) wide.
   (a) The linear-leaved species—see paper I. (1929).
   (b) The phyllodes of *P. natans* and occasionally of a few other species or hybrids.
7. Linear threads.
   P. pectinatus and *P. filiformis*—the latter much finer than the former.

Detailed Descriptions of the British Forms, in the Order of the *London Catalogue*, ed. xi., 1925, emended.

P. NATANS Linnaeus, *Species Plantarum*, 1753, 126. *P. serotinus* Schrader in Koch, *Syn. Fl. Germ.*, 1844, 775.

The late Mr Arthur Bennett agreed that our specimens from Glenridding, Ullswater, Westmorland, 15th August 1919, were as nearly identical with the original *Species Plantarum* examples as it was possible to be. This species is widely distributed and easy to identify among associated species—even at a distance—by its involute emerged leaves. Stem stout, round, sparingly branched, often over 40 in. long in deeper water. Leaves all stalked, coriaceous, entire, flat. Floating leaves normally ovate, but may be elliptical, or nearly round, from 2.5-12 cm. long, acute or obtuse. Base may be cordate (especially in the upper leaves) or more normally narrowed into the petiole which shows a flexible discoloured joint just below the blade. The nerves are numerous, usually 25-27 in the involucral leaves, with somewhat indistinct transverse venation. The submerged leaves are reduced to long, narrow linear phyllodes—petioles and midribs, "with very rarely a limb." These may be up to a foot in length, canaliculate toward the tip, 5-nerved, and with obtuse apexes. Stipules very long—usually 10 cm., may be 18 cm. and exceeding the internodes—with strong longitudinal fibres which persist. Usually there is only 1 spiciferous branch. Spikes cylindrical, 3-6 cm., thick, densely flowered. Peduncles stout, often slightly flattened below and narrowed above, usually 2-3 times the length of the spike. Fruit large (4 mm. or more), slightly compressed, dorsally much rounded, often semicircular, acutely keeled when dry. Ventral margin convex. Beak short. Dried fruit usually with a small deep pit in the sides.

The following forms are British:—

Var. *prolixus* Koch (*fluviatilis* Fries).

Floating leaves oblong-lanceolate, thin and pellucid—an early state of running water.

Var. *ovalifolius* Fieber.

Leaves ovate-oblong, about 11 × 3 cm., obtuse, base rounded or obscurely cordate, usually shortly petiolate. A small form of this (f. *pygmaeoides* Hagstr.) with leaves 6-7 cm. × 2 cm. is recorded from M. Perth.

Var. *rotundifolius* **Bréb.**

Leaves large, short, very broadly ovate or nearly round with cordate base.

Var. *terrestris* Gray is the variable sub-terrestrial form of this species.

The largest floating leaves yet seen in British examples measured 4½ in. × 2⅜ in. (114 × 70 mm.) and were referred (*Journ. Bot.*, 1919, 10) to f. *maximus* Baagöe.

P. GESSNACENSIS Fischer (*P. natans*×*polygonifolius*), *Die Bayer, Potam.*, 1907, 31, 42-43, and earlier in *Mitt. Bayer. Bot. Ges.*, 1905, 472.

Both these references are to Bavarian specimens, but a form gathered from the Upper Lake, Killarney, Kerry, R. M. Barrington, 27th June 1874 is referred to this hybrid by Dr J. O. Hagström under the name f. *hibernicus* Hagstr.—See *Crit. Res.*, 1916, 192. This plant has, at various times, been considered a form of *P. natans* or of *P. polygonifolius* and was first distributed as *P. natans* × *polygonifolius* by Dr G. C. Druce—*Rep. B.E.C.*, 1911, i., 321. I have seen a sheet of this distribution with Dr Hagström's autograph determination and note attached.

P. POLYGONIFOLIUS Pourret, *Memoir. Acad. Toulouse*, iii., 1788, 325. *P. oblongus* Viviani, *Anal. Bot.*, i., 2, 1802, 102. *P. Hornemanni* Meyer, *Chloris Hanoverana*, 1836, 521, nec Koch.

Stem terete, slender, freely creeping and sending up short leafy branches at irregular intervals. In shallow water only an inch or two long. Leaves all stalked, less coriaceous than those of *P. natans* and more variable than those of *P. coloratus*, which are all pellucid. Floating leaves subcoriaceous, elliptic to lanceolate, cordate or more normally narrowed into the petiole which is short or long in shallow water and very long in deep water, not jointed below the lamina. Size, up to 9 × 4.5 cm. Submerged leaves membranous, pellucid, gradually narrowed into the petiole, narrowly lanceolate, often very long and very narrow. Lowest occasionally narrowly linear-lanceolate but a lamina not a phyllode. Lake District examples are commonly 6 in.-8 in. long and about ⅛ in. wide (150-200 mm. × 20-25 mm.). Stipules long (2-4 cm.), blunt, and subpersistent. Spike shorter and more slender than that of *P. natans*, densely flowered and fruited. Peduncles slender, equal (uniform in thickness), many times the spike. Fruit small (2-2.5 × 1.5 mm.), often reddish-brown. Beak short. Dorsal margin rounded when fresh, with faint ridges when dry.

The British forms are well covered by the three varieties given in the *L.C.*

Var. *lancifolius* Cham. et Schlecht.

Has floating leaves narrow, lanceolate, one or two of the upper ± cordate at the base, but those below these are usually rapidly or more gradually narrowed to the petiole. The submerged leaves are normally very long and narrow, gradually tapering at each end of the lamina—*pseudo-fluitans* Syme is included in this variety.

Var. *cancellata* Fryer, *Pots. Brit. Isles*, 1915, 21.

A beautiful form from Shetland, producing few subcoriaceous floating leaves and submerged leaves lanceolate, thin, translucent and pos-

sessing the fine reticulated venation of *P. coloratus*. This latter character has led to the plant being considered a hybrid by various writers. Graebner in Engler, *Pflanzenr.*, iv., 11, 1907, 136, refers it to *P. gramineus* × *polygonifolius* (*P. Seemenii*)—as did both Beeby and Hagström originally—but in *Crit. Res.*, 1916, 178, Hagström places it with some hesitation under *P. polygonifolius*. However, in *Rep. B.E.C.*, 1921, 527, he agrees with Dr Druce that it is not a hybrid and with this opinion we entirely agree.

Var. *amphibius* Fries

Is the most common form and includes all plants growing in shallow water and producing floating leaves smaller than usual and more shortly stalked—the common heath form, *ericetorum* Syme, having floating leaves oblong-oval and averaging about 5 × 2.5 cm. is included here, and nov. forma *parvifolius* Pearsall. Folia natantia parvissima (10-25× 5-15 mm.). Scotland and Ireland.

P. Macvicarii Ar. Benn. in *Ann. Scot. Nat. Hist.*, 1907, 106-108. (*P. polygonifolius* × *praelongus*)

Is reported from Argyllshire, Scotland. It differs from *P. praelongus* in having 3 principal nerves and about 8 (11) secondary: the leaf-base is subpetiolate.

P. coloratus Vahl ex Horneman, *Flora Danica*, 1813, t. 1449. Cham. et Schlecht., *Linnaea*, 1827, ii., 194. Fieber, *Pot. Böhm.*, 1838, 18. *P. plantagineus* Du Croz, ap. Roem. et Schultes, *Syst. Veg.*, iii., 1818, 504. *P. Hornemanni* Meyer ex Koch, *Syn. Fl. Germ.*, ed. i., 1837, 674, and ed. ii., 1844, 777. (Fryer's reference, p. 22, *Pots. Brit. Isles*, of this species to *P. Hornemanni* Meyer, *Chlor. Hanov.*, 1836, 521, is incorrect—see *P. polygonifolius*.)

A plant of stagnant peaty water, rather rare except in the Fens. Stem terete, normally slightly branched but often possessing numerous branches in deep water. Leaves all similar, no clear distinction between floating and submerged leaves, all stalked, thin, pellucid—never coriaceous—elliptical or ovate-lanceolate and sometimes sub-cordate and auricled at the base. The apex is usually obtuse but occasionally slightly cuspidate. The petiole is always short—up to 2 cm.—and in the upper leaves always shorter than the lamina. The lower leaves are frequently lanceolate or falcate and often have a decurrent base and appear subsessile. Phyllodes are absent. The delicate and conspicuous reticulation of the transparent leaves makes this species easy to distinguish. Stipules blunt, with a small mucro, hyaline, subpersistent, scarious when old. Spike long (2.5-4 cm.), cylindrical, densely flowered and fruited. Peduncles slender, gracile, equal, 2 in.-8 in. (5-20 cm.) long. Fruit minute, 1/20th in. (1 mm.), ovate; beak very short often obsolete, subcentral.

No varieties are given in the *L.C.*, nor are any necessary. We have, however, many forms possessing leaves of exceptional size which

may conveniently be referred to f. *grandifolius* Hagstr.—leaves 70-80 × 30-45 mm. Among specimens from our herbarium so named by Dr Hagström were several Irish examples—one from Portarlington, July 1896, R. L. Praeger, had leaves 95 × 56 mm.—and others from the Fens with much longer leaves but much less wide. Mr Arthur Bennett (*Journ. Bot.*, 1919, 11) reports Cambridgeshire plants with leaves 150 × 50 mm., on boulder clay.

P. BILLUPSII Fryer, *Journ. Bot.*, 1893, 353, p.p. (t. 338, non 337). (*P. coloratus* × *gramineus*).

Also fully described in *Pots. Brit. Isles*, 1915, 25-27, plates 16, 17. Of the original *Journ. Bot.* plates Fryer admits that 337 should be excluded—it is probably *P. Zizii* (*angustifolius*)—and those of his later monograph should be preferred. *P. Billupsii* is a very rare Fenland form and no distribution is given in the *L.C.*, 1925. The plant upon which the hybrid was based grew near Parsonware Drove, Benwick, Cambs., and was subsequently cultivated by Fryer and distributed. Dr Druce found a similar form in Wood Walton Fen, Hunts.—*Rep. B.E.C.*, 1922, 630.

P. PERPYGMAEUS Hagstr., *Rep. B.E.C.*, 1922, 630. (*P. coloratus* × *pusillus*). *P. lanceolatus* Smith, var. *hibernicus* Ar. Benn., in Fryer, *Pots. Brit. Isles*, 1915, 63.

In Cahir River, Co. Clare, Ireland, only. See also *Rep. B.E.C.*, 1928, 762.

P. ALPINUS Balbis emend. Aschers. *Fl. Prov. Brandenburgh*, 1864, 658. *P. rufescens* Schrad. ap. Cham. Adnot. ad Kunth, *Fl. Berol.*, 1815, 5. *P. fluitans* Smith, *Eng. Flor.*, ed. ii., 1828, 231. *P. purpurascens* Seidl. emend. Fieber, *Potam. Böhmens*, 1838, 16. (Both Hagström and Graebner give *P. microstachys* Wolfg. ap. Schultes, *Mant.*, iii., 1827, 359, as synonymous with *P. alpinus* but Fernald shows they are distinct species—*Rhodora*, vol. 32, 87, 76.)

Stem simple below the involucral leaves, slender, terete, with internodes shorter than the leaves, and conspicuous nodes. Floating leaves *obovate with tapering base, blunt apex and petioles shorter than the laminæ*, often tinged with purple or red, coriaceous. Submerged leaves thin, membranous, pellucid, lanceolate, narrowed toward each end, subsessile or shortly stalked, entire, apex always blunt and midrib reticulate. British forms usually possess narrow submerged leaves—under $\frac{3}{4}$ in. (20 mm.)—but other European forms are sometimes $1\frac{3}{8}$ in. (35 mm.) wide. Stipules very large, ovate, hyaline, blunt, robust. Spike cylindrical, abrupt, often densely flowered, usually about one-third the length of the slender, erect, equal peduncle. The fruits, when mature, are of medium size, widest just above the middle, narrowed above subequally to a long submedian beak—the upper part of the fruit having a " bottle-neck " shape. The fruit is a most important character which

has been poorly described and figured in British floras. Fryer's figure on the upper part of Pl. 26 (of *P. praelongus*) is quite unlike that of any fruit of *P. alpinus* we have seen. Excellent figures are Butcher and Strudwick, 1930, 383 B, and fig. 17 in Engler, *Pflanzenr.*, iv., 11, 1907, 71.

The *L.C.* list only includes one variety—var. *lacustris* Marsson, which includes all narrow-leaved forms with longer internodes than usual.

To this should be added var. *obscurus* Asch. All leaves submerged, usually to 12 × 1 cm., and with internodes less than 2 cm. long—and var. *Palmeri* Druce (given as a hybrid of *P. alpinus* × *praelongus* in *L.C.*)—see *Rep. B.E.C.*, 1928, 639.

P. VENUSTUS Baagöe in *Comp. rend Cong. de botanique, Paris*, 1900, 517. (*P. alpinus* Balb. × *crispus* L.). Asch. et Graeb. *Syn. Fl. Mitteleur.*, 1913, 515. *P. Baagöei* Ar. Benn. ap. Graebner, *Potamog.*, 1907, 132, nomen.

This is one of the rarest hybrids in the genus, only known elsewhere in Europe from Denmark. It was found by Messrs W. Barclay and J. R. Matthews in the R. Earn, above Dalreoch Bridge, Mid Perth, 13th September 1915. See *Rep. B.E.C.*, 1916, 376, and *Proc. Perth. Soc. N.S.*, vi., pt. iii., 1916, 10. Notwithstanding this distribution through the B.E.C., and Mr Arthur Bennett's long note on " A Hybrid Potamogeton new to Great Britain " (*l.c.*) the name is not included in the 1925 *L.C.* list. We possess five sheets of the original gathering and Dr Hagström has confirmed the name—as above—although at the time of the publication of his *Crit. Res.* he had seen no examples except from Denmark (*l.c.*, 144). The plants differ from *P. crispus* in having leaf-margins non-serrulate, but if the youngest leaves are examined under the microscope the marginal cells occasionally show a slight protuberance in the middle of the outer wall which indicates a faint disposition to form denticles. Other differences from that species are the purplish-red colour of the dried leaves and the absence of marginal undulation. The peduncles and spikes, the branching, and the entire absence of floating leaves are evidences in favour of *P. crispus*. The influence of *P. alpinus* is seen in the nervation, the ligules and the occasionally sloping (and somewhat stalk-like) bases of some of the upper leaves. The leaves are rather uniform in shape, lanceolate tapered at each end, with nearly parallel sides and subacute apex. The ligules are brownish-green (compared with the whitish-green of *P. undulatus* Wolfgang = *P. crispus* × *praelongus*). The average leaf is ± 90 × 9 mm.

P. NERICIUS Hagstr. (*P. alpinus* × *gramineus*). *Crit. Res.*, 1916, 145, non *P. gracilis* Wolfg.

In *Proc. Perth. Soc. Nat. Sci.*, vol. vi., pt. iii., 10, 1916, Mr Arthur Bennett publishes an account of " *P. gracilis* Wolfg. in Perth " and so names plants found by Mr Barclay in Loch Moraig, Perthshire. Hagström (*l.c.*) says that *P. gracilis* Wolfg., and *P. Wolfgangii* Kihlm., have been wrongly referred to this hybrid (*P. nericius*) but are forms of *P.*

gramineus. This is undoubtedly correct in many instances, among which we should certainly include our own herbarium examples of the Perthshire plant, which Dr Hagström named *P. gramineus* f. *Wolfgangii* (Kihlm.) Hagstr. Entirely different are Dr Druce's specimens of this hybrid from the R. Don, at Alford, N. Aberdeen—*Rep. B.E.C.*, 1920, 151. These were found growing with both parents and give clear evidence of each in their intermediate characters.

P. Drucei Fryer, *Pots. Brit. Isles*, 1915, 31. (*P. alpinus* × *natans*) Hagstr., *Crit. Res.*, 1916, 146.

This beautiful plant has at various times been referred to *P. fluitans*, *P. polygonifolius*, *P. alpinus* × *natans*, and *P. alpinus* × *polygonifolius*? See *Journ. Bot.*, 1918, 82; 1899, 524. *Rep. B.E.C.*, 1915, 224; 1919, 713; 1922, 858. *Rep. W.B.E.C.*, 1924-5, 314. In this last-named report Mr Arthur Bennett's long note concludes, "At present I am strongly inclined to call it a species and not a hybrid." This is apparently a pardonable slip of the pen, as in *Journ. Bot.*, May 1925, 149, he wrote, "I do not think we are able to say whether it is a hybrid or a species, with any certainty; though I rather think it may prove the former." In the *Lond. Cat.*, 1925, No. 1947, he shows that this was his considered opinion—a hybrid. At present we have an open mind upon the question and considerable difficulty in regard to the following points. Several of the most constant and distinctive characters of *P. alpinus* which we should expect to make their influence felt in the hybrid are either absent or insufficiently evident in *P. Drucei*. Among these characters are (1) the blunt apex of the leaves, (2) the absence of long (or any) petiole, (3) the pronounced colour, and (4) the "bottle-neck" fruits, of *P. alpinus*. On the other hand, *P. Drucei* possesses a closely intricate and beautiful transverse venation quite unlike that of any other British species, and leaves which show a uniformity of shape, a subequal tapering of each end and a general symmetry of form which are quite uncommon.

Stem short, stout, simple and round. Internodes much shorter than the petioles. Floating leaves coriaceous, long-stalked, oblong-elliptical or ovate with a short mucro. Submerged leaves broadly lanceolate or elliptic-lanceolate, narrowed at each end. Almost invariably ± shortly cuspidate and long-stalked. All leaves are remarkably uniform in shape, varying chiefly at the base, and possess a conspicuous and delicate transverse venation which combines to make them more beautiful than those of any other British species of the genus. Stipules long, 3 in.-4 in., hyaline, lanceolate, herbaceous. Spike cylindrical, flowers many but not crowded, opening freely but usually abortive. Peduncles long and equal. Fruit rarely mature, large, roughly obovoid or nearly elliptical in general outline, dorsal margin nearly semicircular and acutely keeled, beak stout. A very rare species found only in three rivers of the south of England.

In *Journ. Bot.*, 1925, 149, Bennett suggests that the name *P. Drucei* should give way to that of *P. petiolatus* Wolfgang, as Dr Druce's plant agrees with Lithuanian specimens of *P. petiolatus* which he possesses. Hagström (*l.c.*, 189) has examined Wolfgang's examples from both Lithuania and Volhynia and refers them to *P. nodosus* Poiret.

P. SPATHULATUS Schrader ap. Koch et Ziz., *Catalogus plant. Palat.*, 1814, 5, 18. (*P. alpinus* × *polygonifolius*) Asch. et Graeb.

Upper leaves long-stalked, often longer than the laminæ with their tapering bases and blunt apexes. Channel Islands only. See *Rep B.E.C.*, 1922, 621.

P. LANCEOLATUS Smith, *Eng. Bot.*, 1809, t. 1985. *Eng. Fl.*, i., 1824, 232 as species. (*P. alpinus* × *pusillus*) ex Hagstr. *Crit. Res.*, 1916, 149. *P. rivularis* Gillot, in Magnin, *Scrin.*, vi., 1887, 118, and in *Bull. Soc. Dauph.*, 1887, 584.

Good descriptions and figures of *P. lanceolatus* are to be found in *Journ. Bot.*, 1881, 65, t. 217, and *Pots. Brit. Isles*, 1915, 63, t. '39. Fryer was the first writer to suggest hybridity for this species and also the first to recognise its resemblance to *P. rivularis*. Mr Arthur Bennett—*Journ. Bot.*, 1919, 12—does not concur in *P. alpinus* being one of the parent species but considers that *P. heterophyllus* × *pusillus* is more probable. He makes one legitimate point in his criticism of Hagström's opinion—as quoted above—and that is, that the leaves are not "obtuse" but "sub-acute." He refers to this twice and apparently regards "the obtuse apices of the submerged leaves" as the only reason for Hagström's rejection of *P. gramineus* (*heterophyllus*). This is, however, by no means the case. Hagström (*l.c.*, 150) gives ten objections to the name *gramineus*, only two of which need be mentioned here—the smooth margins of the submerged leaves, and their peculiar nervation. These characters together, are amply sufficient for the rejection suggested; quite apart from the others.

Stem very slender and filiform, branched from the base. Floating leaves (when present) small, elliptic-lanceolate, with nearly parallel sides, shortly stalked, blunt or subacute. Submerged leaves long, linear-lanceolate, tapered at each end but much more gradually below, sessile, with apex obtuse or—more usually—subacute. Stipules short, almost subulate, scarious. Peduncles equal, often curved, ¾ in.-1½ in. (2-4 cm.) long, round and usually stouter than the slender stem. Spike very short, ⅛ in.-¼ in. (4-6 mm.), oval. Fruit abortive. Anglesey and Cambridge only—not Clare, Galway (see *P. perpygmaeus*).

P. GRAMINEUS L., *Sp. Pl.*, 1753, 127. *P. gramineus* var. *heterophyllus* Fries, *Novit. Flor. Suec.*, 1828, 37. *P. heterophyllus* Schreber, *Spicilegium Fl. Lips.*, 1771, 21. *P. Proteus heterophyllus* Cham. et Schl., *Linnæa*, 1827, 202. *P. gracilis* Wolfg. ap. Schultes, *Mantissa*, iii., 1827, 355: ex Kihlman, *Bot. Not.*, 1887, 84 = *P. Wolfgangii* Kihlman, *Herb. Mus. Fenn.*, 1889, 128. *P. nigrescens* Fries, *Mantissa*, iii., 1842, 17. *P. varians* Morong ap. Fryer, *Journ. Bot.*, 1889, 33, p.p.

Stem slender, flexuous, much and repeatedly branched at the base forming there a dense mass of submerged vegetation: the upper part is often simple with long internodes till it reaches the surface where it produces short flowering branches with or without coriaceous floating leaves. All leaves are extremely variable—see varieties and forms. Many authors classify into forms with or without floating leaves, but every form does at times produce a few of these, of variable shape. The most common form is elliptical-oblong (or lanceolate) narrowed at each end and usually shorter than the petiole which is often very long (8 cm.). Submerged leaves normally *linear-lanceolate, sessile, with tapered narrow base, serrulate margins, sharp apex,* and the two main lateral nerves gradually bending out toward the apex before joining the midrib. (In *P. lanceolatus* they bend suddenly, with a sharp curve, into the midrib.) The minutely denticulate margin of the apiculate submerged leaves is a most valuable character and is shared by all the varieties and forms. The length of these leaves varies from 1 in.-7 in. (2.5-17.5 cm.) and their width from $\frac{1}{8}$ in.-1 3/16ths in. (3-30 mm.). Stipules broadly lanceolate, acute with a small mucro, only blunt when this decays; small, usually about half the length of the internodes but longer in the upper branches. Spikes densely flowered and fruited, normally 1 in.-2 in. (2.5-5 cm.). Peduncles stout, swollen upward, especially when the fruit is ripe, normally 5-8 cm., but exceptionally 10-25 cm. (f. *longipedunculata*). Lake district forms are frequently $6\frac{1}{2}$ in., $7\frac{1}{4}$ in., $8\frac{1}{2}$ in., and occasionally $8\frac{3}{4}$ in. long. Fruit small, flattened, ovate, dorsal margin with prominent thick (or acute) keel, beak short.

When we come to consider the classification of the very numerous forms assumed by this species we are faced with considerable difficulty. Fries originally (*l.c.*, 1828) divided *P. gramineus* into two proles (=races or sub-species) *graminifolius* and *heterophyllus*. With the latter we are not now concerned, but *graminifolius* has been subsequently very differently conceived by various authors—as a species, proles, variety or forma. Not only its status but its distinctive characters have been variously described and the result is much confusion. All authorities are agreed, however, that it is a form of *P. gramineus* and it should therefore remain as a variety (*L.C.*, 1949 c.).

Var. *graminifolius* (Fries).

The distinctive characters of this variety appear to be (a) stems much elongated and less branched—sparingly, compared with the dense mass of submerged vegetation in the type—(b) very long submerged leaves, linear-lanceolate, otherwise with the characters of the type. Some authors (Graebner) give " all leaves submersed," which although frequently the case is not invariably so; others give " entire, not serrate nor denticulate " (Fryer), or " entire, not apiculate " (Bab.)—to distinguish this " species " from *P. heterophyllus*. Plants labelled *graminifolius* which do, indeed, possess smooth margins to their leaves, are not forms of *P. gramineus* but of some other species.

The two varieties of Fries—*fluvialis* and *lacustris*—most conveniently include the two well-marked series of British forms, long-leaved and

short-leaved respectively. Under each variety continental authors place a number of forms several of which are well represented in Britain.

Var. *fluvialis* Fries.

Long submerged leaves 2 in.-6 in. (5-15 cm.) and usually lacking floating leaves. This includes three width forms—f. *angustifolius* Tis. 4-5 mm., f. *Wolfgangii* (Kihlm.) Hagstr. 7-10 mm., and f. *septentrionalis* (Tis.) Hagstr. 10-15 mm. or more, (var. *maximus* Ar. Benn.). The f. *nigrescens* (Fries) Hagstr. (= *P. nigrescens* Fries, *Mantissa*, iii., 1842, 17) is a somewhat common British form of this variety. It usually possesses floating leaves rounded or slightly tapering below and rather large submerged leaves about 6-8 cm. long and 7-8 mm. wide (the type specimen is 6 cm. × 7 mm.), normally " blackening " when dried. The plant is usually rather robust and well branched. Many of Fryer's *P. varians* belong to this form.

Var. *lacustris* Fries

Includes all forms with shorter submerged leaves—not often over 2 in. (50 mm.) in length, and narrower—sometimes very short and narrow (25 × 3 mm. or less).

A rather more extended description of f. *Wolfgangii* appears to be indicated. The correct citation—*P. gramineus* L. var. *fluvialis* Fries, f. *Wolfgangii* (Kihlm.) Hagstr.—may often be required for British forms as many of our *graminifolius* specimens were so labelled by the late Dr Hagström. Among these were good sheets from R. Suck, Co. Roscommon, Ireland, 26th July 1881. H. L. Levinge. These were sent to us by Mr Arthur Bennett and by him referred to var. *graminifolius* (Fries). Among a fine series of Swedish examples kindly given us by Dr Hagström are three sheets of f. *Wolfgangii* which clearly demonstrate the fact that—within their common range of size—*graminifolius* and *Wolfgangii* are synonymous terms. The dimensions given in *Crit. Res.*, 206, for the latter—70-110 × 7-10 mm.—are those of the most commonly seen forms, but exceptionally fine examples may be larger; the R. Suck plants have submerged leaves 65-125×8 mm. and the Swedish examples possess some leaves 162 × 9 mm., narrowed at each end with the apex very longly acuminate and sharp. The internodes below the primary spike are often 8 in. (20 cm.) long. The plants are relatively little branched and only show floating leaves late in the season.

The var. *hibernicus* Ar. Benn. (*L.C.*, 1925, 1949 d.) is apparently a nomen solum and should have been included under 1948—*lanceolatus*—see *P. perpygmaeus*. It should, therefore, be deleted.

P. SPARGANIFOLIUS Laestadius ap. Fries, *Nov. Mantissa*, i., 1832, 9. Bab. *Man. Brit. Bot.*, 1922, 438. (*P. gramineus* × *natans*) Almquist in *Bot. Notis.*, 1891, 127. *P. Kirkii* Syme ap. Fryer, *Pots. Brit. Isles*, 1915, 16. *P. Tiselii* Richter, *Plantæ Eur.* i., 1890, 13 (nomen solum). *P. dubius* Tiselius *Pot. suec. exs.* i., 1894, No. 19.

Dr Hagström contends that as the name *P. nitens* Weber is used to include all forms of the hybrid *P. gramineus* × *perfoliatus*, so that of

P. sparganifolius should be applied to all forms of the hybrid *P. gramineus* × *natans*.

A rare form reported from three English and two Irish counties. "Babington considered that the Irish *P. Kirkii* absolutely agreed with Laestadius' plant: Syme, Fryer and Bennett dissented" (*Journ. Bot.*, 1919, 11). Some Swedish examples sent by Dr Hagström are very different from ours, the hybrid varying greatly; some forms being near *P. gramineus* and others more resembling *P. natans*. Of our own examples submitted to him Dr Hagström referred to *P. sparganifolius* Laest. those from R. Maam, Galway, September 1906, G. C. Druce, and others from L. Corrib, Galway, September 1858, M. Norman.

The stem is long, terete, usually bare below and branched above. Floating leaves narrowly lanceolate, occasionally elliptical, very long stalked with petioles normally longer than the laminæ, the base usually sloping but in leaves of elliptical shape rounded or subcordate, the apex short, ± obtuse and often mucronate. Spike densely flowered, about ¾ in. (2 cm.), but flowers barren. Peduncles 3 in.-4 in. (7.5-10 cm.), equal and slender. The submerged leaves are often extremely long and very narrow, sessile, tapered at each end, gradually below but more abruptly to the acute apex, *entire*. (Both *P. sparganifolius* and *P. sterilis*, which it much resembles, have smooth margins to their submerged leaves).

P. Seemenii Asch. et Graebner, *Syn. Mitteleur. Fl.* i., 1897, 335. (*P. gramineus* × *polygonifolius*), var. *lanceolatifolius* (Tis.) Hagstr., *Crit. Res.*, 231.

No English records are here given, but the *L.C.*, 1925, ed. 11, p. 46, gives Channel Islands only. *In Rep. B.E.C.*, 1922, 631, Dr Druce records the finding of this hybrid in Ireland and its determination as above by Dr Hagström.

*P. Nuttalii Cham. et Schlecht. in *Linnæa*, 1827, 226. *P. pennsylvanicus* Willd. ap. Cham. et Schlecht., *l.c.*, 227. *P. Claytonii* Tuckerman, *Amer. Journ. Sci.*, ser. i., vol. xlv., 1843, 38, non *P. epihydrus* Raf.

An American alien in Britain: canal at Salterhebble Bridge, near Halifax. See *Pots. Brit. Isles*, 1915, 90. *Rep. B.E.C.*, 1926, 37; 1930, 256.

P. nitens Weber, *Fl. Holsat. Suppl.*, 1787, 11. (*P. gramineus* × *perfoliatus*) S. Almquist in Hartm. *Handbk. Skand. Fl.*, 1889, 49. *P. salicifolius* Wolfgang in Schultes, *Mantissa*, iii., 1827, 355. *P. falcatus* Fryer, *Journ. Bot.*, 1889, 65, t. 286, and *Pots. Brit. Isles*, 1915, 68. *P. salignus* Fryer, *Vict. C. Hist. Devon*, i., 1906, 129.

An extremely variable hybrid, and as most of its forms in this country greatly resemble those of *P. gramineus*, the hybrid is commonly confused with that species. As this wide-spread confusion is largely helped by the vagueness or inaccuracy of many published descriptions

it may be well to refer to some of them. Most authors agree that *P. nitens* possesses the habit of *P. gramineus* but do not stress the point that it is much less profusely branched at the base. Fryer gives "Habit of *P. heterophyllus* but usually differs in the absence of floating leaves." Hooker, " Leaves usually all submerged." Floating leaves are frequently present, especially in still water, and as they afford the very best character for determination of the variety or form, they should be carefully sought. Bab. gives for these floating leaves, " coriaceous, elliptic, stalked." They are usually coriaceous, long-stalked, short-stalked, or sessile—often stalked and sessile on the same plant. If *gramineus* has exercised the greater influence the petioles of the hybrid grow longer; if *perfoliatus*, the floating leaves become sessile and semi-amplexicaul. Most commonly the lamina of the floating leaves is gradually narrowed below, but is sometimes rounded at the base.

The submerged leaves are all similar, sessile, narrowly or broadly lanceolate, gradually tapered above, *rounded-cordate and semi-amplexicaul* at the base. In exceptional cases the stem leaves are not rounded-cordate but lanceolate at the base, but in all such cases the branch leaves have ± rounded bases. The apex is normally cuspidate and *the margins show minute and often fugacious denticles*. The length varies up to 4¾ in. or even 6 in. (12-15 cm.), and the width from ¼ in.-¾ in. (6-20 mm.) or more. Stipules lanceolate, hyaline, variable in length. Spikes with rather few flowers, for the greater part quite sterile. The peduncles are important from the fact that the involucral leaves at their bases are an invaluable character and the basis of Hagström's classification. As to the peduncles the evidence is somewhat meagre or conflicting. Fryer's " short and stout " requires some modification and we have previously (*Journ. Bot.*, 1923, 6) called attention to Lake District specimens which are " long and slender." Taking only the European distribution of *P. nitens*, we find that its peduncles vary greatly in both length and thickness. In specimens from Denmark they are very slender and about 5 in. long. Our English Lake District examples are often 6 in. in length and slender.

Mr R. W. Butcher describes British specimens as " very long, terete, swollen at the top." This agrees with our own experience—the peduncles are more often long than short: they vary considerably in thickness and are usually thickened at or above the middle. They are normally shorter than those of *P. gramineus* from the same area but rarely as short as some extreme German forms (2 in.-2½ in.), or as long as exceptional Swedish examples (8 in. and 9 in.). Neither Mr Arthur Bennett (*in litt.*) nor ourselves have yet seen mature fruits from British plants.

For the classification of the very numerous and widely-differing forms of *P. nitens* it is desirable that some common basis should be adopted. No better classification exists than that of Hagström, and we suggest that as each of his varieties is well represented in Britain it should replace that of the *L.C.*

Var. *subgramineus* (Raunkiær) Hagstr.

Involucral leaves narrowed to the base and always distinctly petiolate—often with long petioles. This variety includes many "forms," of which two only need be given at this stage, f. *involutus* (Fryer) Hagstr.—see ×*P. involutus* Fryer, *Pots. Brit. Isles*, 1915, 69—and f. *subovalis* Hagstr., submerged leaves with sub-cordate oval bases, length 45-60 by 10-11 mm. wide. This variety shows the influence of *P. gramineus* more than either of the two following varieties.

Var. *subperfoliatus* (Raunkiær) Hagstr. (not *subpetiolatus* as in *L.C.*, 1952 c.).

Involucral leaves cordate-based and sessile. This variety shows the influence of *P. perfoliatus* predominantly in the involucral leaves which are sessile and often semi-amplexicaul. Several British forms are included under it, of which only two need mention here, f. *praelongifolius* (Tis.) Hagstr. Stem very long and sparsely branched; submerged leaves very large (up to 15×2 cm. or more) with broad rounded cordate semi-amplexicaul bases; and long peduncles. Under this name would come the following British forms:—*P. salicifolius* Wolfg. in Schultes (*l.c.*). *P. salignus* Fryer (*l.c.*), and *P. decipiens* var. *salicifolius* Ar. Benn., *Lond. Cat.*, 1925, 1954 d. Each of these is a form of the hybrid *P. gramineus* × *perfoliatus*, but *P. salicifolius* Wolfg. ex Fries (*Summa veg. Scand.*, i., 1846, 213) and ex Hartman (*Handb. Skand. Fl.*, 1879, 432) were forms of *P. praelongus*. The other British form of this variety is f. *perfoliatifolius* (Tis.) Hagstr. which includes *P. nitens* var. *maximus* Ar. Benn., *Journ. Bot.*, 1907, 173 (not to be confused with *P. heterophyllus* var. *maximus* Ar. Benn., *Lond. Cat.*, 1949 b), and f. *latifolius* Tis. in Graebner, *Potam.*, 1907, 90. Stem leaves 6-7 × 2 cm. or more.

Var. *subintermedius* Hagstr.

Involucral leaves lanceolate-based, shortly stalked or sessile—occasionally one is rounded at the base. This variety is intermediate in its characters and rather more variable than the other two. It includes, as they do, a large number of forms several of which are British. To f. *typicus* (Tis.) Hagstr. most of our herbarium examples of Fryer's *P. falcatus* were referred by Dr Hagström. This form has submerged leaves, 35-50 × 9-10 mm., with ovate or subcordate bases, and margins showing microscopic denticles—not "entire" (auct. angl.). Under this form, too, were placed British examples of var. *curvifolius* Hartm. There is really no valid reason for the retention of this name as recurved submerged leaves may be seen in most forms of the hybrid. f. *maelarensis* Tis. has lanceolate submerged leaves with bases very narrowly sub-ovate and only by their examination under the lens while fresh—or, better still, by carefully detaching a few, pressing their bases flat on a piece of stamp selvage subsequently kept pressed by an elastic band between two small pieces of blotting paper in one's note-book—can they be distinguished from those of *P. gramineus*. Dr Hagström named our examples from Derwentwater as f. *maelarensis*. In all forms of *P. nitens* it very frequently happens that in drying, the bases of the

submerged leaves become folded and then appear to be narrowly lanceolate, tapering with nearly straight sides—apparently *P. gramineus*!

P. LUCENS L., *Sp. Pl.*, 1753, 126. *P. acuminatus* Schum., *En. Pl. Sœll.*, 1801, 49. *P. longifolius* Gay in Lamarck, *Enc. mét. Bot.* iv., 1816, 535. *P. cornutus* Presl, *Fl. Cechica*, 1819, 37. *P. Proteus lucens* Cham. et Schl., *Linnæa*, 1827, 197.

The largest British species of the genus, with very stout stem often over 10 ft. (3 m.) long, thick and tough. It never produces coriaceous floating leaves and has a tendency to reduce the size of the lamina of the stem leaves—especially at its base—to little more than the midrib portion.

All leaves submerged, translucent, frequently shining, oblong-lanceolate as a rule, but very variable. The leaves are always shortly stalked but apparently subsessile owing to the decurrent lamina. The margins are finely serrulate and the apex usually with a long cusp, or acuminate and mucronate. Normally the leaves possess 11-13 nerves and the spaces between the transverse veins are usually narrow—in longitudinal direction. The leaves are longer and broader than those of *P. angustifolius*. British examples of *P. lucens* are generally 5 in.-8 in. × 1½ in.-? in.—the largest we have seen were 8 in. × 2⅜ in. (20 × 6 cm.). Stipules very large, long, obtuse and with two prominent keels on the back. They are often 5-8 cm. long. Spike stout, long, dense and cylindrical. Peduncles variable in length, stout and thickened upward. The fruit is large and swollen, roundish, scarcely keeled and with a short beak. The most common British forms are var. *acuminatus* (Schum.) Fries, in which the midrib projects to form a long prominent point to the lamina (often much reduced) which frequently has ± involute margins above.

Var. *longifolius* DC. (*P. macrophyllus* Wolfg.) non *P. longifolius* Bab.

Very long and narrow leaves, 8 in.-13¾ in. × ⅛ in.-¾ in. or more (20-35 × 1.5-2 cm.), with short stalks and weaker serrulation. The stem-leaves are very gradually tapered above and below, but the branch-leaves are rather suddenly narrowed at the apex and cuspidate: their stalks and stipules are also shorter.

Var. *insignis* Tis.

Is possibly our most common form, with long lanceolate leaves as described under the type. *P. lucens* produces very robust plants in calcareous waters and the leaves are there frequently encrusted with lime.

P. STERILIS Hagström, *Crit. Res.*, 1916, 238. (*P. lucens* × *natans*). *P. fluitans* Roth ex Beeby in *Journ. Bot.*, 1890, 204. *P. fluitans* Auctt. ex Raunkiær *Danske Blomsterpl.*, i., 1896, 97.

The name *fluitans* should be abandoned as confusing; it has been used in Europe for at least two distinct forms—under *P. fluitans* Roth—it was used in this country (*P. fluitans* Smith) for *P. alpinus*; in America for *P. Nuttallii* and in one European country for the hybrid *P. gramineus* × *natans*.

A rare hybrid recorded for four English counties and one in Ireland; often difficult to distinguish from *P. sparganifolius* Laest. The floating leaves are most often elliptic-lanceolate, narrowed at each end of the lamina and with the apex distinctly and acutely cuspidate. The petioles are normally shorter than the lamina. The submerged leaves are narrowly lanceolate as a rule, with the lamina imperceptibly tapering into the long petiole, forming a very long and narrow leaf, persistent and entire. This hybrid varies considerably, resembling one or other of its putative parents upon occasion. Most frequently it is a tall, robust and well-branched plant showing many floating leaves, but occasionally it is nearly simple, with few floating leaves. In every case all leaves are stalked and the fruits sterile. Some of Fryer's plants distributed as *P. crassifolius* are this hybrid.

P. Babingtonii Ar. Benn., *Journ. Bot.*, 1894, 204-205. (*P. lucens* × *praelongus*) ex Caspary. *P. longifolius* Bab. non Gay. *P. Babingtonii* f. *longifolius* (Bab.) Hagstr.

A plant found in Lough Corrib, Ireland (figured in *Eng. Bot. Suppl.*, 1840, t. 2847), was named by Babington *P. longifolius*. So far as we are aware this is the only record.

P. decipiens Nolte, in Koch, *Syn. Fl. Germ. et Helv.*, 1844, 779. (*P. lucens* × *perfoliatus*) ex Marsson, *Fl. Neuvorp. Rüg.*, 1869, 491. *P. lithuanicus* Gorski in Reich., *Icones*, vii., 1845, t. 31. *P. lucens* sub-sp. *decipiens* Nolte in Hooker, *Stud. Fl.*, 1884, 433.

Ascherson and Graebner (in Engler, *Pflanz.*, iv., 11, 1907) include two hybrids under this name—*P. lucens* × *perfoliatus* Marsson and *P. lucens* × *praelongus* Caspary—and their classification of the numerous varieties and forms under each hybrid is extremely complicated and often inaccurate. So far as their treatment of British species of *Potamogeton* is concerned we entirely endorse the judgment of the late Mr Arthur Bennett (*Journ. Bot.*, 1917, 348), "the involved nomenclature of the Synopsis is difficult to quote unless at great length, and the opinion of the authors (to me *in litt.*) is so variable that I place no dependence on their naming." Mr Fryer always maintained that the original *P. decipiens* of Nolte was the hybrid *P. lucens* × *perfoliatus*, and it is therefore rather surprising that his description (*Pots. Brit. Isles*, 1915, 75) contains no reference to the essential minute denticulations of the leaf margins. Koch (*l.c.*) gives "*margine laevibus*," and Babington (*Man.*, 1922, 440) "at the end entire"—notwithstanding the fact that Nolte's own specimens and those of Fryer show these denticulations distinctly. It is well to remember that neither of the parent species possesses leaves with entire margins and neither produces coriaceous floating leaves. As a result, no plant with entire leaf margins, or producing floating leaves can be referred to *P. decipiens*. As in the case of most hybrids, authenticated examples of *P. decipiens* vary considerably toward one or other of the parent species. The contention of Dr Hagström that this name should be used for all hybrids of *P. lucens* ×

perfoliatus seems to us extremely sound. In this country we have tacitly agreed to the name *P. nitens* for the much greater number of forms of the hybrid *P. gramineus* × *perfoliatus* and therefore we propose to adopt the name *P. decipiens* (as suggested) in our present classification.

Stem stout, round, usually simple below and only slightly branched above. The branches ultimately reach the surface of the water and spread out with their very divergent branchlets. Leaves all submerged, oblong, rounded below, sessile, usually ± rounded-obtuse at the apex but occasionally narrowed and apiculate, never hooded but often wavy at the end. The marginal serrulations or denticulations of the parent species respectively, affect the hybrid to the extent that its leaf margins show small and easily abraded denticles. These are often absent in the older leaves but can invariably be seen distinctly in the youngest and not fully developed leaves. Babington's distinction between *P. angustifolius* " minutely denticulate near the end," and *P. decipiens* " at the end entire," has been responsible for much confusion of names—under the microscope both species show these denticulations irregularly disposed right down the margin, although sometimes more numerous above.

Stipules long, stout and blunt, persistent—the lower often bearing a sessile leaf, or leaf-like tip. Peduncles are often slightly thickened above, not invariably equal (auct. angl.). Spike 1 in.-2 in., dense, barren. The fruit sometimes resembles that of one parent species, sometimes the other, but is usually smaller and always abortive.

British forms we have examined are included in the following varieties:—

Var. *brevifolius* Hagstr.

Leaves less than an inch wide and very rarely over 4 in. (10 cm.) long. Most examples come under f. *pulchellus* Tis. of this variety (65-75 × 15-20 mm.), but many of Fryer's Mepal, Cambridge specimens we refer to f. *lithuanicus* (Gorski) Hagstr., with relatively longer and narrower leaves.

Var. *longifolius* Hagstr.

Leaves much longer—often very long—and rather narrow (15-20 × 2 cm.), the upper stem-leaves with rounded bases. Under this variety is placed *P. upsaliensis* Tis. as f. *upsaliensis* (Tis.) Hagstr. Dr Druce's specimens from Bindon, Dorset (*Rep. B.E.C.*, 1917, 252), and Miss Roper's from Wool, Dorset (*Journ. Bot.*, 1917, 348) are excellent examples of this form.

Var. *latifolius* Hagstr.

Possesses much broader leaves than the two preceding varieties—2-4 cm. in width. Few British plants can be placed here, but most of Nolte's own examples from Germany would come under f. *typicus* Tis. of this variety, and here also we should refer var. *affinis* Ar. Benn.—see *Journ. Bot.*, 1879, 289; 1882, 184; 1919, 14. Swedish forms distributed by Dr G. Tiselius in his *Potamog. Suec. exs.*, ii., 1895, under No. 70 (f. *typicus*)

vary from 7.5-12 × 2-3 cm. (*P. decipiens* var. *salicifolius* Ar. Benn. (*Lond. Cat.*, 1925, 1954 d.) is a form of *P. nitens*.)

P. ANGUSTIFOLIUS Bercht. et Presl, *Rostlin.*, ii., 1821, 19. *P. Zizii* Mert. et Koch, *Deutschl. Fl.*, i., 1823, 845 (*nomen solum*). (*P. gramineus* × *lucens*) ex Hagström, *l.c.*, 210. *P. Zizii* Roth.

Stem stout, long, terete, much branched below. Leaves usually ± alike, but occasionally floating leaves are produced, oblong and tapering at both ends, more distinctly stalked than the lower leaves, uppermost may even be long-stalked but never longer than the lamina. Submerged leaves lanceolate or shortly oblong, rather narrow in proportion to their length, narrowed toward the base, sessile or shortly stalked. There are 2 distinct forms, one with the apex gradually tapering to an acute and cuspidate point; the other with the apex abruptly rounded and mucronate. The margins are undulate, irregularly and minutely denticulate along their whole length—not merely " near the end " or " toward the tip." British examples are rarely over 6 in. in length or 1 in. in width (cf. *P. lucens*).

Stipules long (1.5-4 cm.), broad, blunt, doubly keeled on the back. Spikes dense, cylindrical, 1½ in.-2½ in. (4-6.5 cm.) with numerous flowers. Peduncles stout, thickened above, usually longer than their basal leaves, often in clusters. They vary greatly in length, most often between 3 in-5 in. (7.5-12.5 cm.) but Derwentwater examples (*teste* J. O. H.) are often 18 cm. long. The fruit is small in relation to the size of the plant, laterally compressed, ventral margin nearly straight with a short beak at its upper continuation, dorsal margin with the normal nearly semicircular curve and a prominent keel and lateral ridges. In *Journ. Bot.*, 1923, 5, we stated, " Dr Hagström (*l.c.*, 212) remarks that ' its fruiting-faculty appears in some cases nearly quite undiminished or normal, in most cases considerably reduced and in many quite lacking.' While this accords with our own experience of this species, we may add that the fruiting-capacity seems to depend very largely upon the light-intensity and the rate of carbohydrate synthesis. If this is high, abundant fruits appear, and in our judgment this is usual among the larger-leaved species of Potamogeton." In the English lakes this species is at present found only in Derwentwater and Coniston. In the former it grows in about 1 m. of water and the leaves have a reddish colour owing to the presence of anthocyanin. These specimens fruit freely, and both these distinctive characters can probably be attributed to high light-intensity (± 35%) and a consequent high rate of carbon assimilation. The Coniston specimens—growing in water about 3 m. in depth (L. I. ± 10%)—lack both the colouring and the fruiting of the Derwentwater plants. " In hundreds of yards of Fen ditches in Cambridgeshire there is no lack of fruiting—rarely are there any plants without fruit and the fruit is well-formed " (A. B., *in litt.*). We cannot accept Dr Hagström's further statement (*l.c.*), " I am persuaded that *P. Zizii* rarely, if ever, propagates itself by seeds "—at any rate so far as the Derwentwater plants are concerned. They have been flourishing

in the same place for over 20 years at least, in spite of the fact that they grow in relatively shallow water and are subject all the summer to disturbance and breakage through boating.

In regard to classification we suggest that the present var. *lacustris* of the 1925 *Lond. Cat.* list be dropped and Fieber's two varieties—*validus* and *elongatus*—be substituted, as both are well represented in Britain and cover all forms likely to be seen. In *Journ. Bot.*, 1919, 14, the late Mr Arthur Bennett says, " Of the Cambridge Fens forms a large number fall under var. *validus* Fieb., f. *coriaceus* M. et K. (*P. coriaceus* Fryer); our usual form is *lucescens* Tis.; f. *communis* Hagstr. occurs in Llyn Leydyard (Griffiths); f. *lucentiformis* Hagstr., Westmoor, Cambs (Fryer); var. *elongatus* f. *foliosus* occurs in Coniston Lake, N. Lancs (C. Bailey)." To these I may add that there are two varieties in Coniston Lake, the one just quoted and also var. *validus* Fieb. f. *lucescens* (Tis.) Hagstr. In Derwentwater var. *elongatus* (Fieb.) f. *pulcherrimus* Hagstr. is quite frequent, and we sent both Mr A. Bennett and Dr Hagström several sheets of good fruiting specimens of this. It is, therefore, rather remarkable that no reference to any of the varieties and forms mentioned in the foregoing list—all of which Mr Bennett saw and acknowledged in print—is to be found in his 1925 *L.C.* list. The classification we suggest is based upon the length of the internodes—especially the upper ones, which are more constant.

Var. *validus* Fieber, *Potam. Böhm.*, 1838, 26.

All internodes—or at least the three below the primary spike shorter, 3-6 cm. or less. Under this variety are five forms, three of which are given in the foregoing *Journ. Bot.* list.

Var. *elongatus* (Fieber) Reichenb. *Icones*, vii., 1845, 24, t. 39, f. 68.

All internodes elongate—10 cm. or more. Peduncles also elongate—in British examples up to 20 cm. Under this are three forms, two of which—f. *foliosus* and f. *pulcherrimus*—are British.

P. CRASSIFOLIUS Fryer, *Journ. Bot.*, 1890, 321: *Pots. Brit. Isles*, 1915, 8.
? (*P. natans* × *Zizii*) Aschers. et Graeb. *Synop.*, 1897, 332.

Fryer says that *P. crassifolius* never occurs in the Fens apart from *P. natans* and *P. Zizii*. He therefore gives this as an added reason for his conclusion that *P. crassifolius* is a hybrid of the two species near which it grew. This may be so, but we believe it is quite impossible to demonstrate it. *P. Zizii* (*angustifolius*) is very frequently a fertile hybrid which may, on occasion, function as a species and produce with *P. natans* a ± unstable hybrid, but we doubt very much whether this would, in nature, survive the first winter. In another aquatic genus—*Batrachium*—we have occasionally found most interesting intermediates growing with two well-established species. We have collected an example and circulated it among a few authorities who agreed that it justified the assumption of hybridity, but diligent search the following season failed to discover a single specimen of the supposed hybrid in its original habitat. It is conceivable that the hybrid *P. crassifolius* might have

similarly disappeared had it not been cultivated. Hagström (*l.c.*, 216) thinks that some of Fryer's examples " seem to be this double hybrid," but others are *P. lucens* × *natans* (*P. sterilis*). We agree with the latter, but not with the former conclusion. We have hitherto failed to find sufficient evidence of *P. gramineus* in the hybrid *P. crassifolius*.

The plant is only known from a restricted area in Cambridgeshire and a detailed description is given in *Pots. Brit. Isles*, 8-11, plates 4 and 5. Until recent examples, showing indubitable evidence of *P. gramineus*, can be produced, the name *P. crassifolius* should not be used.

P. NERVIGER Wolfg. ap. Schultes, *Mantissa*, iii., 1827, 359. (*P. alpinus* × *praelongus*) Aschers. et Graebn. Syn., i., 1897, 317. *P. Griffithii* Ar. Benn., *Journ. Bot.*, 1883, 65. See also Hagström (*l.c.*), 149; *Rep. B.E.C.*, 1884, 114; 1925, 787; 1926, 36, and 1928, 639; Fryer, *Pots. Brit. Isles*, 1915, 34.

Only known from one Welsh lake—Llyn-an-afon—near Aber, Carnarvon, N. Wales. Mr Bennett maintained to the end that this plant is a species and not a hybrid, although Dr Hagström says of it, " Its hybrid origin, however, is beyond all doubt, and may now-a-days be disputed in earnest by nobody." We agree that the evidence for hybridity is conclusive. Mr Bennett's contention that " *Griffithii* is an isolation species like *Salmo nigropinnis* (the black-finned Trout) of these isolated Welsh Lakes. They are found nowhere else in the world," will not bear examination. The ease and rapidity with which wild duck, waders and other birds transport aquatic plants renders " isolation " impossible. We are told (*Rep. B.E.C.*, 1928, 640) that this species grows in water 7 feet or more deep. This is a suitable depth for both *alpinus* and *praelongus*, and in its previous history the lake probably contained both these species—at some stage of its development. In our opinion it is probable that *P. Griffithii* is vestigial—both parents having disappeared. For full description and plate see Fryer (*l.c.*).

P. PRAELONGUS Wulfen in Roemer, *Archiv.*, 1805, 331. *P. perfoliatus* var. *lacustris* Wallman, in S. Liljeblad *Utkast till en Sv. flora*, 1816, 706. *P. salicifolius* Wolfg. ex Fries (1846) et ex Hartman (1879) non Schultes, *Mantissa*, iii., 1827, 355 (see *P. nitens*).

Stem stout, long (often 20 ft. = 6 m.), flexuous, branched above, light in colour. Leaves all similar, sessile, pellucid, rounded at the base, oblong, usually very gradually narrowed from base to apex, blunt, distinctly and constantly hooded at the tip. The midrib has a broad border of conspicuous elongate reticulations, the margins are slightly undulate and smooth—those of *P. lucens* are serrulate. This species does not vary with us as in other European countries. Our commonest form possesses leaves 6 in. × 1 in. (150 × 25 mm.) with a length/breadth ratio (L./B.) of 6.0. Most Windermere examples have this size. Those from Esthwaite Water are more often 4 in. × $\frac{5}{8}$ in. (100 × 23 mm.), L./B. 4.3. Cheshire specimens measure 7 in. × $1\frac{3}{4}$ in. (180 × 45 mm.) L./B. 4.0, but we have no British examples of the two extreme Swedish

forms—var. *elegans* Tis., 12 in. × ¾ in. (300 × 20 mm.) L./B. 15, or var. *latifolius* Alpers, 3½ in. × 1¾ in. (82 × 44 mm.) L./B. less than 2!

Stipules obtuse, often exceeding the internodes, thin and scarious, very variable in colour, ultimately fibrous from decay. Hagstr., (*l.c.*) 250, gives " without the double ridges like *P. perfoliatus* and *alpinus* " —on p. 255 he gives *P. perfoliatus* " without ridges," which is correct; *P. alpinus* usually has these ridges, ± conspicuous. Peduncles the longest of any species—hence the name—6 in.-16 in. (15-40 cm.) in this country, but longer in America and Sweden—equal, slightly thicker than the stem and greatly exceeding their subtending leaves. Spike densely flowered and fruited, normally 1¾ in.-2¾ in. (4.5-7 cm.). Dried fruit very large, with a prominent keel often expanded into a wing—especially upward—which may rise above the level of the beak.

This species is a characteristic and beautiful deep-water form, frequent in Windermere, Coniston, Ullswater and Derwentwater, rare in Esthwaite Water. Elsewhere chiefly in the east of England. Most British examples fall under var. *angustifolius* Graebner in Engler, *Pflanz.*, iv., 11, 1907, 97 (*β foliis angustioribus* Hooker, *Brit. Fl.*, ed. 3, 1835, 77). Both stem and branched leaves rather narrow.

P. PERFOLIATUS L., *Sp. Pl.*, 1753, 126.

Few species of *Potamogeton* show greater variability in leaf-form than *P. perfoliatus* and taxonomists almost invariably divide the natural forms into a number of sub-species, varieties and forms. The chief variation is that of the relative length and breadth—which is most conveniently expressed as the L./B. ratio. This ratio varies in nature from 1.5 to 6.5—in specimens seen—and the narrower leaves are usually lighter in colour, of thinner texture and normally produced on thinner stems having much longer internodes. There is, however, in nature, no constant relation between length of internode and width of leaf. The narrower-leaved forms usually occur in deeper water and therefore in low light-intensities. In Windermere, for example, specimens from 20 ft. of water have a L./B. ratio of 4.1, but this ratio is only 2.4 for specimens from 10 ft.—the water in each case being of equal clearness. It must not be assumed, however, that low light-intensity is only found at great depths, as the following figures show. A light-intensity of approximately 2% of full sunlight is found in Wastwater at 32.8 ft., in Ennerdale at 30.5 ft., Windermere, Coniston and Ullswater at 21 ft., Esthwaite 13 ft., and Bassenthwaite 10 ft. only. Waters which are peaty, turbid or discoloured—owing to suspended material—may possess low light-intensity at quite moderate depths, or even in relatively shallow water. We have already shown (*Journ. Bot.*, 1923, 2-4) that the proportion of lime in the soil upon which this species grows is an important factor in determining the shape of its leaves—the broader-leaved forms occurring on the more calcareous soils, the character of the water being relatively unimportant. The problem was subsequently investigated experimentally (Pearsall and Hanby, *New Phytologist*, vol. xxiv., 2, May 1925, 112-120). Three sets of plants bearing the extreme types of leaves

(average L./B.: 1.8, 2.0, 5.5) were grown in tanks on the same soil, under identical light conditions at a depth of 5 ft. By the end of the summer (1920) all were producing similar leaves with a L./B. ratio of about 2.0. The leaves averaged 3.0 cm. in length and 1.55 cm. in breadth. In the following year these plants were grown in different light intensities—the same, one half, and one-fifth of those used the previous year. The same type of leaf was produced in the original L.I., but plants in half this L.I. had leaves 3.3 cm. in length and only 0.9 cm. in breadth—*i.e.*, they were slightly longer and much narrower, having a L./B. ratio of 3.6. The plants in weakest light grew little, had much longer internodes and averaged 1.5 cm. in length and 0.4 cm. in breadth, their L./B. ratio being similar to that from half light-intensity. These experiments left no doubt that some other factor besides light is operating to produce the extreme leaf variation of this species in nature.

Subsequently further experiments were carried out to ascertain the effect of different culture solutions surrounding (1) the roots and (2) the shoots of plants—on the form of the leaves. For full details and figures the reader is referred to Pearsall and Hanby (*l.c.*), 114-116. Briefly summarising the results it was found that the effects were clearly produced mainly by materials absorbed by the roots. The authors' summary (*l.c.*, 117) states, "there are clear grounds for regarding the extreme variability of leaf-form in *P. perfoliatus* as being due to variations under natural conditions of (1) the light-intensity and duration, (2) the calcium content of the soil, (3) the ratio of potassium to calcium in the soil if little calcium is present."

P. perfoliatus is a very widely-distributed species and easy to identify by its perfoliate leaves. The stem is terete, usually stout but often rather slender in deep-water forms, which may be 10 ft. (3 m.) or more, in length. The internodes are variable, long or short but commonly shorter than the leaves. Rarely they may be 10-15 cm. or more (f. *prolixus*). In this form the upper internodes below the primary spike are of this length. Windermere examples are often "f. *prolixus* exactly," according to Dr Hagström.

The leaves are extremely variable, orbicular, ovate, oblong, or lanceolate: sessile (the lowest sometimes stalked) with a cordate and expanded base which partly or completely surrounds the stem. The margins—at least when young—are slightly rough with minute one-celled denticulations which require the microscope for their identity and examination. The apex is usually blunt, often rounded, only occasionally narrowed and bluntly mucronate.

Stipules very short, normally blunt, pale, scarious, without ridges, fugacious. Peduncles equal, about as thick as the stem, very variable in length—in specimens seen, from 2 in.-5½ in. (5-13.5 cm.) and from twice the length of the spike to 5½ times. The spike is thick, densely flowered, usually an inch or more in length—flowers pedicellate. Fruit with dorsal margin semicircular, obscurely keeled with very faint lateral

ridges. Ventral margin gibbous in the upper part and obliquely concave to the base. Beak subcentral, slightly recurved.

To give a more adequate conception of the range of leaf-variation in this species we give a few particulars of herbarium examples:—R. Wey, Surrey, 1882, W. H. Beeby, ½ in. × ¼ in., L./B. 2.0; Stream from L. Vample, Tiree, S. Hebrides, 1897, S. M. Macvicar, ¾ in. × ½ in., L./B. 1.5; Towyn, Merioneth, 1902, D. A. Jones, 1½ in. × ¾ in., L./B. 2.0; Windermere (f. *prolixus*), 1913, W. H. P., 1½ in. × ⅝ in., L./B. 2.4; Coniston (var. gracilis), 1919, W. H. P., 2⅜ in. × ⅝ in., L./B. nearly 4.0; Coniston ("an extreme type," J. O. H.), 1⅛ × less than ⅜, L./B. 5.6; Loch Coron, Anglesey, G. C. Druce, 2⅜ in. × ¾ in., L./B. 3.1; R. Colne, Herts, Dr E. J. Salisbury, 1920, 2 in. × 1⅜ in., L./B. 1.5; Mill Dam, Roxburgh, Scotland, August 1912 (as *Richardsonii*), 3½ in. × 13/16ths in., L./B. 4.4; Loch of Durness, W. Sutherland, 1881, W. F. Miller, 4¼ in. × ¾ in., L./B. 5.6; Mill Dam, Selkirk, 1876, A. Brotherson, 4 in. × ⅝ in., L./B. 6.4.

All British forms of this species are included under the three varieties:—

Var. *ovatifolius* Wallr., *Sched. crit.*, 1822, 66.

To this variety all forms with ovate—or sometimes ovate-oval—leaves much longer than broad, should be referred. Two forms may be mentioned—f. *prolixus* Hagstr. (see above), and f. *macrophyllus* Blytt with large broad leaves, in Ullswater, 4 in. × 2⅜ in.

Var. *rotundifolius* Wallr. (*l.c.*) includes all forms with ± rounded leaves, whose L./B. ratio is usually low.

Var. *gracilis* Cham. et Schl. *Linnæa*, ii., 1827, 190,

Includes forms with relatively long and narrow leaves. Under this variety are three forms varying in little except length of leaf—f. *lanceolatus* Blytt possesses leaves averaging from 7-8 cm.; f. *gracilis* Fries has shorter leaves, 5-6 cm., and f. *longifolius* Tis., longer leaves, 8-10 cm. or more.

P. CRISPUS L., *Sp. Pl.*, 1753, 126. *P. serratus* L., *l.c.* *P. crenulatus* Don, *Prodromus Fl. Nepal.*, 1802, 22.

Stem compressed, obscurely quadrangular, longer sides deeply guttered when mature, ends rounded. Simple below, much and repeatedly branched above. Leaves all similar, sessile but not amplexicaul: margins serrate, often strongly undulate and crisped when mature, but young leaves and lower submerged leaves often flat although finely serrulate on the margins. Apex usually rounded-obtuse but occasionally acute and obscurely mucronate. Normally 3-5 veined, the lateral veins near the margin—the outer being so near as often to be overlooked—with cross venation distant, oblique, and often ± arched. The leaves are lanceolate or linear-lanceolate in shape and commonly 1½ in.-3½ in. (40-90 mm.) long and 8-15 mm. wide, but British examples may be 105 mm. long and only 5-6 mm. wide.

Stipules soon decaying but always present on the younger branches, apex blunt at first but soon becomes torn: short, rarely more than ¾ in.

(20 mm.) long. Spike short, lax, few-flowered (7-10) as a rule, but occasionally more. Peduncle only slightly compressed or channelled (cf. stem), and oval in section, slender, ± curved, commonly 1½ in.-2½ in. (4-6.5 cm.) long.

Fruit quite distinctive and unlike that of any other species. It possesses a long, pointed, slightly curved (falcate) beak usually subequal to the rest of the fruit, in length. Keel prominent, usually with a tooth at its base—the tooth is occasionally very long, and sometimes reduced to a mere tubercle.

Most British forms belong to var. *obtusifolius* Fieber, *Potam. Böhm.*, 1838, 32. The var. *acutifolius* Fieber (*l.c.*) is much more rare but good examples of it were distributed by Miss Ida Roper from Whitchurch, N. Somerset, 21st April 1921, through the B.E.C. The form which has been named var. *serratus* Hudson is a mere state possessing flat leaves lacking marginal undulations but retaining the characteristic serrulations of this species.

P. Lintoni Fryer, *Journ. Bot.*, 1900, 366 (*P. crispus*×*Friesii*); see also *W.B.E.C. Rep.*, 1899-1900, 21. *Rep. B.E.C.*, 1914, 166, and 1920, 152.

This rare hybrid has occasionally been found growing near the parent species and as its general habit closely resembles that of *P. Friesii* in having fascicles of smaller leaves in the axils of the larger it may easily be mistaken for that species. The colour of the foliage, however, is usually a much darker green. Sometimes the leaves more nearly resemble those of the f. *serratus* of *P. crispus*, but lack the saw-like edges of that species. The microscope will be necessary to reveal the exact condition of the leaf-margins. Fryer (*l.c.*) gives "the indistinct, practically obsolete serration" of these as one of his chief characters, but this is not very helpful as the leaves vary considerably in this respect. The older leaves are much more difficult than the younger leaves, which should always be examined first. Usually a few minute denticles may be found near the apex, and the lower margins are ± definitely sinuated with minute projections—which in *P. crispus* form the bases of the teeth—and possibly an occasional minute transparent denticle. The leaves taper at each end, are normally about 5 mm. wide and possess a subacute apex. The original Derbyshire specimens are different in the following respects:—The leaves are narrower—mostly only 3 mm. wide—very dark green in colour, with a very rounded and obtuse apex, and the margins show the merest traces of denticles near the apex only. Dr Hagström confirmed the names of the sheets from which these descriptions are compiled.

P. Cooperi Fryer (*P. crispus* × *perfoliatus*) *Rep. B.E.C.*, 1895 (issued 5th June 1897), p. 497. *P. cymatodes* Asch. et Graeb., *Synops. Mitt. Fl.*, 1897 (published 27th August), 337. *P. undulatus* var. *Cooperi* Fryer, *Journ. Bot.*, 1891, 289.

Stem always compressed and ± furrowed on the flattened broad sides, as in all *crispus* hybrids. Leaves sessile, semi-amplexicaul, oblong, narrow or broad from a rounded or cordate base and always provided with one-celled denticles. Apex obtuse, often rounded and *perfoliatus*-like, never mucronate. Stipules very deciduous on the stem, more persistent on the branches, scarious, truncate. Peduncles slender, equal and normally straight, 1½ in.-2 in. (4-5 cm.). Flower spikes very short: flowers closed but stigmas exerted, abortive.

All British forms are included under var. *serrulatus* Hagstr., which comprises the three forms:—

Forma *eu-Cooperi* Graebner, in Engler, *Pflanz.*, iv., 11, 1907, 134.

Stem-leaves long and broad, usually 6-7 × 2-3 cm. Loughborough Canal, Leics. Hagström (*l.c.*), p. 62, says, "This plant might possibly be *P. crispus* × *praelongus*," but an examination of numerous examples of this form proves that it is not that hybrid—which possesses entire leaf-margins—as the essential denticles are well-marked on all the leaves.

Forma *Jacksonii* (Lees) Hagstr. *P. perfoliatus* var. *Jacksoni* Lees, *Bot. Rec. Cl. Rep.*, 1880, 150. *P. undulatus* (*P. crispus* × *perfoliatus*) var. *Jacksoni* (Lees) Fryer, *Journ. Bot.*, 1891, 290-291.

This has the habit of *P. perfoliatus* and possesses smaller leaves (45-60) × (13-20 mm.). R. Dee, Chester, and several stations in Cambs.

Forma *scoticus* Hagstr.

Has longer and narrower leaves (50-80) × (6-13 mm.) than the preceding forms. Union Canal, above Falkirk, Stirling.

P. UNDULATUS Wolfgang, in Schultes, *Mantissa*, 1827, 360, ex Raunkiaer, *Danske Blomsterpl.*, i., 1896, 104. (*P. crispus* × *praelongus*) ex Caspary (1877). (Not the *P. undulatus* Fryer in *Annals Scot. Nat. Hist.*, April 1892, nor of A. Bennett in *Irish Naturalist*, June 1894. These were both *P. Cooperi*.)

This very rare hybrid is only known at present from Scotland. It much resembles *P. Cooperi*, but differs in possessing leaves with an entire margin, longer and more persistent stipules and a more hooded apex (influence of *P. praelongus*).

P. BENNETTII Fryer, *Journ. Bot.*, 1895, 1 (as *P. crispus* × *obtusifolius* or *Friesii*). (*P. crispus* × *pusillus*) ex Hagström (*l.c.*), p. 63.

Mr A. Bennett admitted this origin in *L.C.*, 1925, No. 1959, and apparently abandons *P. concinnatus* Ar. Benn. in *Journ. Bot.*, May 1908, p. 162, which was the same hybrid.

For detailed description and plate see Fryer (*l.c.*), p. 53, and pl. 33. Hagström (*l.c.*), p. 64, gives excellent diagrams of the stem anatomy. A rare hybrid resembling *P. obtusifolius*—of the species—and *P. Lintoni*, of the hybrids, although its leaves are narrower than those of the latter. Originally found by Messrs R. Kidston and Col. J. S. Stirling, in Wood Pond, Grangemouth, Stirlingshire, in 1890, 1894, and 1897. Excellent fresh material was kindly sent me from this station by Dr G. C. Druce in June 1930.

P. DENSUS L., *Sp. Pl.*, 1753, 126. *P. pauciflorus* Lam., *Fl. Fr.*, iii., 1778, 209. *P. oppositifolius* Lam. et DC., *Fl. Fr.*, 1805, 186.

This species is easy to identify by its opposite leaves. It is very partial to calcareous waters and the stony bottoms of rather rapidly moving streams.

Stem subterete, usually short and frequently with furcate branches in the upper part. Leaves opposite, or nearly so, in pairs (or threes), sessile, amplexicaul, frequently folded and recurved. They vary considerably in shape (ovate or lanceolate, narrowed to the apex which may be obtuse or acute but not mucronate) and size—usually between $\frac{5}{8}$ in. and 1 in. in length and up to $\frac{5}{8}$ in. wide. In Britain they are always relatively short and never exceed $1\frac{1}{2}$ in. (4 cm.) in length. Stipules absent except in the pair of leaves at the base of the branches and the pair subtending the peduncles. They are somewhat connate with the base of the leaf and the upper oblong portion is free, but they are usually difficult to examine. The peduncles are slender, shorter than their leaves, erect in flower but strongly recurved afterwards. The spike is extremely short and only 4-flowered. The fruit is very thin and lenticular, shows no trace of a keel and contains a spiral embryo of $1\frac{1}{2}$ whorls. The British forms fall under the varieties *angustifolius* and *latifolius* Wallroth, *Sched. crit.*, 1822, 66, and occasionally under var. *lancifolius* Mert. et Koch, ap. Röhl., *Deutsch. Fl.*, i., 1823, 859. This has an elongate stem and leaves narrowly lanceolate with margins nearly straight. The leaves usually lack the folding and arcuation of the type, and are nearly flat. (In *Journ. Bot.*, 1919, 17, these three varieties are given as British, two of them are wrongly quoted, and the var. *latifolius* is omitted from the *L.C.*, 1925.)

P. PECTINATUS L., *Sp. Pl.*, 1753, 127. *P. interruptus* Kitaibel in Schultes, *Österr. Fl.*, 1814, 328. *P. zosteraceus* Fries, *Novitiae Fl. Suec.*, 1828, 51. *P. flabellatus* Babington, *Man. Br. Bot.*, ed. 3, 1851, 343.

Dr Hagström has rendered a great service to systematic botany by his masterly treatment of the innumerable forms of this cosmopolitan species. On p. 44 he writes, "It is evident that a species appearing under such different climatic conditions—arctic and equatorial—in salt and fresh water—at the shores of the sea and in small lakes, in rivers and rivulets, on muddy fat ground and barren sandy clay bottom, must be met with in very diverse forms. Thus we find forms with horse-hair-like stems and leaves—and, again, stems 2 mm. in diameter at the base and with stem-leaves 5 mm. broad—with short and long sheaths—with large (4.5 × 3 mm.) and smaller (3 × 2 mm.) fruits."

In dealing with the British forms it is necessary to remember that the stem-leaves are always broader than those of the branches, and the lower leaves of any shoot are broader than the upper. Moreover, the lowest stem-leaves, which are of considerable diagnostic value, are usually decayed and absent by the time the plant flowers or fruits.

Dr Hagström has established two varieties—according as their leaf-apex is blunt and mucronate or more gradually tapered and acute. As

both these varieties are represented in Britain and as *P. interruptus* is certainly not a separate species, these two varieties should replace the classification of the 1925 *Lond. Cat.*

Var. *ungulatus* Hagstr.

Apices of the stem-leaves and of the spiciferous branches (at least in the upper part) and also of the branch-leaves in the lower part, blunt and rounded with an unguiform mucro, or abruptly cuspidate.

The upper stem-leaves are usually about 1 mm. wide or less. The lower vary from 0.5-2.5 mm. in width and are frequently 5-6 cm. long. Of the seven forms included under this variety only two have, as yet, been recorded as British.

Forma *subaequabilis* Hagstr.

Has stem and branch leaves subequal in width—an unusual character. R. Leen, Notts. (Mitchell); Wallasey, Cheshire (Lomax), and other places.

Forma *latiusculus* Hagstr.

Possesses the broadest leaves of this variety, the lowest being often 2.0-2.5 mm. wide. The var. *ungulatus* is relatively less frequently seen than the following.

Var. *diffusus* Hagstr.

The leaf-apex of all branch-leaves gradually tapering to an acute point. The lower stem-leaves are, however, obtuse. This variety is by far the commonest and most widely distributed of the five varieties into which the species is divided—three of these are not British—and of such extremely variable forms that no fewer than 17 subdivisions are deemed necessary to describe them. Fortunately most British forms fall into a few of these.

Forma *laxus* Tisel., *Potam. suec. exsicc. fasc.*, iii., 1897, Nos. 120-122.

Stem filiform and slender, very short uppermost internodes and peds. often shorter than usual—they are in some other British forms from 3 in.-6 in. in length. Widely distributed in Britain—Surrey, Cambs., Stirling, Outer Hebrides, Orkney, Shetland, Isle of Man, Co. Kerry.

Forma *protensus* Wallr., *Sched. Crit.*, 1822, 67. *P. pectinatus* var. *vulgaris* Cham. et Schl. in *Linnæa*, 1827, 165.

A common deep water form with long internodes and narrow leaves.

Forma *scoparius* Wallr. (*l.c.*). *P. interruptus* var. *scoparius* Fryer, *Journ. Bot.*, 1888, 297. *Pots. Brit. Isles*, 1915, 89.

This is a slender form with an elongated stem much branched above, where the internodes are short and the leaves setaceous—often found in shallow brackish water.

Forma *interruptus* (Kit.) Asch. *P. interruptus* Kitaibel in Schultes, *Oesterr. Fl.*, 1814, 328. *P. pectinatus* var. *interruptus* (Kit.) Ascherson, *Fl. Prov. Brand.*, 1864, 666. *P. flabellatus* Bab., *Man. Brit. Bot.*, 1851, 343.

This is a tall plant with a long and stout stem, copiously branched above and often spreading in ± fan-shaped manner: upper internodes 2 in. (5 cm.) and lower much longer. The lower leaves are long, broad (often 3-5 mm.), obtuse, early decaying. Upper leaves much narrower and branch-leaves filiform. Stipules long, bluntly lanceolate and half-clasping. Spikes about 1 in.-2 in., and usually distinctly (or conspicuously) interrupted. Peduncles normally slender and equal. Fruit somewhat large (4 mm.), with nearly straight ventral margin with a short beak as its upper continuation: dorsal margin ± semicircular but gibbous at the apex which is truncate. The central keel may be prominent or obscure.

The common characteristics of all forms of the var. *diffusus* are (1) the long, gradually tapering and very acute points of the young branch-leaves, (2) the much less acute points of the leaves at the middle of the stem, (3) the broad basal stem-leaves with the "shoulders" of the apex abruptly convex and meeting to form a subacute tip—the general effect being ± obtuse. (4) The involucral leaves differing from all the others in being abruptly cuspidate with a ± distinct mucro—the margins being concave at the tip.

P. SUECICUS Richter, *Pl. Eur.*, i., 1890, 15 (nomen solum). (*P. filiformis* × *pectinatus*) ex Almquist.

Dr Hagström (*l.c.*), p. 20, divides this into four varieties, two of which are found in Britain.

Var. *intermedius* Hagström, f. *pectinatioides* Hagstr.

Found by Dr G. C. Druce in the Shetlands, see *Rep. B.E.C.*, 1920, 51. Dr Hagström always contended (*in litt.* and *l.c.*, 37) that the record of *P. vaginatus* from these islands could not stand and had it not been for his untimely end was intending to spend a holiday here the following summer to investigate this and other problems on the spot. However, we are greatly indebted to Dr Druce for his untiring efforts to discover the doubtful plant and for his kindness in sending us an authentic example. It will be noted that Mr Arthur Bennett has deleted *P. vaginatus* from the latest (1925) *Lond. Cat.* list.

Var. *obtusus* Hagström, f. *Kerneri* Hagstr. (=*P. juncifolius* Kerner ap. Fritsch).

A specimen from R. Isis, Port Meadow, Oxon, June 1880 (G. C. Druce), shows the following characters—leaves dark green, very wide (1.5-2.5 mm.) and remarkably obtuse, the apex rounded and smooth with no trace of a point—and agreeing perfectly with authentic specimens from the locus classicus, Northern Tyrol.

P. FILIFORMIS Persoon, *Syn. Plant.*, i., 1805, 152. Nolte, *Nov. Fl. Holst.*, 1826, 20. *P. marinus* L., *Sp. Pl.*, 1753, 126. *P. marinus* L. ex Fr., *Novitiæ Fl. Suec.*, 1828, 54.

A rare species of Scottish and Irish lochs. Stem slender, filiform, sparingly branched. Leaves all similar, filiform, tapering, obtuse

(broader leaves subacute), 1-veined to the naked eye, but actually 3-nerved, there being a thin nerve in the actual leaf-margin. Stipules long, narrow and acute, clasping for about half their length, free above, deciduous. Spikes few-flowered in distant whorls. Peduncles very long, often 4 in.-9 in. (10-23 cm.) in Britain, even 12 in. (30 cm.) in Norway. Fruit small, nearly oval, ventral margin slightly convex with very small beak near its upper end, apex rounded and dorsal margin semicircular.

The following British forms have been recorded:—

Forma *luxuriosus* Hagstr., *Potamog.* in Neuman, *Sveriges Flora*, 1901, 794.

Differs from the type—which is usually of low growth—in being often 1 ft. (30 cm.) high, with very long leaves, and conspicuous spikes. Specimens from "Nr. Old Man of Wick, Caithness, 1893, (Kidston)" were 1 ft. 8 in. (50 cm.) in height. This form also occurs in Asta Loch, Shetlands, with *P. suecicus*.

Forma *major* Tis. (*l.c.*), Nos. 114-115.

A form with longer internodes and larger fruits than the type. Orkneys and Shetlands, Caithness and Berwick.

Forma *crinisimilis* Hagstr.

An extremely slender, very delicate and much branched form with hair-like leaves, very short internodes and shorter peduncles than in the type. Very rare.

Forma *alpinus* Blytt, *Norges Fl.*, i., 1861, 370.

The distinguishing features of this form are the narrow, elongate leaves rising arcuately from their sheaths, and the small subglobose fruits. Camilla Loch, Fife, 1909 (West.).

ADDITIONS TO THE PREVIOUS PAPER I. (*REP. B.E.C.*, 1929).

To complete the list of British species recorded to date, it is necessary to give particulars of the hybrids of the grass-leaved species described in our preliminary paper, I., *Rep. B.E.C.*, 1929, 148-156. Most of these hybrids are extremely difficult to determine owing to the fact that there are often only slight differences in the characters of the two parent species and the resultant hybrids sometimes more closely resemble one or (at other times) the other of these species and consequently greatly differ among themselves. It is therefore impossible to give a description of the hybrid which would be of much use in its identification. As in the case of all hybrids only a perfect knowledge of all the characters of each of the parent species will enable us to recognise the evidence for each in the hybrid. Hybrid forms that are "intermediate in character between the two putative parents" are much rarer than the literature on the subject would lead us to suppose. Far more frequently the hybrids of any two species are roughly divided into two series—each resembling one of the parents more than the other. This predominant partner—as a rule—is easily recognised but the less evident parent can only be ascer-

tained by noting the minute modifications of any character of the former through the influence of an opposite character of the latter. This requires careful and patient investigation under the microscope.

P. DUALIS Hagström (*P. panormitanus* × *pusillus*), *l.c.*, 103.

An extremely rare and difficult hybrid easily confounded with the two following. The characters to be specially considered are those in which the parent species mainly differ—habit, leaves (stiffness, nervation and apex), stipules, winter-buds and fruit. The only records are Ponds near York, 1881 (Bennett); Shropshire, 1886 (Beckwith); Wytham, Berks (Druce) *in Rep. B.E.C.*, 1920, 152.

P. TRINERVIUS Fischer, *Bayer. Pot.*, etc., 1907, 29. (*P. panormitanus* × *trichoides*).

Hagström (*l.c.*, 104) only refers to this hybrid, having then seen it only from Bavaria, but does not fully describe it. Subsequently (*in litt.*) he referred the two following examples to this hybrid:—Aberarth, Cardigan, 23rd August 1899 (Marshall), and Swainsthorpe, Norfolk, 1919 (Druce).

P. FRANCONICUS Fischer var. *spicosus* Hagstr., *l.c.*, 126. (*P. pusillus* × *trichoides*).

This variety has the upper part of the stem resembling that of *P. trichoides*, thread-like with numerous spiciferous branches and long peduncles. The leaves are stiffer than those of *P. pusillus*, dark green and of intermediate width. This hybrid is rather more easily identified than either of the two preceding, on account of the greater differences between the characters of the parent species.

Dr Hagström named the following examples as belonging to this hybrid:—Near Peterborough, Northants, 1909; White Water river, near Warnborough, Northants, 23rd August 1897 (Palmer); Bressington, E. Suffolk, August 1883; near Marsh Gibbon, Bucks, June 1913; Mason's Drain, near Eye, Northants, September 1909; Pools, Marden, W. Kent, 20th July 1893 (Marshall), as *Berchtoldi*, *Rep. B.E.C.*, 1893, 425. All these were collected by Dr Druce where not otherwise stated.

P. SEMIFRUCTUS Ar. Bennett ap. Graeb. *Das Pflanzenreich*, 1907, 138 (wrongly cited as *P. semipuctus*) = *P. Friesii* × *obtusifolius*.

Dr Hagström (*l.c.*, 96) refers specimens by E. Fries in *Herb. Norm.*, v., 81, distributed under the name *P. obtusifolius* var. *lacustris*, to this hybrid. In *Journ. Bot.*, 1919, 18, Mr Arthur Bennett records *P. semifructus* from Wire Mill Pond, Surrey, 1882 (Beeby), and Clunie Loch, Perth, 1882 (Sturrock).

P. PUSILLIFORMIS Hagström (*P. Friesii* × *pusillus*), *l.c.*, 97. *P. intermedius* Fischer.

In *Journ. Bot.*, 1919, 18, this is recorded by Mr Arthur Bennett from Betchcott, Salop, 1882 (Beckwith), and Coulterhouse, Sauchie, Stirling, 1892 (Kidston). It is possible that some British specimens labelled *P. Berchtoldi* Fieber belong to this hybrid.

P. SUDERMANICUS Hagström (*P. acutifolius* × *pusillus*), *l.c.*, 73.

" The plant is collected at the most northern border of the distribution area of *P. acutifolius* and probably belonging to the greatest rarities of the vegetable kingdom. I have named it after my beautiful native county, Sudermania, where it has been gathered by Dr C. J. Hartman." In *Journ. Bot.*, 1922, 55, Mr Arthur Bennett—in somewhat vague terms—refers a plant gathered by Mr C. E. Salmon, " Sussex E., ditch near Camber Castle, 17/7/1900," to this hybrid.

ERRATUM.

I. 155. Under *P. trichoides* there is an omission in regard to the length of the peduncles. Between " near the top " and " 5-11.5 cm." insert—usually under 4 cm. although Fryer gives 2 in.-4½ in. (5-11.5 cm.). In copying out my draft notes for the press these words were unfortunately omitted.

LONDON CATALOGUE *EMEND.*

POTAMOGETON Linn. 462.

1944 natans Linn.—111 ... ... II.385
b. prolixus Koch
c. ovalifolius Fieb.
d. rotundifolius Bréb.
e. terrestris Gray
× polygonifolius
(P. gessnacensis Fisch.) II.386

1945 polygonifolius Pourr.—112 ... ... II.386
b. lancifolius Cham. et Schl.
c. cancellata Fryer—1
d. amphibius Fries
× praelongus
(P. Macvicarii Benn.)—1 ... ... II.387

1946 coloratus Hornem.—44 ... ... II.387
× gramineus
(P. Billupsii Fryer)—2 ... ... II.388
× pusillus
(P. perpygmaeus Hagstr.)—1 ... ... II.388

1947 alpinus Balb.—79 ... ... II.388
b. lacustris Marss.
c. obscurus Asch.
d. Palmeri Druce
× crispus
(P. venustus Baagöe)—2 ... ... II.389
× gramineus
(P. nericius Hagstr.)—1 ... ... II.389
× natans
(P. Drucei Fryer)—2 ... ... II.390
× polygonifolius
(P. spathulatus Schrad.)—C. II.391
× praelongus
(P. nerviger Wolfg.)—See 1956.
× pusillus

1948 (P. lanceolatus Sm.)—2 ... ... II.391

1961 zosterifolius Schum.—25 ... ... I. 149
b. latifolius Gray
1962 acutifolius Link—17 ... ... I. 149
b. major Fieb.
× pusillus
(P. sudermanicus Hagstr.)—1 ... ... II.413
1963 obtusifolius Mert. et Koch—74 ... ... I. 150
b. fluvialis Lange et Mort.
1964 Friesii Rupr.—51 ... ... I. 150
× obtusifolius
(P. semifructus Ar. Benn.)—2 ... ... II.412
× pusillus—1
(P. pusilliformis Hagstr.) II.412
1965 rutilus Wolfg.—2 ... ... I. 154
1966 pusillus Linn.—108 ... ... I. 151
b. lacustris Pears.
c. Berchtoldi (Fieb.) Asch. et Graeb.
d. tenuissimus Mert. et Koch
× trichoides
(P. franconicus Fisch.)—7 ... ... II.412
1967 panormitanus Biv. Bern.—27 ... ... I. 154
b. minor Biv. Bern.
× pusillus
(P. dualis Hagstr.)—3 ... ... II.412
× trichoides
(P. trinervius Fisch.)—2 ... ... II.412
1968 Sturrockii Ar. Benn.—2 ... ... I. 153
1969 trichoides Cham. et Schl.—9 ... ... I. 155
b. Trimmeri Casp.
1970 pectinatus Linn.—91 ... ... II.408
b. ungulatus Hagstr.
c. diffusus Hagstr.
(1971) *f.* interruptus (Kit.) Asch.
f. scoparius Wallr.
1972 filiformis Pers.—21. ... ... II.410
f. luxuriosus Hagstr.
f. major Tis.
f. crinisimilis Hagstr.
f. alpinus Blytt
× pectinatus
(P. suecicus Richt.)—1 ... ... II.410

SPECIES STUDIES IN PLANTS.

E. M. Marsden-Jones, F.L.S., and W. B. Turrill, D.Sc., F.L.S.

About six years ago we realized that many important questions concerning the taxonomy of British plants were not likely to be solved by the isolated methods so much in vogue. It was clear that taxonomists largely ignored the work of geneticists and ecologists, that geneticists troubled little about taxonomy and largely ignored ecological studies, and that some ecologists were careless about taxonomy and failed to appreciate the results of genetical research. A preliminary survey of several genera convinced us that only by an attack on a few chosen genera by the combined methods of herbarium studies, field observations, and controlled breeding, if possible with the help of a cytologist and an anatomist, could we hope to add anything of real value to a solution of those problems conveniently considered as "the species question."

A few words may be said regarding our terminology, aims, and methods:—

Terminology.—The terms ordinarily used by taxonomists, geneticists, and ecologists, are, for the most part, defined with greater or less accuracy either in their places of first publication or in modern text-books. It seems necessary, however, to have one term which shall be of sufficiently wide application to include all differences in characters between individuals within a given taxonomic unit, whether they have or have not a genetical basis. The term *variation* is here used with that meaning.

The *objects* we have in view in our research may be stated as follows:—

A. *Theoretical.* 1. To determine if it is possible to define taxonomic units in general (species, varieties, etc.) with greater accuracy than has hitherto been done. 2. To determine the modes of origin of taxonomic units, and the nature and causes of their distribution.

B. *Concrete.* 3. To stabilise the taxonomy of certain British, European, and Mediterranean plants.

Methods.—The work at Marsden-Jones' Research Station at Potterne, near Devizes, Wiltshire, is divided into three main branches: that connected with—1. the Orders Beds, 2. the Transplant Experiments of the British Ecological Society, and 3. the Experimental Ground.

1. The Orders Beds are planned to hold 1100 species of British plants and about 700 are now grown from seeds or other material of known wild origin. Apart from the accumulation of many interesting biological facts and the advantages of having a variety of living mate-

rial at hand for reference, seeds are distributed annually to various botanical institutions and authenticated material has been grown for many botanists.

The greater part of the available area is occupied by the Experimental Beds which hold between five and six thousand plants. Fully controlled breeding is now done in a newly constructed insect-proof glass house, and also under cages and in tiffany bags in the beds themselves.

In addition we have made extensive analyses, in many parts of Great Britain, of wild populations of the species with which we are particularly working. These have been exactly correlated with breeding experiments. Finally, we have a carefully prepared herbarium and library groundwork, and our results are filed in some 8000 herbarium sheets, card index specimens, and boxed and bottled samples.

2. The Transplant Experiments have been dealt with in a paper published in the *Journal of Ecology*, xviii., 352 (1930), and readers are referred to this.

3. We have space for only a brief summary of the more important results already obtained from breeding experiments and field studies.

Silene.—The distinctness of *Silene vulgaris* and *S. maritima* (excluding the mountain variations) has been proved. They rarely cross in nature, because they rarely meet, but are fertile together reciprocally. The results of crossing the two species under control and obtaining F_2 and backcross generations has proved the genetic nature of some of the distinctive specific characters, such as those of habit, foliage, inflorescence, calyx, petals, and capsules, and also of some varietal characters such as anthocyanin development and seed pattern. There is great polymorphism, which is partly parallel in the two species, as for example in the presence or absence of anthocyanin in different floral organs, and tubercled and armadillo patterns in mature seeds. On the other hand, *S. maritima* is always glabrous so far as we have recorded, while we recognise three types of indumentum in *S. vulgaris* besides completely glabrous plants.

The great intraspecific polymorphism and hybridisation, resulting in numerous character combinations, compelled us to devise a scheme for tabulating our results in a comparative manner. Letter and figure symbols indicate different characters for the various organs, and different combinations are easily compared.

Interspecific crossing of the two species is comparatively rare in nature, though we have discovered it in a few localities in the south of England, and have this year scored a batch of 68 plants obtained from wild hybrid seed.

Attention is now being paid to biological features in life-histories, and light is already being thrown on these ecologically distinct species. We are at present bound to accept them as such, in the sense that were it not for their different physiological characters, enabling them to flourish in different habitats, they would fuse to one polymorphic species,

as it is possible they have done in certain mountain regions, unless, indeed, they have actually segregated as they have extended from such areas (see series of papers in *Kew Bulletin*, 1928 onwards).

The character differences probably arose as mutations. All examined material has the same chromosome number with n=12 (Whyte in *Kew Bulletin*, 1929, 200).

Centaurea.—In the *London Catalogue* (ed. xi., 1925) 15 Knapweeds are given full rank as native or denizen British species, on the authority of Mr C. E. Britton, in addition to *C. jacea*, which is regarded as only a casual. In Druce's *British Plant List* (ed. ii., 1928) a similar classification is followed. We have now definite proof that three of the so-called species are hybrids, and have good evidence that others are also either heterozygotes or of hybrid origin. The relative status of *C. nemoralis* and *C. nigra* (*C. obscura*) is for the moment uncertain, but if we regard them as species we are prepared to reduce the real British species of *Centaurea* to four—*C. nemoralis* Jord., *C. nigra* L. (*C. obscura* Jord.), *C. jacea* L., and *C. scabiosa* L., apart from *C. cyanus* L., *C. paniculata* L., *C. aspera* L., and *C. calcitrapa* L. with which we have not worked in detail.

C. scabiosa is very interesting. It shows considerable polymorphism in foliage characters and in flower colour, but we have not succeeded in crossing it with any member of the *nigra* group nor have we found any wild specimens which could be considered hybrids with *C. scabiosa* as one of the parents, though the species commonly grows in close association with members of the *nigra* group. *C. scabiosa* has, however, been successfully crossed with the yellow-flowered European *C. collina*, giving a most interesting series of hybrids.

Results of more immediate importance have been obtained by our analysis and synthesis of plants of the *nigra* group. Preliminary herbarium studies suggested that *C. jacea* (s.l.) was partly responsible for the polymorphism which occurs in wild populations of Knapweeds in various parts of the south of England. Working on this suggestion we have proved the general truth of our hypothesis, and have also accumulated exact data on many details.

Variation in the species of *Centaurea* with which we have worked is of three kinds:—

1. *Habitat fluctuation*.—This is not of great importance. Thus on the Transplant soils *Centaurea nemoralis* has shown very little variation compared with *Plantago major* on the same soils. Dwarfed forms occur in exposed situations, as on some cliffs and some chalk downs, and in grazed pastures.

2. *Intra-specific variation* with a genetical basis is represented by such characters as radiate, semi-radiate and eradiate capitula; long, medium, and short florets; sex variations (in part correlated with flower size); colour variations; leaf-shape variations (in basal and cauline leaves); habit (to a certain extent); and precocity of flowering.

3. *Variations due to inter-specific heterozygosity.*—These are very numerous, affect most parts of the plant, but are best seen in the phyllaries, and have led to the describing of many new species which are really only hybrids, back-crosses, or segregates of various kinds.

From selfings of certain named plants we have obtained many character combinations, some of which agree with authentic material of described species. Moreover, by crossing *C. nemoralis* varieties with *C. jacea* we have synthesised what are phenotypically the same so-called species. These statements are particularly well illustrated by the analysis and synthesis of *C. jungens* Gugl. and *C. pratensis* Thuill. Back-crossings and further analyses are now in progress. Most races of *Centaurea* with which we have worked are self-sterile to a high degree, though we have one or two exceptions to this.

The research has been carried a considerable step forward by extensive field-work. In some half-a-dozen localities we have studied hybrid-swarms which form most remarkable mixed populations equal in interest to comparable populations of other genera recorded in New Zealand, South Africa, and elsewhere. In these populations it is possible to find the parents quite or nearly pure, and several or most of the so-called allied species. The field evidence is also conclusive that in Britain *C. jacea* is a more recent immigrant than *C. nemoralis*, which in turn is more recent than *C. nigra* (s.s.) which reaches to Scotland and western Wales.

Our main work has been on these two genera, *Silene* and *Centaurea*, but subsidiary work on other genera may be briefly considered:—

The hybrid, *Geum intermedium* Willd., has been shown to segregate on selfing. On back-crossing with either parent (*G. rivale* L. or *G. urbanum* L.) the progeny are very much nearer the parent used. Back-crosses between *G. intermedium* and *G. rivale* can easily be mistaken for true *G. rivale* as is well exemplified by a hybrid population which has been studied near Bradfield, Berks.

Sex and colour variations have been studied in *Ranunculus acris* L. and *R. bulbosus* L. From the breeding and cytological investigations on sex there has emerged the conception of a "time factor," involving the interval between the initiation of the reduction division in anthers and in ovules (Marsden-Jones, Turrill, and Whyte, *Journ. Genetics*, xxi. (1929)). Three colour types (full yellow, lemon yellow and pale) and six sex types (hermaphrodite, hermaphrodite reduced on the male side, essentially female but producing a very little viable pollen, entirely female, entirely male, and neuter) are now known for *R. acris*, and several of these variations have also been found in other species of the genus. Crosses involving extreme female and male plants have yielded females, hermaphrodites, and intermediates in F_1, and male plants have re-appeared in a back-cross with the original male. In controlled experiments up to 1930 maleness only comes out when two doses are put in, and not when two F_1 sibs are crossed together, although our generations have been large. Maleness is associated, in our experience

constantly, with a peculiar crimping of the leaves. Self-sterility is very marked in *Ranunculus acris* and *R. bulbosus*.

By crossing *Saxifraga rosacea* Moench with *S. granulata* L., each with 16 gametic chromosomes, a non-segregating tetraploid was obtained with n=32 (Marsden-Jones, Turrill, and Whyte in *Journ. Genetics*, xxiii. (1930)). This has now bred true to the third generation of over 500 plants. In crossing with either of the original parents, *S. potternensis*, as we have named the tetraploid, appears to be behaving genetically as a species in that the F_1 back-crosses show no segregation.

Space will not permit dealing with our work on *Anthyllis vulneraria*, *Ranunculus ficaria*, and *Primula vulgaris*.

The tentative conclusions we have reached may be summed up as follows:—

1. A conception of "species" must include a consideration of *isolation*, which may be geographical (as in *Centaurea collina* and our English races of *C. scabiosa*), ecological (as in *Silene maritima* and *S. vulgaris*), or genetical (as in *C. nigra* or *C. nemoralis* and *C. scabiosa*).

2. Hybridisation is one of the ways in which taxonomic units are produced (as in *Saxifraga potternensis*).

3. Some accepted taxonomic units are not stable, but are heterozygous phenotypes which segregate on selfing, back-crossing, or further crossing, giving rise to complex hybrid populations (as in *Centaurea* plants of the *nigra-jacea* group).

4. Species, as commonly accepted, are much more variable, much more complex, and much more heterozygous in intra-specific characters than is generally realised.

5. The species question is one to be investigated by methods of experiment with living material combined with field-studies and laboratory, herbarium, and library research.

The research at Potterne is being aided by a Government grant received from the Royal Society.

NOTES ON MENTHA.

J. FRASER.

× *Mentha niliaca* Jacq., var. *Druceana* Fraser, var. nov. (*M. longifolia* × *rotundifolia*). Stem stout, erect, freely branched, with slender, sharply ascending branches, moderately densely villous, with deflexed or retrorse hairs, but loosely so in some places, 2-3 ft. high; internodes 3.5-6 cm. long. Leaves narrowly ovate or ovate-lanceolate, gradually narrowed from near the base to a long, acuminate, very acute point, sessile, cordate or sub-cordate at the base, sharply serrate, thinly hairy with very short hairs above and dark green, undersurface grey tomentose with short hairs, but pilose on the principal nerves with hairs of medium length, ± netted with sunk veins on both faces; superficies 3.5-7.5 × 1.5-2.5 cm.; serratures very numerous, directed forward, irregular in size and spacing, in some specimens rather deep (0.25-3 mm.), acute; leaves of the branches lanceolate, otherwise like those on the stem. Spikes cylindrical, very dense, 3.5-6 cm. long, the lateral ones close under the main spike, nearly horizontally patent. Bracts setose, plumose, slightly longer than the open corolla. Pedicels villous with 3-5 jointed, loosely reflexing hairs. Calyx villous; teeth lanceolate, very slender, ciliate with 2-6 jointed hairs, 4-5 joints being the most common. Corolla pale lilac-purple. Stamens included, rarely exserted.

The above description was first drawn up from a specimen gathered near Abingdon, Berks, in 1926, by G. C. Druce, and distributed under the name of × *M. niliaca* Jacq. The specimen reached me after I had finished the descriptions of Menthae Britannicae for the *Supplement of the B.E.C. Report* for 1926, and though I had Jacquin's description it was inadequate to distinguish the above from the type, and time failed me just then to consult his plate. The description is slightly altered to include a specimen from Yarnton, Oxon, collected in 1927 by G. C. Druce, with a longer main spike; and another from Tenby, Pembroke, collected by Miss E. S. Todd in 1929, with deeper serratures to the leaves. The long, gradually acuminate leaves readily distinguish the variety from all others of this group of hybrids.

× *M. niliaca* Jacq., var. *mollissima* Borckh., f. *brevipila*, forma nov. The leaves are dark green above (not grey), and covered with a very short mealy pubescence, consisting of the bulbous basal joint of the hairs, intermixed with a few, very short, slender hairs; the under surface is more grey and, while the lower leaves are very thinly hairy, showing some amount of mealy pubescence, the upper and younger ones are tomentose beneath. In all other respects this is the same as the variety *mollissima*.

This variety bears the same relation to var. *mollissima* as the var. *Nicholsoniana* does to var. *nemorosa*, and var. *pulverulenta* (Strail) does

to *M. longifolia*. The two last named were originally described as species. I have been unable, so far, to get the locality or name of the collector of the new form. It was sent me by Dr Druce in 1929.

× *M. rubra* Sm., var. *Turreffii*, var. nov. (*M. spicata* × *verticillata*). Stem stout or slender, according to vigour, flexuous, branching ± under the main inflorescence, purple or green, according to exposure, 2-3 ft. high, thinly or rather thickly covered with short deflexed hairs on different plants; internodes 3-5.5 cm. long. Leaves narrowly ovate, obtuse to sub-acute, rounded at the base or slightly decurrent on the petiole, serrate, thinly sprinkled with short adpressed hairs above, and pilose on the principal veins beneath with longer hairs, sometimes rather densely hairy above or below; superficies 4-5 × 2.2-2.5 mm.; serratures irregular, directed forward, obtuse to sub-acute, 0.25-1.25 mm. deep; petioles hairy, 5-7 mm. long. Bracts ovate, similar to the leaves, with shorter petioles, very gradually decreasing in size, until they are very small, but always exceeding the open flowers. Pedicels glabrous or thinly furnished with 2-4 jointed hairs. Calyx tube thinly covered with 2-4, rarely 5 jointed hairs, tubular but slightly wider at the teeth; teeth awl-shaped, ciliate with 1-2 rarely 3 celled hairs. Stamens normally included.

The above variety would seem to exclude × *M. rubra* Sm., but in all respects it resembles × *M. rubra* Sm., var. *raripila* Briq., with a greater degree of hairiness, but more irregular in having hairs on the pedicels and calyx. In 1929, the Rev. Francis Turreff made a gathering of eighteen specimens within 150 yards of one another on the banks of the classic Mill of Tifty Burn, Fyvie, Aberdeenshire, at a point where the stream is eight feet wide. The previous year he sent some specimens which were very erratic in their leaves. Some of them were densely hairy on the upper face, with rather long hairs, mixed with some mealy pubescence; other leaves on the same stem were densely hairy beneath. In other respects they were like the 1929 specimens.

× *M. verticillata* L., var. *ovalifolia* H. Braun, f. *subglabra*. (*M. aquatica* × *arvensis*.) The stem and both faces of the leaves of this form are sub-glabrous, but in all other respects it conforms to an average × *M. verticillata*, var. *ovalifolia*. The pedicels and calyx are hairy as usual.

I omitted a sub-glabrous form from previous descriptions in the hope of finding a sub-glabrous form of the type × *M. verticillata*, and though I have a sheet from Hurlay, near Great Marlow, Berks, in 1888, it is not extreme or good. I do not know to what variety John Gilbert Baker attached the var. *subglabra*, but as the varieties were not segregated in British books or lists in his day, he might have been satisfied with any sub-glabrous form of *M. sativa* L. In any case sub-glabrous forms are most frequent in var. *ovalifolia*, in my experience. My sheet of the f. *subglabra* was collected on the banks of the Thames, below Weybridge, Surrey, in 1898.

BRAMBLE NOTES, 1930.

WM. WATSON.

RUBUS VULGARIS Wh. & N.

In view of the known distribution of *R. vulgaris* on the Continent it has always been an interesting question whether this bramble occurs in Britain. It is absent, apparently, from Scandinavia, Denmark, Sleswick-Holstein and the north of France, is of sporadic occurrence in Belgium, the Lower Rhine and the north-west German plain, and first becomes frequent going eastwards into the hill country towards the Weser.

I have seen two specimens in *Hb. Druce* which I think may be identified as *R. vulgaris*, although as one example is in fruiting condition, and neither example is accompanied with collector's notes, there must be a little uncertainty about the name. One example was collected by L. Cumming at Sellack, Herefordshire, and is named "*R. micans*." The other was collected by G. C. Druce at Brickhill, Bucks, 1899, and the ticket bears the note "May be *R. carpinifolius*, but if so with abnormal panicle. W.M.R." It seems worth while looking out for *R. vulgaris* in England, and I accordingly give a short description of the bramble.

Stem angled, rather hairy at first, armed with strong, large-based, declining and falcate prickles. Leaves glabrous above, softly greyish-felted and hairy beneath; rather coarsely, deeply and more or less doubly serrate-dentate. Terminal leaflet rather narrow, ovate-rhomboid, gradually acuminate, the base rounded and quite entire. The other leaflets cuneate below. The long petioles thinly hairy, armed with hooked prickles; stipules eglandular.

Panicle large and compound, lax, pyramidal; its lower branches long-peduncled and half erect. Rachis angled and flexuose, crimson; armed with falcate, broad-based prickles; and, like its slender branches and pedicels, furnished rather thinly with long patent hairs. Calyx segments patent after flowering, ovate cuspidate. Petals oblong, pinkish or white. Stamens very little longer than the styles. Fruit oblong.

In some respects specimens of *R. vulgaris* remind one strongly of *R. Selmeri* and *R. lentiginosus* Lees. The likeness to *R. Lindleianus* Lees, with which Focke merges it, chiefly lies in the leaves. I should say that *R. Lindleianus* is sufficiently distinct in its villose, broader, cylindrical panicle, leafy nearly to the top, and horizontally and closely and intricately branched; in its white flowers (occasionally flushed with crimson on the outside in the opening bud) and its acuminate calyx segments more decidedly reflexed after flowering; in its longer stamens; and in its leaves more completely white felted beneath, and terminal leaflets more obovate and cuspidate and more shallowly toothed, and its glandular stipules; and finally in the small, subglobose fruit composed of unequal drupelets.

In habit there is probably a considerable difference also.

R. Lindleianus forms a tall, dense bush, greatly branched, sending out in autumn numerous whip-like branches which root into the ground freely at their tips. Focke mentions that *R. vulgaris* does not root freely at the tips. The panicles of *R. Lindleianus* also are greatly developed, often exceeding a foot in length. The flowers open widely, the petals at length spreading horizontally. The leaves are retained through the greater part of winter. On the whole it belongs, I think, more nearly to the *Discolores* than *R. vulgaris* does.

Much more closely allied to *R. vulgaris* is the bramble made known by A. Ley originally from Aconbury, Herefordshire, and subsequently from other stations in Herefordshire. Purchas relates that Briggs was inclined to refer this bramble to *R. Borreri*, although a very strange form of it; that Bagnall regarded it as referable to *R. Salteri*; with which opinion he himself felt he must agree. Babington's opinion—especially valuable as he was the author of the species *R. Salteri*—was that the bramble was not *R. Salteri*. Focke confirmed the opinion that it was *R. Salteri*, and it was accordingly issued in the *Set of British Rubi* to represent that species. Sudre took the identification in good faith, drew the plant for his Monograph from the specimen in the *Set of British Rubi*, and wisely made his description from that specimen, uninfluenced by Babington's description of the real *R. Salteri* of the Isle of Wight. That he was not unaware of the discrepancy may be judged by his remark, " J'ai décrit la plante de Hereford (Set No. 35)."

As Babington said, the Aconbury bramble is not *R. Salteri* Bab. From my own study of the bramble I can fully agree with Sudre that it falls easily within the group of *R. vulgaris*. I propose that it be known as

RUBUS PERARMATUS nov. sp.

The following notes will supplement Sudre's description. Stem glabrous or subglabrous, purple, bearing scattered stalked glands and rather numerous short prickles. Leaves quinate, glabrous above, and greyish felted and thickly pubescent or shortly hairy beneath; the leaflets not contiguous. Terminal leaflet roundish obovate, with a long cuspidate-acuminate point and a nearly entire base; sharply, deeply, somewhat doubly toothed; twice as long as its petiolule. Basal leaflets with stalks about 8 mm. in length.

Flowering branch densely pubescent to its base. Panicle elongate, cylindrical or pyramidal, armed with numerous short but unequal falcate and declining prickles, and furnished with several simple leaves. Rachis pubescent and shortly hairy, bearing scattered stalked glands; branches very prickly. Calyx grey felted; segments ovate-lanceolate attenuate, patent or more or less erect on the small, subglobose fruit. Stamens equalling the styles. Young carpels densely pilose.

Known from *R. vulgaris* by the much shorter, straighter, more numerous prickles (12-20 on the panicle branches), by the more discolourous leaves, the longer-stalked leaflets with veins more deeply im-

pressed, and by the smaller fruit with more erect calyx segments and very hairy carpels.

I have seen plants of *R. Salteri* Bab. in Apse Castle Wood, and in other stations in the south-east of the Isle of Wight. For the present it may suffice to call attention to the following points in Babington's original description in *Synopsis of British Rubi* (1846), page 10, and in Salter's description in Hooker and Arnott's *British Flora* (1850), page 585. All these points, except as to flowers, I have verified on growing plants in Apse Castle Wood.

Babington, *l.c.* Stem long, furrowed, green. Prickles few and small. Terminal leaflets oval, slightly narrowed below, acute, shortly pointed. Stipules linear-lanceolate. Basal leaflets shortly stalked. Flowering branch pubescent with lax hairs, not setose, prickles few. Sepals woolly, closely embracing the oblong fruit. Petals oblanceolate. A very straggling plant, prostrate unless supported or much shaded by trees; remarkably distinct from all its allies.

Salter, *l.c.* Whole plant green, spreading abundantly by creeping stolons as well as rooting at the end of the stems. Petals small, white. Calyx embracing the fruit.

I myself found the green stems standing up unbranched to the height of 5-8 feet, defoliated all but for a few recent leaves near the tip. Similar stems were to be found rising up singly a short distance away. A few stems, borne down apparently by the weight of the leaves in the previous autumn, had rooted at their tip.

Evidently this bramble belongs to the *Suberecti*. How then is the subsequent confusion to be accounted for? Babington informs us that a bramble gathered near Twycross, Leicestershire, by Lees and Bloxam is also "a probable var. of *R. Salteri*," and goes on to give the points of difference, viz., that the stipules are linear, the flowering branch leaves ashy beneath, the petioles and midribs furnished with stronger and more numerous prickles, the flowering branch and panicle rachis armed with strong hooked prickles, and the panicle branches mostly axillary and corymbose.

I have seen a specimen from Stanton Harold, Leicestershire, labelled by Bloxam as *R. Salteri*, which may possibly be the same as the bramble gathered by him near Twycross and determined by Babington as a probable var. of *R. Salteri*. This Stanton Harold specimen—so far as one may judge from a specimen in advanced fruit and without collector's notes—is *R. lentiginosus* Lees, not the contracted *horridus*-state which Lees knew, but the lowland *pyramidalis*-state which Focke called *R. cambricus*. Babington himself in *British Rubi*, page 73, appears to record *R. lentiginosus* from Stanton Harold, unless indeed his record is intended to relate to his "*R. affinis*."

This Leicestershire *R. lentiginosus*, then, came to be regarded as a var. of *R. Salteri*, or as *R. Salteri* itself, and from its likeness to *R. calvatus* caused *R. Salteri* to be associated with that species—but not by Bloxam, who seems to have known *R. calvatus* and *R. lentiginosus* too well to acquiesce in the arrangement.

Under his account of *R. Salteri* Babington relates that Lange sent him a bramble from the woods of Fionia, which Babington thought "almost exactly the *R. calvatus* of Bloxam." I have no doubt that this bramble was really *R. sciaphilus* Lange, which is frequent in the woods of Fionia. The same bramble was gathered by Rogers near Alexandra Park, St Leonards-on-Sea, E. Sussex, "in immense quantity," on 19th August 1897, and was at first labelled by him "*R. lentiginosus* Lees or allied form," which was subsequently in 1901 amended to *Rubus Salteri*. The bramble is unquestionably *R. sciaphilus* Lange, and has the anthers plentifully pilose as in Lange's specimens.

I confess I do not understand Babington's statement at the bottom of page 132 of his *British Rubi* to the effect that he had not seen the typical *R. Salteri* Bab. from any place in Britain except Apse Castle Wood. A few lines above that statement he says that a bramble gathered in South Devon "exactly resembles the original *R. Salteri* from Apse Castle Wood." I think that the bramble from Muckross, near Killarney, S. Kerry, which he records as *R. Salteri*, is the Apse Castle Wood bramble, too.

R. THYRSIFLORUS Wh. & N.

Last year I was enabled to study a specimen of *R. thyrsiflorus* which had been gathered and determined by Focke. I found that this German bramble was identical with an undetermined bramble which I have known for six or seven years past on Putney Heath, Surrey, between Roehampton village and the reservoir on Putney Heath. In 1929, in company with Mr Pugsley, I saw the same bramble in a fresh station below the lower end of one of the bogs on the western slope of Wimbledon Common. I have not seen it elsewhere, nor seen a dried British specimen other than my own from the above stations.

It will be recollected that Focke aroused some controversy by claiming in his treatment of the brambles in Ascherson and Graebner's *Flora of Central Europe* that *R. Bloxamii* was the same as *R. thyrsiflorus*. Rogers and Linton replied that after the fullest consideration they were disposed to retain the name *R. Bloxamii* for our British bramble, and to regard *R. thyrsiflorus* as still unknown in the British Isles. Focke did not change his view in his final Monograph of the brambles. I fully agree with Rogers and Linton that the two brambles are not the same. *R. thyrsiflorus* has a short cylindrical panicle furnished below with large leaves composed of broad and short-pointed leaflets. The stem leaves also are unusually large, the leaflets broad and imbricate and acuminate, and cordate ovate in shape.

R. SPINULIFER M. & L.

I identify as this a pink-flowered bramble which I find on Bostall Heath and in Bexley Wood, in N.W. Kent. The stem is thinly hairy, passes from green to reddish brown, is low-arched then procumbent, forming a bush about two feet high. The stem prickles are very numerous, slender, from a swollen more or less conical base. Although the bramble is classified by Boulay and Sudre as a subspecies of *R. Koehleri*

the stalked glands are considerably shorter than in that species. The terminal leaflets are oval or obovate with a nearly entire base, the dentition is more compound than in *R. Koehleri*, with the principal teeth more prominent and repand. The most marked feature of the panicle is the long and sharply ascending lower panicle branches, armed with numerous equal patent acicular prickles. As on the stem the stalked glands are rather short. The rachis is pubescent and bears many fine pricklets and sunken glands. The terminal leaflets of the upper leaves are obovate-rhomboid, and of the lowermost leaves nearly round and obtuse. The calyx is greenish-grey felted, finely aciculate and dotted with short-stalked glands. The calyx segments are conspicuously white margined, very white within, and end in long slender tips; they are reflexed after flowering. The petals are obovate, much tapered to the base, notched at the apex, becoming divaricate with their sides reflexed. The fruit is rather large, subglobose, and is composed of large equal drupelets. The stamens are white and much exceed the green styles. Young carpels pilose.

I have this bramble under cultivation and am much impressed by its distinctness from *R. Koehleri*. The latter, as known to me in Epping Forest, has small white flowers with red styles, and has a more elongate and more hairy panicle, furnished with longer stalked glands and more numerous long acicles. I doubt, therefore, whether the association with *R. Koehleri* can be maintained.

I have seen *R. spinulifer* also from Badby Wood, Northants, in *Hb. Druce*, and Sudre gives it for Herefordshire on the authority apparently of No. 127 of the *Set of British Rubi*.

R. SCANICUS Areschoug.

Last summer I revisited Netley Heath and found this bramble over an area of perhaps a square mile almost the most frequent form. It had recovered its vigour, and specimens were obtainable which compared well with Swedish examples. I have come across a specimen which is certainly this bramble, collected here by Mr C. E. Britton in 1900. The ticket reads "*R. pyramidalis* Kalt. I think *R. pyramidalis* Kalt. though the panicle is hardly typical. November 1900, W.M.R."

R. NITIDIOIDES W. Watson.

Sussex can now be added to the counties in which this bramble is known to grow. I saw it last summer beside a stream a little to the north of Frant, East Sussex. On Wimbledon Common there is a small form which is, I think, not starved but a genetic form. It is particularly easy to mistake this small form for *R. nitidus*. Dr Gilbert collected it near Eridge, East Sussex, as *R. nitidus*.

R. LARGIFICUS W. Watson.

This is frequent on Rusthall Common, near Tunbridge Wells, West Kent, but always with the stamens a little longer than the styles. It has hitherto been known only from a few localities in N.W. Kent.

R. ARGENTEUS Wh. & N.

To English and to German bramble students this bramble seems to have been always a stumbling-block. Focke believed that he had refound Weihe's type in the neighbourhood of the original locality at Minden. The bramble which he found (only a single bush) he described as being of immense proportions, nearly completely infertile, glandular, certainly of hybrid origin from *R. rhombifolius* (a green-leaved species) crossed with *R. Sprengelii* or *R. infestus* (both green-leaved) or with *R. rudis* (slightly discolorous-leaved). It is difficult to imagine how Focke came to think that this was the plant described and figured by Weihe and Nees as *R. argenteus*, which has silvery-white felted leaves, is quite fertile and has no long-stalked glands. By the time Focke wrote his description of *R. argenteus* in Ascherson and Graebner's Flora he had seen what he believed to be *R. argenteus* from England and also from other places in Germany and Belgium, and his description is apparently drawn up to cover those plants. It is, I think, seriously at variance with Weihe and Nees' very full description and with their figure. In his last Monograph his description is modified, and it is stated that Weihe and Nees' type has not been found for certain in any place in Germany besides the original station at Minden.

It is otherwise, I think, with Sudre's description and plate; they do agree with Weihe and Nees' description, read in its entirety, the preliminary as well as the major description. The chief points about the bramble are, it seems to me, as follows:—

The stem is obsoletely hairy, more or less furrowed, and armed with strong, equal, recurved prickles, unaccompanied with pricklets or stalked glands. The leaflets are all long-pointed and are entire at the base. The stipules are without stalked glands. The leaflets again are more or less doubly, deeply, closely, sharply, moderately-coarsely serrate; deep green and glabrous, or glabrescent above, and rather closely silvery-white felted and pubescent beneath.

The long flowering branch is densely pubescent and felted, and is armed with rather small, slightly falcate prickles. The leaves are more coarsely toothed than on the stem, and graduate into simple ovate, then lanceolate and linear-lanceolate leaves up to the top of the panicle. The panicle is cylindrical above, from a pyramidal base when well developed, the upper branches ascending, 1-2 (3)-flowered. The pedicels are furnished with small hooked prickles. The calyx segments are aciculate, long-pointed, patent as the petals fall, later reflexed. The petals are pink, bleaching to white, large oblong, abruptly clawed. The stamens are short, hardly exceeding the green styles. The young carpels are glabrous. The fruit is large and is freely produced.

Weihe and Nees place *R. argenteus* in a section headed " Mit behaartem aber weder bereiftem noch drüsigem Blatterstengel." After describing the stem prickles they say, " Feinere Spitzen findet man nicht zwischen ihnen." Of the pedicels and calyx they say, " Die Blumenstielchen und Kelche weissfilzig, mit unterlaufenden Drüschen." The

reference is here to sunken, sessile or subsessile glandules, not to stalked glands. Weihe and Nees always speak of stalked glands as " Drusen " or " gestielte Drusen," never as " Drüschen."

I think I have seen this bramble from Sussex and from Devon. It is preferable to see it in flower, and I have seen it only in fruit. Although, therefore, I cannot assert positively that we have Weihe and Nees' bramble in England, I am hopeful that it will be met with again and that it will be possible then to recognise it for certain.

I will now deal with the brambles which in England have been considered to be *R. argenteus* W. & N.

R. DIVERSIARMATUS sp. nov.

This is the bramble made known by Fry and White from Woollard and Brislington in N. Somerset and called *R. erythrinus* var. *argenteus* Wh. & N. See *Journ. Bot.*, 1892, page 11, and Murray's *Fl. Som.*, pages 106 and 415. Sudre wished to call it *R. argenteus* var. *longicuspidatus*.

It differs from *R. argenteus* in the hairy stem bearing pricklets, acicles and long-stalked glands amongst the prickles. The petioles and stipules also have stalked glands. The leaves are 3-5-nate pedate, yellowish green above, white felted to yellowish green beneath, with rather long hairs on the veins. The basal leaflets have stalks 3-4 mm. long. The terminal leaflet is oval-obovate, the base entire or emarginate, the point very long. The serrature is somewhat double.

The flowering branch is bright red, angled, flexuous and very hairy, and is furnished with conspicuous stalked glands and acicles. The panicle is long, broadly cylindrical, leafy to the top, with long widely ascending branches below, usually four inches or so in length but occasionally developing into long leafy secondary panicles. Pedicels about one inch in length, armed with straight prickles. The flowers are large, the petals pale pink, the stamens white (reddening) about as long as the green styles. The young carpels are glabrous, the receptacle subglabrous.

The very unequal prickles on the stem and panicle offer perhaps the strongest point of difference from *R. argenteus*, and to my mind prevent the bramble being placed as a variety of that species.

R. CRYPTADENES Sudre.

This is Briggs's Devon *R. erythrinus*, described by him in *Journ. Bot.*, 1890, page 204. A description also appears in the Supplement to *English Botany*. The following notes made from a study of the bramble on Bostall Heath, N.W. Kent, will perhaps bring out the differences between this and the two brambles just dealt with.

Stem glabrous or bearing short clustered hairs here and there. Prickles large and falcate. Leaves 3-5-nate, large, rather thin, glabrous above, grey to green beneath, shortly hairy at first. Terminal leaflet broadly oval or obovate, narrowed to the base, slightly lobate towards the apex, ending in a long—often very long—cuspidate, usually

straight and channelled point; the base entire or subcordate; teeth broadly ovate, partly sinuate, open, not incised.

Flowering branch glabrescent below, closely pilose above. Panicle long, leafy and lax; closely armed with strong, declining, falcate and hooked prickles. Calyx aciculate and pilose. Petals obovate, entire or notched, pink. Stamens white or pink, much longer than the whitish or pinkish styles. Young carpels each with one or two hairs at first, soon glabrous. Fruit subglobose.

The stipules and bracts are conspicuously fringed with stalked glands, which occur also on the petioles of the leaves on the flowering branch and amongst the hair of the rachis. The leaflets become convex, and occasionally a 6-nate leaf occurs. The petioles and petiolules are often very prickly.

The present bramble, then, is much less hairy and less glandular than the last, the toothing of the leaves is different, and the long stamens are different. It is probably widely distributed: I have seen it from W. Kent, Cornwall, Berks, Cardigan, W. Gloster, N. Devon, N. and S. Somerset, and Oxford. It has been confused with *R. polyanthemus* and *R. calvatus*, as well as with *R. argenteus*.

R. BIPARTITUS Boul. & Bouv.

This is a frequent bramble in some parts of Surrey. I have studied it near Milford, near Newlands Corner, on Farley Heath by Guildford, on Winterfold Heath, in Hurt Wood, and at Witley. In West Kent I have seen it on Rusthall Common, and in East Sussex to the north of Frant towards Tunbridge Wells. I have also seen it near Storridge in Herefordshire. Marshall brought the bramble to the notice of Focke, and received from him the name of R. *erythrinus* Genev. for it, and as such it was issued from Surrey in the *Set of British Rubi*. Another example of the same bramble collected by Marshall from the same neighbourhood was named *R. imbricatus*, I forget whether by Focke or by Rogers, and it is presumably on this gathering that the record of *R. imbricatus* for Surrey in Rogers's *Key* and in his *Handbook*, rests. I have seen a specimen from near Tunbridge Wells, also, which had been identified by Rogers as *R. imbricatus*. This furnished Marshall with his only record of *R. imbricatus* in the *Flora of Kent*.

To confuse matters further a specimen of *R. bipartitus* collected by Murray on Shapwick Moor, Somerset, where it had been observed previously by Fry and White, was declared by Focke to be a variety of *R. nemoralis* P. J. M. Under that name it stands in Murray's *Flora of Somerset*, but with a note in the Addenda that Ley would place it under var. *Silurum*. Later Rogers took the view that it was *R. insularis* Areschoug, and it accordingly stands in White's *Flora of Bristol* under *R. villicaulis*, with which Rogers combined *R. insularis*. We are, however, informed by Marshall in his Supplement to Murray's *Flora* that Rogers subsequently agreed with Ley in naming the Shapwick bramble *R. nemoralis* var. *Silurum*.

It might fairly be inferred from all this that a species new to Britain was in question, and in fact when Sudre saw the specimen from Surrey in the *Set of British Rubi* he pronounced it to be *R. bipartitus* Boul. & Bouv. The citation of the name is not without its difficulties as there has been confusion with the bramble in France as in England, but I give the name as I find it in Bouvet's *Florule des Rubus de l'Anjou* (1911-1923). It is there given specific rank—rightly, I think—whereas Sudre makes it a variety of *R. cryptadenes.*

The following description was made from a bush on Winterfold Heath.

Stem crimson on the exposed side, green and glaucous beneath, the growing tip bronze-coloured; the sides sulcate and striate, furnished with short clustered hairs at first and subsessile glands, becoming glabrous. Prickles patent, declining and falcate; slender, moderately long, not very numerous.

Leaves 5-nate, subdigitate, thick, light green, coarsely undulate and rugose; very hairy above and rough; yellowish or greyish white felted and pubescent beneath, with the midrib and secondaries yellow; all leaflets slightly imbricate and subcordate. Petiole flat, pubescent, armed with few prickles, which are large and falcate above, smaller below. Stipules linear-lanceolate, glandular. Terminal leaflet oval, long and finely acuminate, with rather coarse, unequal, sharp teeth, or with double teeth and becoming then nearly lobate. Basal leaflets small, on stalks 2-3 mm. long, long-pointed.

Flowering branch deep crimson (light red and yellow in the shade), thinly pilose to nearly glabrous below, felted and pubescent or rather pilose above; furnished with several 5-nate leaves below, followed first by ternate leaves, of which the terminal leaflets are narrow oblong-obovate and long-pointed, and then by several simple leaves.

Panicle when well developed pyramidal, large, the lower branches long-peduncled, many-flowered, middle branches deeply divided, upper branches dense, 1-2-flowered, patent; terminal flower subsessile. Rachis armed with strong-based but slender prickles, which are sharply declining or falcate, or on strong examples hooked. Scattered short-stalked glands are to be found on the panicle rachis and branches and on the bracteoles. The flower buds are felted and pubescent and sometimes aciculate but not glandular. The calyx segments are loosely reflexed after flowering and in green fruit. Petals rather large, pink, broadly obovate, short-clawed, the apex bifid, notched or only erose, hairy, incurved. Stamens pink-based, longer than the green styles; anthers slightly pilose. Young carpels densely pilose. Quite fertile.

R. imbricatus Hort differs in its small, white flowers, its roundish-obovate terminal leaflets, green, not tomentose beneath, and its narrow cylindrical panicle.

R. OPLOTHYRSUS Sudre.

This bramble is to be found in fair abundance on Littleworth Common, Abrook Common, and Oxshott Heath, in Surrey; and has received various names from our authorities. Specimens from Oxshott Heath

have been called *R. rhombifolius*, others from Abrook Common have been called *R. pyramidalis*, and from Littleworth Common *R. argenteus*. As "R. dumnoniensis Bab.," I have seen it from Sussex, Devon, Hants, and Dorset.

Sudre ranges it amongst the species falling in the group of *R. argenteus*, and it will therefore not be out of place to give a description of it here, based on the plants in the Surrey localities quoted.

The stem is dark purple, subglaucous, thinly hairy at first, blunt-angled with flat, striate sides; prickles strong-based, long and lanceolate, mostly patent, hairy. There are no stalked glands nor pricklets.

Leaves 5-nate, subdigitate, strigose above, greyish beneath from a shining pubescence when young. Petiole and petiolules deep purple, armed with large curved prickles, pubescent. Terminal leaflet roundly ovate, acuminate-cuspidate, the points short and broad, the base subcordate; moderately coarsely, irregularly serrate-dentate, with some of the teeth recurved, or more evidently doubly serrate. Stipules slightly glandular. Basal leaflets with 5 mm. stalks.

Flowering branch pubescent and more or less hairy, strongly armed with long and slender, declining or falcate prickles. Panicle pyramidal, mainly ultra-axillary, furnished with 1-3 simple leaves; the middle and upper branches bearing many slender patent prickles, and divided usually more than halfway, 2-4-flowered. Bracts and bracteoles slightly glandular.

Petals roundly obovate, with rather a long claw, pinkish or pink. Stamens white (reddening) much longer than the yellowish green styles. Young carpels thinly hairy: receptacle very hairy. Calyx clothed with a dense coat of short shining hairs, greyish green with a white border to the short-pointed segments. Segments rather loosely reflexed in flower and fruit.

R. ALTERNIFLORUS M. & L.

To come now to "*R. argenteus* f. *glandulosa*"—rather an ambiguous designation since four other *R. argenteus* forms are glandulose—I have recently seen two specimens taken from bushes grown in Sudre's garden at Toulouse from seed of *R. alterniflorus* collected by him at Chateaulin, Finistere. The panicles are weak, and look as if they came from starved bushes, but after allowing for this fact they match our plant very well indeed. They have the same long-stalked glands and acicles on the bracteoles, and long-stalked glands exceeding the short hair on the petioles of the leaves on the flowering branch. The well-advanced carpels are still pilose as in our plant. I was glad to note this point as Sudre says that the carpels are glabrous or scantily pilose, and Bouvet says that they are glabrous.

I do not doubt, therefore, that our bramble, which is so abundant in Surrey, Kent and Sussex, is the same as *R. alterniflorus* M. & L. of the north and north-west of France. I have written a full description of the plant in the *London Naturalist* for 1930.

R. IMBRICATUS var. LONDINENSIS Rogers as " R. NEMORALIS P. J. M."

Rogers seems often to have named specimens of *R. imbricatus* var. *londinensis* as *R. nemoralis* P. J. Muell. That he found some difficulty in separating it from his Branksome Park " *R. nemoralis* P. J. Muell.," *i.e.*, *R. oxyanchus* Sudre, is shown by his remark in the *B.E.C. Report*, 1904, page 16, on specimens sent in from eight Surrey commons, " To some extent perhaps it (*i.e.*, *R. imbricatus* var. *londinensis*) may be said to go off from it (*i.e.*, typical *R. imbricatus* Hort) towards *R. nemoralis* P. J. Muell." From Tooting Common, one of these eight Surrey commons, I have seen a specimen of *R. imbricatus* var. *londinensis* collected in 1904, the year of the note quoted above, on which Rogers reported, " *R. nemoralis* P. J. Muell., a beautiful form with very finely toothed leaves and smaller bracts than in our Hants and Dorset plant." Incidentally, another specimen of the same bramble from Tooting Common was identified by Rogers as *R. macrophyllus* Wh. & N., a bramble the affinities of which with " *R. nemoralis* " are referred to in the *Handbook* under *R. nemoralis*.

The confusion is not limited to examples from the Surrey commons. I have seen specimens of *R. imbricatus* var. *londinensis* from Cornwall which Rogers has named *R. nemoralis*, *e.g.*, one from Perran-ar-worthal and another from Connor Downs, near Hayle. Another specimen of the same bramble from Kea Downs, Cornwall, was determined by Rogers as " *R. Scheutzii* Lindeb., less strongly armed than usual."

The explanation of this confusion of *R. imbricatus* var. *londinensis* with *R. oxyanchus* is, I think, to be found in the fact that both brambles grow in Branksome Park, Dorset, and were both identified as *R. nemoralis*. I have seen specimens of each, gathered there by Rogers and labelled by him as " *R. nemoralis* P. J. Muell."

R. imbricatus var. *londinensis* is then a widespread bramble in the south of England. I know it from S. Essex, Surrey, W. Kent, Dorset, and E. and W. Cornwall. Presumably some of the " *R. nemoralis* P. J. Muell." from other vice-counties—it is given in the *London Catalogue* for 17 vice-counties—will be found to be *R. imbricatus* var. *londinensis*. The bramble named *R. nemoralis* from a field near Four Shire Stone, and claimed in *B.E.C. Report*, 1915, page 339, as a N.C.R. for E. Gloster is, I think, *R. bipartitus*.

Focke was not satisfied that the bramble which he studied in England under Rogers's guidance was *R. nemoralis* Muell. Of this bramble, according to Focke, only one bush was ever known and that is now extinct. In his last Monograph he is very definite that it is Genevier's *R. nemoralis* with which he identified the English bramble. Rogers also in *Journ. Bot.*, 1894, makes it plain that he and Focke thought that the Bournemouth bramble agreed with Genevier's description of *R. nemoralis*. The prickles, leaves and flowers of Genevier's bramble seem to me to differ materially from those of either *R. imbricatus* var. *londinensis* or *R. oxyanchus*. Genevier says that the prickles are robust, falcate or hooked; the leaves deep green, the terminal leaflet suborbicular (which

he emphasises by adding that it is rounded); and the petals a bright rose pink, and stamens too. His bramble, therefore, must have been like a *R. Selmeri* with the flowers of *R. rhombifolius* or *R. insularis*.

We should do well to drop the name *R. nemoralis* P. J. Muell. and use *R. oxyanchus* Sudre instead.

The bramble chosen to represent *R. amplificatus* Ed. Lees in the *Set of British Rubi* is not the plant of Lees, nor in my opinion is it a variety of it. The specimens for the *Set* were collected by A. Ley, near Tintern, Mon., and were seen by Focke, who suggested that they represented "perhaps a variety of *R. amplificatus* Lees." Sudre, who seems to have relied largely on the examples in the *Set of British Rubi* for his knowledge of brambles endemic in Britain, described and drew the Tintern plant for his Monograph, yet not without some doubt of its being the true *R. amplificatus*, judging by his warning, "Il est possible que les auteurs anglais aient confondu plusieurs formes sous ce nom. J'ai décrit la plante de *Set of British Rubi*, No. 33."

It is somewhat remarkable that whereas Lees states in the *Phytologist*, vol. iv., p. 823, that *R. amplificatus* occurs in most of the woods about Malvern and Worcester, nevertheless Ley after forty years' brambling in Herefordshire had never met with it (*Journ. Bot.*, 1907, p. 319). Rogers, also, writing in the *Journal of Botany*, 1895, on the list of Rubi in the London Catalogue, ed. 9, owns to being far from satisfied that he yet knows *R. amplificatus*. If reference is made to Babington's *Manual* or his *British Rubi*, it will be seen that his description of *R. amplificatus* is almost verbally identical with the description of *R. Schlechtendalii*, and this latter in turn, he says, is hardly distinguishable from *R. macrophyllus*. The *Handbook* description was apparently written to cover the Tintern bramble as well as Lees' bramble.

I have seen examples of Lees' bramble, collected near Great Malvern and named by him, and I have found it in the north of Herefordshire in a roadside hedge near the Lugg at Aymestry. I have also seen several examples of it from the Midlands, under the names "*R. macrophyllus*" and "*R. Schlechtendalii*." In these circumstances I have prepared the following description of the Aymestry bramble.

R. AMPLIFICATUS Ed. Lees.

Stem long and trailing, glaucescent, becoming reddish brown, angled, thinly hairy, glabrescent, eglandular. Prickles declining from a large compressed base. Leaves 5-nate, petiole short, petiolules villose. Leaflets shortly strigose above, greyish green felted beneath, velvety, the veins thinly pilose. Terminal leaflet obovate, often much narrowed to the base, with a very long falcate point and irregular, or nearly double, serrate-dentate, partly patent teeth; 3-4 times as long as its stalk.

Panicle often very large and with long lower branches, but if not large, then cylindrical with short erect lower branches; bearing large 3-5-nate leaves with very long-pointed leaflets, and often simple leaves to the apex. Rachis angled, densely villose, eglandular, armed below with unequal strong-based falcate or declining prickles, and above with

small acicular prickles. Middle and upper panicle branches divided deeply, and when strong, completely to the base. Pedicels with numerous acicular prickles.

Buds greenish grey felted and pubescent, shortly aciculate. Calyx segments white-margined, ovate-lanceolate, prolonged into linear tips, loosely reflexed in fruit. Petals pinkish in bud, white when expanded, rather large, oval, pointed and clawed. Stamens white, far exceeding the greenish styles. Anthers glabrous. Young carpels glabrous or nearly glabrous. Receptacle pilose, the hairs often protruding between the young carpels.

Lees at one time, like Babington, regarded his bramble as closely related to *R. macrophyllus* (by which however according to his description in *Phyt.*, 1853, he apparently meant *R. pubescens* var. *subinermis* Rogers), but afterwards thought it quite distinct. Bloxam's suggestion that it was *R. vulgaris* Weihe & Nees is very interesting, as it certainly recalls that bramble in several respects. But its nearest ally is, in my opinion, *R. dumnoniensis* Bab., with which it should stand in the *Villicaules* group.

R. LASIOCARPUS nov. sp.

From Lees' bramble just described the Tintern bramble, No. 33 of the *Set of British Rubi*, differs considerably. The stem is rather more sharply angled and more glaucous. The prickles are more slender and longer, some are patent and some declining. The leaves are distinctly small, the leaflets doubly incise-serrate, the principal teeth pointing forwards not outwards. There is a trace of stellulate hairs over the under surface of the leaflets, and the veins are conspicuously pilose. The leaves are harsh to the touch beneath. The panicle varies from cylindrical to pyramidal, and in either case is leafy to the summit. The flowering branch below the panicle is only thinly hairy, but the upper parts of the panicle are clothed with dense hairs. The rachis and branches of the panicle, and the pedicels and calyces are extremely prickly. The middle branches of the panicle are divided to the base usually, as in *R. amplificatus*. The calyx is more hairy than in *R. amplificatus* and is patent in fruit. The young carpels are very densely pilose.

R. HYLONOMUS M. & L.

R. hirtus b. *Menkei*. Mount Nod, near Tunbridge Wells, Mr Borrer —Bab. *Syn. Brit. Rubi*, p. 29 (1846), and *Manual*, ed. 2 and 4. *R. pygmaeus* Weihe—Syme in *English Botany*, iii. (1864); and Bab. *Brit. Rubi* (1869), p. 181, Mount Nod and Eridge, near Tunbridge Wells, Oxhey Wood, Watford, Herts, and Pinner Wood, Middlesex. *R. praeruptorum* Boulay—Bab. in *Manual*, ed. 8. South-eastern counties.

The foregoing references relate to a bramble once apparently well known to Borrer and Babington. It is not the Dorset bramble issued in the *Set of British Rubi* as *R. praeruptorum* Boulay, and described by Rogers under that name in his *Essay*. Last summer I met with Borrer's bramble in fair quantity on Rusthall Common, near Tunbridge Wells, West Kent, and between Tunbridge Wells and Eridge in E. Sussex.

It is unnecessary to describe the bramble afresh as the description by Babington is adequate for its identification, but it should be noted that Babington's " Anthers purple. Styles greenish," should read " Anthers greenish. Styles purple." *R. hylonomus* L. & M. in P. J. Muller's *Versuch* (in *Pollichia*, 1859), p. 224, is the same bramble, and Babington's names being incorrect that is the name by which it must be known. It is common to the south-east of England and the north-east of France.

R. hylonomus belongs to the *R. serpens* group. Borrer therefore correctly indicated its approximate position in assigning it to *R. hirtus*, and Babington erred in removing it to the *Radulae*.

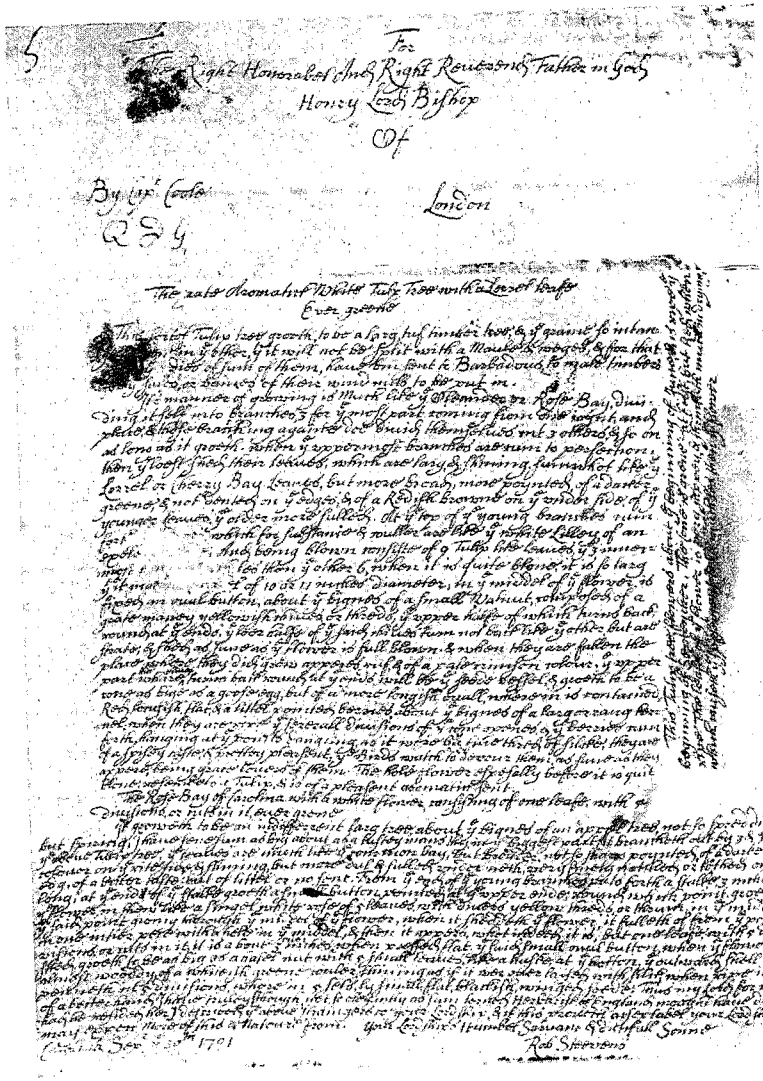
R. BADIUS Focke.

In dealing with the brambles of Central Europe in Ascherson and Graebner's *Flora* Focke states that he has seen a dried example from England apparently belonging to *R. badius*. A specimen which came to me recently from Dr Druce, collected at Langworth Wood, near Lincoln, 10th August 1907, and provisionally named " *R. infestus* (probably)," agrees well with the descriptions of Focke and Friderichsen, and matches a German specimen which I have seen, collected at Brunswick. On the Continent *R. badius* is found in Holstein, in N.W. Germany, and in the lower Rhineland. It is not surprising, therefore, that it should grow in the east of England.

In general appearance it recalls *R. pyramidalis*, especially in the colour of the stem, in the prickles, in the leaf-toothing, and in the long-stalked glands. On the other hand the subsessile basal leaflets, the imbricate leaflets, the (sometimes) broad stipules, and the rising fruit calyx might suggest a relationship with the *Corylifolii*. Focke, like Friderichsen, once placed it in the *Apiculati*, but in his last work it stands among the *Grandifolii*.

The stem is low-arching at the base, then prostrate, brown to crimson, bluntly angled, thinly hairy, sometimes bearing unequal stalked glands and stout-based pricklets above. Prickles broad- or narrow-based, straight, very slender, equal, patent or nearly patent. Leaves 3-5-nate, green beneath and hairy on the veins. Petiole with long straight prickles; the stipules narrow linear-lanceolate, sometimes broader. Leaflets imbricate, margin with unequal, and in part patent, serrate teeth. Basal leaflets shortly stalked or sessile. Terminal leaflet ovate-elliptical or suborbicular, with a subcordate base and a short point. Intermediate and basal leaflets acute.

Panicle rather long, lax and ample, pyramidal, with nearly horizontal upper, and long many-flowered ascending lower branches, clothed with loose patent hair and rather numerous or only a few long-stalked glands. Panicle prickles long slender straight, patent or more or less declining. Calyx bearing many long straight acicles and long-stalked glands, the segments ending in long linear points, patent in fruit. Petals large, elliptical-obovate, rose-red. Stamens pink, exceeding the styles. Anthers pilose. Fruit subglobose.



LETTER RELATING TO MAGNOLIA GRANDIFLORA L.

R. MUTABILIS var. REGNORUM nov. var.

In S.W. Surrey and N.W. Sussex there is a bramble which has generally not been distinguished from *R. mutabilis* Genev. I do not mean *R. glareosus*, which was included under *R. mutabilis* in the *Handbook*, nor *R. mutabilis* var. *Naldrettii* which White separated from the type; but another bramble. On several occasions I have examined it at Witley and at Farley Green in Surrey, and I have seen dried specimens, all named *R. mutabilis* Genev., collected by Marshall at various stations in S.W. Surrey, viz., Dunsfold Common; Barnacle Hill, Witley; pondside, Witley; roadside hedge near Lea Park, Witley; and roadside hedge near Charles Hill, Tilford. I have seen one Sussex example, collected by F. A. Rogers near Lynch, W. Sussex, 5th August 1914, and named *R. mutabilis*.

The earliest example is labelled as follows:—"Pondside, Witley, Surrey. 25/6/90. 24/9/90. Petals large and showy, nearly white, narrow and far apart. White filaments far exceeding the whitish styles. Stem prostrate. *R. mutabilis* Genev. confirmed by Babington. E.S.M." "I agree.—W. MOYLE ROGERS."

R. mutabilis Genev., according to Sudre and Bouvet, has the stem nearly glabrous, terminal leaflets broad, and carpels glabrous. From this the Surrey and Sussex bramble referred to above differs in its markedly hairy stem, narrow terminal leaflets, and very pilose carpels.

The Bucks "*R. mutabilis*" is, I think, white-flowered *R. apiculatus* Weihe.

MAGNOLIA GRANDIFLORA L.

The letter reproduced on the opposite page was sent in 1701 to an English Botanist, and may be of some interest to our American colleagues. It was written by Robert Stevens of Carolina, and sent to Henry Compton, once Bishop of Oxford and then of London, a brother of the second Earl Compton. He was born at that lovely house, Compton Wyniates, Warwickshire, the seat of the Marquis of Northampton, and died at Fulham at the ripe age of 81. He was a great gardener, introducing into England many exotics. These include *Crataegus coccinea*, *Cornus sericea*, *Aralia spinosa*, *Spiraea opulifolia*, *Quercus coccinea*, *Gleditschia triacantha*, and in 1688 *Magnolia glauca* and *longifolia* (now made synonymous in "Index Kewensis"), all North American species. The specimen accompanying the letter was *M. grandiflora*, a handsome tree which produces flowers twelve inches across. It is known in America as Bull Bay, and is excellently figured by Sargent in his "Sylva."

THE BRITISH WHITE WATERLILY, NYMPHAEA ALBA L.

J. Gordon Dalgliesh, F.L.S.

Some botanists have expressed doubts as to *Nymphaea alba* being indigenous to Great Britain, for the plant has for so long been extensively cultivated and crossed with closely allied species or forms that it is impossible to trace the parentage of those found growing on ornamental waters. In almost every case these have at some time been introduced and are not truly wild. Unlike *Nuphar*, *Nymphaea alba* and its allies ripen their fruit under water, so the idea of seeds being conveyed through the agency of waterfowl is not feasible. *Nuphar lutea*, on the other hand, ripens its fruit above water, the pericarp splitting and scattering the seeds, these (being comparatively large and conspicuous, are attractive to waterfowl) remaining floating for some time on the surface. Moorhens have frequently been observed to eagerly devour them, and the testa, being hard, possibly survives the process of digestion, passing out uninjured. During the latter part of August 1927, the writer placed some seeds of *Nuphar lutea* in a glass vessel, where they remained floating for over three days.

NYMPHAEA ALBA L.

The type that Linnaeus based his description on may possibly have been *Nymphaea candida* Presl, which has not always been recognised, or, if so, it has been regarded as merely a variety of *Nymphaea alba*. Linnaeus does not appear to have ever referred to it, although the plant grows in Scandinavia. Presl distinguished *Nymphaea candida* from *alba* chiefly on account of the absence of stamens from the summit of the ovary. According to Conard (*The Waterlilies*, 1905) *Nymphaea alba* × *candida* occurs in East Prussia at Neuhausen, near Konisberg, near Goldapand and elsewhere. Sermander in 1894 claimed to have discovered a red variety of *Nymphaea candida* in Fagertärn, Sweden. Several varieties or sub-species of *Nymphaea alba* have been described by Continental authors on apparently very trivial grounds, thus causing much confusion. It is more than likely that a thorough and careful revision of these so-called varieties would bring conviction that these are but mere states due to natural local conditions. The Continental school has sub-divided *Nymphaea alba* into at least ten varieties, subspecies, and even species. Hentze appears to be the chief offender in this respect. The following is a synonymy:—

Nymphaea alba melocarpa Caspary, 1855, changing in 1863 to *N. alba polystigma*.

Nymphaea aesophii Boissier, 1888.

Nymphaea Dioscoridis Helder, 1885.

Hentze from 1848 to 1852 gave *Nymphaea venusta, rotundifolia, erythrocarpa, parviflora, splendens*, and *urceolata*.

Gave in 1892 had *Nymphaea alba*, var. *intermedia*.

In 1806 Salisbury broke away from *Nymphaea*, substituting *Castalia*, but Conard has tried to show that the name *Nymphaea* must be retained for what he styles the *Eu-Castalia* group and the old name *Nuphar* (*Nymphozanthus*) must stand for the yellow pond lilies (*Botanical Gazette*, January 1917). Hentze's typical *Nymphaea alba* was based on specimens from Upsala and his *erythrocarpa* was so named on account of the red tissues in the interior of the fruit, this type hailing from "Bremerhafen ausdem Lande Hadlen." *Nymphaea parviflora* was based on the smallness of the flowers and *N. aesophii* was recognised by Orphanides by the large size of the flower, the type coming from Macedonia. Yet another, *Nymphaea Dioscoridis*, from Lake Lysimachia in Aetolia, was based on smallness. While this is so, curiously enough, none of the Continental school with their usual zeal for "splitting" and species-making, as might have been expected, raised *Nymphaea alba*, var. *rubra* Lönnroth, to specific rank, all save Carrière (*Nymphaea Caspari*, Rev. Hort. 1880, p. 403) being content to regard it merely as a variety.

The writer has seen in British herbaria specimens of *Nymphaea alba* with pink-flushed flowers. Whether these specimens were truly wild or semi-cultivated could not be determined as the data were insufficient. Conard (*The Waterlilies*) gives the geographical distribution of *N. alba*, var. *rubra*, as Lake Fayer (Fagertärn), in the Parish of Hammar, Nerike, Sweden. *Nymphaea candida* Presl has been divided into no less than thirteen species by the Continental school.

From the foregoing it will be seen under what difficulties present-day workers in taxonomic botany have to contend with in the elucidation of a species.

The geographical distribution of *Nymphaea alba* is given as Europe and North Africa. The writer has examined a small form in the Calcutta Herbarium, labelled *Nymphaea alba*, collected at Deara Dun, N.W. Himalayas, by P. W. Mackinnon. Possibly this specimen is *Nymphaea candida*, var. *kashmirana*, of Hooker and Thomas, and *Nymphaea cachemiriana* of Cambessedes, the original type specimens of this being in the Paris Herbarium. No mention is made, so far as the present writer is aware, of any true *Nymphaea alba* from Eastern Asia. Conard, in his excellent monograph of the genus *Nymphaea*, ignores *Nymphaea alba*, var. *occidentalis* Ostenfeld in *New Phyt.*, 116, 1912, probably because he himself attaches little or no importance to size alone. The above author rightly says:—"It is interesting to note how various observers have been *impressed with different features of the plant* (*i.e.*, *Nymphaea alba*) *as they appear more or less exaggerated in certain localities.*" (The italics are the present writer's.)

Herein lies the sole object of this paper and not to add yet more difficulty to the existing supposed species or sub-species into which *Nymphaea alba* has been surrounded in the past, but to endeavour to try and show that the true British White Waterlily may be of smaller size than those found on ornamental waters. It is most important when collecting to bear in mind possible introduction of some of the Euro-

pean forms and also cultivation when specimens from a given locality are open to any such suspicion.

There can be little doubt that *Nymphaea alba* is indigenous to Great Britain—certainly there appears to be no evidence to the contrary—and in the size of its flowers and leaves is intermediate between the large and showy white waterlily of ornamental waters and *Nymphaea occidentalis* Moss. It is in some of those uncultivated and wholly wild tracts of marshland intersected by broad ditches that one quite unexpectedly comes upon a plant that gives rise to those impressions of difference which Conard, as quoted above, says are more or less exaggerated in certain localities. By the eye alone an observer can, after some experience, instinctively distinguish one plant closely allied to another almost at a glance, as for instance between the flat fronds of *Lemna gibba* and the normal ones of *Lemna minor*. Such was the case during the summer of 1927 when, during a botanical ramble in East Sussex, the writer suddenly came upon a small patch of *Nymphaea alba* growing in a wide marsh drain and restricted to one spot only a few yards in length. At once the attention was arrested by the plants *appearing* to be distinctly smaller than the typical forms of the White Waterlily hitherto familiar only on ornamental waters. Not only did the flower alone appear smaller but the leaves also, these moreover showing much more carmine than was usual even when fully matured, for the time of year was August. There were, too, only floating leaves, no aerials. Where these aerial leaves appear this possibly may be due to overcrowding, individual examples being forced out of the water, as is frequently the case in *Hydrocharis Morsus-ranae*.

Nymphaea alba, var. *minor* Ostenf., has small flowers but does not show any very appreciable difference in the leaf to the flower. The East Sussex specimens had, if anything, a smaller leaf than some specimens of *N. alba*, var. *occidentalis* examined. *Nymphaea alba* has been described as having its leaves nearly orbicular, floating, *red when very young* (writer's italics), attaining 300 millimetres in diameter. This reddish or, more strictly speaking, carmine colour was very noticeable even on the adult leaves, but much more so when the locality was visited on April 27th, 1928, for the purpose of studying the spring growth.

Measurements of a plant in August 1927 gave:—Flower, diameter, 101 millimetres; sepals, 47 millimetres in length; outermost petals, 47 millimetres in length; outer stamens, 25 millimetres in length; largest sized leaf, 118 millimetres in diameter.

Nymphaea alba, var. *occidentalis*—Measurements from well-preserved herbarium material from Sweden:—Flower, diameter, 72 millimetres; leaf, diameter, 110 millimetres.

The following questions arise:—

1. Is *Nymphaea alba* indigenous to Great Britain? No writer on botany of the present day would appear to dispute this, so the question can be satisfactorily answered in the affirmative.

2. Are the East Sussex specimens referred to above merely a slightly smaller form differing only in size from the ? cultivated forms of ornamental waters? Possibly this is so and may be due entirely to environment, for the water in the ditches where it grows is not deep, having a depth of about two feet, and environment, that is shallow or deep water, may have an influence on the size.
3. Does *Nymphaea alba* vary in size all over the country and is the flower and leaf large or small indiscriminately, or is this intermediate state (between the lake form and *N. alba*, var. *occidentalis*) confined to certain localities?

This last query can only be ascertained by very careful collecting and recording. Herbarium material is only too frequently insufficiently labelled. The mere place is not sufficient. Exact habitat, nature of growth, etc., should be recorded, or if plants are not collected full notes can be taken on the spot.

The Abbé Pierre Gave, in the *Proceedings Société Dauphinoise pour l'echange des plantes* (Grenoble), 1892, named a Waterlily *Nymphaea alba*, var. *intermedia*, but what this was exactly the writer has been unable to ascertain. No reference is made anywhere else to this form except in Conard's *Monograph of the Waterlilies*, page 176: "*Nymphaea alba*, var. *intermedia* Gave, 1892; fid. original specimen coll. P. Gave, June 30th, 1891, St. Andre, Haute Savoie." The Abbé, who was a member of the Société Dauphinoise, died in March 1916. On writing to Kew, the Director replied that there were no specimens of *Nymphaea alba*, var, *intermedia* Gave in the Herbarium there. It would be of great interest to know if the Abbé Gave's types were preserved, and where they are now.

For want of further material and information this paper must for the present necessarily remain unfinished, but the writer is inclined to think that the true White Waterlily growing wild in Great Britain should be known as *Nymphaea alba*, var. *minor* DC.

It may be worth noting here that in the East Sussex marshlands, where *Nymphaea alba* grows, *Nuphar lutea* is not present in the immediate neighbourhood, some miles separating the two species.

The writer is greatly indebted to Dr G. Claridge Druce for much kindly help and criticism in the compilation of this paper.

SOME NOTES ON BRITISH ORCHIDS IN 1930.

P. M. Hall.

The season of 1930, at least in the earlier summer months, was remarkable for a wonderful profusion of blossom, and the Orchids, which are notoriously uncertain in their appearance year by year, for the most part enjoyed a really good season too. So that I thought it might be of value to record the impressions gained in an optimum year when one was able to observe the plants at their best. Practically the whole of the observations were made in Hampshire; the remainder in the counties immediately adjoining.

I was put almost completely out of action for a fortnight in the middle of June by a badly sprained ankle, but this only serves to emphasise the remarkable wealth of Orchidaceae which can be seen in the space of one season within a narrow radius. In spite of the richness of the Hampshire Orchid flora, no less than three new county records were made, so that 1930 was for us an *annus mirabilis*.

I have to acknowledge, with great gratitude, the generous co-operation of many helpers. Among them I may mention Messrs G. W. Pierce, R. M. Synge, E. M. Malan, E. H. White, Rev. R. Quirk, and Miss Pickard, who sent Sussex specimens. In the notes which follow I have tried to make acknowledgment to those responsible for the more important discoveries. All the remaining observations are my own. It can be assumed that wherever Owslebury is referred to, the original finder of the plant in question is Mr Pierce, who has worked out the flora of this district so zealously. The arrangement and nomenclature of genera and species follows the second edition of Druce's *List of British Plants*. I wish to make it quite clear that this has been done for the sake of convenience and not as an implication of acceptance of that arrangement and nomenclature *in toto*. I am fully aware that many of the generic and specific names are still *sub judice* and have no wish to embark upon a nomenclature-war at present.

Malaxis paludosa (L.) Sw.

Rayner's *Supplement to the Flora of Hants* is correct in calling attention to the dwindling of this species in the New Forest. Though far less frequent than it was 20 years ago, it can still be found without great difficulty in many of the New Forest bogs. I formed the impression that it was more numerous in 1930 than in 1929: this was certainly the case at Holmsley.

Listera cordata (L.) Br.

The occurrence of this species near Brockenhurst was recorded in the *Gardener's Chronicle*, 1928, and quoted in *Rep. B.E.C.*, 1929. The discovery was made by a correspondent of Dr Turrill's, but I have failed

to obtain any further details. It is a matter of considerable importance to know whether this plant, the correct identification of which is indubitable, occurred in a plantation or on the open moorland under heather. The original station for this plant in Hampshire must always be under grave suspicion on account of its occurrence among planted conifers. Further details as to the plant's occurrence in a new station many miles further east might do much to clear up the status of the plant in Hampshire.

Spiranthes aestivalis (Lam.) Rich.

This plant did not have quite so successful a season as in the year before: 26 flowering plants in the "new" station and 2 in the "old" station as compared with 36 and 5 respectively in 1929. Nevertheless the plant looks robust enough in the new station and, barring accidents, ought to continue to hold its own. This species was commencing to bloom as early as July 5th, when I had the very rare pleasure of showing Mr W. D. Miller a plant new to his experience. I have noticed that the flowering spikes of this species are sometimes imperfect, having been bitten off or damaged in some way. When paying another visit on July 15th I found one of the spikes lying flat on the ground, having been bitten off apparently by a rabbit.

Spiranthes spiralis (L.) C. Koch. (*autumnalis* Rich.).

This species appears to have had its optimum season in 1928 when it was more abundant than I have ever seen it. It was less numerous in 1930 than in 1929 when its occurrence was about normal. My experience of this species in these three years agrees with that of other observers.

Cephalanthera Damasonium (Mill.) Dr. (*pallens* Rich.).

Two abnormal forms of this species were found by me this year: both occurred in a station where this species grew intermingled with the next. I do not think that either of these forms is the result of hybridisation in this case, but this possibility must never be overlooked when two or more Orchids are growing together and abnormalities are found. One plant had some but not all of the flowers monstrous in that they had two labella each and additional perianth segments: otherwise the plant was typical. A similar abnormality is recorded by Camus but appears to be of rare occurrence.

Of the other abnormal form there were two plants; these differed from the type in having the leaves rather narrower but the principal feature was that the flowers entirely lacked the rich orange-coloured markings on the epichile. I can find no reference to the occurrence of such a form elsewhere. At first I thought these plants might be hybrids on account of the narrower leaves, but abandoned this idea later as I could find no trace of structural difference from the type. Also both supposed parents have the orange markings (though not identical in each case) and there seems no reason why a hybrid offspring should be

devoid of markings. A hybrid between these two species is known on the Continent: this is ×*C. Schulzei* Camus. This plant is illustrated on Plate 132 of the *Iconographie*, and the flower is shown wholly white but the letterpress makes no reference to the absence of the orange lines.

Cephalanthera longifolia (Huds.) Fritsch. (*ensifolia* Rich.).

This species flowered very freely this year in South Hants, and thanks to the guidance of Mr E. H. White I was enabled to see a patch of 40-50 flowering spikes in a beech wood in the Valley of the Meon. Part of this patch has been taken into grounds recently enclosed for the garden of a house, and it is hoped that the trees will not be cleared. Mr R. M. Synge found a patch in a new station at Ashford Chace, near Petersfield, while he and I independently found this species, but not in flower, in Bordean hanger also. These two stations are both in North Hants.

Helleborine leptochila (Godfery) Dr.

This species has hitherto not been recorded from Hampshire but two very distinct forms, one from each vice-county, detected this summer, have been referred to this species by Colonel Godfery. Both forms were abnormal and merit a somewhat detailed description. The first form was discovered by Mr Pierce, who kindly showed it to me immediately *in situ*. About 20-30 very scattered plants were growing in light shade under beeches: the plants were very small and inconspicuous, not more than six inches in height on an average, and wholly green in colour. Though they were clearly related to the self-fertilising *leptochila* group, yet there were very obvious differences and I was unable to assign any name to them. In two or three cases two stems rose from the same rhizome, but in every other case there was only a single stem. Two characters appeared to separate this plant from the published description and illustration:—(1) The epichile was broadly triangular in outline instead of being narrow and tapering, and (2) the flowers instead of being widely opened were hooded and only partly opened. They remained in this state during the whole time of flowering and some in fact never opened at all. I had no previous experience of this group, and as far as I could gather from the published papers, this plant seemed to me to combine characters of *leptochila* and *dunensis*, and I made a mental reservation that it might be the var. *vectensis*, of which it was difficult to obtain a clear impression. An interesting feature of this plant is the length of the flowering period. Mr Pierce first made his discovery early in August and the flowering continued until September 24th. One bloom was observed to be in flower for six weeks.

A specimen was sent to Dr Druce but he was unfortunately away and the flower was withered when he returned. He thought it might be *leptochila*. Mr C. B. Tahourdin very kindly interested himself in this plant and independently suggested that it might prove to be *vectensis*. He was good enough to give me much useful information concerning *leptochila* and the original discovery of *vectensis*. One specimen was preserved in pickle and later shown to Colonel Godfery, who un-

hesitatingly pronounced it to be a starved form of *leptochila*, with the possibility that it might correspond with the form named *vectensis*.

There is therefore a distinct possibility that this plant may prove to be var. *vectensis*, but this cannot be decided without further study. At first sight this plant certainly seems to have considerable differences from type *leptochila*, and it may merit being given a varietal rank either under the name of *vectensis* or some other.

The other form was found by R. M. Synge in Northants in a well patronised locality where one would have thought nothing new could lurk hidden. One plant only was found at first, but on a subsequent visit I was able to find another plant with three flowering stems—the first plant had one stem only. This was a weak rather decumbent plant with pale whitish green widely-opened flowers very different in appearance to Mr Pierce's form. The feature of the plant was that all the segments of the flower were narrow and tapering and that the labella instead of being divided into hypochile and epichile, as is normal in this genus, consisted of a simple segment similar to the others, the hypochile merely being marked by a shallow longitudinal groove. I could find no record of any peloriate *Helleborine* in the text books but decided that this must be a peloriate form probably of *leptochila*, and this diagnosis was subsequently confirmed by Colonel Godfery. The remarkable thing about this form is this: the second plant with three stems found by me was about 200 yards away from the first plant found by Synge: both were absolutely identical in their peloriate form and no normally formed *leptochila* were seen at all in this station. Both *H. Helleborine* (L.) Dr. (=*latifolia* Dr.) and *H. purpurata* (Sm.) Dr. occurred near this form, but it was obviously distinct from both of these and Colonel Godfery had no doubt that it belonged to *leptochila* on account of the form of the column.

Orchis Simia Lam.

This plant was visited in its sole remaining British station and found to be in sadly reduced circumstances since my last previous visit in 1914; then there were some sixty blooms to be seen as against 12 in 1930. I happened to observe that on these 12 plants only one individual blossom had its anthers removed: unfortunately I did not count the total number of blossoms but it is certain that they would average not less than 8 per head, so that it would seem that one per cent. or less only of the individual flowers had the anthers removed. This suggests a possible cause for the disappearance of this plant, that it no longer reproduces itself by seed owing to the disappearance of a former insect visitor. It is worth noting that Darwin, in "Fertilisation of Orchids," refers to the imperfect fertilisation of both *Oo. fusca* (*purpurea*) and *militaris*, two species closely allied to *Simia*, one of which is practically extinct in Britain while the other is much diminished in numbers. *O. ustulata*, another allied species, is also in my opinion diminishing. In this case nurserymen may be partly to blame. In the words of Darwin, written nearly 60 years ago, "from these facts the suspicion naturally

arises that *O. fusca* is so rare a species in Britain from not being sufficiently attractive to insects, and to its not producing a sufficiency of seeds." The same would no doubt apply to *Simia*, and in these days there is no harm in bringing to notice anything which may help to exonerate collectors of the charges freely levelled against them.

Orchis latifolia L.

My views on the occurrence of this species in Britain have been expressed quite recently in a letter to Mr H. Cary Gilson which he was good enough to print in his excellent little monograph, "The British Palmate Orchids," published under the auspices of the Winchester College Natural History Society. Briefly let me say that I have seen nothing in 1930 to make me change those views. The evidence for the occurrence of *O. latifolia* L. is sufficiently strong to convince such eminent authorities as Colonel Godfery, Dr Stephenson and Dr Heslop-Harrison and they and those who follow them recognise *latifolia* and hybrids of *latifolia* with other species from localities in Hampshire. I can only say that in my experience, which is practically limited to the Hampshire localities, but extensive within those limits, I have yet to see any situation which suggests to me the presence of *latifolia*. Near Winchester, plants have been pointed out to me as *latifolia* or hybrids of *latifolia* but in every case *Oo. maculata* L. (agg.) and *praetermissa* Dr. were also present and the presence of these two plants was sufficient to explain adequately every plant found with them. Until I find a situation inexplicable without *latifolia*, I see no necessity for postulating a third species where two will suffice.

O. incarnata L.

This species was exceptionally luxuriant in 1930. In some of the water meadows of the River Meon, near Wickham, this species was in greater plenty than I have ever seen it, and was the predominating Orchid, even outnumbering *Oo. praetermissa* Dr. and *Fuchsii* Dr. Although this species has only become well understood in quite recent years, I notice that in the *Second Supplement to Topographical Botany* new records have been added only and the comital distribution has not been revised, although many of the records for *incarnata* L. in *Topographical Botany* and the *First Supplement* must surely be for *praetermissa* Dr. Before the latter plant was segregated it was called sometimes *incarnata*, sometimes *latifolia*. As an example of a mistake which I think may remain uncorrected in many cases, let me refer to the Isle of Wight for which *incarnata* was recorded in *Topographical Botany* without personal authority. *Praetermissa* certainly occurs here, but the occurrence of *incarnata* is at least doubtful. Mr E. H. White, who knows the Isle of Wight flora very well, says that he has never seen true *incarnata* there, and Mr J. Groves, whom he has consulted, confirms this. *Incarnata*, however, still remains on record for the Isle of Wight. A revision of the distribution of this plant would appear to be advisable. British readers of Camus' *Iconographie* will be surprised at the words,

" fleurit au moins 20 jours *après* l'O. latifolia." It is generally recognised by observers, in the south of England at least, that *incarnata* is the earliest of the palmate Orchids to bloom. Camus also says that in the neighbourhood of Paris, while *latifolia* is apparently a plant principally of basic soils, *incarnata* is often found in marshes overlying chalk or watered by chalk streams, but in Great Britain appears to be missing from the chalk. (Godfery in *Journ. Bot.*, 1918, p. 49.) This is, I think, a misunderstanding. Godfery questions the occurrence of *incarnata* upon the bare chalk Downs. He would not, I am sure, deny that marshes watered by chalk streams are the characteristic locality for *incarnata* in the south of England. As a matter of fact, *incarnata* has been found very rarely as a plant of chalk Downs in the same way as *praetermissa* is found much more commonly.

Var. *pulchrior* Dr.

This is an extremely interesting plant of which I was fortunate enough to have a good deal of experience during 1930. E. M. Malan was kind enough to send me specimens from the New Forest, near Beaulieu Road Station, which clearly belonged to this variety. They were found in full flower and in considerable numbers on May 28th. This date coincides with the flowering time of the type and was puzzling as one of the characteristics of var. *pulchrior* Dr. is stated to be its later time of flowering. Later on, July 5th, I found this plant in Holmsley Bog, and it was then in good flower and by no means over. The affinity of this plant is clearly with *incarnata* L. on account of the upper sepals which are nearly as erect as in the type and the sharply reflexed side lobes of the labellum. The spike is compact and a little less narrow and strict than in the type. The ground colour of the flower is reddish-purple, much as in *praetermissa*, with a pattern of bright crimson lines and dots. A white-flowered form also occurs and at Holmsley this and the purple-flowered form occurred in about equal numbers. I have in my herbarium a specimen collected by R. B. Ullman in Wicken Fen, Cambs., in July 1914, and have also detected a specimen in Mr L. B. Hall's herbarium from the Bourne Valley, near Bournemouth. Mr J. E. Lousley has recently sent me a gathering of this plant from Thursley Common, Surrey, July 11th, 1930. Though very much smaller than the Holmsley specimens, they undoubtedly belong to this variety for which I have not been able to find a previous record for Surrey. Subject to further investigation early July appears to be the normal flowering time for this variety. A possibility with regard to this variety which should not be overlooked is that it may prove to be identical with var. *serotina* Haussk. The description of the latter variety as given by Camus, *Iconog.*, p. 225, makes no reference to the purple colouring, which is a feature of var. *pulchrior* Dr., but otherwise there is nothing in the description and distribution which would appear to make the identification of these two varieties impossible. M. Schulze, *Die Orchidaceen Deutschlands*, etc., 1894 (no pagination!), states that the flowers of this variety are bright purple. Var. *pulchella* Druce is also listed by Camus but with

the note—" Douteux." While the status of this variety may be in doubt and possibly also its title to a new name, there can be no doubt of its occurrence and right to recognition as a distinct and remarkable variety. At Holmsley it is associated with an interesting florula consisting of, among other plants, *Malaxis*, *Drosera anglica*, *Carex limosa*, and *Utricularia minor*. Its favourite situation is in sphagnum at the edge of the gutters of water containing the foregoing plants, sheltering beneath a tuft of sedge or Myrica bush. The comparative distribution of this variety and of the type needs working out, but it would appear that the type is a plant of river banks and water meadows, and the variety a plant of sphagnum bogs and stagnant water.

O. incarnata L. × *praetermissa* Dr.

Hybrids, of which *incarnata* is one parent, are distinctly uncommon. One plant referable to the above cross was seen at Wickham this year. Its inflorescence was very long and narrow and the flowers were of a dull pale lilac.

O. praetermissa Dr.

Very luxuriant but quite typical specimens were seen on the landslip below Niton, Isle of Wight, and Miss Pickard also sent specimens from West Sussex. Several specimens were seen of the " Down " form at Cheesefoot Head, near Winchester, and one specimen of the same form on Beacon Hill in the Meon Valley, while near Owslebury a specimen was found in a field which was formerly arable but has not been ploughed for about twenty years. A colony of several plants of *Habenaria virescens* (Sollik) Dr. has also established itself nearby in the same field.

O. maculata L., var. *candidissima* (Weber).

One specimen of this variety was found in Matley Bog, New Forest. When Dr Druce restricted the use of the name *maculata* L. to the plant formerly called *ericetorum* Linton, he proposed the name *leucantha* for the white-flowered variety of this plant. It appears to me advisable to retain the name var. *leucantha* Dr. In the present state of our knowledge of the Continental forms the identification with *candidissima* is purely conjectural. In any case, is not the authority for the *candidissima* Krocker not Weber?

O. Fuchsii Dr.

I find that specimens occur in which the pattern of the lip takes the form of regular loops; so that it is possible to explain the presence of loop patterns in the hybrids without having recourse to *latifolia*, of which a regular loop pattern is said to be characteristic. A regular pattern of loops is also to be found in *O. maculata* L.

Sub-var. *albiflora* Dr.

This name was proposed for the white-flowered form of *Fuchsii* in *Rep. B.E.C.*, 1917, *Supplement*, 167, but seems to have been abandoned by Dr Druce, not appearing in the second edition of *The British*

Plant List. The occurrence of a single specimen near Winchester in 1928 was referred to in my note in *Rep. B.E.C.* for 1928, p. 792. This year a small group of six plants was seen in the same locality. These plants were quite uniform and the flowers of all the plants were small, smaller than those of the average *Fuchsii* type growing all around, but no smaller than those of many of the normally coloured plants. In 1928 Dr Druce identified this plant with *O. O'Kellyi* Dr., but I can still see nothing in it beyond albino *Fuchsii*, and if it is a fact that it cannot be differentiated from *O'Kellyi*, then it seems to me that *O'Kellyi* must be reduced to the status of a var. or sub-var. of *Fuchsii*. With regard to the small size of the flowers, Cary Gilson thinks that the factor of albinism may be linked with a " small flower " factor. This is no more than speculation at present, but is at least a very pertinent suggestion.

COLOUR FORMS.

This may be an appropriate place at which to interpolate a few remarks on the subject of naming colour varieties. In this matter at present there is most complete and lamentable confusion. To take a few examples among the Orchidaceae only from *The British Plant List*: var. *candidissima* of *maculata* L.; var. *flavescens* of *Ophrys apifera* Huds. and other colour forms are admitted to the List; yet albino and other colour varieties occur in *Orchis Morio*, *praetermissa*, *Fuchsii*, *mascula* and *pyramidalis* and in *Habenaria Gymnadenia* but are not admitted. This inconsistency is not confined to the Orchidaceae alone. In *Viola* colour varieties are admitted to *odorata*, *hirta* and *sylvestris*, but not to *Riviniana*, *canina* or *palustris*. Numerous other examples might be quoted. In many cases these colour forms are known to be genetically constant and it would appear to be very desirable that colour forms should be treated consistently and either disregarded entirely (as is done by some continental authorities) or recognised by names as variety, sub-variety, or form, as their status may be decided. I would suggest the use of a distinct designation for colour forms if a concise and intelligible term could be found or invented. I do not wish to suggest that the present confusion is confined to *The British Plant List* or indeed to British authorities: the Continental authors are in no better case. Even in Camus' monumental monograph, the " Iconographie des Orchidees d'Europe et du bassin Meditérranean," there is no defined system of dealing with colour forms. For example, we find the following: p. 131. *Anacamptis pyramidalis* Rich. sub-var. *albiflora* F. Major; p. 137, *Traunsteinera globosa* Reichb., forma *albiflora*; p. 180, *Orchis coriophora* L., var. *albiflora* Macchiati. These three albino forms bear exactly the same relationship to their three respective types but are designated by three different terms. This inconsistency is to be found throughout the work. The latest German monographers of the Orchids, Keller and Schlechter, practically ignore all colour variations and are at least self-consistent, designating them all by the term *lusus*. This term does not appeal to me, as *lusus* connotes mere teratological monstrosity which is a different form of phenomenon to albinism and colour-variation.

I suggest that the use of a distinct designation for this type of variation would be very helpful if it did no more than result in a uniform practice.

O. Fuchsii Dr. × *praetermissa* Dr. = × *Mortonii* Dr.

This hybrid occurs wherever the two parents are found growing together, as they so often do. Both grow upon the chalk downs near Winchester in association with *Habenaria Gymnadenia* Dr. and *Ophrys apifera* Huds., and exactly the same association may be seen in a moist meadow near Southwick, S. Hants. In the latter station I obtained this year a complete gradation between the two parents: ringed spots on the leaves and lip patterns of loops were found among the hybrids but these two characters were very rarely combined in one plant. Some specimens were seen which approached one parent much more closely than the other: these would no doubt be F_2 plants or back crosses.

O. pyramidalis L.

Near Owslebury in one station are a considerable number of plants with white flowers (=sub-var. *albiflora*, f. *major*) and an occasional specimen with pale pink flowers. This species was particularly abundant in 1930.

O. hircina Crantz.

A single specimen of this species, cut with hay in a field near Morestead, S. Hants, was recognised by a pupil of Mr Pierce, and is now in my Herbarium. Previous records of this species appear in Rayner's *Supplement to the Flora of Hants*: it has occurred more than once in the Winchester district but only in single specimens.

Aceras anthropophora (L.) Br.

This species was a few years ago regarded as an extreme rarity in Hampshire. While still by no means uncommon, it has been found to be fairly well distributed in the county. The Cheesefoot Head station this year had over twenty flowering plants. Mr Pierce found a single plant in a new station not far from here. Near Exton, in the station recorded in Rayner's *Supplement*, there were quite two or three hundred luxuriant specimens. The Cheesefoot Head and Exton specimens were rather different in appearance, the former being greener, smaller, and very inconspicuous, the latter being much yellower, taller and stouter and far too conspicuous for their own safety. Mr Lousley tells me that he finds two such different forms in Kent and Surrey. Continental authorities recognise several forms, including *flavescens* Zimmerm. and *virescens* Ruppert. Camus says that these forms lack the red edging to the perianth segments. However, this is not lacking in either of the forms which I have seen. The difference between them may prove to be only a matter of age and development.

Mr E. H. White, the original discoverer of the only known station in the Isle of Wight, informs me that 12 plants flowered this year. It

had not appeared at all for three years previously apparently owing to close grazing by sheep.

Ophrys sphegodes Mill.

This species has been recorded from North Hants and the Isle of Wight but has not been seen in either vice-county for very many years. The discovery of a single specimen in S. Hants this year will inspire hope that it may re-appear elsewhere. One rather poor but quite unmistakable specimen was found by one of Mr Pierce's pupils on a chalk down. Owing to Mr Pierce's indisposition the specimen was unfortunately picked and taken to him for identification. This species was exceptionally plentiful this year in its Dorset station, and as early as April 27th I found a specimen with five fully opened flowers. Camus retains the name *aranifera* Huds. for this species with the following footnote:—" Sticklers for priority (les prioritaires intransigeants) will adopt the name *O. sphegodes* Mill." If *sphegodes* Mill. is admitted to have priority, there would not appear to be any good reason for adopting any other name.

O. apifera Huds.

This species was extraordinarily abundant in 1930, appearing in meadows and hay fields and all sorts of places where its presence had not been previously suspected.

Var. *flavescens* Rost.

Mr White was kind enough to get me a specimen of this variety from a station near Newport, Isle of Wight, where a considerable colony is known to him. It grows intermingled with this type but according to Mr White flowers 2-3 weeks earlier. I have not seen such a character attributed to this variety elsewhere.

Var. *albida* Garnier & Poulter in vol. i. of the *Annual Hampshire Repository*, published with plate at Winchester, 1799 = var. *intermedia* G. Camus in *Bull. Soc. Bot. Fr.*, xxxviii., p. 42 (date?), and *Iconographie*, p. 234.

This variety differs from the foregoing var. *flavescens* Rost. in having the sepals white but the lip coloured normally as in the type and not greenish-yellow. The plant may be still found at Bordean, N. Hants, whence this variety was originally described. It grows with the type and thus has persisted for more than 130 years, a very striking illustration of the permanence of colour forms. All the white-sepaled plants which I have seen at Bordean have the normally coloured labellum and none the greenish-yellow labellum of var. *flavescens*. If the publication is valid, *albida* would appear to be the earliest varietal name, and should be adopted for this variety.

O. Trollii Heg. & Heer.

In Rayner's *Supplement* the Rev. R. Quirk makes a somewhat surprising statement to the effect that *Trollii* is the predominating form

of *apifera* in the neighbourhood of Winchester. This view must, I feel sure, be based upon a misapprehension. The best illustration which I know of *Trollii* is in White's *Bristol Flora*, showing the labellum very long, narrow and tapering. In many places near Winchester there may be seen a modification of *apifera* in which the pouch of the labellum, instead of being perfectly square-ended, has been, as it were, partially unfurled so that the shape of the labellum is that of a truncated cone. While this is certainly a slight modification of the type in the direction of *Trollii*, it is far from attaining the extreme form to which alone the name *Trollii* is applicable. I have examined some hundreds of *apifera* this year, but not one could be called *Trollii*. I feel sure that Mr Quirk must have based his view upon this " pseudo-Trollii."

Camus lists var. *Trollii* Reichb. fil. as a variety of *apifera*, observing that it is probably to be regarded as a monstrosity, showing a partial return to a regular form of flower. Elsewhere Mdlle. A. Camus has made the suggestion that *Trollii* is only a monstrosity or mutation of *apifera* and this certainly accords with the very sporadic appearance of the true plant.

Habenaria Gymnadenia Dr., var. *densiflora* (Wahl.).

In the moist meadow near Southwick, previously referred to, occurred a number of very luxuriant specimens of *H. Gymnadenia*, to which the above name is apparently applicable. Mr Lousley tells me that the Southwick plant matches Swedish examples of this var. very closely. *Densiflora* is said to have a different scent to the type and to have relatively shorter spurs. Some of the Southwick specimens measured 56 cm. in height and it is difficult to see in them more than luxuriant specimens from a moist situation which exceed the type in size, in the same way as the specimens of *O. Fuchsii* growing with them exceed in dimensions the *O. Fuchsii* growing with the typical *Gymnadenia* on the Downs.

Var. *ornithis* G. Camus, Bergon & A. Camus in *Monographie des Orchidées D'Europe*, etc., 1908.

This is the name applicable to the beautiful albino colour-form of *Gymnadenia* which occurs sparingly at Cheesefoot Head. It should strictly be cited as var. *ornithis* (Jacq.) G. Camus, etc., Jacquin having described this plant as *Orchis ornithis* in *Fl. Austr.*, ii., p. 23 (1754). *Leucantha* and *albiflora* are other names which have been applied to this variety.

Habenaria Gymnadenia Dr. × *viridis* (L.) Br. = *Jacksonii* (Quirk) Dr. = × × *Coeloglossogymnadenia Jacksonii* A. Camus *Iconographie*, p. 277.

Five plants of this hybrid were seen this year. In all of them *Gymnadenia* was predominant, but there are undoubted traces of hybridity in this plant, and I think it may be assumed that the parentage originally suggested is correct. Both *Gymnadenia* and *viridis* grow in the

immediate vicinity. The second form of this hybrid, which occurs near Winchester but in N. Hants, did not flower this year. The latter form has been named ×× *Coeloglossogymnadenia Quirkii* A. Camus, *loc. cit.* Hybrids must of their very nature be variable, and it appears superfluous to name their various forms.

Habenaria Gymnadenia Dr. × *Orchis Fuchsii* Dr. = ×× *Orchigymnadenia Heinzeliana* G. Camus *Monograph. Orch. Fr.*, p. 77, vide *Iconog.*, p. 390.

R. M. Synge found an excellent specimen of this hybrid at Cheesefoot Head this year. It was, generally speaking, intermediate between the two parents. The flowers, which were distinctly scented, had darker markings as in *O. Fuchsii*, but the spurs were long and slender, approaching those of *H. Gymnadenia*. There could be no doubt as to the parentage of this plant. Synge's specimen would appear to fall under ×× *O. Heinzeliana* G. Camus rather than ×× *O. Legrandiana* G. Camus, another form of the same hybrid in which *Gymnadenia* parentage predominates.

Habenaria albida (L.) Br.

This species was recorded for S. Hants in *Rep. B.E.C.*, 1919, p. 681, on the authority of Major Robertson from Chandler's Ford, and this record has been perpetuated in the 2nd Supplement to *Top. Bot.* It is not included in Rayner's *Supplement to Townsend's Flora of Hampshire*. While the occurrence of this plant in Hampshire is not an impossibility, I think the present record should be regarded with grave suspicion until further confirmation is received. Chandler's Ford is a most unlikely place in which to find this species, as the soil of the district is a light sand. Further, I am not able to trace the Major Robertson responsible for the record. Major Malcolm Robertson, of Winchester College, who takes an interest in the Orchids of the neighbourhood, denies any knowledge of the matter. If the record is a genuine one, I hope that these remarks will bring confirmation of it.

The following species were also seen by me in Hampshire in 1930, but presented no unusual features:—*Neottia Nidus-avis* L., *Listera ovata* (L.) Br., *Helleborine palustris* (Mill.) Schrank, *Helleborine* (L.) Dr. and *purpurata* (Sm.) Dr., *Orchis Morio* L. and *mascula* L., *Ophrys muscifera* Huds, *Habenaria viridis* (L.) Br., *virescens* (Zollik) Dr. and *bifolia* (L.) Br.

In addition, though not actually seen by myself in 1930, *Orchis ustulata* L. and *Herminium Monorchis* (L.) Br. also occurred.

BOTANISING IN ALGERIA.

C. D. Chase, M.C., M.A.

The following notes refer to a tour taken with a Leplay party in early April 1930. We landed at Algiers on the afternoon of April 6th after a stormy crossing from Marseilles and only had one day in the capital. I spent it walking round the low amphitheatre of hills on the slopes of which the city is built. The ground, which seemed very fertile, was mostly under cultivation, interspersed with patches of garigue. The flora of the latter seemed to approximate very closely to that of Corsica —*Erica arborea*, *Pistachia lentiscus*, *Cistus monspeliensis* and *Rosmarinus* being prominent. The huge yellow Umbellifer, *Ferula communis*, was very abundant in waste places, sometimes accompanied by *Achyranthes argentea*. The garden of our hotel, the Saint Georges, deserves a special word of praise as it was beautifully kept and thronged with interesting shrubs and flowers. There was a dragon tree, *Dracaena Draco*, and several kinds of *Strelitzia* with masses of *Wistaria* and *Bougainvillaea spectabilis*.

On the 8th, motor-coaches took us over the Atlas range to Bou Saada, situated on the Hauts Plateaux or, as it is sometimes called, the Petit Sahara. The drive through the Atlas was very beautiful but there was no time for botanising. The Hauts Plateaux, a bleak tableland, are not rich in plants, though the Alfa grass, *Stipa tenacissima*, grows there in vast abundance and is an important article of commerce. We saw caravans of camels laden with it. Plants seen in the neighbourhood of Bou Saada and on the way from there to Biskra included *Allium odoratissimum*, *Acanthyllis tragacanthoides*; *Haloxylon articulatum*, a favourite food of the camels; *Stipa parviflora* and *S. tortilis*, *Scorzonera undulata*, a beautiful flower; *Cleome arabica*, a sticky plant with little brown flowers and flat pods, and *Meniocus linifolius*, a Crucifer with a strange distribution, being found in Spain, Algeria and South Russia. Biskra is on the edge of the real Sahara. We found the famous Garden of Allah rather disappointing. It contained many palm trees but few flowering plants—a few *Hibiscus* and *Bougainvillaea*, *voilà tout*. There was, however, a well-grown specimen of *Ficus macrophylla*, sometimes called the Rubber tree. Self-appointed guides of all ages, who stick to tourists like leeches, do not add to the pleasure of a visit to the Garden. There is a certain amount of cultivation around Biskra, as there is around all the oases we visited, and a number of common weeds of cultivation grow there, but the really native plants are few. Most conspicuous among them are those species which the camels, for some reason or other, will not touch. Such are *Peganum harmala*, with large white flowers; *Euphorbia guyoniana* and *Limoniastrum guyonianum*.

From Biskra to Touggourt, 130 miles, we travelled by the metre gauge railway in a comfortable restaurant train. The line runs through

the desert to the oasis of Touggourt, the furthest south point of the railway system. The French occupation of the country is resulting in a great number of artesian wells being sunk and in many thousands of palm trees springing up along this line of railway, where before there was nothing but desert. As is often the case a good many introduced plants have followed this railway, but some real desert plants were also picked at the numerous halts the train made. These included *Echium humile*, *Citrullus colocynthis*, probably the "gall" of the Bible, with a gourd resembling a lemon; *Phelippaea violacea*, two feet high; *Astragalus gombo*, with large yellow flowers; several species of *Tamarix*, *Muricaria prostrata*, a Crucifer with a pod like a miniature battle-axe; *Plantago ovata; Zygophyllum album*, in abundance, as the camels are not partial to it; *Cutandia memphitica*, *Fagonia glutinosa*, *Aristida pungens*, *Cyperus conglomeratus; Henophyton deserti*, a Crucifer with winged fruit; a variety of *Moricandia arvensis*, and a variety of *Salicornia herbacea*. Most of these desert plants have a wide range through the Sahara and Libya as far as Arabia. They can be found, with descriptions, in Post's "Flora of Syria," which includes the Desert of Sinai.

We returned by the same railway to Biskra and then went by coach to Constantine, stopping on the way to visit the Roman ruins of Timgad. Among the ruins were growing *Roemeria hybrida*, *Echium grandiflorum*, *Lithospermum apulum*, *Cynoglossum cheirifolium*; *Schismus marginatus* a very small grass, and a host of other plants. Constantine, built on a hill with deep gorges on three sides, was a famous stronghold in olden times. We spent a whole day wandering about the ravines and steep hillsides. The interesting plants here included *Celsia cretica*, *Erinacea pungens*, *Anagallis linifolia*, *Bellevalia trifoliata*, *Geranium atlanticum* with large flowers, *Convolvulus supinus*, *Ophrys scolopax*, *Fumaria numidica* with white long-stalked flowers, *Centaurea pullata*, *Scrophularia frutescens*, *Sedum coeruleum* and *Erodium hymenodes*.

From Constantine to Tunis was two days' journey by motor coach via Bone and Hamman Meskoutine. The hot springs at the latter place are well worth a visit, though to test the heat of the water it is not necessary to fall into it as one of our party inadvertently did. Near these hot springs the fields were as colourful as an Alpine meadow in June, the massed effects of *Hirschfeldia geniculata* (yellow), *Echium grandiflorum* (red), *Anchusa italica* (blue) and *Convolvulus tricolor* being very striking. Other striking flowers here were *Chlora grandiflora* and *Ornithogalum arabicum*. Soon after crossing the border from Algeria into Tunisia we passed through a large forest of *Quercus Mirbeckii*, a deciduous oak whose down-covered leaves were just opening on April 17th. The Transatlantique have a good hotel in this forest at a place appropriately called Les Chênes.

At Tunis time was found for two most interesting walks, one from Carthage to La Marsa and round Cap Kamart, the second up the mountain, Bou Kornein (1884 feet), ten miles from Tunis across the bay. This is the sacred mountain of the ancient Carthaginians with its two

horns. Both for the extensive view from its summit and for the wealth of flowers upon it a walk up this mountain in April is to be recommended. The lower slopes are covered with a thick growth of *Tetraclinis articulata*, a Conifer which, unlike most of its kind, sends out fresh branches when cut. Some of the gnarled and twisted trunks seemed to be of considerable age. This tree has a limited North African range. Among the plants noted on Bou Kornein were the following—*Teucrium Chamaepitys*, *Lavandula multifida*, *Cyclamen persicum*, *Scilla clusii*, *Scorzonera coronopifolia*, *Euphorbia bivonae* and *Tordylium apulum*. The plants here and at La Marsa suggested greater affinities with Sicily and the south of Spain than with those around Algiers. The La Marsa gathering included *Iris juncea*, *I. sisyrynchium*, *Marrubium alysson*, *Retama retam*, *Fagonia cretica*, *Cyperus schoenoides* (on the sand by the sea) and the grasses—*Lygeum spartum*, *Pennisetum asperifolium*, *Festuca coerulescens* and *Avena longiglumis*.

The species mentioned in the above short article are only a few of those seen during our fortnight in North Africa. Altogether between 500 and 600 were noted. Battandier and Trabut give 3316 species in their excellent little Flora of the French possessions in N. Africa. This number includes a good many introduced plants and a number of others which are given specific rank would not be considered more than varieties by most botanists. Perhaps 3000 species would be a fair estimate for the indigenous flora of Algeria and Tunisia. This number is largely owing to the Atlas Mountains. These cease at Tunis. The next great section of N. Africa going eastward—Cyrenaica, Libya and Tripolitanica, i.e., the Italian possessions—has a far poorer flora. The absence of mountains no doubt largely accounts for this. The Flora, edited by Durand and Barrette, of these Italian possessions, includes only about a third of Algeria's 3000. This difference in the vegetation of their two North African empires has perhaps a bearing on the political tension between France and Italy, or at least we may say it points to the underlying causes of that tension.

ADDITIONAL PANSY RECORDS.

E. DRABBLE.

Since the last list was published (*Rep. B.E.C.*, 1928, pp. 794-800) the undermentioned plants, amongst many others, have been examined. A list of Scottish records also has appeared in the *Transactions and Proceedings of the Botanical Society of Edinburgh* (Vol. xxx., Part III., 1930). For the naming I alone am responsible; the collectors' (or senders') names are given in brackets.

V. AGRESTIS Jord.

Devonshire—Braunton (R. Taylor).
Isle of Wight—Alverstone (E. Drabble and J. W. Long); Freshwater, Godshill, St George's Down, Sandown (E. & H. Drabble).
Hampshire—Lyndhurst (E. Vachell).
Surrey—Witley (G. M. Ash); Pyrford (E. C. Wallace); between Headley and Epsom Downs (J. E. Lousley).
Hertfordshire—Hitchin, Great Wymondley, St Ippolyts (J. E. Little); Letchworth (H. Phillips).
Berkshire—Ravenswood (G. C. Druce).
Buckinghamshire—Hambledon (G. C. Druce).
Cambridgeshire—Cambridge (E. Vachell).
Northamptonshire—Aynhoe (G. C. Druce).
Gloucestershire—Wotton-under-Edge (E. Vachell).
Glamorganshire—St Lythans (E. Vachell).
Lincolnshire—Ancaster (H. Preston); Stamford (S. C. Stow).
Leicestershire—Branston, Cadeby, Kilby, Knipton, Slathern, Thurnby (A. R. Horwood); Newbold Head, Stoughton (W. Bell).
Rutland—Essendine (A. R. Horwood).
Sarnia—Sark (F. Ballard).

V. SEGETALIS Jord.

Kent—Walmer, 1879 (G. C. Druce).
Surrey—Ashtead (E. C. Wallace).
Hertfordshire—Letchworth, Wymondley (H. Phillips).
Northamptonshire—Naseby (A. E. Ellis).
Leicestershire—Ayleston (L. G. Briggs); Stoney Stanton (A. R. Horwood).
Sarnia—Sark (F. Ballard).

V. SEGETALIS Jord., f. OBTUSIFOLIA (Jord.).

Devonshire—Coffinswell (W. K. Martin); Tiverton (G. Watts); Braunton (R. Taylor).
Surrey—Peaslake (J. W. Mears).
Hertfordshire—Great Wymondley (J. E. Little).

Middlesex—Pinner (W. A. Walkin).
Northamptonshire—Hinton (G. C. Druce).
Pembrokeshire—Tenby (E. S. Todd).
Leicestershire—Market Bosworth (W. Bell).
Nottinghamshire—Rushcliffe (G. C. Druce).
Durham—Harraton (W. J. Fordham).
Perth—Killin (K. D. Little).

V. DESEGLISEI Jord.

Cornwall—Par (E. Thurston).
Devonshire—Silverton (G. Watts); and f. *subtilis* (Jord.), Braunton (G. Watts).
Somerset—Minehead (E. C. Wallace).
Sussex—Lurgashall (A. J. Burdon).
Kent—Shooters Hill (N. G. Lawson).
Surrey—East Molesey (J. Fraser).
Hertfordshire—Albury, Hitchin, Little Wymondley, St Ippolyts, Tingley Wood (J. E. Little); High Down (G. C. Druce).
Oxfordshire—Witney (E. Vachell).
Norfolk—Burgh St Margaret, Caistor (A. J. Burdon).
Cambridgeshire—Cambridge (E. Vachell).
Gloucestershire—Symond's Yat (G. C. Druce); Cotswold (E. Vachell).
Lincolnshire—West Willoughby (S. C. Stow).
Leicestershire—East Hardwick (P. H. Arundel); Enderby, Mowley Hill, Stathern (A. E. Wade); Swannington (A. R. Horwood).
Cheshire—Alderby (J. Britten).
Yorkshire—Cleveland, Nunthorpe (W. J. Fordham).
Isle of Man—Jurby (C. I. Paton).
Sarnia—Sark (F. Ballard).

V. ARVATICA Jord.

Hertfordshire—Great Wymondley, Pinches Cross, Pirton, Tingley Wood (J. E. Little).

V. LATIFOLIA Drabble.

Devonshire—Saunton (G. C. Druce); Tiverton (G. Watts).
Surrey—Langley Bottom, Epsom (J. E. Lousley).
Hertfordshire—Hitchin (J. E. Little).
Oxfordshire—Oxford (G. C. Druce).
Pembrokeshire—Haverfordwest (A. E. Ellis).
Leicestershire—Lutterworth (W. Bell); Moira (A. R. Horwood); Whetstone (A. F. W. Wade).

V. RURALIS Jord.

Somerset—Portishead (E. C. Wallace).
Surrey—Hatchford (E. C. Wallace).
Hertfordshire—Hitchin, St Ippolyts (J. E. Little).
Oxfordshire—Adderbury, Elsfield, Gangsdown Hill (G. C. Druce).

Lincolnshire—Spitalgate, near Grantham (S. C. Stow).
Leicestershire—Birch Hill (W. Bell); Blackbrook (T. Carter).
Yorkshire—Aughton (W. J. Fordham).

V. ANGLICA Drabble.

Devonshire—Hennock (C. E. Larter).
Kent—Walmer, 1879 (G. C. Druce).
Hertfordshire—Tingley Wood (J. E. Little).
Lincolnshire—Saltersford (S. C. Stow).

V. CONTEMPTA Jord.

Hertfordshire—Hitchin, St Ippolyts (J. E. Little); Letchworth, Tring, Welwyn (H. Phillips).
Berkshire—Colman's Moor (G. C. Druce).
Buckinghamshire—Hanslope (H. Phillips); Chesham Vale.
Staffordshire—Gobaldisham Heath (E. Vachell).
Leicestershire—Abberford (P. H. Arundel); Croft (M. G. Whittingham); Morecott Farm Quarry, Wing (A. R. Horwood).
Cheshire—Wallasey (var. *patula* Drabble) (E. & H. Drabble).
Selkirkshire—Selkirk (G. C. Druce).

V. LLOYDI Jord.

Cornwall—Par (E. Thurston).
Somerset—West Monkton (E. S. Marshall).
Buckinghamshire—Castlethorpe, Princes Risborough (H. Phillips).
Denbighshire—Glyndyfrdwy (A. E. Ellis).
Lincolnshire—West Willoughby (S. C. Stow).
Leicestershire—Husbands Bosworth (A. E. Ellis).
Yorkshire—Barmby Moor (W. J. Fordham).
Westmorland—Meathop Moss (T. A. Dymes).
Isle of Man—Jurby (C. I. Paton).
Sutherland—Melvich (E. S. Marshall) (var. *insignis*).

V. LEJEUNEI Jord.

Yorkshire—Cleveland, Newby, Skipworth Common (W. J. Fordham).
Caithness—Killimster (Mrs Wedgwood).

V. VARIATA Jord.

Devonshire—Coffinswell, Milber Down (W. K. Martin).
Sussex—Newtimber (G. C. Druce); Eridge (E. Bray); Wood Guestling (A. G. Young).
Essex—Little Clackton (W. Moss).
Yorkshire—Kiplingcotes (W. J. Fordham).
Cumberland—Melmerby (C. E. Salmon).

V. VARIATA Jord., var. SULPHUREA Drabble.

Devonshire—Coffinswell, Conybeare, Milber Down, Moreton, Hampstead (W. K. Martin).

Suffolk—Bury St Edmunds (E. S. Todd).
Worcestershire—Malvern (H. E. Wilkinson, 1871).
Leicestershire—Ackworth (P. H. Arundel).
Yorkshire—Barmby Moor, Escrick (W. J. Fordham).

V. MONTICOLA Jord.

Cornwall—Land's End, Nanjizal, St Just in Penwith (A. E. Ellis).
Devonshire—Tiverton (G. C. Watts).

V. LEPIDA Jord.

Derbyshire—Froggatt (W. J. Fordham).
Isle of Man—Peel (C. I. Paton).
Stirlingshire—Buchlyvie (R. Mackechnie).

V. LUTEA Huds.

Flintshire—St Asaph (no collector's name, old); Holywell (J. Lambert).

V. LUTEA Huds., f. AMOENA Henslow.

Denbighshire—Berwyn Mountains (A. E. Ellis).
Northumberland—Bardon Hill (M. E. Page).

V. LUTEA Huds., f. SUDETICA Willd.

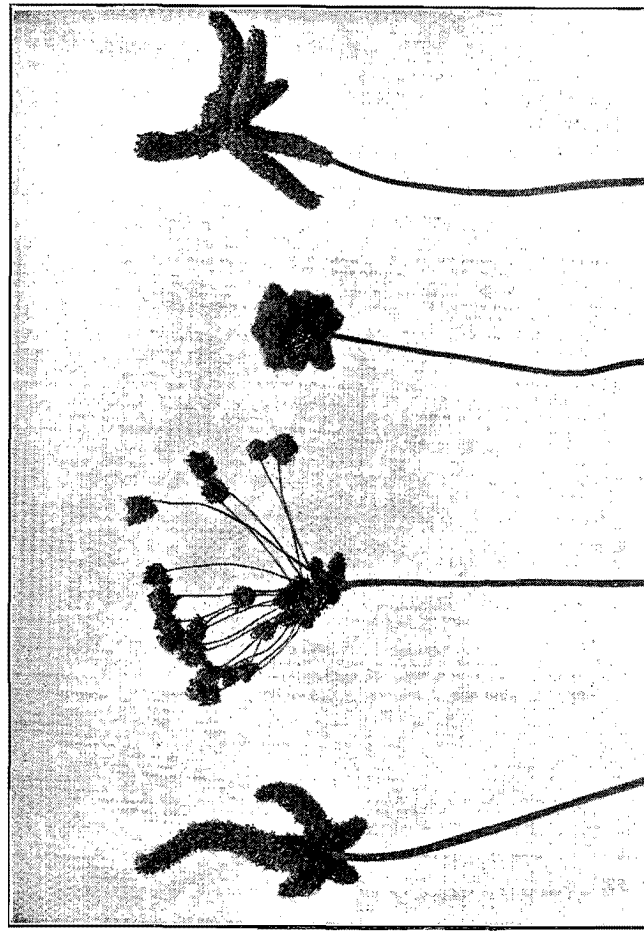
Perthshire—Killin (K. D. Little).
Aberdeenshire—Ballater (H. H., 1847).

V. CURTISII Forster, f. FOSTERI H. C. Watson.

Norfolk—Thetford (G. C. Druce).
Carmarthenshire—Pembrey Burrows (E. S. Todd).
Pembrokeshire—St David's (A. E. Ellis).
Isle of Man—Ramsey (C. I. Paton).

V. CURTISII Forster, f. PESNEAUI (Ll. & F.).

Glamorganshire—Kenfig (E. Vachell).
Pembrokeshire—St David's (A. E. Ellis).
Cumberland—Haverigg (W. H. Pearsall).
Isle of Man—Arrisdale (C. I. Paton).



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TERATOLOGICAL FORMS OF PLANTAGO LANCEOLATA L.

TERATOLOGICAL FORMS OF PLANTAGO LANCEOLATA L.

R. J. Flintoff, F.C.S.

In the summer of 1930 a young farmer, Randolf Yeaman, of Allerston, discovered some curious forms of Plantain, a few of which he gathered, and took to Mr James Green, of Thornton Dale, the well-known local naturalist. Mr Green had never seen anything like them, and very kindly sent specimens to me. They were the fruiting spikes of *Plantago lanceolata*, and had been found at Allerston Sandpit, near Pickering. Later, Mr Green discovered similar growths by the side of the Whitby and Pickering road between Kingthorpe and the Fox and Rabbit Inn. These specimens interested me very much indeed, for I had heard of such monstrosities, but never seen them. I have learned of other observers finding similar growths during last summer in different places in North Yorkshire.

The general character of the flowering or fruiting spikes is demonstrated by the four typical specimens in the illustration. Since I was unable to offer any explanation it seemed desirable to obtain the opinion of some authorities, and so I submitted specimens to several well-known botanists, and they very kindly gave to me the information embodied in these notes. Their remarks are more particularly interesting, because each one expresses an opinion from his own point of view. Like the phenomenon of the fall of the leaf, very little appears to be known as to the cause of these monstrosities. I visited the sites at Allerston and Kingthorpe, and failed to determine any reason regarding soil conditions why the plantains, growing here, should manifest these monstrous spikes.

Bentham and Hooker, in their *British Flora*, state in reference to the Plantaginaceae: "Herbs with radical tufted or spreading leaves, and leafless flower stalks bearing a simple spike or single terminal flower —the stem in some exotic species becoming elongated, branched and leafy." In No. 2 specimen, the second from the left, the stem has branched from the top forming an umbelliferous arrangement. This form would appear to be quite new, and the most peculiar. I have seen a plant of *P. lanceolata* with a much branched stem and a normal inflorescence at the end of each branch. This is quite a different monstrosity. Although *Plantago lanceolata* is a very variable plant I have been unable to find any references to these peculiar inflorescences except in the books mentioned.

At Allerston sand-pit I found *Reseda lutea* L. and very fine specimens of *Erodium cicutarium* L'Hér. growing in association with the *Plantago*; and in the adjoining arable field *Calamintha clinopodium* Benth., and very large growths of *Lycopsis arvensis* L., 1½ feet high at least, and still in flower on the 26th November were noted only a little distance away from the *Plantago*.

On the 5th September 1930, Miss E. M. Wakefield, of Kew, informed me that "the branched spikes of *Plantago* appear to be a known teratological phenomenon, but it is impossible to say what may be the cause.

Mr Worsdell mentions them several times in his book on *Teratology*, and suggests they may be a reversion to an earlier type, comparing them with the normal branched spikes of certain other species." Miss Wakefield refers to *The Principles of Plant Teratology*, by W. C. Worsdell, published by the Ray Society, 1915-1916. This work is now out of print and rare, and I have found it impossible to purchase a second-hand copy, but Mr T. Sheppard, M.Sc., kindly lent me a copy, and I wish to thank him.

I consulted Mr A. Matins Smith, M.A., F.L.S., and in a letter, dated 7th October 1930, mainly dealing with other matters, he incidentally makes the following reference to these monstrosities: "With regard to your *Plantago* fruits, I think their chief interest to me is the evidence they give of discontinuous variation. We are apt to think the change from a simple to a branched inflorescence must have required a long course of evolution, but here we see it at a single step. I notice in Lees' *Flora of West Yorkshire* a variation similar to the one you have found is recorded for *Plantago lanceolata*. Some botanists attach other meanings to such sports, monstrosities, mutations or what you will, but to me the above is their chief importance." The entry in Dr Arnold Lees' *Flora*, to which Mr Smith makes reference, is: "A curious monstrosity of this—a plant with many heads on a single stalk—was found by A. Carr, by a footpath from Ecclesfield to Wadsley Bridge, Sheffield."

Dr G. C. Druce, F.R.S., expressed the opinion that these growths were not the result of the activity of an insect. On the 7th November 1930, he wrote: "Thank you for the specimens of *Plantago*. These are one of the many monstrosities of that variable plant. I do not think 'a mite' has anything to do with the growth." Dr Druce refers me to his *Flora of Berkshire*, and here I find, on page 415: "*Plantago lanceolata*, a three-headed monstrosity (*triceps*) was found by Mr J. C. Melvill in moist meadows close to Sandford Mill on the Loddon in 1876." Dr Druce names these growths "var. *monstrosa*"—if three heads "*triceps*," and, if more than three, "*multiceps*."

Dr Pearsall has always been extremely kind in helping me, and in this matter I thank him for his assistance. He writes: "28th November 1930. I am returning your *Plantago* spikes. I have never seen anything like them, and certainly think they should be recorded. So far as I know there is no explanation of such freaks. It is usually said they may be induced by abnormal nutritional conditions, but I do not know of any experimental work on the subject, unless, it is included in the early part of the *Mutation Theory* by De Vries. I feel certain De Vries did not mention *Plantago*."

It would be presumption for me to express any opinion on this subject, yet I may be allowed to state that from a certain experience I have had with cultivated plants it would appear these growths may be due to some peculiar condition associated with their nutrition. As will be seen later, I did venture to suggest tentatively to Mr Worsdell that undue pressure, or unequal pressure on the root might have some influence in producing such growths. It may be unusual weather, interfering with the normal metabolism of the plant, encourages these abnormalities,

Plantago lanceolata is a perennial, so that the observation for a few consecutive seasons of the plants which have produced abnormal inflorescences this season may throw some light on the subject, and this I intend to do.

My good friend, Mr H. J. Wilkinson, of York, sent to me an old book, published in 1817 by Thomas Hopkirk, the younger, of Dalbreth, F.L.S., M.W.S., entitled *Flora Anomia—A General View of the Anomalies in the Vegetable Kingdom*, and from page 144 I take the following: "The flower-spike of the Ribwort Plantain sometimes becomes proliferous, a number of small spikes growing from the main one, and often, lesser ones again from them. Plate X., fig. 2. A plant in Dalbreth garden has retained this appearance for many years, whilst one, removed into a poor soil, returned immediately to its original form." This is an experiment I hope to repeat. The illustration is not similar to any of those I have given in the plate, but as a type resembles No. 3 from the left.

Dr Druce suggested I should consult Mr W. C. Worsdell, the author of the *Principles of Plant Teratology*. Mr Worsdell has been very gracious, and has supplied to me valuable information for which I am very grateful.

On the 2nd December 1930, Mr Worsdell wrote: "Many thanks for yours of the 29th ultimo, which interested me greatly. I am always so pleased to see specimens of abnormalities, and to hear from people who are interested in morphological questions. I have a figure of the same abnormality of *Plantago lanceolata* in my book. I state therein that this is due to proliferation of some of the flowers of the normal inflorescence giving a compound inflorescence. But what causes this condition is quite beyond me." The illustration given in Mr Worsdell's book approximates to No. 1 specimen on the left of those given in the plate.

In another letter, dated 7th December 1930, Mr Worsdell very kindly sent to me a pertinent reference from his book, and this I quote later. Mr Worsdell continues: "I am afraid I say very little in my book about this abnormality in *Plantago lanceolata*. I deal with all phenomena entirely from a morphological standpoint, and do not consider physiological causes. I do not think you will be able to discover the physiological cause of the monstrosity. It might be done after laborious experimentation year after year."

"There are cases of proliferation which we may regard with certainty as representing the exact condition of the ancestry of the plants concerned. In other cases where we cannot presume with certainty the proliferation is a reversion to a character in the immediate ancestry, yet when we find the abnormal feature occurs as a perfectly normal one in other closely allied members of the group, it no longer assumes a strange and unnatural appearance, and in such cases the reversion theory is much more applicable than any other. For example, the abnormal branching of the spike in *P. major* or *P. lanceolata* finds its counterpart in the normally branched inflorescence of such species as *P. Cynops* and *P. Psyllum*."—*Principles of Plant Teratology*, ii., 32.

The illustration given, Fig. 3, Plate XXVII., of the *Plantago lanceolata* is " the proliferation of the lower flowers of the spike into paniculate inflorescences." Mr Worsdell adds: " This is the same abnormality as yours. Though the branching of the spike in *P. lanceolata* takes its own peculiar form, it is this tendency to branch under certain stimuli—What are they?—which seems to suggest the branching may be a reversion to a former ancestral condition, especially as certain modern species branch normally. The simple spike is probably derivative." With the greatest possible respect to Mr Worsdell, I should have imagined the simple spike would be original, and the branched inflorescence derivative.

Again, on the 21st December 1930, I received another letter from Mr Worsdell, from which I take the following: " Thank you very much for the photograph of the *Plantago* abnormalities. I am very pleased to see them. They are certainly extraordinary, especially No. 2 from the left. It would be interesting to know the exact conditions required to produce them. You are quite welcome to print my remarks if you consider to do so. I am glad you are publishing an account of these things. These abnormalities may quite well be due to pressure on the roots, but one cannot tell without experimenting, and the abnormal treatment would have to be inaugurated at a very early period in the life of the plant."

I have done my best to collect data relating to these monstrosities of *P. lanceolata* from those best able to supply authoritative information. The result is to learn that the cause of these growths is unknown. If others are in a position to throw more light on this interesting subject I can only hope they will do so.

I have already referred to Mr Worsdell's statement relative to the branching of *P. lanceolata* " under certain stimuli," and to this question: " What are they?

I have suggested pressure on the root may result in some cases of abnormalities, because I have had an instance of fasciation in the growth of a Delphinium, which I feel confident followed from this cause. A true instance of *post hoc, propter hoc*. There may be, of course, other causes and, I believe, there are. But with regard to these monstrosities of *Plantago lanceolata* I have come to the conclusion—for what it may be worth—they have developed as a result of certain seasonal peculiarities, such that growth was retarded for a time, and then suddenly stimulated. That is the stimulus I suggest in answer to Mr Worsdell's enquiry, which means réally the process of nutrition received a much increased impulse. In these particular instances I don't think the nature of the soil has played any unusual part in the phenomenon.

I shall keep these plants under observation, and record what happens. Such facts may prove helpful. The elucidation of this difficult subject I must leave to more capable investigators.

I thank very sincerely my good friends, Mr John Burnett and Mr A. S. Lealman, for all the care and trouble they have taken to obtain a good photograph.

ADVENTIVE FLORA OF BURTON-UPON-TRENT.

Sir Roger Curtis, Bart.

3/5. Anemone coronaria L. Eur.
4/1. Adonis annua L.
4/2. A. aestivalis L. Eur.
6/9. Ranunculus arvensis L.
13/3. Delphinium Ajacis L. Eur.
21/1. Papaver somniferum L. Orient.
21/5. P. Argemone L.
23/2. Glaucium corniculatum (L.) Curt. Eur. (phoeniceum Cr.).
24/1. Roemeria hybrida DC. Eur.
33/4. Mathiola bicornis DC. S. Eur.
35/4. Radicula islandica (Oeder) Dr. (palustris Moench).
42/1. Alyssum montanum L. Eur.
49/2. Sisymbrium Sophia L.
49/3. S. altissimum L. Eur. (pannonicum Jacq.).
49/4. S. orientale L. Eur. (Columnae Jacq.).
49/5. S. Irio L. Eur.
49/13. S. Loeselii L. Eur.
50/1. Erysimum cheiranthoides L.
51/1. Conringia orientalis (L.) Dum. Eur. (Erysimum perfoliatum Cr.).
51/2. C. austriaca Sweet. Eastern Eur.
54/4. Brassica Rapa L. Cult. Turnip.
54/16. B. juncea Coss. Asia. (lanceolata Lange).
54/22. B. incana (L.) F. Schultz. (adpressa Boiss.).
60/2. Coronopus Coronopus (L.) Karst.
61/3. Lepidium Draba L. Eur. Var. virescens Dr.
61/8. L. perfoliatum L. Eur.
61/10. L. chalepense L. Orient.
61/20. L. virginicum L. N. Am.
61/22. L. densiflorum Schrad. N. Am.
64/1. Thlaspi arvense L.
68/1. Isatis tinctoria L. Eur.
70/1. Vogelia paniculata (L.) Hornem. Eur.
74/1. Bunias Erucago L. S. Eur.
76/3. Rapistrum rugosum (L.) All. Eur.
79/1. Erucaria hispanica (L.) Dr. Greece, etc. (=Myagroides Hal.).
80/4. Raphanus sativus L. Cult.
95/2. Saponaria Vaccaria L. Eur.
96/3. Silene conica L.
96/4. S. noctiflora L.
96/5. S. anglica L.

96/15. S. CONOIDEA L. E. Eur.
96/16. S. DICHOTOMA Ehrh. Eur.
96/24. S. MUSCIPULA L. Medit.
117/3. MALVA ROTUNDIFOLIA L.
117/9. M. PARVIFLORA L. Eur.
145/2. LUPINUS ALBUS L. Eur.
152/9. TRIGONELLA M. PROCUMBENS Reichb. E. Eur., etc. (CAERULEA).
153/1. MEDICAGO FALCATA L.
153/3. M. SATIVA L. Cult.
153/4. M. HISPIDA, var. DENTICULATA (Willd.). Var. APICULATA (Willd.).
153/5. M. ARABICA Huds.
153/7. M. LUPULINA L.
154/1. MELILOTUS ALTISSIMA Thuill. (OFFICINALIS).
154/2. M. ALBA Desr. Eur.
154/3. M. ARVENSIS Wallr. Eur. = PETITPIERREANA Hayne.
154/4. M. INDICA (L.) All. Eur. (PARVIFLORA Desf.).
154/6. M. INFESTA Guss. Sicily.
155/15. TRIFOLIUM HYBRIDUM L. W. Eur.
155/37. T. RESUPINATUM L. S. Eur.
160/2. LOTUS TETRAGONOLOBUS L. S. Eur.
166/6. ASTRAGALUS ODORATUS Lam. Orient.
170/1. CORONILLA VARIA L. Eur.
170/3. C. SCORPIOIDES Koch. Eur.
173/1. ONOBRYCHIS ONOBRYCHIS (L.). (SATIVA Lam. = VICIIFOLIA Scop.).
176/9. VICIA LUTEA L.
176/24. V. FABA L. Cult.
176/25. V. NARBONENSIS L. S. and C. Eur.
176/26. V. PANNONICA Crantz. Eur.
176/31. V. PEREGRINA L. Eur.
176/38. V. PUBESCENS (DC.). Medit.
178/3. LATHYRUS TUBEROSUS L.
178/9. L. APHACA L.
178/22. L. OCHRUS L. S. Eur.
180/1. PISUM ARVENSE L. Cult.
189/11. POTENTILLA NORVEGICA L. Eur.
219/2. LYTHRUM HYSSOPIFOLIA L.
245/3. BUPLEURUM ROTUNDIFOLIUM L.
245/6. B. LANCIFOLIUM Hornem.
249/1. AMMI MAJUS L. S. Eur.
276/3. PEUCEDANUM SATIVUM (L.) B. & H.
279/1. CORIANDRUM SATIVUM L. Eur.
279/2. C. TORDYLIOIDES Boiss. First time in Britain.
282/1. DAUCUS CAROTA L.
283/2. CAUCALIS DAUCOIDES L. Eur.
283/5. C. NODOSA Scop., var. PEDUNCULATA (R. & F.) Dr.
283/8. C. LATIFOLIA L. Eur.
296/10. GALIUM TRICORNE Stokes.
298/5. ASPERULA ARVENSIS L. Eur.

300/1. SHERARDIA ARVENSIS L.
339/4. AMBROSIA TRIFIDA L. N. Amer.
341/3. XANTHIUM SPINOSUM L. Cosmop.
356/1. HEMIZONIA PUNGENS Torrey & Gray. Calif.
356/3. H. KELLOGGII Greene. Calif.
364/1. ANACYCLUS CLAVATUS Pers. S. Eur.
364/2. A. RADIATUS Lois. S. Eur.
364/3. A. VALENTINUS L. S. Eur.
364/4. A. DISSIMILIS Pomel. Algeria.
370/17. CHRYSANTHEMUM CORONARIUM L. Medit. Var. BICOLOR.
371/3. MATRICARIA SUAVEOLENS (Pursh) Buch. N. Amer. (DISCOIDEA DC.).
371/5. M. DECIPIENS C. Koch. Orient.
371/6. M. DISCIFORMIS DC. As. Min.
371/7. M. SUFFRUTICOSA (L.) Dr. S. Afr. (MULTIFLORA Fenzl).
383/7. SENECIO SQUALIDUS L. S. Eur.
383/8. S. VISCOSUS L.
385/1. CALENDULA OFFICINALIS L. Eur.
385/2. C. ARVENSIS L. Eur.
393/2. ARCTIUM NEMOROSUM Lej. = NEWBOULDII A. Benn.
395/3. CARDUUS PYCNOCEPHALUS L., var. TENUIFLORUS (Curt.).
396/8. CIRSIUM ARVENSE (L.) Scop., var. MITE Koch, and var. SETOSUM C. A. Mey.
397/3. ONOPORDON ILLYRICUM L. Eur.
399/1. MARIANA MARIANA Hill. Eur. (LACTEA Hill).
405/12. CENTAUREA CYANUS L.
405/15. C. CALCITRAPA L.
405/31. C. SOLSTITIALIS L. Eur.
405/32. C. MELITENSIS L. S. Eur.
409/1. CICHORIUM INTYBUS L.
467/2. ANAGALLIS ARVENSIS L.
467/3. A. FOEMINA Mill.
485/1. GILIA ACHILLEAEFOLIA Benth. Calif.
485/2. G. CAPITATA Sims. N. Amer.
487/1. NEMOPHILA INSIGNIS Benth. Calif.
488/4. PHACELIA TANACETIFOLIA Benth. Calif.
493/2. LAPPULA LAPPULA (L.). Eur. (ECHINATA Gilib.).
494/1. ASPERUGO PROCUMBENS L. Eur.
496/5. AMSINCKIA MENZIESII Lehm. Calif.
504/1. ALKANNA LUTEA A. DC. Eur.
507/2. LITHOSPERMUM PURPUREO-CAERULEUM L.
509/5. ECHIUM ITALICUM L. Eur.
510/2. CERINTHE MINOR L. Eur.
513/3. CONVOLVULUS TRICOLOR L. S. Eur.
516/1. LYCOPERSICON LYCOPERSICON (L.). S. Amer. (ESCULENTUM
522/1. DATURA STRAMONIUM L. Hill).
532/7. LINARIA MINOR (L.) Desf. (VISCIDA Moench).

534/1. ANTIRRHINUM MAJUS L. Eur.
534/2. A. ORONTIUM L.
566/7. SALVIA AETHIOPIS L. Medit.
566/17. S. VERTICILLATA L. Eur., etc.
571/2. LALLEMANTIA IBERICA F. & M. Asia Minor.
576/1. MARRUBIUM VULGARE L.
580/1. WIEDEMANNIA ORIENTALIS Fisch. & Mey. Orient.
588/16. PLANTAGO LAGOPUS L. S. Eur.
593/3. HERNIARIA HIRSUTA L. Eur.
600/6. CHENOPODIUM MURALE L.
600/7. C. OPULIFOLIUM Schrad. Eur.
600/8. C. ALBUM L. (CANDICANS).
600/8. C. ALBUM L. (CANDICANS). Vars. SUBFICIFOLIUM (Murr) Dr. LANCEOLATIFORME (Murr) and × VIRIDE. GLOMERULOSUM (Reichb.). PAUCIDENS (Murr) Dr. VIRIDESCENS St Amans. PSEUDO-BORBASII (Murr) Dr. BERNBURGENSE (Zschacke) Dr. VIVAX × OPULIFOLIUM = PREISMANNI Murr = WHELDONI Murr.
600/11. C. LEPTOPHYLLUM (Nutt.) Brit. & Br. N. Amer.
600/12. C. FICIFOLIUM Sm.
600/13. C. GLAUCUM L.
600/14. C. VULVARIA L. (OLIDUM Curt.).
600/20. C. STRIATUM (Krasan) Murr. India.
604/2. BETA VULGARIS L. Cult.
606/3. ATRIPLEX PATULA L., var. BRACTEATA Westerlund.
606/11. A. TATARICA L. Eur.
613/1. SALSOLA KALI L.
615/15. POLYGONUM EQUALE Lindm.
615/19. P. PATULUM M. Bieb. E. Eur. (BELLARDI auct.).
618/20. RUMEX PATIENTIA L. Eur., in some quantity.
618/29. R. OBOVATUS Danser. S. Amer. (PARAGUAYENSIS).
632/2. MERCURIALIS ANNUA L.
637/2. URTICA URENS L.
698/1. ASPHODELUS FISTULOSUS L. Eur.
698/2. A. TENUIFOLIUS. Orient.
754/1. PANICUM MILIACEUM L. Tropical.
756/2. SETARIA VIRIDIS (L.) Beauv.
756/3. S. GLAUCA Beauv. Eur.
765/1. PHALARIS MINOR Retz.
765/2. P. BULBOSA L. Eur. (TUBEROSA L.).
765/5. P. CANARIENSIS L. Cult.
765/7. P. PARADOXA L. Eur.
766/2. ANTHOXANTHUM ARISTATUM Boiss. Eur. (PUELII Lec. & Lam.).
780/1. AGROSTIS VERTICILLATA Vill. Guernsey, etc.
782/1. POLYPOGON MONSPELIENSIS (L.) Desf.
785/1. APERA SPICA-VENTI (L.) Beauv.
794/1. AVENA FATUA L., var. GLABRATA (Peterm.).
794/7. A. SATIVA L. Cult.

826/16. FESTUCA DANTHONII A. & G. Eur. (CILIATA Danth.). Abundant in its second British locality.
826/18. F. MYURUS L.
826/19. F. LIGUSTICA (All.) Bert. Eur.
827/1. BROMUS RIGENS L. (MAXIMUS Desf. = VILLOSUS Forsk.).
827/4. B. TECTORUM L. Eur.
827/8. B. RUBENS L. S. Eur.
827/16. B. SECALINUS L.
827/22. B. ARVENSIS L. Eur.
827/27. B. SQUARROSUS L. Eur., etc.
831/1. SECALE CEREALE L. Oat. Cult.
835/3. HORDEUM MARINUM L. Guernesy. (MARITIMUM With.).
835/12. H. DISTICHON L. Cult.

Almost all the above were seen by me in company with Sir R. Curtis. It seems desirable to bring all these Staffordshire adventives together. Most of them have already appeared in the List.—G. C. D.

PLANTS NEW TO THE CYPRUS FLORA, 1928 AND 1930.

G. CLARIDGE DRUCE.

RANUNCULUS BRACHYCARPUS Fisch. & Mey. Kyrenia.
PAPAVER RHOEAS L., var. PRYORII Druce. Platres.
FUMARIA BRACTEOSA Pomel. Paphos.
RESEDA ALBA L., forma PARVULA. Stavrovuini.
ALYSSUM MARITIMUM Lam. Bellapaise (probably introduced).
EROPHILA PRAECOX Stev., var. VIRESCENS (Jord.). Troodos, 6000 ft.; Limassol, sea-level.
LEPIDIUM DRABA L. Nicosia, etc. The common plant is *L. chalepense* L.
CAMELINA SATIVA Cr.
BURSA CONCAVA (E. At.). Larnaca; Paphos.
B. PATAGONICA (E. At.). Gambo. Ag Neophilus.
B. BATAVORUM (E. At.). Nicosia.
B. MEDITERRANEA (E. At.). Pedaila; Kythraea.
B. RUBELLA (E. At.). Paphos; Limassol; Lapithos, etc.
B. TREVIORUM (E. At.). Gambo Valley.
B. TURONIENSIS (E. At.). Makhaeras.
CALEPINA CORVINI Desv. Myrtou.
CERASTIUM VULGATUM L. Kuklia.
GYPSOPHILA PORRIGENS Boiss. ? Alien. Larnaca.
SILENE GALLICA L. (Unlocalised previously.) Paralimni.
RAPHANUS SATIVUS L. Limassol; Stavrovuini, etc.

VIOLA RIVINIANA Reichb. Stavros; Kikko.
V. MIRABILIS L. Prodromos; Saita.
EUDRANTHE COELIROSA L. Alien. Saita.
DIANTHUS sp. Paralimni.
SAGINA PROCUMBENS L. Ktima.
HYPERICUM PERFORATUM L., var. ANGUSTIFOLIUM Gaud. Troodos.
ALTHAEA ROSEA L. Makhaeras.
MALVA ALCEA L. Platres.
ERODIUM MOSCHATUM L'Hérit. Famagusta.
ACACIA SYANOPHYLLA. Planted. Limassol.
MEDICAGO ARABICA Huds. Myrtou.
VICIA BITHYNICA L. Larnaca; Paphos; Stavrovuini.
V. HIRSUTA L. Stavros.
DODONAEA VISCOSA. Morphode, planted.
ROSA GALLICA L. Ornodos; Vasa; probably introduced.
CAUCALIS NODOSA Scop. Rather common—Lapithos; Paphos; Nicosia. Previously only recorded by Sibthorp.
C. LEPTOPHYLLA L., var. ERYTHROTRICA Post. Stavrovuini.
SAMBUCUS EBULUS L. Kythraea.
DIOTIS MARITIMA Cass. Between Famagusta and Salamis. Once previously found at Limassol by Michoelides.
CREPIS FALLAX Boiss. Gambo Valley.
XANTHIUM STRUMARIUM L. Prodromos.
CENTAUREA REUTERIANA Boiss. & Held. Pentadactylos; Makhaeras.
TARAXACUM HELLENICUM D. Platres; Nicosia; Hilarion.
SONCHUS OLERACEUS L., var. TRIANGULARIS Wallr. Larnaca; Famagusta.
Var. CILIATUS (Lam.) Dr. Nicosia.
Var. ALBESCENS Neum. Myrtou.
S. ASPER Hill. Nicosia.
SOLANUM RUBRUM Mill. Kikko.
S. MINIATUM Bernh. S. Andrea; Alefka.
S. GLAUCUM. Naturalised. Famagusta.
LINARIA. This was doubtless Sibthorp's *Cymbalaria* which has not been verified.
ANAGALLIS ARVENSIS L., var. ALBIFLORA. Dconos Forest.
VERONICA DIDYMA Ten. Troodos; Paphos; Bellapaise.
Var. THELLUNGIANA (Lehm.). Paphos; Gambo; Myrtou.
OROBANCHE RAMOSA L. Akanthou.
SCROPHULARIA PEREGRINA L. Lapithos.
MENTHA CYPRIA H. Br. Troodos; Stavros.
SALVIA HIEROSOLYMITANUS Boiss. Yialousa.
S. VERBENACA, var. VERNALIS. Kikko; Lania, 1000 ft.
CHENOPODIUM MURALE L. Common, Limassol, etc. (This is doubtless the *C. rubrum* of Holmboe.)
C. OPULIFOLIUM Schrad. Salamis.
C. ALBUM L. Salamis; Famagusta.
ATRIPLEX HASTATA L. Paphos; Kuklia; Larnaca.
A. TATARICA L. Larnaca.

EUPHORBIA CASUA Boiss. Salamis.
POLYGONUM AVICULARE L., var. HETEROPHYLLA (Lindm.). Nicosia.
FICUS SYCAMORUS L. Doubtless planted, Famagusta.
URTICA URENS L. Tsuda; Limassol; Famagusta; Ay Napa; Nicosia.
CASTANEA CASTANEA (L.) Karst. Platres.
SALIX FRAGILIS L. Near Gambo.
RUSCUS ACULEATUS L., var. vel forma PUMILUS Druce. Lapithos.
TULIPA sp. Near Myrtou. A very dark blackish crimson in several fields.
ZANNICHELLIA REPENS Boenn. Larnaca.
CAREX PENDULA Huds. Stavros.
C. TROODII Turrill. Troodos, 6300 ft.
C. EXTENSA Huds. Larnaca.
SPOROLOBUS PUNGENS Kunth. Salamis.
POLYPOGON MONSPELIENSIS Desf., var. PURPURASCENS. Limassol.
SCHISMUS ARABICUS Nees. Only recorded by Sintenis. Still at Lefkonica.
TRISETUM PANICEUM Pers. Nicosia.
AVENA CLAUDA Dur. Gambo.
A. WEISTII Steud. Nicosia; Pentadactylos.
KOELERIA BERTHEA Boiss. & Blanch. Paphos; Kyrenia; Salamis; Larnaca.
K. PUBESCENS Beauv. Larnaca.
FESTUCA BREVIS (Boiss. & Kotsch.). Myrtou.
BROMUS RIGIDUS Roth. Larnaca.
B. STERILIS L. Limassol.
B. SCOPARIUS L., var. STENANTHA Stapf. Limassol.
LOLIUM RIGIDUM Nym. Limassol; Kyrenia.
TRITICUM BICORNE Forsk., var. NANA. Salamis.
HORDEUM MARINUM L., var. Larnaca.
DRYOPTERIS FILIX-MAS, nov. var. Stavros.
POLYPODIUM VULGARE L., var. BREVIPES Milde. Pentadactylos.
CHEILANTHUS FRAGRANS W. & B. Only noted by Sibthorp. Lania; Pentadactylos.
TOLYPELLA GLOMERATA Leonh. Paralimni.
CHARA CANESCENS Loisel. Limni; near Famagusta; Larnaca.
C. GYMNOPHYLLA Beauv. Famagusta.
C. GALIOIDES DC. Famagusta; Limni; Salamis.
LAMPROTHAMNOS ALOPECUROIDES Braun. Larnaca; Rizokarpazo; Paphos; Kyperomda; Platres.

I have to most warmly thank Dr Unwin for his extreme kindness and valuable assistance in planning my itinerary and in allowing me the guidance of his forest officer and the company of his assistant, Mr Qongier, who accompanied me through the island. He was a real help. My Secretary, Mr J. Chapple, was of great assistance on this most enjoyable botanical expedition. I have covered over 3000 miles of that lovely island.

THE BRITISH FORMS OF *RANUNCULUS ACER* L.

E. DRABBLE, D.Sc., F.L.S.

The forms of *Ranunculus acer* L. occurring in this country have presented difficulties to many collectors, and it cannot be said that attempts to refer our plants to named Continental varieties or species have been altogether successful. That there are several distinct plants included under the name *R. acer* must be apparent to everyone who has made a careful examination of them. For the last six years the writer has given much attention to these plants both in the field and in cultivation.

In the forefront of most attempts to elucidate the varieties has figured the character of the rhizome, and this very largely has been the cause of the difficulty. It had generally been stated that *multifidus* (*Boraeanus*), *tomophyllus* and *erectus* have little or no rhizome; *Steveni*, *vulgatus* and *Friesianus* a more or less well developed one.

Before the rhizome as a diagnostic feature can be evaluated, it is necessary to have a clear conception of the mode of growth of the subterranean parts of *R. acer*. The plant is perennial and forms new branches on the underground stem, and these branches develop eventually into the next season's flowering stems, *i.e.*, the buttercup-plant as generally gathered. One of these branches arises at the base of the current year's aerial stem, in the axil of one of the so-called "radical" leaves, and carries on the growth sympodially below the surface of the ground. This may be accompanied by other lateral branches behind the main one, and all of them may grow upwards to form the next year's flowering shoots.

After the flowering and fruiting stages are over the subterranean stem of the current year disappears, usually entirely, and the lateral branches alone are left. These lateral branches may remain very short or may lengthen considerably, in the latter case forming rhizomes. In both cases adventitious roots are formed freely. The actual length of rhizome present in any specimen at any particular time depends on (i) the amount of actual lengthening of the subterranean branch before it turns upwards as the flowering stem, and (ii) the degree to which decay of the proximal part (*i.e.*, the originally attached end) of this branch has proceeded. With little actual lengthening *or* with rapid disappearance of the rhizome from behind, we have the condition described in French works as "souche à rhizome court ou nul." On the other hand, if the underground branch lengthens and does not die away rapidly from behind we have the "souche à rhizome allongé, oblique ou horizontal."

R. multifidus DC. (*Boraeanus* Jord.), in the Isle of Wight at any rate, is a spring or early summer plant. After flowering and fruiting the aerial parts die away more or less completely, together with the

current year's subterranean stem, leaving the lateral branches as short, stout knobs which form adventitious roots, but do not lengthen. These in the following year grow upwards in the air directly to form the flowering stems with their basal leaves. Thus *multifidus* is usually without a rhizome at any stage. Yet even in *multifidus* lengthening may rarely and very exceptionally take place. I have seen in Mr J. E. Little's herbarium a beautiful example of this. In the old schemes, with their insistence on rhizome characters, such a plant finds no place.

In *tomophyllus*, which generally resembles *multifidus* in behaviour, we often find slight lengthening of the subterranean stem, and thus we have the " souche à rhizome moins court " (Rouy and Foucaud).

Steveni and *Friesianus* in the Isle of Wight for the most part flower in late summer and autumn, and when the fruits have been shed—often quite late in October—the basal leaves are retained and growth of the subterranean lateral branch proceeds during the winter. Early in the following year, about February, this branch forms from its terminal bud a tuft of leaves and the rhizome continues to grow. In the summer—before, during, or after flowering—the rhizome dies away from behind and so the flowering stage may retain little or no rhizome.

The case of *R. rectus* is of particular interest. This name was given to plants with a short oblique rhizome, but differing in no significant characters from *Steveni*, and there can be no doubt that the curtailed rhizome led Rouy and Foucaud (*Fl. Fr.* i.) to place *rectus* as a " forme " under *Boraeanus* (*multifidus*) instead of under *Steveni* with which it should be united and not maintained even as a form, the other alleged points of distinction, even those of the fruit, being quite inconstant.

It thus becomes evident that the presence or absence of a rhizome cannot be regarded as of primary diagnostic value. When considered for the variety as a whole it may be significant, but it is of little or no value in the determination of individual specimens. *Multifidus* very rarely develops one, but quite exceptionally it may do so; *Steveni* and *Friesianus* usually form one, but it may decay and disappear early. How far its development and persistence are dependent on soil-conditions it is not yet possible to say. The *formation* of a rhizome is probably more or less independent of the kind of soil, its *persistence* largely conditioned by the soil.

When the real significance of rhizomal characters has been grasped the problem is much simplified. The fruit-characters generally mentioned have been examined in a very long series of British and Continental specimens, with the following results:—(i) The described differences are partly due to the comparison of fruits in different stages of maturity; (ii) even where differences do occur in the fully mature achenes, they are not correlated with the other characters.

In form the petal and the scale over the nectary do not appear to offer constant and reliable characters in individuals. In *multifidus* the petal is often cuneate-based and the scale longer than broad, while in *Steveni* and *Friesianus* the petal is generally ovate and the scale broader in proportion to its length, but taken alone these differences do not

seem to have much diagnostic value. With regard to the scale, Moss also (*Camb. Brit. Fl.*) was evidently of the same opinion, as he states that the scale "is said" to be longer than broad in *multifidus*, about as broad as long in *Steveni*.

We are left then with leaf-form and general habit of growth on which chiefly to fix our attention.

Cultivation of our main lowland types has led me to the belief that there are three genetically distinct plants to which the names *multifidus* (*Boraeanus*), *Steveni* and *Friesianus* are applicable, and that these were definitely recognised by Jordan, though, unfortunately, his (and also Boreau's) lengthy descriptions fail to distinguish clearly between diagnostic characters and individual variations. It is instructive to compare Jordan's brief descriptions in the *Diagnoses* (1864) with the lengthy ones in *Obs.* vi. (1847). We see how in the later work he has pruned away much redundant detail and come much nearer to clear and accurate diagnoses.

In dealing with a problem like the present one the first step must always be to determine as carefully as possible what are the genetically distinct forms and what are their constant characters. It is then necessary to find out how far these forms have been recognised and named by earlier workers. If they have previously been named and described, one must then examine the descriptions and, if necessary, amend them, usually by way of disencumbering them of details of non-essential fluctuating characters, and in this last proceeding great care and judgment are necessary. It is absurd to name plants afresh because they do not conform exactly to the original descriptions in their fluctuating characters, while possessing those constant characters which really constitute the essential features of the taxonomic unit. And yet this has been done all too frequently. As an example may be cited Wallroth's work on the Scandinavian pansies, in which he names afresh many of the plants recognised by Jordan and others because he could not make them square in some non-essential features with the original descriptions. The writer may here mention that, though he is a whole-hearted supporter of the "type-system," he realises that it is just as necessary to distinguish between essential and non-essential features in the type-specimen as in the description.

RANUNCULUS ACER L. (*sensu lato*).

(1) Var. MULTIFIDUS DC. Prodr. i., 36 (1824); *R. Boraeanus* Jordan, Obs. vi. (1847). Aerial stems up to 18 inches to two feet or more in height, glabrous or slightly hairy below, branches forming very acute angles with one another; rhizome generally undeveloped, though very exceptionally this may be present. Leaves very deeply divided palmately into long and narrow acute segments; petioles long, those of the basal leaves densely hairy.

Exsicc.—*R. Boraeanus* Jord., Billot Fl. Gall. et Germ., 1105, in Herb. Mus. Brit. and Herb. Drabble. *R. Boraeanus* Jord., Schultz Herb. Norm. nov. ser. cent. 22, 2102, in Herb. Mus. Brit.

Forma *stipatus* Jordan (pro sp.), Diagn., p. 72, is a well-marked form of lower growth, with fewer divisions of the leaves and the primary segments of the cauline leaves with long stalks.

Exsicc.—Glen Avon, Banff, August 1889—G. C. Druce. Kilgwrrwg Bottom, Monmouthshire, 19th May 1908—W. A. Shoolbred. (Both in Herb. Druce.)

Forma *tomophyllus* (Jord.); *R. tomophyllus* Jord. Diagn., p. 72 (1864). Habit generally similar to *Boraeanus* Jord., but plant usually of less stature and with smaller and less finely divided leaves. Petiole and lower part of aerial stem densely hairy. Some of these characters may be static—my cultures seem to indicate that they are—but *tomophyllus* is so closely similar to *multifidus* that it is best treated as a form of that variety. The application of the name in herbaria shows that collectors have taken widely different views of the quantitative development of the characters just mentioned necessary to qualify a plant for this name. Those with densely hairy lower part of the stem may securely be called *tomophyllus*.

Exsicc.—*R. Boraeanus* Jord. *R. tomophyllus* Jord., Port du Dro, Belleîle, Morbihan, 13 Juin 1894, in Herb. Mus. Brit. *R. tomophyllus* Jord., Kérnel, Belleîle, Morbihan, Juin 1901, Herb. Gadeceau, in Herb. Mus. Brit. *R. acris* L., c. *Boraeanus* Jord., f. *tomophyllus* Jord. Weston-super-Mare, July 12, 1909, Watson Ex. Club, in Herb. Drabble.

(2) Var. R. Steveni (Andrz.) ap. Besser, Suppl. iii. ad Cat. Pl. Hort. Bot. Gymnas. Volhyn. (1814); *R. acris* L., Jord. Obs. vi., p. 15 (1847); *R. Steveni* Jord. Diagn., p. 73 (1864). Habit similar to that of *multifidus*, but usually not so tall and with the branches more widely spreading. Aerial stem—at least below,—petioles and leaves hairy, often densely so; rhizome generally formed and more or less persistent, but often completely absent by decay in flowering specimens. Leaves much less deeply lobed than in *multifidus* into 3-5 cuneiform segments which overlap little or not at all and are undivided in their basal half or two-thirds, but divided above into short broadly-based triangular acute lateral lobes.

Plate.—Reichb. Icon f. 4605, where, however, the central lobe is broader and less cuneiform than usual. The leaf of his fig. 4606, labelled *rectus* (see below), is more typical of *Steveni*.

Exsicc.—*R. Steveni* Andrz. Finchley, Middlesex, 1913; and Moons Hill, Freshwater, I.W., October 1930, in Herb. Drabble.

R. rectus Boreau Fl. Cent., ed. 3, p. 15 (1857); Jordan Diagn., p. 74 (1864). The plants thus named both from this country and from the Continent which can be regarded as in any way authentic are merely *Steveni* with little or no rhizome. The immature carpels may have a long narrow form much as in those figured in Reichb. Icon. f. 4606, but this form is not maintained by the mature achenes, and *rectus* should be entirely merged in *Steveni*.

In the north of Scotland dwarf, few-flowered and unusually hairy plants of *Steveni* occur, but it does not seem desirable to distinguish these by name until they have been tested in cultivation.

(3) Var. FRIESIANUS Jord. Obs. vi., p. 17 (1847); Boreau Fl. Cent., ed. iii. (1857) (including *R. vulgatus* Jord. ap. Boreau Fl. Cent., ed. iii.; Jordan Diagn., p. 74 (1864). I cannot distinguish in any way between *Friesianus* and *vulgatus* in characters of rhizome, leaf or fruit. Plant (in this country) generally flowering in late summer and autumn. Rhizome usually well developed and often persisting during the flowering period; flowering branches more slender and divaricate than in *multifidus* and *Steveni* and not so tall. Basal and lower cauline leaves divided to about two-thirds into very broad contiguous or overlapping segments, which are again divided only into short ovate-triangular lobes. Beak of fruit generally rather longer than in *multifidus* and *Steveni*, but this is not a reliable character.

Exsicc.—*R. vulgatus* Jord., de Coulanges (Yonne), cult., 1859, ex herb. A. Jordan, 1864, in Herb. Mus. Brit. *R. vulgatus* Jord., Vichy Allier, 14 Juin 1867, Herb. Gaston Genevier in Herb. Mus. Brit. *R. Friesianus* Jord., Moons Hill, Freshwater, November 1929, in Herb. Drabble.

In the extreme north of Scotland and on high mountains *Friesianus* is often dwarf and more hairy than in lowland districts—though it is usually a very hairy plant. Generally these are merely states of ordinary *Friesianus*, but in Dr Druce's herbarium are plants from Shetland and Sutherland which are clearly different and should be distinguished as a form. Some of these specimens have been incorrectly named *tomophyllus* by Marshall and others, but they are quite different from that plant.

Forma *villosus* mihi; plant small (c. 4-10 in.) with few medium or large flowers; stems, petioles and laminae densely clothed with yellowish or fawn-coloured hairs, teeth of the leaves usually shorter and more obtuse than in typical *Friesianus*.

Exsicc.—*R. acer* L., var. Betty Hill, Sutherland, July 1907, G. C. Druce. *R. acris* L. Loch Spiggie sands, Shetland, July 1921, G. C. Druce. *Ran.* [ ]. Sea coast, Melvich, W. Sutherland, 15th September 1897, W. A. Shoolbred (as *Steveni*). (All in Herb. Druce.)

Of the names in the British lists there remain for consideration *pumilus*, *Nathorstii* and *minutiflorus*.

(4) Var. PUMILUS Wahlenberg, Fl. Lapp., 1812.—This plant was found by Dr Druce on Corrie Sneachda, Cairngorms, Easterness, in July 1888 (see *Journ. Bot.*, 1889, p. 204). It ranges in height from under six inches to thirteen inches or more. It has an erect aerial stem with few rather large flowers and with the peduncles often arching. The radical leaves are tripartite with divisions of the *Steveni* type, but with very obtuse teeth, the terminal tooth being short and rounded. Both radical

and cauline leaves are rather glossy and almost glabrous; the petals are marked with brownish veins. In general appearance the plant greatly resembles *R. bulbosus*.

Exsicc.—*R. acris* L., var. *pumilus* Wahl., Corrie Sneachda, Easterness, July 1888, G. C. Druce. *R. acris* L., *sens. lat.*, Lochnagar, S. Aberdeen, G. C. Druce (both in Herb. Druce). *R. acris* L., var. *pumilus* Wg., in Monte Knudsho, alpium Dovrensium, August 1864, F. Ahlberg, in Herb. Mus. Brit.

Townsend (*Journ. Bot.*, 1900, p. 381), following Rouy and Foucaud, wrongly gives *R. parvulus* Clairv. as a synonym. Clairville (Man. d'Herborisation en Suisse et en Valais) places *parvulus* in his group with "fruits tuberculés."

R. Nathorstii A. Beurlin (pro sp.) in Act. Holm., 1889.—I am very grateful to Dr Druce for allowing me to examine a specimen in his herbarium from Ben Lawers thus named by Freyn. It is an upright plant, 7 inches in height with almost glabrous stem, leaves of the *multifidus* type and a single large flower 1 inch in diameter even in the cup-form (*i.e.*, without spreading the petals) and with long oblong sepals. This specimen looks distinct enough, but other plants that have been named *Nathorstii* by Bucknall and others from Scotland are merely upland states of *Steveni*. Until I have seen much more material and have had the opportunity of cultivating this plant I am reluctant to express an opinion as to its status.

R. acer, f. *minutiflorus* Druce, *Rep. B.E.C.*, 1916, p. 469. This name is applied to plants with very small, but perfect, flowers. I have seen these small flowers in *multifidus* and *Steveni*. Carpels are fully formed and are apparently fertile, as they swell and ripen in the usual way. Such plants do not seem to be leading to the diclinous condition which is of common occurrence in *R. acer* and is well described by Marsden-Jones and Turrill in *Journ. Genetics*, vol. xxi., No. 2. The lemon yellow flowers to which they refer in their interesting paper have been seen by me only in *tomophyllus* (Finchley, 1913) associated with deeply emarginate petals.

The British segregates of *R. acer* then appear to be these:—

R. acer L.

(a) Var. *multifidus* DC.
  f. *stipatus* (Jord.).
  f. *tomophyllus* (Jord.).
  f. *minutiflorus* Druce.

(b) Var. *Steveni* (Andrz.).
  f. *minutiflorus* Druce.

(c) Var. *Friesianus* (Jord.).
  f. *villosus* mihi.

(d) Var. *pumilus* Wahl.

[(e) Var. *Narthorstii* (A. Beurl.).]

It would be unwise at present to make any detailed statement about the distribution of the different varieties of *R. acer*, but it appears that var. *multifidus* and its forma *tomophyllus*, and also var. *Steveni*, are common throughout Great Britain, and that var. *Friesianus* is much less common, though widely distributed; var. *Friesianus*, f. *villosus* has been seen from N. Scotland only; var. *pumilus* from N. Scotland and possibly from Monmouthshire.

The records given below are drawn chiefly from specimens in Dr Druce's herbarium and in my own; for the naming I am responsible.

R. acer L.

Var. *multifidus* DC.—V.-c.s 10, 12, 17, 18, 19, 20, 21, 22, 23, 24, 27, 28, 34, 35, 37, 38, 49, 55, 57, 58, 59, 62, 70, 87, 88; Sarnia.

Forma *tomophyllus* (Jord.).—V.-c.s 6, 17, 21, 23, 24, 25, 32, 35, 38, 39, 49, 57, 74, 92, 97, 105, 107, 108; Sarnia. Ireland—Kerry; Killarney (G. C. Druce).

Forma *stipatus* (Jord.).—V.-c. 94, Glen Avon, Banff (G. C. Druce).

Var. *Steveni* (Andrz.).—6, 7, 10, 12, 13, 14, 15, 17, 19, 21, 22, 24, 34, 35, 49, 53, 54, 57, 58, 59, 65, 66, 88, 96, 97, 98, 104, 105, 106, 107, 108, 110; Sarnia. Ireland:—Kerry, Killarney (G. C. Druce); Galway, Roundstone (G. C. Druce); Cork, Glengariff (G. C. Druce).

Var. *Friesianus* (Jord.).—(10) I. of Wight—Freshwater (E. and H. Drabble). (12) N. Hants—Odiham (C. E. Palmer). (17) Surrey—Limpsfield (H. E. Fox). (21) Middlesex—Acton (no collector's name). (44) Carmarthenshire—Pembery (G. C. Druce). (49) Carnarvonshire—Snowdon (G. C. Druce). (57) Derbyshire—Castleton (E. and H. Drabble). (83) Midlothian—Morningside (H. C. Bell). (106) E. Ross—Ault Guish (G. C. Druce). (112) Shetland—Balta Sound, Unst (G. C. Druce).

Var. *Friesianus*, f. *villosus* Drabble.—88) Mid Perth—Ben Lawers (G. C. Druce). (108) E. Sutherland—Betty Hill (G. C. Druce); Melvich (W. A. Shoolbred). (112) Shetland—Loch Spiggie Sands (G. C. Druce).

Var. *pumilus* Wahl.—(92) S. Aberdeen—Lochnagar (G. C. Druce); Cairntoul (H. E. Fox). (96) Easterness—Corrie Sneachda, Cairngorms (G. C. Druce).

I am very grateful to Dr Druce for the loan of all the sheets of *R. acer* in his herbarium, which carry more than two hundred specimens.

DR DRUCE'S EIGHTIETH BIRTHDAY.

It is reported that extra staff was needed at Oxford Post Office on May 23, 1930, to deal with the correspondence for Yardley Lodge, Crick Road. And this may well have been the case since over 800 telegrams, letters, cards, photographs and addresses arrived that day, bringing their hearty messages of congratulation and regard to Dr Druce on the attainment of his four-score years. Some took the form of "Round Robins" signed by the staff of Institutions. In others the Head acted as spokesman for his Members and Fellows. Eminent botanists, not only of the United Kingdom but throughout the world, sent their greetings, and, in many cases, what was yet more appreciated, their personal photographs also; so that a collection has been made that is unique and invaluable of the present day likenesses of some of the most important botanists of the world.

The mere opening of the envelopes could not be completed before it was time for their recipient to take train to London for the lunch arranged in his honour by the Earl and Countess Buxton, where among the guests were the Marchioness of Lansdowne, the Countess of Mexborough, Lady Loch, Lady Rayleigh, the Ladies Alethea Buxton, Delia Peel, Phyllis Ponsonby, Victoria Russell, The Honourable Mrs H. Adeane, Hon. Mrs G. Baring, Hon. Mrs C. N. Rothschild, Viscount Gray of Fallodon, Viscount Henley, Hon. Mr Justice Talbot.

After this came his "birthday party" proper. This took the form of a Conversazione in which the Wild Flower Society, to which he has always acted as guide, philosopher and friend, combined with the Botanical Society of the British Isles to fill with their joint members the spacious Marylebone Room of the Great Central Hotel, the arrangements being shared between the Hon. Mrs Baring and Mrs T. J. Foggitt. Dr Druce himself stood at the door to receive the 150 guests who crowded to congratulate him on the 80 years he seemed to bear so lightly. Among so many whose names are well known in the world of botany and other old friends it would be invidious to make a selection.

At four o'clock came the little ceremony of the occasion. Sir Maurice Abbot-Anderson took the chair on the platform, on which, beside Dr Druce, were gathered Viscount Gray of Fallodon, Chancellor of the University of Oxford; Lord Henley, the Hon. Mrs Baring, Lady Davy, and Mrs R. W. Dent, President of the Wild Flower Society. In the charming and graceful fashion for which he is so famed, Lord Grey then spoke of his old friend and of his world-wide renown, quoting him as a splendid example of the inexhaustible satisfaction and pleasure which are earned by those gifted with the power to take their joy and interest in outdoor natural history. This was a pleasure that he himself understood from his own personal studies in bird life. It would be a mistake to suppose that Dr Druce's special knowledge was limited to

botany, for the speaker had yet to find a subject on which the Doctor did not seem well informed; but in botany he had vast information to give, he delighted to give it, and he gave it unsparingly and in the most delightful fashion. All the world made use of him, and he was willing to help all alike. In the words of the poet (name not disclosed but known to many present),

If the plant is too abstruse
Pack it off to Doctor Druce.

In a touching allusion to his own blindness, Lord Grey told how his old friend, with his medical knowledge, had been able to help him, and though, fortunately, with no need to know anything about it, even in Braille he proved his match. He concluded by saying that, though the progress of science was great, it yet gave no indication of bringing us to the end of knowledge; rather, it but made the world of the unknown ever larger and vaster, so that for patient endeavour and research there was no limit.

Lord Henley in a witty speech picked up a few points that Lord Grey had left unsaid, and Mrs Dent, on behalf of the Wild Flower Society, added hearty congratulations and wishes and gratitude for ever-ready help.

Lord Grey then handed to Dr Druce a cheque as a birthday offering from his many friends and admirers of the Botanical Society and the Wild Flower Society, and the big room echoed with applause when the Doctor rose to return his thanks. He spoke in his usual happy fashion, and if his voice showed evidence of emotion this was but natural in a moment when such overwhelming proof of affection and esteem were offered. In truth, he would have been less than human if such tribute as the day had brought had left him unmoved.

With a few words of thanks to the organisers, Sir Maurice Abbot-Anderson closed the formal proceedings, and then came tea and the opportunity for many friends to meet and exchange greetings and the newest gossip of the botanical world. The whole afternoon was voted a most delightful and successful occasion, and when the hero of it all—tired probably, but happy certainly—motored home to Oxford in the twilight of that memorable day of May, he heard the bells of his own city, which he has served so long and truly, ringing their peals of acclamation for his eightieth birthday.

GERTRUDE FOGGITT.

The first circular sent out by the organising committee was as follows:

Stoneybrough, Thirsk, Yorks,
February 15th, 1930.

Dear Sir/Madam,—It has been suggested that, as the 80th birthday of Dr George Claridge Druce is on May 23rd next, it would be a pleasing recognition of his labours if his fellow-workers would send to him on that date, to Yardley Lodge, Oxford, a postcard of congratulation, with,

if possible, a signed photograph. We venture to ask you to give it your support, and allow your name to be appended to this appeal.—We are, yours sincerely,

V. Adeane (The Hon. Mrs H. Adeane).
H. T. Baker (The Rt. Hon. H. Trevor Baker).
O. Baring (The Hon. Mrs Guy Baring).
R. Curtis (Sir Roger Curtis, Bt.).
R. H. Corstorphine (R. H. Corstorphine, Esq.).
J. Davy (Lady Davy).
T. J. Foggitt (T. J. Foggitt, Esq., J.P.).
E. Vachell (Miss E. Vachell).
M. L. Wedgwood (Mrs Wedgwood).

GERTRUDE FOGGITT, *Sec., pro tem.*

This was followed by a second circular, as under:—

Stoneybrough, Thirsk, Yorks,
May 7th, 1930.

Dear Sir/Madam,—It has been suggested that, as the 80th birthday of Dr George Claridge Druce is on May 23rd next, it would be a pleasing recognition of his great labours for Botany if his fellow-workers would send to him on that date, to Yardley Lodge, Oxford, a postcard of congratulation, with, if convenient, a signed photograph. We venture to ask you to give it your valued support.—We are, yours sincerely,

Abbot-Anderson, Sir Maurice, C.V.O., M.V.O., President of Flora's League.
Boulenger, G. A., D.Sc., LL.D., F.R.S., Professor of Botany, L'Université, Brussels.
Britton, Dr N. Lord, Keeper of Botanic Gardens, New York, U.S.A.
Chodat, Prof. Dr. R., Institut Botanique, L'Université, Geneva.
Cotton, A. D., Keeper of the Herbarium and Library, Royal Botanic Gardens, Kew.
D'Arcy Thompson, Prof., F.R.S., St Andrews University.
Domin, Karl, Professor of Botany, Prague.
Fernald, Prof. M. L., Gray Herbarium, Harvard University, U.S.A.
Gordon, G. S., Professor of English Literature, President of Magdalen College.
Gregory, Sir R., D.Sc., LL.D., Editor of *Nature*, President of Gilbert White Fellowship.
Harmer, Sir Sidney F., F.R.S., President of the Linnean Society.
Hill, Capt. A. W., C.M.G., F.R.S., Director of the Royal Botanic Gardens, Kew.
Loder, Gerald W. E., F.S.A., etc., President of the Royal Horticultural Society.
Parry, Lewis Morton, President of the Pharmaceutical Society.
Praeger, Dr R. Lloyd, National Library, Dublin.
Priestley, Prof. J. H., The University, Leeds.

Ramsbottom, Capt. J., O.B.E., Keeper of the Department of Botany, British Museum.
Saye and Sele, the Lord, High Steward of the City of Oxford.
Schroeter, Prof. Dr. Carl, Professor of Botany, The University, Zurich.
Smith, Prof. W. Wright, F.R.S.E., Regius Keeper of the Royal Botanic Gardens, Edinburgh; King's Botanist in Scotland.
Tansley, Prof. A. G., F.R.S., Sherardian Professor of Botany, the University of Oxford.
Trow, A. H., Principal of the University of Wales, Cardiff.
Ullswater, R. H. Viscount, G.C.B., President of the Society for the Promotion of Nature Research.
Vines, Dr S. Howard, F.R.S., Emeritus Professor of Botany, Oxford.
Watson, Prof. J. A. S., Professor of Rural Economy, Oxford; President, Ashmolean Natural History Society of Oxfordshire.
Weiss, Prof. F. E., F.R.S., Professor of Botany, Manchester University.

Acting Committee:

V. Adeane (The Hon. Mrs H. Adeane).
H. T. Baker (The Rt. Hon. H. Trevor Baker).
O. Baring (The Hon. Mrs Guy Baring).
R. Curtis (Sir Roger Curtis, Bt.).
R. H. Corstorphine (R. H. Corstorphine, Esq.).
J. Davy (Lady Davy).
T. J. Foggitt (T. J. Foggitt, Esq., J.P.).
E. Vachell (Miss E. Vachell).
M. L. Wedgwood (Mrs Wedgwood).

GERTRUDE FOGGITT, *Sec., pro tem.*

A Reception will be given to Dr Claridge Druce in the Great Central Hotel, London, at 3 p.m., May 23rd, when Viscount Grey of Fallodon, K.G., the Chancellor of the University of Oxford, will be the speaker. Tickets, including tea, 3/6 each, to be had from Mrs Foggitt, Stoneybrough, Thirsk, Yorks.

Addresses were sent by:—

The Royal Botanic Gardens, Kew.—"We feel that we cannot let the occasion of your eightieth birthday pass without conveying to you our hearty congratulations and our best wishes for your continued health and vigour. We take this opportunity also of expressing our admiration for your work on British Botany and especially for your Floras of Oxfordshire, Berkshire, and Buckinghamshire, and your very complete 'List of British Plants.' The recent honour bestowed on you of election to the Royal Society was felt by all who knew you to be a fitting recognition of the many years you have devoted to the study of the British Flora."—(Signed) A. W. Hill, T. F. Chipp, A. D. Cotton, T. A. Sprague.

The signatures following represent those of the botanical staff at Kew and of botanical visitors who have been working in the Herbarium recently:—E. M. Wakefield, E. G. Baker, N. Y. Sandwith, R. D. Williams, R. Lloyd Praeger, W. C. Wordsell, S. A. Skan, E. Nelmes, W. B. Turrill, N. E. Brown, O. Stapf, J. M. Dalziel, C. V. B. Marquand, A. W. Trethewy, H. Gilbert Carter, M. L. Green, P. W. Richards, V. S. Summerhayes, G. Kukenthal, J. Hutchinson, J. B. Gillett, T. Pierch, V. E. Tredeliuz, W. R. Price, W. B. Grave, E. Milne-Redhead, J. H. Burkill, H. K. Airy Shaw, C. W. P. Nicher, J. Secker, A. R. Horwood, A. A. Bullock, F. Ballard, C. I. Dickinson, F. N. Howes, D. E. Newton, C. H. Jones, R. Paulson, H. N. Ridley, C. Norman, C. Thuerder, W. Dallimore.

A printed address from the Department of Botany, British Museum.—"To Dr George Claridge Druce, J.P., M.A., D.Sc., LL.D., F.R.S. On the occasion of the eightieth anniversary of your birthday, the scientific staff and others studying in the Department of Botany, British Museum, send heartiest congratulations and greetings. We hope that you will long continue in good health and in the enjoyment of the botanical studies by which you have so enriched the knowledge of our native flora."—(Signed) J. Ramsbottom, A. B. Rendle, A. J. Wilmott, J. E. Dandy, C. Norman, A. Gepp, G. Tandy, A. Lorrain Smith, E. Baker, D. Hillcoat, S. Moore, G. Taylor, A. H. G. Alston, F. L. Stephens, A. W. Exell, W. R. Sherrin.

The Ashmolean Natural History Society of Oxfordshire (of which Dr Druce was a founder).—"We, the undersigned members of the A.N.H.S.O., wish to congratulate Dr Druce on his 80th birthday, and, whilst thanking him for his past services to our Society and to the botanical world in general, hope that he may enjoy such health as will enable him to continue that help for some time to come."—(Signed) J. A. S. Watson (President), E. B. Poulton, H. Balfour, J. J. Walker, W. J. Sollas, H. H. Turner, F. A. Bellamy, T. V. Barker, J. M. Douie, R. S. Troup, K. A. Stone, H. Knox Shaw, H. M. Best, C. J. Bayzand, G. D. H. Carpenter, P. H. Badcock, R. Shuffrey, E. E. Calcutt, L. D. Palmer, M. G. Hueles, J. Burtt Davy, J. Collins, A. H. Hamm, Campbell Keir, H. B. Counsell, E. B. Vincent, E. F. Pittman, J. L. Norton, H. Muir, W. Lester Smith, E. B. Taylor, H. Bancroft, E. D. Amery, J. Dolbear, H. C. Goodall, M. C. Radford, F. Naab, J. Haynes, H. B. Musgrave, A. H. Best, G. H. Rogers, K. F. M. Filsell, A. H. Flemming, T. Trollope, J. T. Filsell.

Sir Sidney F. Harmer, President of the Linnean Society.

The Royal Horticultural Society, G. W. E. Loder (President) and Council.—"The Council of the Royal Horticultural Society desire me to convey to you their hearty congratulations on the occasion of your 80th birthday, and at the same time to express their warm appreciation of your long and varied services to Horticulture and Botany, coupled with the expression of their earnest hope that you may long be spared to continue it in health and happiness."

Prof. F. O. Bower, President of the British Association (of which Dr Druce was Secretary of the Oxford Meeting of 1894, and Vice-President in 1926).

Geneva—L'Institut de Botanique Herbier Botanique.

The New York Museum.—Prof. H. Fairchild Osborn.

The University of St Andrews.—Prof. D'Arcy Thompson, Sir Robert Robertson.

The University of Bangor.—Prof. D. Thoday.

The University of Cambridge.—Prof. A. C. Seward, J. C. Willis, W. Balfour Gourlay.

The University of Cambridge, Botanic Garden.—H. Gilbert Carter.

The University of Edinburgh, Royal Botanic Gardens.—Prof. W. Wright Smith, and staff.

The University of Leeds.—Prof. J. H. Priestley, Dr W. A. Sledge.

The University of London.—Prof. R. Ruggles Gates.

The University of Manchester.—Sir H. Miers, Prof. F. E. Weiss.

The University of Newcastle-on-Tyne, Armstrong College.—Prof. J. W. Heslop Harrison, Dr K. Blackburn.

The University of Reading.—Prof. J. R. Matthews, Prof. J. Percival.

The University of Southampton.—Prof. S. Mangham.

The University of Wales, and the National Museum, Cardiff.—Principal A. H. Trow.

The University of Amsterdam.—Prof. B. H. Danser.

The University of Basle.—Dr P. Aellen.

The University of Berlin-Dahlem.—Prof. O. E. Schulz, Em. Prof. P. Graebner.

The University of Brussels and Jardin du Botanique.—Dr Willdemann, Prof. E. G. Boulenger.

The University of California.—Prof. E. D. Merrill.

The University of Charmont, France.—Patrice Riencourt de Longpré.

The University of Carlsruhe.—Dr K. H. Zahn.

The University of Coburg.—Pfarrer G. Kukenthal.

The University of Copenhagen.—Prof. C. H. Ostenfeld.

The University of Geneva and L'Herb. Boissier.—Prof. Dr. R. Chodat, G. Beauverd, V. Tackholm, A. Martin, F. Chodat.

The University of Harvard.—Prof. M. L. Fernald, Prof. R. Thaxton.

The University of New York.

The University of Oslo.—Prof. J. Holmboe.

The University of Paris, The Sorbonne.—Prof. S. A. Dangeard, Gaston Bonnier.

The University of Prague.—Prof. Dr. K. Domin.

The University of South Africa.—Prof. R. S. Adamson.

The University of Stockholm.—Dr E. B. Almquist, Dr H. Dahlstedt.

The University of Vienna.—Dr R. Von Wettstein, Dr K. Ronniger.

The University of Zurich.—Dr H. Schinz, Em. Prof. C. Schroeter.

The Society for the Promotion of Natural Areas (of which Dr Druce was one of the founders).—Viscount Ullswater, Viscount Henley.

The Pharmaceutical Society of Great Britain (of which Dr Druce was an examiner for ten years).—The President, Mr H. M. Parry.

The Gilbert White Fellowship.—The President, Sir Richard Gregory, and Council: " . . . the highest appreciation of his active work and stimulating influence in connection with Botanical Science and Nature knowledge generally. The Council trusts that he may yet continue for some years to instruct and inspire students of Plant Life, not only in Great Britain but elsewhere. In common with every friend of natural knowledge throughout these islands and beyond, the Council wishes Dr Druce to realise that his personality, as well as his knowledge, have been of the highest value to the promotion of interest in Nature generally, and that they are grateful for a life of such value and achievement."

The Corporation of the City of Oxford.—The Mayor, Captain G. T. Button: " . . . I felt as Mayor of Oxford that I must send my congratulations to one who has served the City so long and faithfully as yourself."—Alderman Sir Hugh Hall, E. J. Brooks, J. H. Salter, W. H. Perkins, E. B. Lewis, etc.

The School of Forestry, Oxford.—Prof. A. H. Troup, Dr J. Burtt-Davy.

The School of Rural Economy, Oxford.—Prof. J. A. S. Watson, Dr Bancroft.

The John Innes Horticultural Institution.—The President, Sir Daniel Hall.

Flora's League.—Sir Maurice and Lady Abbot-Anderson.

The United Grand Lodge of Freemasons (of which Dr Druce is P.A.G.D.C.).—Grand Secretary, Sir P. Colville Smith.

British Section, The International Association of Journalists.—The Committee, and Clive Holland, A. S. E. Ackermann, Sir H. Brittain, Sir R. Bruce, etc.

Bergen Museum.—Olaf Hanssen, Rolf Nordhagen.

The All Saints' Feoffees, Oxford (of which Dr Druce has been Chairman for 30 years).—S. King, Vice-Chairman.

The Oxfordshire Archaeological Society (of which Dr Druce is joint Secretary and Vice-President).—Rev. C. C. Brookes, etc.

Oxford City Public Library (of which he is Chairman).—The Committee, Librarian (E. E. Skuce), and staff.

Oxford Committee of Public Health (of which Dr Druce has been Chairman since 1897).—Dr Williams, Dr Omerod, and staff.

Oxfordshire Regional Planning Committee.—Chairman, Committee and Secretary: " . . . An expression of high appreciation of the services you have rendered in so many directions to the efforts which are being made to preserve the amenities of the countryside."—Major A. J. Muirhead, M.P.

The Provincial Grand Lodge of Oxfordshire (of which he has been Charity Representative for 21 years).—J. A. Tawney, Secretary.

Oxford Income Tax Commissioners (of which Dr Druce has been a member for over 30 years).—W. H. Linnell, Secretary.

The Oxford and District Gas Company (of which Dr Druce is Vice-Chairman).—H. J. Bradley, W. H. Castle, R. Downing, W. E. Caton.

The Oxfordshire Royal Horticultural Association.—President, Mrs George Herbert Morrell: "Heartiest congratulations on your 80th birthday, and may you have many more!"

The West of Scotland Agricultural Institute.—Prof. Major K. W. Braid.

The Wild Flower Society.—Mrs Dent, Mrs Foggitt, Lady Davy, etc.

The Oxford Philatelic Society (of which Dr Druce is a past President).—F. A. Bellamy.

The Oxford South Ward Allotments Association (of which Dr Druce has been Chairman for over 20 years).—The Committee, Members, and Secretary (R. Hurst).

The (Oxford) Grandpont Horticultural Society.—The President, Mrs G. Herbert Morrell.

The Northamptonshire Natural History Society (which Dr Druce founded in 1876).—Beeby Thompson, H. N. Dixon.

Campbell College, Belfast.—Capt. C. D. Chase.

The Malvern Field Club.—President, Rev. A. Day; Vice-President, Canon J. E. H. Blake; Secretary, S. E. Warner.

Innsbruck.—Dr J. Murr.

Langendorf.—Dr R. Probst.

Velp.—Dr J. P. Lotsy.

Magdalen College (to which Dr Druce belongs).—"Warmest congratulations from Magdalen and myself."—President, Prof. G. Gordon, and Members; ex-President Sir T. Herbert Warren, K.C.V.O.; Prof. C. J. Webb, Prof. C. H. Turner, Prof. A. Tansley, etc.

Abell, Miss L.
Abingdon, The Countess of.
Abbot-Anderson, Sir Maurice, C.V.O., and Lady.
Ackerley, Miss M. E.
Ackermann, A. S. E.
Acland, Miss S. A.
Adams, Mrs Isabel, F.L.S.
Adams, Rev. John H.
Adams, L. T.
Adamson, Prof. R. S. (Capetown).
Adeane, The Hon. Mrs H.
Airy-Shaw, H. K.
Almquist, Dr E. B. (Stockholm): "My best congratulations, and thanks for all your kindness to me."
Allchin, Mr and Mrs F.
Allen, Miss Barbara.
Allen, Miss Olga.
Alston, A. H. G.
Amery, F. D.
Aplin, O. V.
Arber, Mrs.
Armitage, Miss Eleanor.
Arnett, Mr and Mrs J.
Ash, Gerald.
Assheton, Mrs.
Atkinson, Mr and Mrs E. L.
Bacon, J. M.
Badcock, Rev. P. H.
Baker, Edmund G.
Baker, Rt. Hon. H. T.
Balfour, Prof. H.
Ballard, F.
Bancroft, Helen, D.Sc.
Baring, The Hon. Mrs Guy, Miss Olivia, Simon, Aubrey, Giles, and Esmond.
Barton, Mr and Mrs.
Batten-Pool, Capt. A. H.
Bathurst, Miss.

Baxter, Elizabeth.
Bayliss, H.
Bayzand, C. J.
Beauverd, Prof. Gustav (Geneva).
Becherer, Alfred (Geneva).
Beeson, C. W.
Bellamy, C. J. V.
Bellamy, F. A., F.R.A.S., and Miss.
Bellman, Rev. A. F.
Bennett, Rev. F. and Mrs.
Bennett, Reginald, M.A.
Berrill, Miss E.
Best, A. H.
Best, H. M.
Berch, T. (Peradenyia).
Bishop, E. B.
Blackburn, Dr Kathleen.
Blakiston, G.
Blicq, Leslie and Mr and Mrs.
Blow, T. Bates, F.L.S.
Bonnier, Prof. Gaston (Paris).
Boucher, W. W.
Boulenger, Prof. Dr. A. G. (Brussels).
Bourne, Dr G. C., F.R.S.
Bower, Prof. F. O., F.R.S., President of British Association. —". . . of your own contributions to exact recording I need not speak; they are common property . . ."
Bogle, Mrs.
Bradley, H. J., J.P., and Mrs.
Braid, Prof. Major K. W.
Brady, Lady and Miss E.
Branson, F. W.
Bray, Miss K.
Bretch, Mr.
Brice, Miss N.
Bright, Miss Ruth.
Briquet, Prof. J. (Rector, L'Université du Genève).
Brittain, Sir Harry.
Britton, C. E.—" May you long continue to be the guide and inspirer of all interested in Field Botany."
Britton, N. Lord and Mrs (Bronx Park, New York).
Broadwood, Miss Bertha.
Brookes, Rev. C. C.
Brooks, Ald. E. J., J.P.
Brothers, H. Neville Chamberlane.
Brown, G. C.
Brown, N. E., F.L.S.
Brown, Colonel.
Brown, Miss Margaret.
Brown, Miss.
Browning, F. R.
Buckler, Mrs G., Ph.D.
Buckler, Mr W. and Miss Barbara.
Buig, Mrs (née Hicks).
Bullock, A. A.
Bullock-Webster, Canon G. R.
Bulteel, Mrs Juanita.
Bunker, F.
Burdon, Rev. Preb. R. J.
Burdon, Mrs.
Burkill, J. H.
Burtt-Davy, Dr J.
Butcher, R.
Button, Capt. G. T., Mayor of Oxford.
Buxton, The Earl and Countess.
Buxton, Lady Alethea.
Cadbury, Mrs Barrow.
Calcutt, Miss G. E.
Campbell, The Hon. Mrs and Miss.
Campbell, Miss M. S.
Carpenter, Dr G. D. H.
Carter, Ald. J.
Carter, H. Gilbert, M.A.
Cartwright, Mrs.
Castle, W. H.
Caton, W. E.
Cator, Miss Diana.
Chamberlain, Miss Hilda.
Champneys, Mrs Basil.
Chase, Capt. C. D.
Chipp, Major T. F.
Chodat, Prof. Dr. R., Geneva.—" Avec toutes nos felicitations et bons voeux."
Chodat, F., D.Sc.
Churchill, Lady Gwendoline.

Churchill, Mr and Mrs, T. H. B., and Jack.
Claridge, Miss M.
Clark, W. Feaver.
Clark, F.
Claydon, E. P.
Claydon, Miss.
Claydon, M. E.
Claye, Rev. Canon, D.D.
Clive, Holland.
Cobb, The Misses A. B. and M.
Cole, Miss Alice.
Cooke, R. B.
Cope, Hautville.
Collier, Dr W.
Collins, J.
Colville, Mrs.
Cottis, Miss.
Cotton, A. D.
Couchman, Mrs.
Courthope, R.
Cove, Mrs Miriam and Captain.
Corstorphine, R. H., B.Sc., and Mrs.
Counsell, Dr H. B.
Cruft, G.
Cruttwell, Rev. E. C.
Cunninghame Grahame, R. B.
Curtis, Sir Roger, Bart.
Dahlstedt, Dr H. (Stockholm).
Dallimore, W.
Dalziel, J. M.
Dandy, J. E.
Danzeard, Prof. S. A., Sc.D.—"Très honoré collègue. Permittez-moi de me joindre à tous les admirateurs de votre belle et longue carrière scientifique pour vous addresser à l'occasion . . . mes compliments personnels et mes voeux. Le Professor Gaston Bonnier qui s'etait tant occupé de systematique aurait en une autorité plus grande que la mienne pour vous dire ses confraternelles félicitations. Vous voudrez bien trouver dans celles que je vous prie d'agréer l'écho de la voix de mon éminent prédecesseur dans le Chaire de Botanique de la Sorbonne."
Dartmouth, Earl of.
David, Miss Aileen.
Davies, Mrs.
Davy, Lady.
Davidson, W.
Debenham, Mrs.
Dent, Mrs and the Misses Edith and Hilda.
Dickinson, C.
Dixon, Lt.-Col.
Dixon, H. N.
Dodd, Theodore, M.A., J.P.
Dolbear, J., J.P.
Domin, Prof. Dr. K. and Mrs (Prague).—"Very best wishes in the new decade of your rich life. Mrs Domin joins with me in the congratulations and our boy also sends his best wishes to "Uncle" Druce.
Douie, Sir James and Lady.
Douie Urquhart, Mrs.
Downing, R.
Drabble, Dr Eric.
Druce, Francis.
Drummond, Mrs Lawrence.
Drummond, Miss May.
Dunton, Miss Winifred M.
D'Urban, W. S. M.
Edwards, Canon W. Gilbert.
Edwards, Mrs.
Elkins, Dr F.
Evans, Dr A. H.
Everett, J.
Ewing, J. L., LL.D.
Ewing, Mrs Elizabeth.
Exell, A. W.
Eyre, Mrs.
Farren, Lady.
Farr, E. H.
Farrer, Mrs B. A.
Fernald, Prof. M. L. (Harvard).
Fiennes, Hon. Mrs.

Farrer, Mrs.—"Reginald Farrer's mother sends you her warmest congratulations on the attainment of your 80th birthday. Your talents, your life, and your achievements have blessed the world, and I thank you for your help to my son, and send you a photograph of his Garden of Memory."
Filsell, J. T. and Mrs.
Fisher, Rev. Canon R.
Fleming, Dr and Mrs.
Fleming, A. H.
Flintoff, R. J.
Foggitt, T. J. and Mrs.
Forrester, G. P.
Franklen, Lady Mansell.
Franklen, Mrs.
Fraser, J., A.L.S.
Freshfield, Misses.
Gamble, Mrs.
Gamlen, J. C. B., M.A., and Mrs.
Gambier-Parry, T. R., M.A.
Gaskell, H. H.
Gates, Prof. R. Ruggles.
Gepp, A.
Gibbings, Mrs C. M.
Gibson, Dr A. G.
Gillett, A. B. and Mrs.
Gillett, Jan B.
Gilmour, J. P.
Gilson, A. G.
Gleichen, Lord and Lady Edward.—"Warmest good wishes and congratulations. We think with great pleasure of our flower hunt together outside Damascus."
Godden, Mrs A. J.
Goodall, H. C.
Gordon, Prof. G. S.
Gourlay, W. Balfour, M.A.
Graebner, Em. Prof. Dr. P. (Berlin).—Telegram: "Affectionate congratulations."—Graebner.
Graham, Mrs Dorothy.
Gray, Frank and Mrs.
Green, H. L.
Gregory, Mrs E.
Gregory, Sir Richard.
Grenfell, Miss Maud.
Grey of Fallodon, Viscount, K.G.
Griffith, J.
Griffith, Prof. and Mrs F.
Griffith, Dr J., Mrs and Miss.
Grove, Mrs.
Groves, James.
Gurney, Dr R. C.
Haggart, D.
Haines, Gerald.
Hall, Sir A. Daniel.
Hall, Sir Hugh.
Hall, P. M.
Hall, Mrs Macalister.
Hall, L. Beeching.
Hall, Miss Margaret.
Hamm, A. H.
Hanbury, F. J.
Hanssen, Olaf, Bergen.
Hardcastle, Mrs F.
Harmer, Sir Sidney, P.L.S.
Harris, Rev. G. H.
Harrison, A. Orfeur.
Harting, E. M.
Harting, Miss.
Hartington, the Marquis of.
Hart, A. G.
Harvey, Rev. H. H.
Haynes, Gerald.
Hayward, Miss I. M., F.L.S.
Heath, Rev. D. M.
Henochsberg, S. G.
Henley, The Viscount.
Hennedy, Mr Jewell.
Hepworth, G. A.
Herford, Rt. Rev. Bishop.
Heslop Harrison, Prof. J. W. F.R.S.
Hicks, Arthur.
Hillcoat, D.
Hill, Captain A. W., F.R.S.
Hills, Walter, ex-Pres., Ph. Soc.
Hirst, H.
Hodgkin, C. E.

Holden, Prof. H. S.
Holder, F. W.
Holland, Jim and Guy.
Holmboe, Prof. J.
Horner, Lady.—"Very many congratulations and all best wishes from all at Mells."
Horner, Rev. G.
Horner, Maurice.
Horwood, A. R.
Houstoun, Mr and Mrs C.
Howes, F. N.
Hughes, Mrs M. G.
Hurst, C. P.
Hudson, Rev. J. Clare.
Hutchinson, J.
Jackson, A. Bruce.
James, C. W.
Jack, James.
Jenning, Mrs.
Jenner, Mrs.
Johnson, W.
Johnston, Col. H. H.
Jones, Prof. Neilson.
Jones, Clarence C.
Jones, E. Marsden.
Keeble, Sir Frederick, F.R.S.—"To-day, perhaps, I realise more clearly than ever I did the unique value of your contributions to the science of Botany, and I should like you to think how keenly all botanists recognise the nature of their indebtedness to you."
Keir, Campbell.
Kennett-Hayes, Miss.
King, Bolton, M.A.
Kingsdon, C.
Kirby, Mr and Mrs F.
Knight, S.
Knowling, Mrs.
Knox-Shaw, Dr.
Kukenthal, The Ffarrer (Coburg).
Laidlaw, F. L.
Lamb, Joshua.
Landon, Miss Jennie.
Lansdowne, The Marchioness of.
Lascelles, F.
Leach, T. H. and Mrs.
Leach, C.
Leach, E.
Lee, D. Campbell (U.S.A.).
Lee, Mrs.
Legge, Lady Joan.
Lester, Smith.
Lewis, Ald. E. B., J.P.
Lhuerdon, Camillo.
Little, J. E., M.A.
Loch, The Lady.
Loder, Gerald.
Lofthouse, T. A.
Long, J. W.
Lotsy, Prof. J. P., D.Sc.
Lowe, Marshall A. F. (New York).—"I know that Dr Britton holds Dr Druce in high esteem."
Lousley, J. E.
Lucas and Dingwall, The Baroness.—". . . I have never forgotten the wonderful day we all spent with you at Breccles . . ."
Lumb, D.
McGill, J. F.
McLachlan, Dr J.
Madan, F. (ex-Bodley Librarian).
Manfield, Mrs Harry.
Mangham, Prof. S.
Manners, A. P.
Mander, Miss D. St Clair.
Marsden, Mrs C. Delaben.
Marsden-Jones, E. M.
Marquand, C. V. B.
Marshall, Rev. T. W.
Mason, Rev. W. Wright.
Martin, A.
Matthews, Prof. J. A.
Melville, R.
Mercer, S.
Merrill, Prof. E. D. (New York and California).—". . . I still remember with pleasure our botanical conversation on board the Princess Alice in 1908 to the Orient."

Merry, Rev. Mansell.
Mexborough, The Countess of.
Meyer, Miss.
Miers, Sir H.
Miller, Brig.-Gen. A. B.
Miller, W. D.
Milne, R. M.
Milne-Redhead, E. M.
Moore, Spencer.
Morgan, Dr G.
Morrell, Mrs G. Herbert.
Morris, Miss.
Muirhead, Major A. J., M.P.
Musgrave, H. B.
Murr, Dr J. (Innsbruck).
Murray, V. E.
Murphy, L. V.
Naab, F.
Neild, Miss A. M.
Newman, Mrs Robert.
Newman, Mrs.
Nelmes, E.
Newton, Dorothy.
Nicholson, C.
Nordhagen, Rolf, Bergen.
Norman, Cecil.
Norton, Miss Jane.
Nott, Mr and Mrs C. P.
O'Callaghan, Mrs.
Odling, Montague, M.A., F.C.S.
O'Kelly, P. B.
Orme, Major and Mrs.
Ormerod, Dr.
Osborne, Prof. Fairfield.
Ostenfeld, Prof. C. H. (Copenhagen).—"I have always wondered at your energy and zeal and we have had many opportunities to work together in that respect."
Ottley, The Rev. Canon and Mrs.
Overy, Miss H. L.
Owen, Miss O'B.
Palmer, Miss Lucy D.
Parry, L. M.
Parkin, Dr J.
Patey, W. J.
Paulson, Robert.
Peake, Harold, F.R.S.—". . . It is now nearly half a century since we made friends over an Orchis."
Pearsall, W. H.
Peck, Major Saville.
Peel, Col. the Hon. Sidney, Lady, and Miss.
Perrycoste, Mrs.
Pickard, J. W.
Pittman, E. F.
Ponsonby, The Lady Phyllis.
Powell, H. W.
Powell, Miss Doris.
Pownall, Geoffrey.
Poulton, Prof. E. B., F.R.S.
Praeger, Dr Lloyd.
Prain, Sir David, F.R.S.
Price, W. R.
Prince, Ernest (New York).
Priestly, Prof. J. H.
Probst, Dr R. (Lagendorf).
Pugh, Miss E.
Radford, Dr J.
Ramsbottom, J.
Ramson, Mr F. C. S. and Mrs F.
Rayleigh, The Lady.
Rayner, Dr Olive C.
Rayner, J. F.
Rea, Carleton.
Rechinger, Dr Karl (Vienna).
Rees, E. A.
Rendle, Dr A. B., F.R.S.
Reynolds, Rev. E.
Reynolds, Bernard.
Richards, Paul.
Richmond, Mrs.
Riddelsdell, Rev. H. J., M.A.
Ridge, W. T. Boydon.—"I should like to pay my tribute to the wonderful work you have done for floristic botany and also in having achieved the distinction of being the greatest authority on the British flora."
Reincourt de Longpré, Patrice de (France).

Ridley, Rev. S. O.
Ridley, H. N., F.R.S.
Ridley, Miss Florence.
Rilstone, F.
Robertson, The Rt. Rev. Bishop.
Robertson, Sir Robert, F.R.S.
Robertson, Prof. R. A.
Robinson, Miss Florence.
Robinson, Miss M.
Rogers, G. H.
Ronniger, Dr Karl.
Roper, Miss I. M., F.L.S.
Rose, Lady.
Rothschild, The Hon. Mrs N. C.
Rowell, W. N.
Rowell, Mrs.
Russell, Miss Flora.
Russell, Lady Victoria.
Ryman, Mrs.
Sadler, Sir Michael.
Salter, Ald. J. H. and Mrs.
Salmon, Miss H. M.
Sandwith, C. I.
Sandwith, Noel, M.A., and Mrs.
Sargeant, R. H.
Satge, Mlle. de.
Saye and Sele, The Lord and Lady.
St Quentin, W. H.
Scherwerdt, Mrs C. M. R.
Schinz, Dr Hans (Zurich).—"In sincere recognition of your great and valuable labours for Botany."
Schulz, Prof. O. E., D.Sc. (Berlin).—"Zum 80 Geburtstage sende ich ihnen meine herzlichste Glückwünshe. Mögen Sie noch recht lange in Gesundheit und Geister frische der scientia amabilis erhalten bleiben."
Schroeter, Prof. C., D.Sc. (Zurich).
Scott, Sir Samuel, Bart.
Scott, Dr Dukinfield H., F.R.S.
Seckler, J.
Severn, Lady.
Seward, Prof. A. C., F.R.S.
Shaw, H. K. Airy.
Shaw, The Rt. Rev. Bishop.
Sherrin, W. R.
Shuffrey, Mrs.
Skain, S. A.
Skuce, E. E.
Slessor, Lady Cynthia.
Smith, Prof. W. Wright.
Smith, A. Lorrain.
Smith, Sir P. Colville.
Smith, R. L.
Smith, Miss Clarence.
Smith, Arthur.
Smith, Dr Willoughby.
Sollas, Prof. J. W., F.R.S.
Souter, Miss.
Sowter, F. A.
Sprague, T. A.
Stapf, Dr Otto.
Stanley, Brooks.
Stanley, H. D.
Stair, The Countess.
Stanley, Colonel and Lady Kathleen.
Stansfield, Dr F. W.
Stebbing, Mr and Mrs J., Norman, and Miss Violet.
Stebbing, The Misses.
Stephenson, P.
Stephenson, Francis L.
Stephenson, Miss E. H.
Stevens, Miss Catherine.
Stobie, Dr W.
Stone, Miss.
Stone, S. J. Warry.
Storrs, Mrs Francis.
Stuart, Mrs.
Stubbs, Miss.
Summerhayes, V. S.
Sutherland, James.
Svedeling, Vils E. (Upsala).
Swanton, E. W., A.L.S.
Swordler, Mrs.
Tackholm, V.
Tahourdin, C. B.
Tandy, Geoffrey.
Tansley, Prof. A. G., F.R.S.
Tawney, J. A., M.A.
Tawney, Miss Lily.

Talbot, The Hon. Mr Justice.—"May I wish you all joy of your birthday. I think it can be given to few to look back on a fuller or more useful life. . ."
Talbot, Miss.
Taylor, E. B.
Taylor, G.
Taylor, Miss.
Tennant, the Hon. Stephen.
Thackeray, Miss.
Thaxter, Prof. R. (New York).—"With felicitations and best wishes and pleasant recollections of Port of Spain."
Thoday, Prof. D.
Thomas, Dr Archibald and Miss.
Thompson, Miss Agnes.
Thompson, Prof. D'Arcy, F.R.S.
Todd, Miss.
Todd, M. R.
Todd, Mrs.
Towndrow, Mr, A.L.S., and Mrs R. F.
Townsend, Mrs.
Trapnell, Colin G.
Travis, W. B.
Trethewy, A. W.
Trollope, Thos.
Troup, Prof. R. S., F.R.S.
Trower, W. G.
Turner, Prof. C. H.
Turner, Prof. H. H., F.R.S.
Turner, Dr Cresswell.
Turner, A.
Turrill, Dr W. B.—"With all its happy memories of all your acts of kindness in the past."
Turrill, F. E.
Tulk, Miss A. A.
Ullswater, The Viscount.
Underhill, Mrs.
Unwin, Dr A. H. (Cyprus).
Vachell, Miss.
Vaughan, Dame Helen Gwynne.
Veley, Dr V. H., F.R.S.
Veley, Mrs, D.Sc.
Venables, Miss Edith and Mary.
Vincent, Rev. E. B.
Vines, Dr S. H., F.R.S.
Vivian, Miss Clarice.
Wakefield, Miss E.
Walker, Sir Emery.
Walker, Commander J. J.
Walker, H.
Walsh, Andrew.
Warren, Sir Herbert and Lady.—"If I am right, you reach today your eightieth birthday, though to look at you and your energies it is difficult to believe this, even for your oldest friends, who have watched with constant admiration and regard very many of your well-filled years. May I say that I am proud to have some claim to be reckoned among the oldest and most admiring? May I offer you my most warm congratulations and best wishes, in both of which Lady Warren joins. You wear many honours and distinctions. They are all well deserved. Indeed, I think this measure might still be added to and yet not be unduly filled. If there were a Laureateship of Botany, which would be a very charming and fitting post, no one would be so well suited to fill it as yourself. For while, so to speak, many wreaths—Civic, Scientific and Academic—are yours, no one has deserved better of the beautiful Goddess Flora, and the Chaplets which you have woven for her, and which she bids you wear herself, will, indeed, be amaranthine."
Waterfall, C.
Waterhouse, Dr A. T.
Watt, Hugh Boyd.

Watt, Winifred.
Watson, Major and Mrs Guthrie.
Watson, Prof. J. A. S.
Watson, Wm.
Warner, Spencer.
Webb, Prof. C. C. J.
Wedgwood, Mrs.
Webb, Mr and Mrs F.
Webb, J. A.
Weiss, Prof. F. E., F.R.S.
Weyer, William Van de.
White, Dr H. J., Dean of Christ Church.
White, J. Walter, F.L.S.
White, Winifred.
Wild, Mrs C. L.
Wilder, Rev. H.
Willdemann, Prof. E. (Brussels).
Willan, Mrs.
Wilkinson, E. B.
Wilkinson, Miss Maud.
Wilmott, A. J., M.A.
Willmott, Miss, F.L.S.
Williams, Rev. C.
Williams, Dr G. C.
Williams, Ethel.
Williams, Maud.
Williams, R.
Williams, I. A.
Williamson, Mr and Mrs R. H.
Wilson, A.
Winter, R. P.
Wolcot, Mr and Mrs H.
Wolley-Dod, Lt.-Col. A. H. and Mrs.
Worsdell, W. C., A.L.S.
Wotherspoon, Miss.
Wright, Miss.
Young, Dr J. Stirling.
Young, Miss Gertrude.
Zahn, Dr Hermann (Carlsruhe).

The very generous sum collected by the Hon. Mrs Guy Baring it was at first thought well to use in order to purchase a portion of land on which a rare plant grows, but its owner would not dispose of it. He realises its importance and is doing his best to see that it shall be preserved. The great artist, Mr P. de Laszlo, has kindly offered to paint the portrait of Dr Druce, and the sum will be used towards defraying the cost. Sittings were actually arranged when the very serious illness of Dr Druce led to its postponement.

"O Thou whose days are yet (immortal) Spring,"
Long years ago! a tiny babe was thou,
And Mother Nature smiling from above
Bent down, and with her blessings kissed thy brow.

Like Royal King of old in wisdom grown
Thou hast the eye to see Beauty in everything.
The lofty tree waving its arms on high,
The humblest weeds by thee are named and known.

But, greatest gift of all, that kindly heart
That gathers in thy friends to share these joys,
The ever ready hand outstretched to help
The weaker brothers who would do their part.

All Hail! O chosen one! on this thy day
May countless blessings on thee through life flow
And autumn when it comes—Beloved of all!
Can only wrap Thee in its golden glow!

C. I. SANDWITH.

The extraordinarily kind appreciation shown by our members and friends entirely overwhelms me and renders it impossible for me to give adequate thanks to those who have so generously supported the idea of offering such welcome salutations.

It is true that for thirty years I have worked with my whole heart for our Society, and have striven hard to make it successful and of real service to my fellow-workers, but the labour brought its own reward. Besides, it gave me opportunities of making friends with a very large circle of nature lovers throughout the world, many, alas, who are no longer with us, but whose letters and specimens are still carefully preserved by me, while those who still remain to carry on the torch are additionally dear to me for this very delightful recognition of my eightieth birthday. We are told that the years of our life are three score years and ten, and if by reason of strength they become four score years, yet is their strength labour and sorrow. Labour, it is true, has been my lot, but that is an unmitigated joy, while sorrow, certainly, has not been my portion during the last decade, since, thanks to the forbearance and assistance given to me, it has been the happiest and perhaps the busiest ten years of a busy life. Has it not witnessed the publication of the Floras of West Ross, of the Shetlands, of Oxfordshire, Buckinghamshire and Northamptonshire, the British Plant List, the Botany of the Oxford District for the British Association Meeting, the Botany of Huntingdonshire for the Victoria County History, three Editions of Hayward's Botanist's Pocket Book, and ten annual Reports of our Society, the 3228 pages of which bear witness to the industry of our members.

During this decade it has been my great privilege to visit and botanise in Skye, the Shetlands (twice), Orkneys, the Isles of Harris, Ireland (four times), Channel Islands (three times), the Dauphiny, Switzerland, Italy (three times), Brittany, Greece (twice), Palestine, Egypt (twice), Cyprus (twice), Canaries and Teneriffe (twice), Denmark, Holland, Spain, Majorca and Dalmatia.

Thanks to the two Committees, and especially to the Hon. Mrs Guy Baring and Mrs Foggitt, the meeting in London on May 23rd was a great success, and to crown their generous efforts, a cheque was given to me in the name of our members by the Viscount Grey of Fallodon. This one could not think of taking for one's own use, but it was hoped that a piece of ground, on which a specially rare plant grew in Oxfordshire, might be purchased, in order to secure the plant's continuance. The owner proved obdurate—there were cogent reasons for his refusal—but our object was secured when his interest in the matter was sufficiently

aroused to lead him to undertake its protection from marauders. The Committee then decided to ask the eminent artist, Mr P. A. de Laszlo, to undertake a portrait of me which should eventually be given to some public institution, probably the Bodleian Library, at Oxford, where his picture of the Pope now hangs. This he most kindly undertook to do, and last November I went to see him in order to arrange for sittings at Hampstead. As the fates would have it, in coming back to Oxford in a dense cold fog, a severe chill was contracted which brought on a very dangerous illness, which it seemed might prove fatal. However, one was spared, although from that date till now (May 20) I have been confined to my room. Therefore the sittings had to be abandoned. With a great generosity, which one can never repay, Mr de Laszlo broke his rule and in the third week in May he came to Oxford, gave me the sittings in my own house, and completed a real work of art, which has greatly pleased those who have seen it. The picture has been sent by Mr de Laszlo for exhibition in Paris with a selection of his other works. To put a coping stone on his goodwill he has offered to entertain the members and friends at his house in Fitzjohn's Avenue, Hampstead, in July, when it is hoped a formal presentation of the picture will be made.

Where so many have shown so gracious and kindly a disposition towards me it would be invidious to signal out any for special notice. It would, however, be sadly lacking if I omitted to offer the sincerest thanks to the Earl and Countess Buxton for giving a luncheon party on that day, and to those who initiated and served on the first Committee, or in other ways gave special help, namely:—The Hon. Mrs H. Adeane, the Hon. Mrs Guy Baring, Lady Davy, Mrs Foggitt (née Gertrude Bacon), Sir Maurice Abbot-Anderson and the Viscount Grey of Fallodon, to which for a special reason the name of Mr P. A. de Laszlo must also be added.

It may be stated that all the addresses, letters, postcards, telegrams and photographs, numbering well on to a thousand, have been finely bound in a portly volume, of which the sight will always warm my heart and bring fragrant memories to my mind in the days—they cannot be many—which are yet to come.

PERSONALIA AND VARIOUS NOTES.

SIR JOSEPH CAHN has presented Newstead Abbey, the Lake, and gardens to the City of Nottingham.

WE are glad to see an appreciation and photograph of Dr F. W. Stansfield in the *Gardeners' Chronicle* of April 12, 1930.

MRS O'CALLAGHAN is to be warmly congratulated upon her winning the two medals of the Royal Horticultural Society for paintings of Fungi.

OUR congratulations are offered to Mr R. E. Cory on his marriage to Miss Rosa Kester, formerly connected with the Cambridge Botanical Gardens.

ON June 14 Earl Buxton was awarded the African Society's Gold Medal. This is bestowed from time to time on those who have done eminent work for South Africa.

A MEMORIAL to Lord Lambourn was unveiled by Mr G. W. E. Loder, the President, in the Royal Horticultural Society's Hall, on November 4, of a Bronze Portrait Medallion on a Marble Panel.

THE twenty-third Annual Report of the National Museum of Wales, 1929-30. This energetically managed Museum, under the care of Dr Cyril Fox, was visited by 247,534 people in the year. Our members, Mr Hyde and Mr Wade, are keepers of its excellent Herbarium.

AGE OF OAKS.—Of indigenous trees in these islands, those which live the longest are yews and oaks, and in both cases the length of life is commonly grossly exaggerated. As to oaks, I have been familiar all my life with the country saying that they are 300 years growing, 300 years standing still, and 300 years dying. This is about 50 per cent. of the Gaelic estimate quoted by Lord Dartmouth, and is, in my judgment, much nearer the truth.—The Hon. VICARY GIBBS, Aldenham House, Elstree.

EARLY STAGES OF PLANT SUCCESSION FOLLOWING FOREST FIRES.—Observations made on two burnt areas on Mount Desert Island, Maine—one on the summit of Blue Mountain Peak at an elevation of 7000 ft., and one in the interior of Maine—show a remarkable similarity in the earlier stages of plant growth after the conflagration. *Marchantia polymorpha*, an important pioneer in burnt areas in the northern temperate zone, appeared also on Blue Mountain. It was succeeded by *Polytrichum commune* and *P. juniperinum* in Maine, and by the latter only in Jamaica. The lichen *Peltigeria polydactyla* was regularly associated

with these mosses both in Maine and in Jamaica. *Pteridium aquilinum*, common on burnt areas throughout the northern temperate zone, was replaced by the closely related *P. arachnoideum* on Blue Mountain. A very similar succession has been recorded in the British Isles. The swollen bud-covered base of the trunk of birches enables them to produce new shoots after a fire more quickly than any other species with which they are associated.—A. F. SKUTCH (*Ecology*, 10, 177, through *Biolog. Abstr.*, 1930, 4, 1020).

IN PRAISE OF ASH.—Mr Lionel James's delightful lines in *The Times* to-day about the different sorts of wood for wood-fires have inspired the following, which I venture to send to you.

Caudes, *fage*, foco si te servamus in annum:
Sit seposta diu fax tua, *castanea*.
Ferales *ebuli* flammae: sed *fraxinus* auro
Reginam decorat seu nova sive vetus.
Et *piceae* et *larices* cito consumuntur: *acanthus*
Testibus Hibernis optima farra coquit.
Friges, *ulme*, rogo funus ceu putre: sed aurum,
Fraxine, reginae fusca virensve paras.
Populus ora hominum fumo torquebit amaro:
Panchaeo complet *malus* odore lares.
Quercus sicca vetusque gelu domat: arida regis
Udave tu soleas, *fraxine*, calfacies.

—B., March 1. From *The Times*.

FAMOUS BOTANISTS.—A collection of some two dozen portraits of famous botanists, with specimens of living plants that have been named after them, has been arranged in Museum No. III., near the Main Gate, at the Royal Botanic Gardens, Kew. Among the plants, which include rock-garden plants and trees, are *Linnaea*, *Lobelia*, *Dahlias*, and *Fuchsias*. The *Dahlia* received its name in honour of the Swedish professor, Andreas Dahl, a pupil of Linnæus, and the *Fuchsia* after Leonard Fuchs, a well-known physician and botanist of the 16th century and author of the famous Herbal. *Lobelia* commemorates the name of Matthias de l'Obel, botanist to James I., and physician to William Prince of Orange. *Heuchera* (Alum root) takes its name from Johan von Heucher, a German botanist, and the tropical *Bougainvillaea* from Louis de Bougainville, a French military commander who served under Montcalm in the American War. Among famous British botanists after whom plants have been given their generic names portraits are exhibited of Charles Darwin, Sir Joseph Banks, the Rev. Stephen Hales, Archibald Menzies, and Alan Cunningham, Kew collectors, and others.

BRITISH ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE—CENTENARY FUND.—The Centenary will be celebrated in London, on September 23-30, under the Presidency of General Smuts. The Council is desirous that on that occasion a sum of £40,000 shall be raised, in order to put

the financial side of the Society in a satisfactory condition. In summary, the Association is seeking the proposed substantial addition to its endowment in order that it may meet the expenditure appropriate to the fitting celebration of its Centenary; maintain and extend its activities for the advancement of science, and especially maintain and extend its support of research; properly discharge its national trusteeship of Down House; make itself a more effective agent of publication; prove a less exacting guest in the localities of its meetings; assure the means of carrying out its Imperial responsibilities, and extend its facilities for junior students of science. It has been stated that "to voluntary service in the interests of science the whole record of the British Association stands as one great memorial." The object of the present appeal is to strengthen the organisation which makes use of that service. Contributions may be addressed to, and will be gratefully acknowledged by, the General Treasurer, British Association, Burlington House, London, W.1.

Lucky Days.—Here is another version of the old rhyme, quoted in *The Times* of August 27, which I learned when a boy:—

Monday for health,
Tuesday for wealth,
Wednesday the best day of all,
Thursday for losses,
Friday for crosses,
Saturday no day at all.

But a far more interesting rhyme is one which was told me by a Cheshire woman:—

Monday's child is fair of face,
Tuesday's child is full of grace,
Wednesday's child is full of woe,
Thursday's child has far to go,
Friday's child is loving and giving,
Saturday's child works hard for its living,
But the child that is born on the Sabbath day
Is happy and blithe and good and gay.

—The Rev. G. S. Tudor-Evans, Audlem Vicarage, Cheshire.

Weiss, Prof. F. E., F.R.S.—The resignation of Prof. Weiss from the Harrison Chair of Botany in the Victoria University of Manchester breaks a chain of a great and uninterrupted progress from 1892 to 1930. He has taken the opportunity of writing for the Discussions Journal, "Fifty years of the Botanical Department of Owen's College and the University." Founded in 1851, it had in the person of Dr Williamson, a medical practitioner, a first-rate naturalist even in 1872. He had only one room for storing the specimens with which to illustrate his lectures. Then he appointed Prof. Boyd Dawkins, to whom the task of teaching was entrusted, and in 1880 Prof. Milnes Marshall was en-

trusted with Zoology. When the University Charter was obtained in 1880 a separate Chair in Botany was established. Among the pupils were Marshall Ward, who, after a distinguished career at Cambridge, came back in 1882 to be Williamson's assistant. When he left in 1888 he was succeeded by Thomas Hick, a keen Yorkshire naturalist. In 1891 Williamson, after 41 years' service, resigned the Chair, devoting himself as he had done to the investigations into the coal-measure plants till he died in 1896, when the present Sir Frederick Keeble succeeded him. In 1898 Prof. O. V. Darbishire, now at Bristol, held the Lectureship in Botany for 11 years. Manchester had the advantage, among others, as Lecturers of Mr A. D. Cotton, Dr Marie Stopes, and others. At present the University has 250 students of Pharmacy. As will be remembered the University was fortunate enough to become the possessor of the huge Herbarium of Dr J. Cosmo Melvill and that of our old Secretary, Mr C. Bailey, each consisting of about a quarter of a million sheets.

BRITTON, DR N. LORD.—On May 25, 1929, Dr Britton resigned his position as Director of the New York Botanical Garden, which he had held since July 1, 1896. The Scientific Directors, in accepting his resignation, which dated from August 1, expressed their deep appreciation of his distinguished public service in planning and developing the garden throughout its 33 years of uninterrupted growth and leadership among the Botanical Institutions of the country. It was further resolved to appoint him Emeritus-Professor. They also recommended the assignment of Associate Curator Percy Wilson to be Dr Britton's research assistant. A most pleasing record of his great services is given. Dr Elmer Drew Merril, who has done such excellent work in the Philippines, was appointed the new Director, and he took on his duties on January 1, 1930. He was born at East Auburn, Maine, on October 15, 1876, and graduated at the University there in 1898. In 1904 his Alma Mater conferred on him the degree of M.A., and in 1926 the Hon. Degree of D.Sc. For three years he was assistant Agrostologist to the U.S.A. Department of Agriculture in Washington. In 1902 he was botanist in Manila, where he became the head of the Department of Botany of the Philippines. On one occasion I had the pleasure of being a fellow traveller with him to the East. In 1924 he became Dean of the College and Director of the Agricultural Experiment Station of the University of California; there he took a leading part in the organisation of the new Californian Botanical Garden at Los Angeles. He is the author of more than 200 papers dealing with the Flora of North America and the East, and has described 3000 new species and several genera. We wish him all success in his new appointment, for which his energy and ability are so well fitted.

NATURE, May 17, 1930, p.752.—Congratulations and good wishes are offered to Dr George Claridge Druce, who will be eighty years of age on May 23. The story of his earlier years has been told by Dr Druce

himself in the introduction to the " Flora of Buckinghamshire " (1926), the third of his series of floras descriptive of the Thames valley counties. The autobiography tells of difficulties successfully overcome by hard work and perseverance, and is an interesting record of the zeal and industry with which, from early boyhood, Dr Druce has, almost literally, pursued the study of our British flora, and has gained a knowledge of the rarer plants in their native habitats which is unique. This has been achieved in the intervals of an exacting business life—that of a pharmaceutical chemist. For many years Dr Druce has been honorary curator of the Fielding Herbarium at Oxford, and, in association with a former Professor, Dr S. H. Vines, has published accounts of the historic collections at the University, notably the Dillenian and Morisonian herbaria. The field botanist is indebted to him for a modern edition of the best used handbook of British plants—Hayward's " Botanist's Pocket-Book "—and Dr Druce has also himself compiled a " List of British Plants." Since 1904 Dr Druce has been the moving spirit of the Botanical Exchange Club, the annual report of which supplies records and critical notes on members of the British flora. In 1908 its circle of interest was extended by the formation of a society which should include well-wishers in addition to active workers. Dr Druce's botanical interests are not limited to the British flora. He has travelled widely, his visits extending so far as Australia and South America. Our latest news of him was that he was botanising in Cyprus, an account of a former visit to which he recently described at a meeting of the Linnean Society. That Dr Druce should have received an honorary M.A. degree and later the Sc.D. of Oxford* is evidence of the esteem in which his work is held and the position he has won in the University town in which he has for many years lived and worked. A further recognition was the fellowship of the Royal Society, to which he was elected in 1927.

ANCIENT MEDICINE AND SURGERY.—A lecture on " Ancient Medicine and Surgery " was given by Lord Moynihan under the auspices of the London Society in the hall of the Royal Society of Arts. Sir John Rose Bradford presided. Lord Moynihan said that the sources from which they derived their knowledge of ancient medicine and surgery were the bones of individuals who had died as long ago as 500,000 years, the mummies from ancient Egypt, the drawings of prehistoric and early historic times in caves and tombs, and the writings of poets, playwrights, and physicians, some of them of the highest value. The study of material from all these sources showed that disorders very similar to those now attacking mankind were very ancient enemies, and that until comparatively modern times almost identical views as to their nature, origin, and method of control were held in countries far apart. He showed how Pithecanthropus was already the victim of a certain muscular disorder; how the Heidelberg man revealed a condition of

*This degree was taken, not given.

surgical tuberculosis (Neanderthal man, he suggested, like so many people to-day, was compelled to drink milk infected with tuberculosis); how chronic osteo-arthritis occurred in the Nile valley thousands of years ago, and was so characteristic that the determinant of old age was the figure of a bent, crippled old man. The hand of the aunt of Tutankhamen showed signs of a healed fracture. It was a big, strong muscular hand for a woman, commented Lord Moynihan, and this particular bone was very rarely fractured unless the hand was conveying a blow with a good deal of force. These facts gave rise to interesting conjectures as to the domestic life led by the lady! No orthopaedic surgeon in the world to-day could get a better result from a fractured forearm than was achieved 3000 years ago in the case of a young girl who had broken both forearms and had presumably died of other injuries, for the bones were only just uniting and the splints and bandages were still in position. As the bandages were unwrapped, they showed the exact methods by which splints made from Nile reeds were applied and the accuracy of the resulting alignment. The Pharaoh of the Oppression suffered and probably died from acute appendicitis. Examination of his heart gave an ocular demonstration of the Old Testament statement:—"And the Lord hardened the heart of Pharaoh." The aorta was found in such a well-preserved state that Mr S. G. Shattalk, of the Royal College of Surgeons, was able to make sections of it and compare them with those made from a man recently dead. No pathologist could tell which was the ancient and which was the modern vessel. Both were attacked by the disease atheroma, a condition in which calcium salts were deposited in the cells of the vessel, making it rigid and inelastic. It did not expand adequately to the stream of blood coming from the heart. Mental changes went with this rigid arterial system. There was a narrowness and rigidity of outlook, a lack of enterprise and initiative.

THE AGE OF TREES.—As some of the letters which you have recently published on the subject of the age of trees seem to be based on misconception, it may be useful to those who are interested in the question to know where such evidence may be found, and the value which may be attached to it. Domesday Book may be ruled out. It does not cite those boundary surveys of lands in which mentions of individual trees are frequent, partly, in all probability, because those boundaries were already centuries old at the time when Domesday was compiled, and were therefore well known, partly because the citation of the bounds of all the lands included in the work would have entailed the compilation of a record of gigantic size, the cost of which could hardly have been faced by a Government of that age. Furthermore, the object of the survey was to record the rights of the Crown, and, incidentally, of the feudal tenants under the Crown, rather than to protect the rights of the tillers of the soil to the lands they tilled. I have not made use of the whole of the Domesday record; but I have had to examine large parts of it, and I do not remember any instance of the mention of an individual tree. Woodland is frequently mentioned in reference especi-

ally to rights of swine pasture, the felling of timber, and the supply of firewood. The rights cited are those which the village communities had held before the Conquest; and, though a rough estimate of the area of the woodland is usually given, there is nothing of the nature of a detailed account of its bounds. The pre-Conquest charters of the Saxon age, on the other hand, cite some thousands of individual trees as boundary marks. It is noticeable that the trees usually chosen are those which are most durable, the oak, the ash, and the thorn, though in wet lands the willow is often taken as a boundary mark. It is also the case that even at the present day a tree of the species cited in the old survey may be found on the spot indicated. But it cannot be assumed that that tree is the actual tree mentioned in the charter, because landholders were naturally careful to replace trees which formed boundary marks when they decayed or were destroyed. Lord Leigh in his letter of this morning mentions a Gospel oak at Stoneleigh. The term is not uncommon in mediæval land surveys. But it had nothing to do with the "preaching" of the Gospel. As many will know, it was customary throughout mediæval England to make perambulations of parish boundaries, usually on Rogation Days, which, for this reason, were popularly termed Gang Days. In the course of the perambulation the Epistle and the Gospel for the day were read at certain customary points in the boundary, usually, as it would appear, at an oak tree. The name "Gospel oak" has survived in numerous instances on the present map. A few examples of "Epistle oak" survive in Saxon and later documents; but they are far more rare.—G. B. GRUNDY, Beam Hall, Oxford, July 3. From *The Times*.

VITAMINS.

If you want a vitamin,
With the alphabet begin.
First, there's A—dissolved in fat—
Cures, they say, the rickets that
Might, perhaps, sometimes attack
Children good or bad or slack,
Cures neuritis—poly-kind—
In your body or your mind.
Butter, lettuce, eggs, and milk
All will make you feel like silk.
Eat 'em, drink 'em, bite 'em in,
If you want A-vitamin.

Next comes B—in water found—
So you see it's all around.
If you've beri-beri had,
You'll be very, very glad
After you have eaten B,
For improvement you will see.

Graham flour and husky rice,
Fruit and vegetables nice,
Milk and cheese contain the B
That will make you brave and free.
Eat 'em, drink 'em, bite 'em in,
If you want B-vitamin.

Now we come to vitamin-C,
Called the best of all the three.
If you'd "curvy" be
And from scurvy free,
Don't say it's no use.
Drink a quart of orange juice,
Or you may instead
Suck a large tomato red.
Eat 'em, drink 'em, bite 'em in,
If you want C-vitamin.

Cautious words in books profound
Say that vitamins abound
In the foods we'd scarce suspect.
So in eating don't neglect
Things the vitamins will give,
If you'd literally live.
Some they say will make you glad,
Healthy, lucky, thin, or sad
Whatsoe'er the letter be—
D or E or F or G,
H or I or maybe J,
Possibly it may be K,
L, M, N, O, P,
Q, R, S, or T,
Still it may be U or V.
Or it may be even Z.
Wise ones say the end's not yet
While we have the alphabet.

LYMAN C. NEWELL.

—From *Industrial and Engineering Chemistry.*

SUPPLEMENT TO REPORT OF BOTANICAL SOCIETY AND EXCHANGE CLUB FOR 1930.

SAMUEL BREWER'S DIARY:

A CHAPTER IN THE HISTORY OF BOTANICAL EXPLORATION IN NORTH WALES.

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INTRODUCTION.

Early in 1927 the herbarium and a number of botanical books belonging to Mr J. E. Griffith, of Bangor, were acquired by the Botanical Department of the National Museum of Wales. Several of the books had formerly been the property of Hugh Davies, author of *Welsh Botanology*, and among them was a small calf-bound volume inscribed on the outside "Welsh plants" and bearing on the title page the signature "H. Davies, 1776, F.L.S., 1790," followed by "R. Brisco Owen." Included in this volume are the following transcripts in Hugh Davies's handwriting:—

i. "Doctor Richardson's directions for Welch Plants to Dr John Jac. Dillenius." This is the letter "from Dr Richardson to Dr Sherard" published in the Richardson Correspondence (*Extracts from the Literary and Scientific Correspondence of Dr Richard Richardson, M.D., F.R.S.*, edited by Dawson Turner, Yarmouth, 1835, No. 96, p. 237) and there dated on internal evidence, 1st April 1726. In Hugh Davies's transcription the date is correctly given as May 7th, 1726 (cf. Druce, *Journ. Bot.*, xxii., 150, 1884).

ii. "Plants observed in a journey from London into North Wales by the way of Wiltshire, Somersetshire, Gloucestershire and Shropshire, by John Jacob Dillenius, M.D. et Prof. Botan. Oxon, in company with Mr Samuel Brewer, A.D. 1726." A version of this diary was published by Druce and Vines (*The Dillenian Herbaria, Oxford*, 1907; see below). Another, in some respects complementary, account of this journey in the form of a letter from Dillenius to Dr Richardson was published in the Richardson Correspondence (No. 100).

iii. "Mr Brewer's Diary, 1726-7," which forms the subject of the present communication.

SAMUEL BREWER. According to T. B. Flower (*Wiltshire Archaeological and Natural History Magazine*, xviii., 71-80, 1879) Samuel Brewer " was born at Trowbridge in 1670* and had a small estate in the county. After an ordinary school education he became engaged in the woollen manufactory of that town, where he proved very prosperous in business . . . After . . . some years . . . he became unsuccessful and devoted the remainder of his life to the study of natural history." However, that his interest in natural history and related studies developed fairly early in life is shown by his own account of a journey made in 1691 from Yorkshire to London (" Adversariorium hodoeporicum," a transcript of which (19 ff. 8vo.) is in the Kew Library†). He made this trip, as he records, in order to meet some of the famous men of his day and to examine for himself the best collections both of natural curiosities (including living plants) and books, and in every respect his wish seems to have been gratified. On the way to London he spent ten days at Oxford, five of them sightseeing at the ancient university, the remainder going about with " Mr Floyd, Keeper of the Museum " (evidently this is a mistranscription for " E. Lloyd," *i.e.*, Edward Lhuyd, the Welsh naturalist and antiquary, who had succeeded Dr Plot as Keeper in the previous year). While at the metropolis he made the acquaintance of, among others, Dr Pluckerd (Plukenet)—(" I was informed he had the best hortus siccus in Europe ")—and he made a special journey into Essex to see Mr Ray and " Mr Daile." Among the museum collections which he inspected were one at Wolerton Hall (presumably Wollaton Hall, Nottingham); Mr Coniers', " an apothecary " (in London); that of the Royal Society at Gresham College; and Mr Charlton's at Temple Barr, " the finest that ever I saw " (it included insects " kept in drawers covered with transparent glass," serpents, shells, " formed stones, medalles and coynes "). He noted the native plants growing beside the road at various places, so that although it may have been true that, as he told Sir Hans Sloane in 1729, he " never gathered any wild specimens till within these five or six years, nor never went a mile out of my way for them, till I went with Dr Dillenius into Wales " (*Sloane MSS.* 4050, f. 36), he was certainly not indifferent to them.

At the conclusion of the tour Brewer returned to Kendal and walked afoot home to Dokherah‡ Hall. It is a little difficult to reconcile this circumstance with the account, given above, of his having been engaged, apparently for a very considerable period after leaving school, in the woollen trade at Trowbridge. It may be conjectured, however, that he was concerned with the same trade at Kendal, which was long famous for its " green." Little or nothing seems to be known of the ensuing period of Brewer's life, but it was probably at this time there befell him the many misfortunes which weighed so heavily upon him in later years.

*Flower authenticates this date by reference to an entry in the baptism registers in the parish church at Trowbridge.

†A note by the transcriber states that the original was in the possession of Miss Currer (the heiress of the Richardson estate) at Eshton Hall.

‡Mr S. O. Moffet, M.A., tells me that the modern spelling is " Dockray."

According to his account he suffered " great loss by fire, bad debts, some thousands by a partner and being barred by an elder brother and other relations from three or four considerable estates by unjustly cutting of entail " (*Sloane MSS.*, 4050, 36), and elsewhere he speaks of " the loss of £20,000 earned by the sweat of his braines " (*Sloane MSS.*, 4053, 30). The next event of which there is definite record is his botanical journey into Wales with Dillenius in 1726.

The two botanists travelled by way of Berkshire, Wiltshire, the Mendips, and Brean Down to Bristol, whence their route lay through Gloucester, Worcester, Shrewsbury and Bishops Castle. Here they were joined by Littleton Brown, " a young ingenious clergyman " (Dillenius' description v. *Rich. Corr.*, No. 109, p. 290), who, however, left them after the ascent of Cader Idris. They entered Wales near Newtown, and made their way via Llanidloes and Dolgelley to Cader Idris, after ascending which they visited Anglesey. Having spent six days on the island they returned to the mainland at Carnarvon and set out for Llanberis, en route for Snowdon. They had come provided with Richardson's " directions " (*Rich. Corr.*, No. 96): Dawson Turner's suggestion that this letter was written for Dillenius's benefit (but not actually to him) is born out by the sentence (given in Hugh Davies's transcript, not in the *Rich. Corr.* version): " I wish Dr Dillenius and his companions a pleasant journey, much satisfaction, etc."; moreover, after the tour was over Dillenius wrote to Richardson (*Rich. Corr.*, No. 100, p. 263) thanking him for his directions, " which were very useful to us." Dillenius' account of their ascent of Snowdon and Glyder (the greater part of which is missing from the version printed in the *Dillenian Herbaria*) proceeds as follows:—

August 20th. We walked up to Snowdon called Wyddfa; took our way by Lilston, where we met with plenty of *Acetosa folio rotundo in medio deliquium patiente* [*Oxyria digyna* Hill]. *Gladiolus lacustris* [*Lobelia Dortmanna* L.], *Subularia repens folio minus rigido* [*Littorella juncea* Berg.] in the lake Llyn-cwmm-y-ffynnon-felan; the other small lake a little above this call'd Ffynnon-frech, where the *Subularia vulgaris* [*Isoetes lacustris* L.] is said to grow, and no where else, we did not examine, being in haste to get up; a little above this lake was great plenty of *Adiantum album crispum alpinum* Schw. [*Cryptogamme crispa* Br.]. *Selago* [*Lycopodium Selago* L.], *Selaginoides* [*Selaginella Selaginoides* Gray], *Lycopodium foliis sabinae* [*L. alpinum* L.] were common plants above and below these lakes. A little higher among the wet rocks *Thalictrum minimum* [*Thalictrum alpinum* L.]; *Lychnis alpina* [*Silene acaulis* L.], especially towards Crib-gôch, which is the best way to go up for variety of plants. Towards the top we found *Serpyllum hirsutius fruticosum* [*Thymus Serpyllum* L.]; and at the top amongst other mosses *Muscus islandicus purgans* [*Cetraria islandica* L.]; *Alsine villosa flore magno* [*Cerastium alpinum*, var. *lanatum* Lam. ?], *Saxifraga hirsuta foliis oblongo rotundis.* Upon the Glyder grows plentifully *Cochlearia minor rotundifolia* Merr. [*Cochlearia alpina* Wats.] à marina rotundi-

folia Park. specie vix differt; the leaves of the *montana* are more shining and the whole plant somewhat bigger; *Cochlearia vulgaris* [*Cochlearia officinalis* L.] amongst the wet rocks of Crib-gôch is common, as also upon the Glyder in some places; the leaf of this is more shining than when it grows by the sea side, thinner and more hollow. When we got to the top of Snowdon the weather that was very fair in the morning changed and was very foggy, which made our further search fruitless and we returned very late.

August 21st. We rested.

August 22nd. We went to Glyder. At the bottom we found *Conferva ramosa lubrica* and *Graminifolia lacustris prolifera* [*Pilularia globulifera* L.]. In our way to the old woman's cave we looked for *Hieracium pulmonaria latifolia minus uno vel altero flore* [*Hieracium argenteum* Fries ?], and found nothing else than a variety of the common *fruticosum latifolium hirsutum*. We ascended the Glyder, a mountain that lies on the other side of the river over against Crib-gôch; a little lower than this in a lake Lyn y Cwn grows, besides the *Subularia vulgaris rigida* [*Isoetes lacustris* L.] and *Graminifolia* [*Pilularia globulifera* L.], and *Subularia repens folio minus rigido* [*Littorella juncea* Berg.], *Graminifolia thlaspeos capitulis*, all not yet known to grow in England. According to the directions we could not find the *Hieracium* said to grow there, nor the *Virga aurea* [*Solidago Virgaurea* L.], but instead of this *Lycopodium foliis juniperinis* [*L. annotinum* L.] and *Lichenastrum argenteum*.

August 23rd. We rested and shifted our plants, the same day in the afternoon took a little walk about Llanberrys; a little above the church by the wayside grows *Gentianella flore semper tetrapetaloide* Hist. Lugd. [*Gentiana campestris* L.] fig. calyce ex duobis foliis majoribus et totidem minoribus conflato. In the lake below the bridge a quarter of a mile from Llanberris grows *Subularia erecta folio tenuiore et longiore* [? *Subularia aquatica*] very different from the other sorts; *Papaver luteum perenne* [*Meconopsis cambrica*]; *Gladiolus lacustris* [*Lobelia Dortmanna*]. No flower or seeds upon the *Subularia rigida*.

August 25th. Rainy weather.

According to Pulteney (II., 188) the two botanists went next to Ireland; Brewer spent the winter and the greater part of the following year in North Wales, and his experiences during the latter part of his stay in the principality are described in detail in the Diary which follows. He was almost entirely occupied with collecting plants, parcels of which he sent periodically to Dillenius. The latter's acknowledgments and his requests for further material and for information on special parts are contained in letters preserved at South Kensington (*Letters*, ff. 1-12). Thus, on 14th March 1726-7,* he wrote (f. 6): "I think you

*At this period, January 1st had not been universally adopted as the first day of a new year: in England and Wales the old style (with March 25th as New Year's Day) was still adhered to—hence the practice of giving alternate year dates during January, February and March.

have done a great deal this season and more than could be expected. All you have found new or shall find hereafter it shall be mentioned in your name. There is needed a good apparatus for an Appendix to lower kinds of plants."

It was evidently arranged that Dillenius should have a complete set of Brewer's Welsh gatherings in return for naming them and that the remainder should be returned to the collector; yet little more than a year after his return from Wales Brewer was complaining that Dillenius was not keeping to the bargain, but had dispersed several specimens into Consul Sherard's collection and wished to withhold the names of the remainder until the conclusion of the *Pinax* on which he was engaged, " may be," as Brewer wails, " 10 or 20 years after I am rotten in my grave " (*Sloane MSS.*, 4050, f. 1). (His fears had some justification, as Dillenius left the *Pinax* unfinished and it was never published.) The dispute led to an open breach between the former friends and they did not resume relations until 1741 (*Letters*, f. 84. Thomas Knowlton to Samuel Brewer). Brewer must ultimately have secured possession of the greater number of his specimens for, as is recorded in letters preserved at the British Museum (*Sloane MSS.*, 4051, f. 267, and 4052, f. 158), he sent two parcels of Welsh plants to Sir Hans Sloane in 1731 and 1732 respectively. These are presumably the specimens now in Herb. Sloane. Thus, those in Vol. 229 (ff. 45-60) form a " collection of fuci, sponges, etc., from Samuel Brewer collected by him in North Wales. The labels are in his own hand writing. He was assisted by Dillenius in naming them." The circumstances in which many of these specimens were obtained are related in the Diary. Other specimens of Brewer's are in Vol. 231 (ff. 33-67; these were collected jointly with Dillenius, and comparatively few are localised) and in Vol. 293 (seaweeds from Wales, in ff. 54-55). The specimens at South Kensington duplicate, but only to a certain extent, the completely representative series of Brewer's plants retained by Dillenius and now preserved in the Dillenian Herbaria at Oxford.

Brewer probably followed Dillenius' advice (given in a letter written on September 30th, 1727) not to " stay too long in Wales but to get out of the difficult country before the bad weather set in," for it is evident from the Richardson letters that already in November 1727 he had gone to stay at the house of his friend, Dr R. Richardson, at North Bierley, near Bradford: later he took a house of his own in the district, and his correspondence shows that he lived there continuously until 1742. During this period he was evidently in poor circumstances. He was glad to accept the presents of money which Sir Hans Sloane made him in return for specimens and for drawings of seaweeds: thus Sir Hans sent him £5 in August 1732 in return for a parcel of 80 plants (Nicholson, p. 286, cf. *Sloane MSS.*, 4052, f. 158). He had perforce to act as his " own cook, baker and chambermaid," and though he had " a strong itching to go to Craven yt is so remarkable for plants and fossils " and would have liked to explore " the neighbouring seas " his means would not allow of so much travelling. To these and the troubles already re-

ferred to were now added the dismissal of his son from the service of the (? East India) Company and " the undutifulness of a daughter." His garden seems to have been almost his only consolation.

By 1742 Brewer was 72 years of age, and it is a little difficult to believe that he afterwards became head gardener to the Duke of Beaufort at Badminton,* as recorded by Nichols (on the authority of a member of the Richardson family) and repeated by the D.N.B. The same writer states that Brewer died at Bierley and was buried at Cleckheaton, but omits to mention the date (Nichols, p. 288). It is further related that " his valuable collections of plants and seaweeds . . . collected and dried by himself . . . were purchased of him a little before his death by Richard Richardson for £20, though some years before he had refused £100 offered for them from Sir Hans Sloane " (Nichols, *l.c.*). It is possible therefore that another set of Brewer's Welsh plants is waiting to be rediscovered: if this should happen the plants would find their most appropriate home in the National Museum of Wales.

Dawson Turner (*Rich. Corr.*, p. 276, footnote) sums up Brewer as " an uneducated man and one of a low station in society," a judgment which is on the whole consistent with the impression derived from the Diary and from his correspondence. Thus, he had a certain facility in the use of Latin, but his descriptions of new plants, written in that language, are not always grammatically correct. But the evident regard in which he was held by Dr Richard Richardson and certain other contemporaries tells very strongly in his favour; and it is abundantly clear that he was a keen observer and a most persevering collector, so intent on his work that, as he says, his misfortunes seldom made any impression on him when out in the air. Dillenius wrote in 1728: " He has done me a great deal of service; and I am sure I shall never meet with a better searcher, especially for mosses. When we travelled together in Wales in all the badeness and violency of weather and rain he would stop and pick up mosses " (*Rich. Corr.* cix., p. 290). He provides yet one more example of a man who, in spite of the defects of his early training, was able by sheer enthusiasm to carve for himself a niche in the temple of botanical fame. His name has been given to a genus (*Breweria* Robert Brown) and a species (*Helianthemum Breweri* Planchon).

THE DIARY. The existence of Brewer's Diary must have been known to Pulteney, who refers (II., p. 189) to Brewer's botanical collaborators, the Rev. Mr Green and William Jones. But the earliest explicit reference to the Diary known to the writer is contained in C. B. Clarke's papers on the " Earliest Records of British Plants," where there is an allusion to a manuscript " Botanical Journey " by Brewer (*Journ. Bot.*,

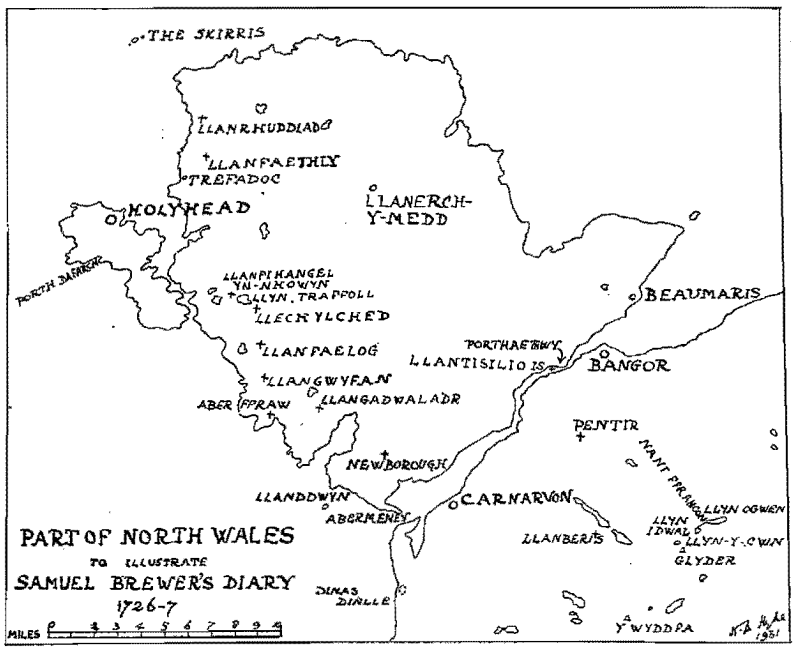
*An interesting sidelight is thrown on to Brewer in the role of gardener by the following entry in a bookseller's catalogue issued recently: Cultivation of Auriculas and Carnations with Hints as to the Management of the Tulip, the Ranunculus, the Polyanthus, and other Flowers, copied from the rough first draft of Samuel Brewer, by his little son, pp. 119 folio. £15 15s. (In a book catalogue of J. H. Knowles, Spring 1929.)

xxx., 120, 1892); later Clarke quoted Brewer's account of his discovery of *Elisma natans*, near Llanberis (*Journ. Bot.*, xxxiv., p. 84, 1896; cf. *Diary* under July 21st). J. E. Griffith (*Flora*, p. 78) refers to "Mr Brewer's MSS. Diary which I now possess," and quotes Brewer's reference to his discovery of *Diotis maritima* and also Hugh Davies's later note on the same species (*Diary*, September 3rd). Short quotations have also been published by G. C. Druce (see under August 7th) and J. Britten (see under July 10th). Reference was made to Brewer's "Botanical Journey through Wales" in an Appendix (B, by D. Lleufer Thomas) to the Report of the Royal Commission on Land in Wales and Monmouthshire, 1896 (cf. *Journ. Bot.*, xxxvi., p. 10, 1898, where the Bacstrom MS. referred to below is erroneously ascribed to Solander); and T. K. Rees (*Journ. Linn. Soc.*, xlvii., 287, 1925) has summarised Brewer's account of seaweeds collected by or for him.

The original *Diary* was presumably compiled day by day, but that subsequent additions may have been made by the author is suggested by the words "though Dr Richardson says we were upon the very rock" (see under July 10th), which read like an interpolation made after Brewer had discussed the incident with Richardson. No copy of the *Diary* in Brewer's handwriting seems to be in existence, but two transcripts are known: (i) in the handwriting of Sigismund Bacstrom; this copy is entitled "Samuel Brewer's Botanical Journey through Wales in the Year 1726;" it was formerly the property of Sir Joseph Banks and bears his signature on the title-page; it is now in the Department of Botany, Natural History Museum, Cromwell Road; with one exception (Griffith) all the allusions above-mentioned are to this MS.; and (ii) in the handwriting of Hugh Davies; this MS., which, as already stated, is in the Department of Botany, National Museum of Wales, Cardiff, is the "MSS. Diary" quoted by Griffith. These two versions have been compared, word for word, by the writer. The Davies transcript (D. MS.) has been used as the basis of the version now published, and important variations therefrom noted in the Bacstrom transcript (B. MS.) have been referred to in the notes given in brackets. It is apparent from internal evidence that the two transcripts were made independently from a pre-existing text: thus Bacstrom copied an entry for March 11th which Davies entirely omitted, but on the other hand Davies's version contains a sentence under March 13th which is missing from Bacstrom's.

Most of the flowering plants and ferns referred to by Brewer have been identified by reference to *The Dillenian Herbaria*, which is indispensable to the student of early eighteenth century botany. Brewer's references to lichens and mosses are rather obscure, which was only to be expected, as many of his specimens represent species previously unknown. It was hoped that an examination of the actual specimens in the Dillenian collections at Oxford might elucidate these references, but it was found that the data were quite insufficient to permit of this. Almost every available item of information as to provenance has been published in *The Dillenian Herbaria*, but in regard to the mosses and

lichens comparatively little is known, as the Herbarium of the Historia Muscorum is almost exclusively a series of unlocalised, undated type specimens. However, when the number of allusions in the *Diary* to gatherings of "mosses" and Dillenius' own remark as to Brewer's assiduity in collecting these plants are considered, it seems certain that a large proportion of the lower cryptogams in the Dillenian Herbaria must have been collected by Brewer. The majority of the characteristic flowering plants and ferns of North Wales had been observed and re-



corded before Brewer's day; but a number, chiefly of the commoner plants of both Carnarvonshire and Anglesey, do not seem to have been noted by any earlier observer: these apparent "earliest records" for the two vice-counties are indicated by an asterisk (*). Many of the places referred to in the *Diary* are marked in the accompanying sketch map.

Brewer, following the usual pre-Linnean practice, quotes the abbreviated title of the works to which he refers: the full titles of these, and also of works referred to by the present writer, will be found at the end.

I am indebted to the Director, British Museum, for permission to examine Brewer's letters in the Sloane Collection; to the Keeper of Botany, British Museum (Natural History), for allowing me to make notes from the Bacstrom transcript and from Brewer's specimens in

Herb. Sloane; to the Keeper of the Kew Herbarium for facilities in consulting *Adversariorum Hodoeporicum*, and to Professor A. G. Tansley for similar facilities in regard to the Dillenian Herbaria at Oxford; I should like to acknowledge the kindness of Mr J. Ardagh in directing me to sources of information concerning Brewer, and, finally, I have to thank the Council of the National Museum of Wales for the use of Hugh Davies's MSS.

MR BREWER'S DIARY.—[33].*

1726-7.

February 26. I went out into the woods about Penrhyn house near Bangor formerly the seat of Archbishop Williams; this day Mr Warburton was buried from that seat, the moiety of which came to him by his Lady a relation of the said Archbishop, the other moiety belonging to Walter Young's Lady they being co-heiresses of this estate. *Lichenoides crustaceum* seems to differ from any I have yet seen. *Lichenoides arboreum foliosum ex. cinereo glaucum, superne laeve inferne scabrum, in scutella* [= ? *Stictina scrobiculata* Scop.]. *Byssus.* A kind of wild flax. *Lichenastrum* in a deep ditch where much water runneth down by Melinescob. Near Bangor a fern.

March 3rd. I took from the same place a short walk over the mountains towards Pandu-maes-y-geirchan, a tucking mill in Bangor parish, and found—[34]—at the side of a rill running down the hill into the river *Lichen petraeus pileatus* R. Syn. 114 N. 1. [**Fegatella conica* Corda.] in head; a *Lichenastrum* also in head, and a Bryum. I followed the river called Afon-cegin 'till I came to Aber-cegin, and searched the rocks facing the sea called Bryn-cegin and followed the shore till I came to Hiran, where the storehouses are, all in the parish of Bangor, and found the undermentioned mosses. [None are given.] By the side of Afon-cegin I observed great plenty of *Lichen* and *Lichenastrum* in head as before.

March 4th. Wm. Jones brought me the mosses from a deep ditch near the Palace Garden in Bangor as mentioned underneath. [But again no list of mosses is given].

March 5th. [B. MS. here interpolates: Wm. Jones and I took a short walk and] I found in the deep ditches in the Palace Garden upon rotten wood almost buried *Peziza miniata major* [**Humaria granulata* Sacc.] almost two inches over, and a small *Lichenastrum.* At the foot of trees a Mushroom or Fungus without stalk or root; and just before —[35]—we came to Sily-wen where Thos. Price liveth, a quack Doctor who knoweth a good many physical plants, between Garth and

*The numbers given in brackets (*e.g.*,—[38]—) correspond with the pagination of Hugh Davies's MS.

Porthaethwy-ferry, under the rocks, almost upon the ground I found *Lichen petraeus stellatus* [**Marchantia polymorpha* L.]; the under part of the leaf is purple, on the middle of each leaf there riseth upon short pedicels a green head or cap divided into five or six segments which covereth a sort of seed vessel divided into four, in the shape of a star, and reacheth almost to the bottom of the pedicle; these heads at first sit close upon the leaf, of a purple color like a vetch.

March 7th. I took a walk over the mountains to the river Afon-cegin and between the two Mills called Pandu-maes-y-geirchan and Melin-Esgob, the first a fulling mill the other for corn, I found upon the stones sticking in bunches *Conferva nodosa*; River Sponge a little divided of a dark-green color. N.B. the tides never reach it.—[36]—In the same river a plant with the face of a Chara but without flower or seed and also a *Stellaria* (Starwort or a kind of Aster) Syn. 289. 1. but not being in flower and having never observed it before in this state, I am not certain tho' it is a very common plant.

[B. MS. proceeds "March 11th. W. Jones and I went over Pont Marchogion in the woods which lye between the bridge and Penrhyn House near Bangor and found the several mosses numbered underneath." No numbered list is given, however].

March 13th. Wm. Jones and I went over into Anglesea by Porthaethwy and searched all the rocks thereabouts for mosses but found them all dried up. [B. MS.: From thence] we walked towards Beaumares but reached no further than my Lord Bulkeley's upper Park; I looked for the curious branched moss that I found before at the foot of the rock, just by the hedge near Robert Jones's house the Chester carrier at Llandegfan.

In a rill running down the hill just as we came into Lord Bulkeley's Park I found *Petasites* R.S. 179. [**P. officinalis* Moench] and in the same place the mosses as under. From thence we returned to Porthaethwy and searched—[37]—the watery holes upon the rocks that can never be come at but at the lowest ebb, which lie about the Church called Llandisilio formerly served by the famous Antiquary Wm. Rowlands; over these rocks called Llandisilio rocks, he says that Julius Agricola invaded this Island. I never saw before so great a variety of *Conferva, Coralinae*, and *Fucoides*, as I found in this place; nor so pleasant a sight by the great variety of color and structure in one hole or pool. [B. MS. adds: those I took of them are numbered as underneath.] This pool is at the foot of a small rocky island called Ynys-y-Moch, which signifies the pigs' island, it lies between Porthaethwy and Llandisilio rocks; upon one of these rocks (that is an island at very low ebb) I found *Atriplex maritima fruticosa, Halimus et portulaca marina dicta* R.S. [153] N. 11 [**Atriplex portulacoides* L.]

March 15th. Thomas Price the conjurer brought me the undermentioned from the wears he renteth of the Bp of Bangor, called Ynys-

fadoc-goch,—[38]—out of the watery places there; an olive-colored sea Garlic, a yellow branched seaweed when laid first upon the paper out of the water it appeared round and tubulous like small guts of a slimy substance. [B. MS. adds: Another very much like the last mentioned except its not being so much branched as that is.]

March 16th. From Mr Green the undermentioned mosses [here is a gap in the transcript] this with *Lichenastrum* leaves hath brown dusky heads like the 1st Meum or Bald-money.

March 24th. William Jones and I left Bangor for Llanfaethly, and went by Llanerch-y-medd, where was a fair kept; I bought me a pair of spectacles and a box for my magnifying glass, and got to Llanfaethly the same night by six (tho' two miles by the round). We walked so very fast that we observed nothing by the way except a *Conferva globosa* near the bridge that leadeth over Afon-Alaw, about two miles before we came to Llanfaethly. In watery holes on the rocks called Trwyn-hir, which signifies a—[39]—long nose or point, we found several curious *Conferva*, *Fucoides* and *Corallinae* as numbered &c. And in the watery holes on the rocks called Carreg-hanner-trai which signifies a rock that appears at half ebb, we found several other curious *Confervae*, *Fucoides*, and *Corallinae*.

March 27th. At the point called Trwyn y clegir, in the Parish of Llanrhuddlad, we found in great plenty *Fucus phyllitidis folio* [**Laminaria saccharina* f. *Phyllitidis* Le Jol.], or Mor-dowys, and great plenty of a Fucus that is called everywhere in N. Wales Dilesh [**Dilsea edulis* Stackh.]; but different from that in R. Syn. and a great many [B. MS. interpolates: old and] seedling plants of sea-laces [**Chorda Filum* Stackh.].

In the watery places upon the highest rocks called Llechau-llyfnion, which signifies smooth slates, just by Trefadoc in the Parish of Llanfaethly we found sticking to the sides of the rocks, covered over with common fucus, *Fucus s. Alga folio membranaceo purpureo*, Lapa—[40]—*thi sanguinei figura et magnitudine*, R. Syn. [*Phycodrys rubens*, Batt. (*Delesseria sinuosa* Lam.)]. We first observed it upon the rocks between Gardd-y-feddyges which signifies the Doctress's Garden, and the point called Trwyn-hir; and a little beyond a large creek in the rocks about forty yards long, at the end of which is the finest cave I ever saw adorned on the sides and crown, very thick set, with *Chamaefilix marina anglica* [*Asplenium marinum* L.] and a Lichen with some other curious plants. The cave is so large that eight couple might dance in it, and about it I found a very beautiful Fucus with an Ilex leaf set alternately, *Fucus membranaceus purpureus nunc Ilicis nunc Quercus folio* [This name does not occur either in R. Syn. or elsewhere in print but it does occur in a label in Brewer's handwriting attached to a specimen of *Phycodrys rubens* Batt. (*Delesseria sinuosa* Lam.) in the Herbarium of the Synopsis at Oxford. Brewer says of this specimen " If it is new as I suppose it is

pray let it be called Fucus membranaceus," etc., as given in the Diary. Another specimen of the same alga, also labelled by Brewer, is at S. Kensington]; and in a small spring walled in, in a strait line, and about the midway between the Parsonage-house and Trefadoc, I found *Conferva fontana nodosa pulcherrime nigricans* [? *Batrachospermum atrum* Harv.]; the well is called Ffynnon-bach-y-llysg in a field called Gorsbach.—[41]—Note that the pedicles only of the young plants of *Fucus arboreus polyschides edulis* C.B. Pin. R.S. [*Sacchorhiza polyschides* Batt.] are eaten by the Welsh who call them Ym-rwal.

April 5th, 1727. Wm. Jones and I went from Llanfaethly to the point called Trwyn-y-clegir. Upon the rocks facing the sea (upon the rocks and heath that grows there) I found *Muscus aureus tenuissimus* Merr. Pin. [*Telochistes flavicans* Norm.] and upon the rocks facing the sea a little further towards the Skirris or lighthouse rock, I found in flower great plenty of *Hyacinthus stellatus* [*Scilla verna* Huds.] which is not above two inches high with from two to six leaves, the petals divided into six segments of a blue color and as many stamina tipped with purple and a pointal in the middle, it makes a pretty appearance and resembles the double hepatica.

April 6th. We left Llanfaethly and by four in the afternoon got to Bangor; the first thing I observed in the way, was in the water a little before we came to Llechgynfarwydd—[42]—a *Ranunculus* in flower and fruit, and in a little rill past Rhyd-gariadog I found a grass-leaved plant fortè a *Potamogeton*; and under a house in Bodfordd by the wayside, I found a green moss upon the ground formed like a *Lichenoides foliosum* of a very tender texture.

April 7th. Thos. Price brought me from his wiers called Ynysfadocgoch *Spongia ramosa* Syn. 29. 1. [*Chalina oculata* Pallas.], a large green *Fucus* of a spongy texture very much divided, blunted at the top, and is partly round, as big as a common reed. A *Spongia dichotoma teretifolia viridis* R.S. 29. 3. a Fucus of a fleshy substance like a cock's comb, cut and divided several ways, a large prickly shellfish of the shape and work of a button.

April 8th. Wm. Jones and I went with Thos. Price to Ynys-fadocgoch, the British island and some other little islands adjacent between Porthaethwy and Moel-y-don where we found *Fu*—[43]—*cus spongiosus nodosus* [? *Ascophyllum nodosum*, Le Jol.], and also a *Fucus* shaped like a kidney, some of a bluish color, and others variegated like marble with sand-color and blue, and also the *Fucus* with oak-leaves.

May 20th. Wm. Jones and I took a small walk about Bangor, and in the meadows below the free-school [B. MS. interpolates: "called the Fryers"], and on the other side of the river towards the sea, I found great plenty of *Pentaphyllum palustre rubrum crassis et villosis foliis Suecicum et Hibernicum* R. Syn. [*Potentilla palustris* Scop. var. *villosa*

Lehm.] and great plenty in fine state of *Salix pumila foliis utrinque candicantibus et lanuginosis* C.B. [*S. repens* L.], *Muscus palustris adianta aureo affinis scapis tenuioribus foliis brevibus*, R.S. 98. 32. [**Philonotis fontana* Brid.] and the 1st and 2nd *Polytrichum* [*P. commune* L. and *P. juniperinum* Willd.] in a very fine state.

May 29th. We left Bangor accompanied by the Rev. Mr Green; on our way to Perfedd-goed in the watery, boggy places and rills about Mr Parry's house we often saw *Pentaphyllum*—[44]—*palustre rubrum crassis* &c. [*Potentilla palustris* Scop. var. *villosa* Lehm.] and *Pentaphylloides palustre rubrum* [*Potentilla palustris* Scop.] growing together and found the new mosses I went thither for.

June 1st. I came to Pentir; this morning Wm. Green and I went towards the mountains from his Uncle's Mr Williams and found the Widgeon-headed colored *Bryum capitulis reflexis* in head and *Hypnum* which new mosses I went chiefly after, and in a large inclosure, rented by Mr Doulben of Bangor, called Cae'r-gôf, which signifies the smith's field we found several pretty new mosses in the rills that come from the head of the ground; and, amongst the grass near the said rills, great plenty of *Selaginoides* [*Selaginella Selaginoides* Gray] in good state; several sorts of grasses, and, in the most fertile part of the ground, great plenty of *Lunaria minor* [**Botrychium Lunaria* Swartz.] in a very good state; and in the said rills a small red hyssop-leaved plant coming into flower; and returning from the Turfery upon—[45]—the mountains amongst the heath, and always upon neat's dung, we found a very strange *Bryum capitulis erectis*, shaped like an urn with very large capitulum, and a round thyme leaf; and on both sides the river, before and after we came to the Mill called Pentir mill, we found great plenty of *Osmunda* in a very beautifull state at least five feet high [B. MS. adds: and no doubt but it will rise 2 feet higher before winter], and, in a dry field amongst broom, the greatest plenty I ever saw of *Orobanche* R. Syn. 1st., [**O. Rapum-Genistae* Thuill.], and a beautiful purple one; and on the bogs about half a mile from Mr Williams's house *Oxycoccus* [**Vaccinum Oxycoccus* L.] in flower and fruit.

June 2nd. I left Pentir and was accompanied by Mr Green to Trigfylchau rocks, where we met with *Ranunculus globosus*, [*Trollius europaeus* L.]; and *Cirsium* [*Saussurea alpina* DC.]; *Saxifraga Ericoides* [*Saxifraga oppositifolia* L.] in flower, but very rarely being too late; *Saxifraga trifida*; and *Alsine pulchro flore tenuifolio*, in flower; I think *Lychnis saxatilis juniperi folio* [*Arenaria verna* L., cf. *Dill. Herb.*, p. 107]; Tournefort's *Empetrum* [**Empetrum nigrum* L.]; *Papaver perenne laciniato folio* [*Meconopsis cambrica* Vig.];—[46]—*Lychnis alpina minima* [*Silene acaulis* Jacq.]; single headed *Gramen lanuginosum* on Waengynfil, a large turfary [sic] above Pentir, with other grasses, *Hieracium* by some called Lungwort, and a small grass; on the top of the house that stands at the upper end of Nantffrancon great apple-headed Moss in head and stars also. This night

we lay at a house on the east end of Llyn-Ogwyn called Tal-llyn-Ogwen; this house lies above the horses road that leads over Benglog to Llanrwst; about north-east of it and the pool we found also *Caryophyllata purpurea montana* [*Geum rivale* L.] with a very beautiful double flower which Mr Green transplanted to his Uncle's garden at Pentir. [Trigfylchau, the scene of this and the following days' chief activities, is mentioned repeatedly in the *Synopsis* but, beyond the fact that it is a spur of the Glyder Fawr, its exact position seems not to have been determined.]

Sat. June the 3rd. Mr Green and I went again to Trigfylchau in search of *Bulbosa alpina* [*Lloydia serotina* Reichb., no specimen of which is in the Dillenian collections] which as yesterday proved fruitless, tho' we observed the directions of both Dr Richardson's letters [Hugh Davies's transcription of "Dr Richardson's directions for Welch Plants," — afterwards published in *Correspondence of Richard Richardson*, ed. Dawson Turner, 1835, pp. 237-246—containing detailed reference to this plant, is bound up with the *Diary*], but found the plants undermentioned, *Gnaphalium* [probably *Antennaria dioica* Gaertn., of which Brewer sent a specimen to Dillenius; v. *Dill. Herb.*, p. 65], a handed *Orchis* with a green flower very dif—[47]—ferent in its structure from any that I yet saw, *Rubia*, *Bistorta*, *Consolida*.—Here Mr Green left me.

Sunday June 4th. I went from Tal-llyn-Ogwen to Llanberrys, but returned the same day; I met with in the ground where Mr Griffith's house is and near his house, being part of the estate that Mr Evans rented, a *Ranunculus pratensis repens* [*Ranunculus repens* L.*], with a double flower and in our return almost upon the top of the mountain called [here is a blank space] I found a large branched *Polytrichum*, with round capsules and a laciniated calyptra reaching down about halfway of the capsule.

Monday June 5th. [B. MS. reads: "Mr Rowlands being expected at Tal Llyn Ogwen I could not go far from the house but sent my guide to Trygfylchan after *Bulbosa* having shewed him the figure of the plant and gave him a small rush plant about the size. I also gave him Dr Richardson's Direction to find it, but he returned at night without finding that or anything else." D. MS. continues] In my walk this day I found all the sorts of *Subularia* except the 4th in Llyn-Ogwen; the 1st and 3rd cast upon the shore in great quantities and larger than ever I saw it. The horses ate very greedily of that which was cast ashore, and that in the water, and the people tell me that they wait there every day for it, and leave good grass that grows near it; and that the—[48]—fish love it as well, that they are larger there than in any of the other lakes, which they attribute to their eating the Subularia which they call Gwair Merllyn; Gwair is hay and Merllyn a Welch Prophet. The 2nd *Subularia* in the Syn. looks rusty and decaying, which makes me think that it dies to the root every winter. [In *Dill. Herb.* the Subu-

larias are identified as—1, *Isoetes lacustris* L.; 2, *Littorella juncea* Berg.; 3, *Isoetes lacustris* L., var. *fragilis* Gray. An expanded account of the last-named, by Brewer, is also given, together with his correction of the translation of Gwair Merllyn: he explains that in his previous letter—and, we may add, in the *Diary*—he had the meanings of the two words transposed].

Tuesday June 6th. The weather being very bad and I not willing to keep Mr and Mrs Rowlands out of their bed (being come to see the sheep and goat shearing) I left Tal-llyn-Ogwen and returned to Bangor.

June 12th. I left Bangor and went that night to John Davies at Cwmbrwynog, near the old Castle at Llanberris; the plants observed by the way were as follows, at Pentir a *Bryum capitulis reflexis* with red pedicles and heads, and a hairy leaf; a *Phalangium* [presumably **Narthecium ossifragum* Huds.] in flower (an herb that cureth the venemous [sic] bites of spiders of that name), *Nummularia flore purpureo* [*Nummularia minor flore purpurascente*, Syn. 283, 2 = **Anagallis tenella* Murr.] money wort or herb two-pence; a kind of centimorbia or all-heal; two sorts of Alsine with purslane leaves—[49]—out of water near Pentir; I found upon the mountains just before we crossed the Lakes a small *Salix* with a more round leaf than the sandwich willow, in other respects like it.

June 13th. Richd. Parry and I went to the top of the rocks called Clogwyn-du-yr-arddu; and the rocks that join to ym where we found *Dens leonis montanus angustifolius* Syn. [presumably *Taraxacum palustre*, DC., cf. *Dill. Herb.*, p. 63, where the original label is quoted thus: From ye high rocks above Llyn Coron y Fynnon Velen I could not meet with any of it in flower, Mr Br, who took it for Syn. 171. 4 but it is nothing but a variety of the common]; *Nasturtium saxatile* Ger. [Bacstrom's transcription adds " stone cress." = *Arabis petraea* Lam.] in flower; a small Ranunculus that seldom beareth more than one flower, and never more than two; *Oxys* [*Oxalis acetosella* L.] in flower and fruit; *Thalictrum montanum minus foliis latioribus* R. Syn. [Possibly *T. montanum* Wallr., but the specimens from the same locality ascribed in *Dill. Herb.* (p. 70) to this species were collected in September, and therefore cannot be those here referred to] hath berries like Argentine, leaves like coriander, and stalks like poppy. *Thalictrum minimum montanum atro-rubens foliis splendentibus* R. Syn. [*Thalictrum alpinum* L.]. A coffee colored *Lichenastrum* that Dr Dillenius took last year in this country but not then in head, in viewing it with a magnifying glass some of the—[50]—heads looked like the seed pod of an Auricula growing in the top of the leaf, and other heads divided into four segments as the other Lichenastra are.

June 14th. Richard Parry and I walked to Wyddfa and searched the other part of Clogwyn-y-Garnedd and found the undermentioned plants: *Cirsium polyanthemum* Syn. 193. [*Saussurea alpina* DC.] coming

into flower, *Selago* [*Lycopodium Selago* L.] and old plants with fresh branches breaking out of the decayed ones, which sheweth it is perennial; *Alsine* with its leaves a little curled; one plant in flower of *Saxifraga foliis oblongis rotundis dentatis, floribus compactis*, R.S. [*S. nivalis* L.], from the upper stones of Clogwyn-y-Garnedd, *Alsine myosotis lanuginosa alpina grandiflora* [Baestrom MS. adds "amplomembranoceo;" presumably *Cerastium alpinum* L., var. *lanatum* Lam., although the only modern record of this plant relates to Carnedd Llewelyn: cf. *Flora*, p. 22] this I observed in the same place that I found it in the last year, but in so weak a state that I could not take an example of it.

June 15th. Richard Parry and I went from our lodgings towards Carnarvon—[51]—in search, but in vain, for *Orchis pusilla alba odorata, radice palmata* [*Herminium albida* R. Br.] and met with nothing remarkable, but upon a bog near Mr Williams's house (the farm called Llwyn-Celyn) a very stiff, round and crested stalked *Hieracium* that I do not know, and a Gramen near the farmhouse called Hafod-ty-newydd, which signifies the new dairy-house, in flower, with the appearance of a calyx cut into six segments and set around with as many stamina, each of them having apices sitting upon them, and a pointal in the middle with an apex upon it also, and near the same place in the water an *Alsine* with a purslane leaf, with white petals.

June 16th. Richard Parry and I went to Ogof Clogwyn-dû'r-arddu to search the cave for *Adiantum an album tenuifolium ruta-murariae accedens*, J.B. [In *Dill. Herb.* an unlocalised specimen numbered to correspond with this species is identified as *Asplenium Ruta-muraria* L., var. *majus* Gray.] which proved fruitless, we found there after great fatigue to get up, nothing but—[52]—what grew within an easy reach thereabouts except a round-headed *Bryum* that seemeth to differ from the 2nd Syn. and a *Hypnum* with a *Trichomanes* leaf; and in a shaking bog by the river-side, that cometh from Clogwyn-dû'r-arddu and a little before we came opposite to my Landlord's dairy-house called Helfa-fawr, a sort of rush rising up with a stalk set with a small imperfect flower, which appears by viewing thro' a magnifying glass, to have a calyx one double cut into three segments and a pointal rising up in the middle, thick set on top, with small threads; I suppose 'tis the *Juncago palustris et vulgaris*, R.S. [**Triglochin palustre* L.] and in the river I found in several places *Ranunculus aquatilis*, Ger. Em. R.S. with a double flower, and great plenty of *Subularia repens folio minus rigido*. [*Littorella juncea* Berg. B. MS. proceeds: "In the same river but at a good distance the same *Ranunculus* with a single flower, and great plenty of *Subularia repens*. I was forced to part with R. Parry who would not follow me upon the rocks."]

June 18th. I took a short walk from my lodgings near the old castle towards—[53]—the mountains and about a mile South-west upon high ground, I found in flower and seed a *Nasturtium* resembling very much that which we sow in gardens for salleting, only the stalk seemed more

hoary and of an ash-color; from thence I went to the Lake called Llyn-dwythwch above the turbary, where I saw growing the 2nd *Subularia* [*Littorella juncea* Berg.] but of a rusty red color as I observed everywhere at this season; and the 1st [*Isoetes lacustris* L.] cast upon the shore; and *Subularia erecta juncifoliis acutis mollibus* [**Subularia aquatica* L.] 7 or 8 inches high in seed, and not finding any of them last year, in the several places we found them, makes me conclude that these which I now found are the first crop, and those last year were a second crop raised from the seed that ripened the spring, if so they are annuals that raise themselves two or three times in a summer; and here I found *Gladiolus lacustris* [**Lobelia Dortmanna* L. R.S. 287* says "In omnibus Cambriae montibus occurrit," but does not particularise] in a better state than we found it last year—[54]—*Note* that the Subularia last mentioned is in a decaying state and the seed mostly droped or ready to drop; it hath a long root like a radish, and when the seed is ripe the root dieth, but another riseth and joins to the old decayed one, I fancy 'tis something like the Tulip, the old dies, but a new one is produced.

June 19th. I took another walk to Llyn-dwythwch, and found very near it in two places amongst the heath a very elegant Bryum with a head like an urn; and in this lake a *Potamogeton* and also another small round-leaved one that I think I have not met with before; and in the rill that runneth out of the Lake I met with another *Potamogeton* with a long narrow leaf about twenty yards from the lake; and in the lake sticking to the stones in the bottom a very elegant brown *Conferva nodosa*, very slippery and tender; it grew in round balls of the size of an orange, I was a little surprized when first I saw it, because—[55]—I never met any before that grew into such a figure.

June 21st. Wm. Jones, Landlord, and I went from our lodgings directly for Wyddfa or Snowdon, searching all the upper rocks of Clogwyn-y-Garnedd, and went down as far as conveniently we could, where we found before we came to Wyddfa several plants more of *Cirsium* (soft thistle) and *polyanthemum*, R.S. [evidently *Saussurea alpina* DC., though there appears to have been here an error in transcription] and after we passed Wyddfa upon the upper part of Clogwyn-y-Garnedd, where there are a great many loose stones, and very few large ones, and several grassy places, we met with great plenty of the *Alsine myosotis facie, Lychnis alpina flore amplo niveo repens* D. Lhwyd Syn. 349. 5. [*Cerastium arcticum* Lange] the place lieth eastward from the Wyddfa, and here we searched very carefully, and all the ground between Wyddfa and Clogwyn-y-Garnedd, and found *Salix alpina alni rotundo folio repens* R.S. [*Salix herbacea* L]. We went from hence searching all the rocks as we went down—[56]—to Llyn-llydaw for the new moss I found last year which Dr Dillenius called *Lichenoides coriaceum pullum* &c. which we found again upon the great stones lying near the upper part of the said Lake towards Llyn-cwm-y-ffynnon-las, and also another like it set with small prickles, and in this lake I found a strange plant resembling

in leaf the first *Stellaria* in the Syn. which was first observed by Wm. Jones, and out of the wings of the leaves it has a double seed vessel like a *Veronica*; and about these Lakes I found the coffee-colored *Lichenastrum* in a better state than I met with it before, and several other curious mosses. From hence we went to the lower part of Clogwyn-y-Garnedd, and ascended as high as we could where it was practicable and found almost everywhere a third sort of grass upon grass; took several plants of *Virga aurea montana folio angusto subincano flosculis conglobatis*—[57]—R. Syn. [*Solidago Virgaurea* L., var. *cambrica* (Huds.) Koch] and in several places more of *Polyanthemum* Syn. 193. 2. [obviously Syn. 193. 3, *Saussurea alpina* DC., is intended] found almost everywhere a sprinkling of *Saxifraga foliis oblongis rotundis dentatis floribus compactis* [*Saxifraga nivalis* L.]; but the greatest plenty (and that not a great many) towards the end of the said rocks, and next to Crib-y-Distill; but the plant that I found in the middle of the said rocks with a leaf like a *Ptarmica* and a spike like a Bistort pleased me best and here I found *Nummularia major lutea*, Syn. [This is usually regarded as *Lysimachia Nummularia* L., but the locality renders it most improbable in the present instance] smaller and more sharp-pointed than the common; we took a few plants of the *Lonchitis aspera major* [*Polystichum Lonchitis* Roth.].

June 26th. Mr Owen, W. Jones and I prevented by the weather from going to Llyn-cwm-y-ffynnonfelen, in the attempt found in fruit *Salix alpina Alnifolio*, [*S. herbacea* L.]; searched Bwlch-coch for Bistorta [presumably *Polygonum viviparum* L., f. *alpinum* Moss, for specimens of which Dillenius had made special request when writing on 31st May—vide *Letters*, f. 10], but in vain. [B. MS. gives an extended version of this paragraph].

June 28th. W.J. and I went from our lodgings the pastureway to Llyn-cwm-y-ffynnonfelen and Llyn-cwm-y-ffynnon-frêch and searched the rocks round both these—[58]—lakes for *Paronichiae similis sed major perennis alpina repens*, Syn. 292. 2, [*Draba incana* B. Huds. Fl. Angl., ed. 2], but without success. I observed on the last mentioned Lake *Subularia vulgaris erecta folio rigidissimo*, Syn. 306. 1 [*Isoetes lacustris* L.] and in Llyn-cwm-y-ffynnonfelen the same *Chara* that Dillenius and I found last year [*Nitella opaca* Agardh, cf. *Dill. Herb.*, p. 51] but now in small heads of an orange-colour, five or six of them together enclosed in the smallest branch of leaves on the tops of the plants; but could not see in this Lake one of Consl. Sherrards *Subularia* where was great plenty last year. I observed nothing upon the rocks, but what I saw before, tho' in a better state which induced me to take *Lonchitis aspera major* [*Polystichum Lonchitis* Roth.]. I had like to have omitted our finding upon the high rocks over the first mentioned Lake a Lichen which I take to be the same Dr Dillenius and I found on Cheder rocks with holes sunk in most of its leaves, which is seen on the underside, like a dish with—[59]—the under part turned uppermost; the leaves of

it are white and hairy underneath, and green on the upper, and broader, and not so long as the other great Lichens are. [B. MS. adds: "This W. Jones found upon the high rocks before the first lake when I was with him." Neither Llyn-cwm-y-fynnon-frêch nor Llyn-cwm-y-fynnon-velen is marked on the six-inch O.S. map, nor is either referred to by Carr and Lister (*The Mountains of Snowdonia.* London, 1925); but J. Gay, who visited Snowdonia in the company of the English botanists, C. C. Babington and W. W. Newbould, in 1862 states (*Bull. Soc. Bot. France,* x., 391, 1863) that the first-named collected plants in the vicinity of Phynon-vrêch and Phynon-velan, both of which lakes were situated in Cwm Glas, the former being reached first on the way up from Llanberis Pass, the latter being somewhat higher (2200-2300 ft. altitude) on the east side of Snowdon and dominated by " des parois à pic qui aboutissent superieurement au Crib-y-Ddysgyl." This description seems to correspond with the positions of Llyn Glas and Llyn Bach respectively.]

July 1st. We went from our Lodgings at Cwm-brwynog in the parish of Llanberris near the old castle to Wyddfa and searched Clogwyn-y-Garnedd as far as we could go down, where we found the Lichen again that Dillenius and I found upon Cheder rocks with a hollowness sunk in the leaves and a black spot in the bottom; and also more plants of *Alsine myosotis facie* &c. [*Cerastium arcticum* Lange] that is cut in the Syn. [Tab. xv., Fig. 2] *Salix pumila folio rotundo* [*S. herbacea* L.]; a *Gramen*; one plant in flower of *Saxifraga foliis oblongis rotundis dentatis floribus oblongis,* R.S. [*Saxifraga nivalis* L.] and in ripe seed *Saxifraga alpina ericoides flore coeruleo,* R.S. 353.1 [*Saxifraga oppositifolia* L.] and amongst the moss on the top of Wyddfa and other places thereabouts *Lichenoides rigidum Eringii fol*: R.S. 77. 90 [*Cetraria islandica* (L.)]—[60].

July 3rd. I went to Trigfylchau in search for *Bulbosa alpina juncifolia, pericarpio unico erecto in summo cauliculo dodrantali* Syn. 374. [*Lloydia serotina* Reichb.] but in vain; I met with *Plantago* [presumably *Plantago maritima* L.] *Salix, Cirsium, Virga aurea* [*Solidago Virgaurea* L.] and a *Turritis, Anacampseros radice rosam spirante major,* Syn. 269. 2. [*Sedum roseum* Scop.] and another with a serrated leaf; (Orpine); and another with oblong leaves, (Do.).

July 4th. We went to Llyn-y-cwn, where we took ripe seeds of *Gnaphalium,* two small seedling plants upon the rocks between the Lake and Trigfylchau; and between the two mountains *Hieracium,* and in several places on the rocks between the two mountains, especially west of the Lake, Salix; and another smaller Salix with a sharp pointed leaf.

July 5th. Again to Llyn-y-cwn and ascended the green and pasture way up the Glyder in search, but in vain, for *Lycopodium elatius juniperinum* [*L. annotinum* L.]—[61]—being as I thought the very place where I found it last year in plenty, but found on most of the low rocks that surround the lake between the two mountains many seedling plants

of *Hieracium alpinum villosum flore magno singulari caule nudo* [*H. holosericeum* Backh.]; but most plenty upon the great and highest rock that standeth west of, but very near the Lake; I found none in flower, but two plants with ripe seeds. [This passage supplies the locality of the specimen referred to in *Dill. Herb.*, p. 62.]

In our return we searched the shore of the Lake by the great bridge of Llanberris, and found in a neck of the Lake that runneth into the Meadow, the plant, that I found in a river, in fruit, which, in viewing with the magnifying glass, appears like an acorn out of a shell set upon a spike; Dillenius called it [here a gap in the MS.].

July 7th. We went to Clogwyn-du-yn-yr-Arddu and took, in ripe seed *Nasturtium petraeum* [*Arabis petraea* Lam.] and likewise *Alsine Pusilla flore pulchro, folio tenuissimo*, Syn. 350. 4. [*Arenaria verna* L.] and also *Lychnis alpina minima* [*Silene acaulis* Jacq.];—[62]—and on the dry large stones about the Lake, *Lichenoides coriaceum pullum Delicata pro radice* and two others of a different texture, one of them finely adorned with heads, both of them have the appearance of roots as the first.

July 10th. We went to Trigfylchau with Wm. Griffith (who was guide to Consul Sherrard and Dr Richardson), in search for *Bulbosa alpina* [*Lloydia serotina* Reichb.], but in vain; nor did I observe anything new. [The B. MS. version of this passage reads: "July 10th. We went to Trigfylchau with Mr Griffith who was guide to Consol and Mr Sherard and Dr Richardson, to the place in search for *Bulbosa*, but they did not find it, tho' Dr Richardson says they were upon the very rock, being very dark and wet weather; Griffith said that he carried us to every place where the said gentlemen went after plants that day and in particular to the place where he says they searched for *Bulbosa*, but our search this day was as fruitless as theirs." It has been suggested (by J. Britten, *Journ. Bot.*, lxi., 227, 1923), largely on the strength of this passage, that Richardson and the Sherards had visited the Glyder in search of *Lloydia* earlier in 1727. But it seems hardly likely that Brewer, who was in the district the whole of the summer, should not have joined forces with Richardson in making such an expedition. It will be recalled that Richardson had been shown *Lloydia* by its original discoverer, Edward Lhwyd, and he appears to have been, at the time of which we are speaking, a great friend of Brewer's.]

July 12th. Prevented by the weather from going to Bwlchcôch &c. in search for *Bistorta*, we searched all that which riseth above Llanberris, on the top of the Mountain that leadeth the horseway to Wyddfa-lechog, and found several curious mosses, that I had not met with before, upon great stones that commonly stood at some distance from others; first a very hard, short one, in tubercula which is set round with [gap] like *Muscus arboreus cum orbiculis*, the leaves very finely cut into branches of a brown color; and a creeping—[63]—soft one easy to take from the stone, very finely divided into branches of a mouse color; and a black

one with a head of a pyramidal shape of a red color striped with black rising from the top of the leaves; this Moss I observed in most places about Llanberris; and also three sorts of Lichenoides with roots as mentioned the 7th instant, and in our way home in the river that runs from Clogwyn-du'r-arddu we found two or three heads of the Grass-moss that is common in the mountain rivers like a *Lichenastrum* and branched and hairy; I believe we did not take less than a horse-load at different times, but never found more than these three heads, which seemed to be set all three in a different manner.

July 13th. Mr Jones and I took a walk towards the great lake beyond the old castle, and in the woods called Coed-y-ty-dû, which signifies black house wood, upon the bogs I met with *Ros Solis folio oblongo* [**Drosera longifolia* L.] which is the only place I—[64]—found it, since I left Cadair Idris, and on the rocks here I found again the new Moss that Dr Dillenius named *Lichenoides fuliginosum patellis exiguis planis.*

July 14th. We set out for Bwlch-côch with a design to search for *Bistorta min alpina foliis imis subrotundis minutissime serratis* D. Lhwyd. R.S. 147. 3. [*Polygonum viviparum* L., forma *alpinum* Moss] but the weather proving unfavourable we returned by the river, that runneth from Arddu between the two ridges of mountains and empties itself into the great lake by the old castle, where we found a little beyond the bridge that leadeth to my Landlord's dairy-house called Helfa-fawr the *Fontinalis* in head that Dr Dillenius and I took last year but not in head; he took it to be a new species different from the 2nd Syn. Also a kind of Saxifrage that groweth about walls; we took out also a great deal of the branched moss with Trichomanes leaves like the small *Lichenastrum* of a greyish color—[65]—and hairy to search at our leisure for its heads, and on the rocks below our lodgings, and under the well that the family make use of I observed in appearance two sorts of Birch, with very broad leaves deeply indented, and one of them more rough and hairy than the elm tree; at first sight I took them for Tilia, perhaps this variety may proceed from their being young and luxuriant.

July 16th. We made another unsuccessful attempt (owing to bad weather) to find Bistorta Syn. No. 3, but at the side of a little rill above the house where we lodged, and near the place where the family wash their milk vessels, I found *Cassida* if not the 2nd Syn. 'tis a new one; it has a white flower the under lip spotted with purple [this is almost certainly the hybrid **Scutellaria galericulata* × *minor* = *S. Nicholsoni* Tauber't referred to in *Dill. Herb., p.* 79]; and in standing water in David Griffith's Turbary I found a *Conferva* smaller and longer than that which I found in Llyn-dwythwch.

July 17th. We went up the mountains a little above Clogwyn-du'r-Arddu,—[66]—and down between Llyn-cwm-y-ffynnon-frech and Llyn-cwm-y-ffynnon-felin searching all the rocks on our right hand in our way to Bwlch-côch, where 'tis said *Bistorta alpina* grows, and found the rocks all the way up very productive of almost all the Snowdon plants,

and found two plants of *Saxifraga foliis oblongis rotundis* &c. [*S. nivalis* L.] in a more beautiful state than ever I saw it before; and in several places the new Lichen; and in a cave towards the upper part a Bryum in head with a pellucid dutch-box-tree leaf and short pedicles, and also two sort of small *Salix* seedling plants with the underpart woolly, shaped and serrated like betony but larger; I could not find any of it in flower.

July 18th. We went up Wyddfa the weather dark and foggy, we could not go down so far as we intended, we only found *Alsine myosotis facie* Syn. No. 5. [*Cerastium arcticum* Lange] in ripe seed, and a few Mosses in head, and am in hopes one of them is the new Bryum Dr Dillenius was so pleased with.—[67].

July 19th. We set out with an intent to go to Clogwyn-y-Garnedd in search of *Filicula alpina pedicularis rubrae folio subtus villosa* [*Woodsia hyperborea* R. Br.], but the weather proving foggy we returned to the rocks called Cwm-dwrw-enyth which almost surrounded four lakes, one of them very shallow; from these lakes you have a view of five more that are very near to them; I found the rocks dry and barren tho' many rills run between them, in which are many mosses; some of them I took for examination, not being certain whether they are new or old. By the sides of the middle lake, upon the stones under water I found a pretty brown *Lichenoides* very prettily divided into branches, not so soft as those compared to jelly, and I found the same in great plenty in the rills near the Lake, that came down from the high rocks, and in the same place a small *Chamaenerion* [*Epilobium alsinefolium* Vill. "From ye Rill near ye Lake Llyn Coch," *Dill. Herb.*, p. 149] (*Epilobium alp?*) [? transcriber's gloss] which seldom produced more than one seed-vessel thick set with leaves; the—[68]—middle Lake is called Llyn-côch, i.e. Red Lake, where I found a white *Ranunculus* with leaves shorter and smaller than *aquatilis* Syn. 249. 3. otherwise the same. The Great Lake that is at a distance from the four, and below them, and near East to the farm called Cwm-brwynog is called Llyn-ffynnon-y-gwas. *Note* that I found in the said dry rocks (page 67) a *Vitis Idaea* with a serrated and crisped leaf shaped like the *Buxi folio*, and in the rill, upon the stones and rocks a creeping *Coralloides* pinnated like a fern; and at our first coming upon the rocks from Arddu we observed a *Hypnum* in head.

July 21st. Took a walk down to the meadows below the old castle, and in the great and lowermost lake towards Carnarvon I met with the undermentioned plants *Ranunculus flammeus angustifolius* [**Ranunculus Flammula* L.]; *Nymphaea flore albo* [**Nymphaea alba* L.]; Burr flax [B. MS. has "flag"] with a small long narrow leaf swimming upon the water; and a Plant with—[69]—a white three-leaved flower and in fruit, with leaves shaped like a narrow purslane leaf on the top, the under leaves like *Subularia* in shape, tho' not tubulous or jointed as the *Subularia* is [**Elisma natans* Buch., cf. Clarke, *Journ. Bot.*, xxxiv., p. 83, 1896]; and here I observed the Irish *Subularia*

[**Subularia aquatica* L., cf. R. Syn., 307, 4, " in lacu Hibernico Lough Neagh."] and *Subularia repens* [*Littorella juncea* Berg.]; all these plants were near together at the head of the Lake.

July 22nd. We went down towards the old castle, and crossed the river at the bridge, and about the middle part of the river between the two lakes, under the side, sticking to *Subularia repens*, I found *Spongia fluviatilis ramosa viridis fragilis* Syn. 30. 5. [*Spongilla lacustris* L.] which looked in the water like *Lycopodium*. I could not take it out whole being very brittle and difficult to come at, so that I could not get a fair specimen of it.

July 24th. Left Llanberris and came to Bangor to Mrs Smith's observed nothing remarkable by the way, the weather being very wet, except—[70]—near a farm-house call'd Brithdir Mawr about two miles from Bangor and in that parish I found a very elegant *Cannabis spuria*, with a very large white flower with purple spots in the under jaw [According to Hudson *Cannabis spuria* Ger. = *Galeopsis Tetrahit* L., but Brewer's observation refers to **G. dubia* Leers., an unlocalised specimen of which is in the Dillenian Herbarium; I am informed by Miss Vachell, F.L.S., that she has collected the plant in this locality]; and in the turbary near the place where the Occycoccus [sic] grows and about a quarter of a mile from the smith's shop in the parish of Llanddenioen a third sort of *Pentaphylloides palustre rubrum* [*Potentilla palustris* Scop.]; it seemeth to be more hairy and silver-colored than the two sorts I met with before.

July 26th. Mr Green brought from Anglesea the under-mentioned plants; from the grassy places among the sand near Newborough, *Vulneraria supina flore coccineo* Syn. 325, 2 [*Anthyllis Vulneraria* L., var. *coccinea* L.]; from the dry rocks about the same place *Lichenoides cartilagineum luteovirens scutellis planis folio aquantibus* new; from the sandy shore facing the main sea between Abermeney ferry and Llanddwyn, where the decayed—[71]—church standeth *Leucoium marinum majus* Park. Syn. 291. [*Mathiola sinuata* R. Br.] and a *Sedum minus luteum ramulis reflexis* Syn. No. 2, very hot upon the tongue [**Sedum reflexum* L.].

July 29th. Thos. Price brought me *Aster maritimus tripolium dictus* [*Aster Tripolium* L.] which is call'd in Welch Scyrfy gwrw, i.e., the male scurvy, which is very commonly used here, with very good success, by them that have the Scurvy or other such breaking out.

Mr Green sent me from Pentir six small *Orchis* which I take to be *Orchis palmata minor flore luteo-viridi* R. Syn. 381, 22 [*Habenaria viridis* R. Br.] but as they have not roots I cannot be sure; and *Fungus seminifer externe et interne hirsutus* which I think differs from the 2nd *seminifer* in Syn. [*Cyathus striatus* Hoffm.] also two small plants of *Chamaenerion*.

August 5th. Received from the Revd. Mr Green the under-mentioned plants taken from the same places in Anglesea as we did the last year;

but now in a better—[72]—state, tho' not in a good one, being too far gone, especially the Helianthemums; three or four sorts of *Limoniums*; the small annual *Helianthemum* [**Helianthemum Breweri* Planch.] from Holyhead mountain which is almost covered with it, and a good quantity of the seed of it; it grows in great plenty on the south end of the ridge of the mountain whereon stand the ruins of an old chappel. N.B. It is that part of the mountain that lies remotest from the town of Holyhead to the South-west; in this part of the mountain is a large standing pool of water seldom or never dry, and if you walk upon the highest part of the mountain west of this pool, 'till you come to the south end of it, you cannot miss the plant; the mountain that it grows upon is called Llech-ddu, which lieth between the sea and lake called Llyn-Mawr; and the greatest plenty groweth upon the highest part, where is a heap of stones partly walled in—[73]—form of a circle. He also brought at the same time two sorts of Gentianellae. [This note was copied from the B. MS. and published by G. C. Druce in *Journ. Bot.*, xl., 1902, p. 231. According to C. B. Clarke (*Journ. Bot.*, xxx., 120, 1892) Hudson's reference (*Flora Anglica*, ed. 2, p. 282) was the first record of *H. Breweri* to be published. The earliest reference to this species is in a letter from Dillenius to Brewer (31st May 1727) in which he says, "I desire him (*i.e.*, Mr Green) to look after the plant you sent from Holyhead for a small annual tetrapetaly. It is a *Cistus* and seems to be new "].

August 16th. Mr Green, Wm. Jones and I came to our old lodgings at Cwmbrwynog in the Parish of Llanberris.

August 17th. We walked up Wyddfa and took seeds of all the choicest plants that we found ripe, but met with no plants that I had not met with before except *Filix alpina pedicularis rubrae folio, subtus villosa* [*Woodsia hyperborea* R. Br., cf. *Dill. Herb.*, p. 46]; which was first observed by Mr Green on a high rough rock that standeth perpendicular and faceth the head of the lake called Llyn-cwm-y-ffynnon-las, 'tis about the middle of Clogwyn-y-Garnedd, and the said rock is as high as it is hardly possible for a man to climb up to; it grew very much exposed to view, and hardly any grew lower than ten feet, so that we were forced to take them down with a pole twenty feet long with a radicator at it's end.—[74]—*Note* that the *Filix* was past its beauty and mostly in a withered state. The place where this delicate Filix grew is in a pretty large nich, or a place that juts in within the other rocks and faced with a pretty plain place; and in one of the little pools that you see under you as you come down the east side of Wyddfa, on the top of the ridge that leads from Wyddfa to another rugged mountain eastward called Lliwydd, and on the top of Clogwyn-dû-talcen-y-Llyn I found a *Gramen*; and near the same place where the *Filix alpina* &c. grew I found *Chamaerubus saxatilis*, Syn. [**Rubus saxatilis* L.].

August 20th. I left Llanberris and went to the house at the head of Llyn-Ogwen called Tal-llyn-Ogwen; we went to Llyn-y-cwn and searched the rocks there for *Hieracium villosum alpinum* &c. [*H. holosericeum*

Backh.] in hopes of finding it in flower, but found it not in that state; from—[75]—thence we ascended Glyder to seek for *Dens leonis foliis angustioribus*, Syn. 171. 2. but in vain; we came down by Llyn-Bochlwyd which standeth above, south and triangular of Llyn Idwal and Llyn Ogwen in which lake we found great plenty of *Spongia ramosa fluviatilis*, Syn. 30. 5. [*Spongilla lacustris* L.].

August 21st. The weather stormy with snow &c. we returned to Bangor, and observed but little by the way unless in Nantffrancon meadow an *Equisetum* that I think differs from all that I had seen; an *Equisetum palustre minus polystachion* ? Syn. 131. 7. [possibly the barren specimen from this locality of *E. maximum* Lam. referred to in *Dill. Herb.*, p. 51; but Ray's plant seems to be synonymous with *E. palustre* L., var. *polystachyum* Weigel].

August 27th. I crossed the sea at Moel-y-don: in my way to Newborough I observed under a wall, a little before I came to Llanidan, where Mr Thos. Price [B. MS. has "Llwyd" instead of Price] lives and a candidate for Anglesea Coty great plenty of *Rubus Minor fructo coeruleo* [**R. caesius* L.]; and a little above the mill, a mile before we came to Newboroug,—[76]—called Melin-wen, i.e. White Mill, I found a water plant I take to be a *Chara*, and in the high way a little before I came to the mill in a watery place I found another which I take to be a new *Hydroceratophyllon*, and in the great lake at Newborough I found cast upon the shore *Potamogeton foliis pinnatis* [**Myriophyllum spicatum* L.] smaller than N. 17. R. Syn. it has no spikes, it is therefore difficult to determine what the plant is.

August 28th. I took the sea shore at the nearest place in view, and followed it pretty close 'till I came a little past Llanddwyn where I found upon the rocks facing the sea Tithymalus [*Euphorbia Paralias* L.] and in the sand near the shore in a good state that which Dr Dillenius and Mr Stonestreet thought to be new [*E. portlandica* L.; cf. *Dill. Herb.*, p. 97, "upon ye sea shore about Llanddwyn" and Ray Syn., 313, "Tithymalus maritimus minor, Portlandicus—found by Mr Stonestreet in the narrow neck of land which joins Portland to Devonshire 1711."], and also under the rocks *Rubus minor fructu coeruleo* [*R. caesius* L.]; and about a mile from Llanddwyn, in our way to Abermeney, near the shore, and also at some distance—[77]—further into the sand, I found great plenty of *Leucoium marinum majus* [*Mathiola sinuata* R. Br.] but all in the circumference of a quarter of a mile, and but one plant of them in flower, and that with good seed; at Abermeney I met with but two plants in flower and seed of *Eruca monensis* [*Brassica monensis* Huds.] which I took, and returned; in the circle, I took the seeds of *Vulneraria supina flore coccineo* [*Anthyllis vulneraria*, var. *coccinea* L.] *Aster luteus crithmi folio* [*Inula crithmoides* L.], *Cakile* [*Cakile maritima* Scop.], Sandwich Willow [*Salix repens* L.], *Tithymalus paralias*, Portland. I also found, where the *Leucoium* grows, *Polygonum marinum* [? *P. Raii* Bab.]; and in the sand marshes a

Gramen spicatum that Dr Dillenius observed last year, but he did not take it up with much creeping roots as I have now, that characteristic therefore was then unobserved.

September 1st. I went from Bangor and crossed the sea at Garth into my Lord Bulkeley's Park, where I found Hieracium, from thence to Beaumares;—[78]—then to Ffryars where Mr White lives, and where I found my good friend the Revd. Dr Foulkes [who was well known to the botanists of his day; he had formerly botanised in Anglesey with Edward Lhwyd and at least one plant discovered there by him was described and figured in the first edition of the Synopsis (*Letters*, 2)]; I took a boat near Penmon farm and went over to Priestholm or Puffin Island, but to no purpose, having searched all the rocks that were accessible and the pasture ground above them, and observed nothing to grow there (except in a hole of water in the rocks a brown *Conferva* that seems to differ from all those I met with before) that was worth notice; *Geranium pusillum betonicae folio nostras*, Syn. 356. 1. [*Erodium maritimum* L'Hér.] covered almost all the pasture ground; there was also plenty of Sea Beet, *Smyrnium* [*Smyrnium Olusatrum* L., cf. *R. Syn.*, 208, §1], Elder, and some *Chamaefilix marina angl*: [*Asplenium marinum* L.] (Lovage myrrhae odorem spirans) upon the rocks but not in plenty; in short nothing but what grew upon the rocks opposite to the Island under Penmon farm, where there is much greater plenty and variety of plants, and in a better state.—[79].

September 2nd. Dr Foulkes was so good as to accompany me to Penmon farm where we searched but in vain for the tetrapetalous plant with a Cymbelaria leaf that Dr Dillenius found there last year, and lost it soon after he found it; near the sea upon the highest ground above the rocks opposite to Priestholm Island I found a *Helianthemum* with a yellow flower, there were many of them in that state. I think I found on the stones in my Lord Bulkeley's Park the new Polytrichum that I found there last winter, now in head, and before with a calyptra or veil on.

September 4th. I went with Dr Foulkes to Newborough; we rode over all the sands and marshes from Llanddwyn to Abermeney, but found nothing but what I met with last year, except a *Pentaphyllum* or *Pentaphylloides* that seemeth to differ from any I met with before.—[80]

Sept. 5th. Dr Foulkes and I from Newborough crossed the sands to Llangadwaladr, there is a handsome building joining to the church erected by Sr. Arthur Owen which serves as a seat for all his family; from thence we went to Aberffraw, thence to Llangwyfan, the church standeth in the sea at high water; we followed the shore, which is steep and rocky, till we came within a mile of Llanfaelog, there we found it sandy, and searched for *Asparagus maritimus crassiore folio* [*A. officinalis* L.; B. MS. calls it asparagrass] said to grow here, but could not find it, but here we found, for a mile together, great plenty of *Gnaphalium marinum*, Syn. [*Diotis maritima* Cass.; doubtless the speci-

men referred to in *Dill. Herb.*, p. 65, came from here] which I took several specimens of in good condition and a quantity of good seed; here I found also good plenty of *Soldanella* [**Calystegia Soldanella*] with much good seed. [The next few lines (to " in the island ") combine both B. and D. versions.] We left the shore and went to Llanfaelog where there is a public house, and from thence we went to a great lake four miles round in the Parish of Llanfihangel called Llyntraffoll. In this lake are many small rocky islands. We searched here thinking this to be the lake—[81]—where is said to grow *Lysimachia bifolia flore luteo globoso* [*Lysimachia thyrsiflora* L.], but afterwards was informed it was a little further. We soon came to it. It is called Llechylched not Nynnechyched as mentioned in the Synopsis there being no such place in the island, but the weather would not suffer us to search this place which is chiefly boggy, and appears to be very productive of several uncommon species of reeds and other plants and likely for Lysimachia. This lake lies under Llechylched church, 'tis about two miles from Presaddfed where Mr John Owen liveth. Between Llangadwaladr and Aberffraw we found a small *Conyza media* [**Pulicaria dysenterica* Gaertn.], in good riding like the Wiltshire downs; and in the great lake call'd Llyn-traffoll *Persicaria salicis folio perennis, Potamogeton angustifolium dictum* [**Polygonum amphibium* L.]; no doubt but in the Lake and the Islands there are plants to be found not yet observed.

Note.—Gnaphalium maritimum doth not grow anywhere about Abermeney or Llanddwyn (which is the old church three miles from Abermeney) whatever it did formerly [cf. Ray's statement, " We found it plentifully on the Sand near Abermeney-Ferry, in the Isle of Anglesea," *R. Syn.*, 180] *Leucoium* [*Mathiola sinuata* R. Br.]—[82]—groweth within a mile of Llanddwyn near the shore and about two miles from Abermeney; and this ought to be corrected in the next edition [of the Synopsis]. Memorandum: *Veronica spicata cambrobritannica, Buglae subhirsuto folio* [*Veronica hybrida* L.] was found by Dr Foulkes at Gloddaith, just above Sr. Roger Mostyn's house and sent me by his nephew, Sir Ed. Griffith of Conway, Merchant. [The transcriber adds in pencil, " I found the *Asparagus* &c. on a sandy bank near the sea A.D. 1778. 27 August, H. Davies." (His specimen is in the Welsh National Herbarium.) " I fear the *Gnaphalium marinum* is lost—I have sought in vain for it several successive years. H.D." However, Davies may not have looked in the right place, for Lightfoot in the course of his visit with Banks records, " Aug. 7th [1773] . . . *Athanasia maritima* [*i.e.*, *Diotis*] among the sands at Llanfaelog . . . but only a few plants and those not yet in flower. It flowers in Sept." (v. Riddelsdell: *Journ. Bot.*, xlii., 305, 1905). According to Griffith (*Flora*, p. 78) this species was re-discovered at Llanfaelog in 1894.]

Sept. 7th. Wm. Jones and I went to the seashore near Llyfni-river (by Carnarvon, Pont-y-saint, Pont-newydd, and Dinas where my Lady Wms. liveth), and by Dinas Dinlley and so all along the sea-side in

search for *Solanum lignosum, s. Dulcamara marina* [*Solanum Dulcamara* L., var. *marinum* Bab.], but 'tis not there. We found *Echium marinum* [*Mertensia maritima* S. F. Gray; it was discovered here by Lhwyd, cf. *R. Syn.*, p. 228] upon the high stony shore between Dinas Dinlley and the river above mentioned which is the same place where Dr Dillenius and I found it last year. I took seeds and plants of it and planted some of them by Mr Jones at Silwen, near Bangor, and sent Dr Ffoulkes some of it to plant, and gave him seeds of all my sea plants. Before we came to that river and passed the *Echium* Island good seeds of the *Soldanella* were obtained; it being low water we returned thro' the marshes, and all along the sea-shore to Carnarvon, but met with nothing remarkable, except the small *Solanum* that I found last year near the Fryers by Beaumares [*i.e.*, *S. nigrum* L.; cf. *Dill Herb.*, p. 84].—[83]—I took seeds of it to try if it be a small new species.

Sept. 24th. Wm. Jones and I left Bangor and went to Llechylched to the great boggy place there called Cors-Llechylched, and here we searched for *Lysimachia* [*L. thyrsiflora* L.] in vain, but found two other yellow *Lysimachiae* in a wither'd state and had we searched this place in a more proper season 'tis probable I might have found the *Lysimachia* I went after; but the late rains raised the water so high, that we could not search the most proper and likely places for it, and the people cut everything they can come at to thatch their corn and hay with; we did what was possible for us to do in hopes of finding it, we walked for a mile together in water above our knees, and the earth shaking under us.

We went from thence to Holyhead and lodged at Weldon's house; but it were—[84]—named more properly if called Illdone, for I never was used worse anywhere. The next morning we went up on Holyhead mountain for the new *Helianthemum* [*H. Breweri* Planch.] that I found there last year, the place is very well described in the Journal for the 5th of August last the mountain it grows upon is called Llêch-ddû which lieth between the sea and the lake Llynmawr and the greatest plenty groweth upon the highest part where there is a heap of stones partly walled into the form of a circle; there is a higher ridge of mountain between the Town and this mountain; after we had gathered seed of the *Helianthemum* and took up several seedlings of it, we went to Porth-dafarch after the four sorts of *Limonium* that grew there, which we found in great plenty upon the top of the high rocks facing the sea on both sides of this Porth.—[85]—The smallest sort grew in the small, narrow necks or Isthmi that run into the sea, and the greatest plenty of the smallest sorts groweth upon the left-hand of the same Porth, towards Cappel St Ffraid; near Porth-da farch, in one of these little narrow necks, or Isthmi, I found upon the rocks *Muscus aureus tenuissimus*, Syn. [*Telochistes flavicans* Norm.]. In our return upon the dry rocks about Porthaethwy near Bangor I found *Lichenoides* of a mouse color between N.2. and 3. Syn. 65. [*i.e.*, *Alectoria* sp.] and also a brown *Lichenoides*. Near Porth-dafarch between the stones towards the top close to the sea, and at the side towards Holyhead mountain Wm.

Jones observed an Umbelliferous plant resembling a *Daucus*, but not being in seed I cannot fully determine what it is, the leaves are larger and narrower than I ever observed in any of that class before.

LIST OF ABBREVIATIONS.

Names of authors of modern (binominal) species are omitted. The titles and dates of older works are quoted from Ray's Synopsis, ed. 3, and do not necessarily refer to the respective first editions.

B. MS.—Transcript of Brewer's Diary in the hand of Sigismund Bacstrom; now in Dept. of Botany, British Museum (Natural History).

C.B.—Caspar Bauhin, author of the "Pinax et Prodromus Theatri Botanici," Basle, 1671.

Dill. Herb.—"The Dillenian Herbaria," an account of the Dillenian collections in the Herbaria of the University of Oxford, by G. Claridge Druce and S. H. Vines. Oxford, 1907.

D. MS.—Transcript of Brewer's Diary in the hand of Hugh Davies; now in Dept. of Botany, National Museum of Wales.

D.N.B.—"Dictionary of National Biography."

Flora.—"The Flora of Anglesey and Carnarvonshire," by John E. Griffith. Bangor, 1895.

Ger. and Ger. Em.—"The Herball," by J. Gerard, 1597; and the same revised and enlarged by Thomas Johnson, 1633.

Hist. Lugd.—Historia plantarum Lugdunensis [by Jacques d'Aléchamps; second French edition]. Leyden, 1653.

J.B.—Johann Bauhin, author of the "Historia Plantarum Universalis," Yverdun, 1650.

Letters.—Volume of manuscript letters to Samuel Brewer from J. J. Dillenius (ff. 2-31); from Thomas Knowlton (ff. 32-85); and from Peter Collinson (f. 86). In Department of Botany, British Museum (Natural History).

Merr; Merr. Pin.—"Pinax Rerum Naturalium Britannicarum," by Christopher Merrett. London, 1667.

Nichols.—"Nichols' Illustrations of the Literary History of the Eighteenth Century." Vol. I.; London, 1817.

Park.—John Parkinson, author of "Theatrum Botanicum," 1640, and "Paradisus Terrestris," 1629.

Pulteney.—"Historical and biological sketches of the progress of botany in England" (vol. ii.), by Richard Pulteney, London, 1790.

R.S.; R. Syn.—Synopsis methodica stirpium Britannicarum, by John Ray. Ed. 3 [by J. J. Dillenius]. London, 1724.

Rich. Corr.—Extracts from the literary and scientific correspondence of Richard Richardson, M.D., F.R.S., of Bierley, Yorks. Edited by Dawson Turner. Yarmouth, 1835.

Schw.—Schwenkfeld: Catalogus stirpium et fossilium Silesiae. Leipzig, 1600.

Sl., Sloane MSS.—Sloane Collection of manuscripts in the British Museum, Bloomsbury.