THE

JOURNAL OF BOTANY

BRITISH AND FOREIGN

EDITED BY

J. RAMSBOTTOM, O.B.E., Dr.Sc., M.A., V.-P.L.S.
Keeper, Department of Botany, British Museum (Nat. Hist.).

VOL. LXXVIII.

LONDON
TAYLOR AND FRANCIS, LTD.
RED LION COURT, FLEET STREET
1940.

CONTENTS.

CONTRIBUTORS TO THIS VOLUME.

ALSTON, A. H. G., M.A., F.L.S.
BARNES, B., D.Sc., F.L.S.
BOX, H. E.
BROOKE, B. J.
BURKILL, I. H., M.A., Sec. L.S.
CALLEN, E. O., B.Sc., Ph.D.
CAMPBELL, M. S., F.L.S.
CHAPMAN, V. J., M.A., Ph.D., F.L.S.
DANDY, J. E., M.A., F.L.S.
DARLINGTON, H. R.
DAWSON, A. E. ELSE, M.Sc.
EDEES, E. S.
HARDY, ERIC.
HOCHREUTINER, E. P. G.
JONES, R. F., Ph.D.
LAMB, I. M., B.Sc., F.L.S.
LIND, E. M., B.Sc., Ph.D.
LOUSLEY, J. E.
MATTHEWS, J. R., M.A., F.L.S.
MELVILLE, R., Ph.D., F.L.S.
NORMAN, C., F.L.S.
PHILIPSON, W. R., B.A.
PRAEGER, R. LLOYD, D.Sc.
PUGSLEY, H. W., B.A., F.L.S.
RAMSBOTTOM, J., O.B.E., F.L.S.
RILSTONE, F., A.L.S.
ROSE, F.
SANDWITH, N. Y., M.A., F.L.S.
SKALINSKA, M., Ph.D.
STEARN, W. T., F.L.S.
SWART, J. J.
TAYLOR, G., D.Sc., F.L.S.
TUTIN, T. G., B.A.
WALLACE, E. C.
WASHBOURN, R., B.A.
WILMOTT, A. J., B.A., F.L.S.
WRIGHT, F. R. ELLISTON.

LIST OF PLATES.

THE

JOURNAL OF BOTANY

BRITISH AND FOREIGN.

STUDIES OF BRITISH POTAMOGETONS.—XII.

By J. E. Dandy, M.A., and G. Taylor, D.Sc.

XII. *Potamogeton pusillus* in Great Britain.

In the first of these studies (Journ. Bot. lxxvi. 90–92), which dealt with the typification of *Potamogeton pusillus* L., we showed that this name should be used for the species formerly known as *P. panormitanus* Biv., and that the species to which it was wrongly applied by Hagström and other recent authors should be called *P. Berchtoldii* Fieb. These two species are superficially much alike, and the important fact that they differ in the structure of the stipular sheaths was not generally appreciated until Hagström pointed it out in his ' Critical Researches ' (1916), where the differences between *P. panormitanus* and "*P. pusillus*" (*sensu* Hagstr.) were explained at length. Previously, in Britain as elsewhere, the two species were commonly confused under an aggregate *P. pusillus*, and the result is that most of the published records of *P. pusillus* must be revised in order to determine the species to which they refer. The British records of *P. pusillus* are so very numerous that long research will be required before they can all be investigated, and even then some of them, in the absence of vouching specimens, may have to remain ambiguous. Already, however, we have examined a sufficiently large number of specimens of both *P. pusillus* and *P. Berchtoldii* to give a much-needed indication of the distribution of the two species in Great Britain, and we therefore feel justified in publishing the results without further delay. *P. pusillus* is dealt with in the present study, and a corresponding account of *P. Berchtoldii* will follow. Ireland is not included in either paper, as we have so far seen specimens from fewer than half of the 40 Irish vice-counties, for all of which *P. pusillus* (in the aggregate sense) has been recorded.

The great majority of British specimens of the true *P. pusillus* have in the past been referred to Linnaeus's species in the broad

sense, or to varieties of it. Plants from certain localities, however, have been erroneously named *P. trichoides*, *P. rutilus*, or *P. Friesii*; and some of these, notably the "*P. rutilus*" from Anglesey, have been regarded as rarities and specially collected on that account *. In 1885 some specimens gathered at Wolferton, in West Norfolk, were correctly recorded as *P. panormitanus* by Druce (in Bot. Exch. Club Brit. Is. Rep. 1884, 114), but it is not clear why these particular samples of *P. pusillus* should have been selected for such distinction, and not until after the appearance of Hagström's monograph, which included three records of *P. panormitanus* from Britain, were serious attempts made to separate British specimens of this supposedly rare species from the common "*P. pusillus*" (*i. e.*, *P. Berchtoldii*). A. Bennett (in Journ. Bot. lvii. 18 (1919)) published sixteen British records of *P. panormitanus*, and in the following year Druce (in Bot. Soc. & Exch. Club Brit. Is. v. 582) produced a batch of fourteen, for most of which Bennett was responsible. Instead of bringing some order out of chaos, however, the publication of these records served only to increase the confusion, for at least half of them were errors, being based on specimens of *P. Berchtoldii*. Obviously the identifications were the result not of critical examination but of mere careless conjecture. Worse was to come, however. In 1921 Druce (*op. cit.* vi. 50, 152), partly on the authority of Hagström, treated specimens of *P. pusillus* as four different hybrids: "*P. pusillus* L. [meaning *P. Berchtoldii*] $\times$*P. trichoides*=*P. franconicus* Fischer" (from Berks); "$\times$*P. trinervius* Fischer=*P. panormitanus*$\times$*trichoides*" (from East Norfolk); "$\times$*P. Sturrockii* Benn.=*P. obtusifolius*$\times$*panormitanus* Hagstr." (from East Gloucester); and "*P. dualis* Hagstr.=*P. panormitanus*$\times$*pusillus* [*i. e.*, *Berchtoldii*]" (from Berks). Such treatment was quite unjustifiable, for the plants represent ordinary states of *P. pusillus* and show no trace of hybrid origin. Nevertheless the example was followed by Bennett, who in Journ. Bot. lx. 55 (1922) recorded a plant of *P. pusillus* from East Sussex as "*Potamogeton*$\times$*sudermanicus*" (supposed to be *P. acutifolius*$\times$*Berchtoldii*), and subsequently (*op. cit.* lxiv. 331) identified material from Stirling as "*P. Friesii*$\times$*pusillus* [*i. e.*, *Berchtoldii*]=$\times$*P. pusilliformis* Hagstr." Thus British specimens of *P. pusillus* have been referred to six different hybrid combinations, three of which do not even include true *P. pusillus* as one of the supposed parent species! In view of these various and vagarious treatments the reader will not be astonished at the length of the synonymy of *P. pusillus* given later in this paper.

Actually the separation of *P. pusillus* from *P. Berchtoldii* is not difficult, provided that the differences are thoroughly understood and the plants examined with proper care. Infallible

* See the third of these notes (Journ. Bot. lxxvi. 240).

characters are furnished by the winter-buds and stipular sheaths, but the former are not always available for examination. The sheaths are closed (tubular) in *P. pusillus* and open (convolute) in *P. Berchtoldii*, but their texture is delicate and their structure cannot be made out satisfactorily unless the material is floated out and examined very carefully under a dissecting microscope. In *P. pusillus* the sheaths frequently become ruptured in age, and it is advisable, therefore, that only young shoots should be subjected to dissection.

Our investigations show that *P. pusillus* is very widely distributed in Great Britain, and not at all uncommon in suitable localities. It occurs from West Cornwall eastwards to East Kent and northwards to Shetland, and up to the present we have seen specimens from 71 out of the 112 vice-counties. Unlike *P. Berchtoldii* it prefers alkaline (even brackish) waters, but it is by no means confined to them and there are many localities where both species are found. The leaves vary considerably in width according to local conditions, the broader ones occasionally having five nerves instead of the normal three, and there can be no doubt that this variation has been responsible for some of the misidentifications: narrow-leaved states have been confused with *P. pusillus* var. *tenuissimus* (which is a state of *P. Berchtoldii*) and with *P. trichoides*, while broader-leaved states have been mistaken for *P. Friesii*.

Below we give a vice-comital list of gatherings of *P. pusillus* from Great Britain examined by us, preceded by a synonymy which includes a selection of references relating to cited gatherings. A sign (†) placed after a reference means that we have not seen a specimen of every plant concerned therein. The gatherings listed are represented in the British Museum Herbarium (including the Boswell and Hanbury Herbaria) unless otherwise indicated. Gatherings referred to in the cited literature are distinguished by a sign (*). As a great many published records remain to be investigated we have not attempted to indicate any new county records.

P. PUSILLUS L. Sp. Pl. i. 127 (1753).—Johnston, Fl. Berwick-upon-Tweed, i. 41 (1829) †.—A. Murr. Northern Fl. 110 (1836) pro parte †.—Bromfield in Phytologist, iii. 1012 (1850) pro parte †.—Brewer, Fl. Surrey, 244 (1863) pro parte †.—Trim. & Dyer, Fl. Middlesex, 296 (1869) pro parte †.—Mennell in Journ. Bot. xx. 52 (1882).—Ley in Rep. Bot. Rec. Club, ii. 230 (1883).—A. Benn. apud Fortescue in Scot. Naturalist, vii. 24 (1883).—Druce in Rep. Bot. Rec. Club, iii. 73 (1884); Fl. Oxford. 286 (1886) pro parte †; in Journ. Bot. xxiv. 371 (1886); in Bot. Soc. & Exch. Club Brit. Is. vi. 152 (1921) pro parte, 528 (1922) pro parte.—Bagnall, Fl. Warwick. 271 (1891) pro parte †.—Beeby in Scot. Naturalist, xi. 30 (1891) excl. var.—Somerville in Journ.

Bot. xxxi. 119 (1893).—J. E. Griff. Fl. Anglesey & Carnarvon. 141 (1895) pro parte †.—F. B. W. White, Fl. Perth. 312 (1898) pro parte.—Marshall & Hanb. Fl. Kent, 365 (1899) pro parte †.—C. E. Salmon in Journ. Bot. xxxix. 419 (1901).—A. B. Jackson in Journ. Bot. xlii. 347 (1904) †.—J. W. White, Fl. Bristol, 610 (1912) pro parte †.—Little in Watson Bot. Exch. Club, ii. 461 (1915).—Horwood & Noel, Fl. Leicester. & Rutland, 576 (1933) pro parte †.—Dandy in Bot. Soc. & Exch. Club Brit. Is. xi. 511 (1938).—Martin & Fras. Fl. Devon, 645 (1939) †.—Dandy & Taylor in Bot. Soc. & Exch. Club Brit. Is. xii. 62 (1939); in A. H. Evans, Fl. Cambridg. 167 (1939).

P. panormitanus Biv. Nuov. Pi. 6 (1838).—Druce in Bot. Exch. Club Brit. Is. Rep. 1884, 114 (1885); *op. cit.* v. 581 (1920) pro parte; *op. cit.* vi. 528 (1922), 751 (1923); *op. cit.* ix. 374 (1931).—Hagstr. Crit. Res. 98 (1916) †.—A. Benn. in Journ. Bot. lvii. 18 (1919) pro parte †; in Watson Bot. Exch. Club, iii. 148 (1921); ex H. Halcro Johnston in Trans. & Proc. Bot. Soc. Edin. xxviii. 113 (1922).—Pearsall apud Little in Trans. Norfolk & Norwich Naturalists' Soc. xi. 383 (1923); in Bot. Soc. & Exch. Club Brit. Is. x. 845 (1935).—Sledge in Bot. Soc. & Exch. Club Brit. Is. x. 452 (1933).—E. C. Wallace in Watson Bot. Exch. Club, iv. 235 (1934).—Wolley-Dod, Fl. Sussex, 466 (1937).

P. panormitanus var. *minor* Biv. Nuov. Pi. 6 (1838).—Druce in Bot. Soc. & Exch. Club Brit. Is. vi. 50, 152 (1921); *op. cit.* vii. 900, 1067 (1926).

P. pusillus var. *rigidus* A. Benn. apud Fortescue in Scot. Naturalist, vii. 25 (1883).

P. pusillus var. *tenuissimus* (non Mert. & Koch) E. S. Marshall in Journ. Bot. xxxi. 234 (1893).—F. B. W. White, Fl. Perth. 312 (1898).—A. Benn. in McNeill, Colonsay, 181 (1910).—W. A. Nicholson, Fl. Norfolk, 154 (1914) pro parte †.—Pearsall ex Vachell in Bot. Soc. & Exch. Club Brit. Is. x. 731 (1934).

P. trichoides (non Cham. & Schlecht.) J. Groves in Bot. Exch. Club Brit. Is. Rep. 1897, 569 (1898) pro parte; *op. cit.* iv. 166 (1915).—A. Benn. in Journ. Bot. li. 336 (1913).—Druce in Bot. Soc. & Exch. Club Brit. Is. viii. 762 (1929).—Lousley in Bot. Soc. & Exch. Club Brit. Is. x. 990 (1935).

P. rutilus (non Wolfg.) A. Benn. in Journ. Bot. xxxviii. 65, t. 407 (1900); ex H. Halcro Johnston in Trans. & Proc. Bot. Soc. Edin. xxviii. 182 (1923).—C. E. Salmon in Watson Bot. Exch. Club, ii. 64 (1906).—Druce in Bot. Soc. & Exch. Club Brit. Is. v. 310, 527 (1919); *op. cit.* ix. 374 (err. *rutilis*) (1931).—Pearsall in Bot. Soc. & Exch. Club Brit. Is. x. 845 (1935) pro parte.—H. Halcro Johnston in Bot. Soc. & Exch. Club Brit. Is. xi. 667 (1938).

P. Friesii (non Rupr.) C. Waterfall in Watson Bot. Exch. Club Ann. Rep. 19, 22 (1903).—Pearsall in Bot. Soc. & Exch. Club Brit. Is. x. 546 (1934).

P. pusillus var. *acuminatus* A. Benn. in Journ. Bot. xlv. 173 (1907).

P. ——.—Moss in Bot. Exch. Club & Soc. Brit. Is. ii. 599 (1911).

P. pusillus var. *similis* A. Benn. in Fryer & Benn. Pot. Brit. Is. 84 (1915).

P. pusillus f. *angustifolius* (non G. Fisch.) A. Benn. ex Little in Journ. Bot. lvii. 311 (1919).

P. franconicus (non G. Fisch.) Druce in Bot. Soc. & Exch. Club Brit. Is. vi. 50 (1921) pro parte.

P. trinervius (non G. Fisch.) Hagstr. ex Druce in Bot. Soc. & Exch. Club Brit. Is. vi. 50, 152 (1921) pro parte.

P. Sturrockii (non F. J. Hanb.) Hagstr. ex Druce, *loc. cit.* (1921).

P. dualis (non Hagstr.) Druce in Bot. Soc. & Exch. Club Brit. Is. vi. 152 (1921).

P. sudermanicus (non Hagstr.) A. Benn. in Journ. Bot. lx. 55 (1922).

P. pusilliformis (non Hagstr.) A. Benn. in Journ. Bot. lxiv. 331 (1926).

Vice-county distribution of gatherings examined :—

(1) West Cornwall. Pond, Coverack, St. Keverne, June 1934, *J. D. Grose*, Ref. 795 (Herb. Grose). Loe Pool, Helston, Aug. 1876, *H. E. Fox* (Herb. Druce). Isles of Scilly, July 1890, *I. Somerville* *; Aug. 1894, *R. I. Lynch.*

(2) East Cornwall. Withiel, 1873, *R. V. Tellam.*

(4) North Devon. Meldon Quarry, Okehampton, July 1937, *G. T. Fraser* *.

(6) North Somerset. Rhine, Catcott Heath, Aug. 1916, *H. F. Devis* (Herb. Kew). Rhine, Yatton, July 1904, *F. L. Foord-Kelcey.* Walton Moor, Walton-in-Gordano, Aug. 1919, *H. S. Thompson.* Weston-in-Gordano, June 1901, *J. W. White* *; July 1903, *G. C. Druce* (Herb. Druce). Kennet & Avon Canal, Bath, Aug. 1932, *E. Vachell* (Herb. Vachell).

(7) North Wilts. Kennet & Avon Canal, Crofton, Great Bedwyn, July 1937, *J. D. Grose*, Ref. 2779 * (Herb. Grose), and *E. C. Wallace* * (Herb. Wallace); Aug. 1939, *G. Taylor.*

(8) South Wilts. Kennet & Avon Canal (near Crofton), Great Bedwyn, July 1937, *J. D. Grose*, Ref. 2779 * (Herb. Grose), and *E. C. Wallace* * (Herb. Wallace). Kennet & Avon Canal, Wilton, Grafton, Aug. 1939, *G. Taylor.*

(9) Dorset. Ridge, Arne, July 1920, *N. D. Simpson*, Ref. 20268 (Herb. Simpson). Little Sea, Studland, Aug. 1881, *H. T. Mennell* *; Aug. 1883, *P. S. King.* Pond near Encombe, Corfe Castle, July 1937, *J. F. G. Chapple.*

(10) Isle of Wight. Marshes, Medina Valley near Cowes, July 1921, *J. Groves & J. W. Long.* Brading Marshes, July 1835,

W. A. Bromfield * (Herb. Kew); July 1915, *E. W. Hunnybun*. Brading Harbour, Bembridge, July 1881, *C. Bailey*.

(11) South Hants. Pool on upper beach, Mudeford, Christchurch, Sept. 1934, *J. E. Lousley* (Herb. Lousley).

(12) North Hants. Fleet Pond, Aug. 1921, *J. Davy* *, and *T. J. Foggitt*; July 1934, *P. M. Hall*, Ref. 1218 * (Herb. Hall; Herb. Kew).

(13) West Sussex. Ditch near Sidlesham Mill, June 1901, *E. S. Marshall*, Ref. 2607 *. Drain near R. Arun, Houghton, Sept. 1938, *A. H. G. Alston*. Ditch by R. Arun, South Stoke, Aug. 1938, *E. C. Wallace*. Peppering, Burpham, June 1918, *R. J. Burdon*. Amberley Wild Brooks, July 1899, *C. E. Salmon* *; June 1900, *T. Hilton*; Aug. 1901, *E. F. Linton* (Herb. Druce; Herb. S. Lond. Bot. Inst.), and *E. S. Marshall*, Ref. 2606 *; July 1902, *E. S. Marshall*, Ref. 2693 *; Sept. 1938, *A. H. G. Alston*. Henfield, *W. Borrer* (Herb. Borrer, at Kew).

(14) East Sussex. Ponds and ditches near Lewes, July 1899, *T. Hilton* *; June 1925, *G. C. Druce* *; Aug. 1933, *E. C. Wallace*, Ref. 1858 * (Herb. Wallace; Herb. Kew; Herb. S. Lond. Bot. Inst.). Ditches, Iford, July 1898, *T. Hilton*; July 1938, *A. H. G. Alston*. Southease, *J. Woods* (Herb. S. Lond. Bot. Inst.); June 1892, *T. Hilton*. Stream near Exceat Bridge, Westdean, Aug. 1931, *J. E. Lousley* (Herb. Lousley). Drove, Eastbourne, July 1914, *E. Bray*. Stream near Pevensey, July 1932, *H. K. Airy-Shaw & A. K. Jackson* (Herb. Kew). Ditch, Pevensey Levels, July 1933, *E. C. Wallace*, Ref. 1860 (Herb. Wallace; Herb. S. Lond. Bot. Inst.). Ponds, Bulverhithe, Hastings, July 1850, *W. W. Saunders*. Royal Military Canal, Pett, June 1939, *L. H. J. Williams*. Ditch near Camber Castle, Icklesham, July 1900, *C. E. Salmon* *. Ditches, Rye, July 1898, *T. Hilton* *; July 1900, *T. Hilton & C. E. Salmon*; July 1902 * and June 1903, *T. Hilton*. Fen Place Mill Pond, Worth, July 1921, *C. E. Salmon* *.

(15) East Kent. Dyke near The Swale, Cleve Marshes, Whitstable, Sept. 1938, *E. C. Wallace*. Salt ditch west of Seasalter, Whitstable, Aug. 1930, *J. E. Lousley* (Herb. Lousley). Great Stour below Grove Ferry, Wickhambreux, Aug. 1938, *C. Norman*. Royal Military Canal, June 1880, *A. Bennett*. Romney Marsh, Aug. 1875, *F. J. Hanbury* in *Herb. Hanbury* *. Lydd, July 1933, *F. Druce* (Herb. F. Druce).

(16) West Kent. Erith, Aug. 1880, *J. Groves*. Greenhithe, Swanscombe, June 1875, *B. D. Jackson* *; June 1881, *J. Groves*. Hot water, Northfleet, Sept. 1896, *J. Groves* [leaves abnormally lacunar, perhaps owing to temperature of water]. Brackish stream, Gravesend, June 1922, *W. B. Turrill* (Herb. Kew). Thames & Medway Canal, Higham, June 1939, *J. B. Marshall*, Ref. 973.

(17) Surrey. Ash & Normandy (near Aldershot), July 1881, *W. H. Beeby* (Herb. S. Lond. Bot. Inst.). Near Chertsey, May 1886, *W. H. Beeby*; June 1886, *W. H. Beeby* (Herb. S. Lond. Bot. Inst.). Cutt Mill Pond, Puttenham, Aug. 1892, *E. S. Marshall*, Ref. 844. R. Wey Navigation near Send, July 1931, *E. C. Wallace* (Herb. Wallace); Aug. 1931, *J. E. Lousley* (Herb. Lousley). Old Woking, Woking, 1927, *J. Davy* * (Herb. Druce); July 1929, *T. J. Foggitt*. R. Wey Navigation, Weybridge, July 1909, *E. S. Todd* (Herb. Todd). Newdigate, June 1932, *L. Haig* (Herb. Kew). Esher, Aug. 1843, *H. C. Watson* (Herb. Watson, at Kew). Ditton Marsh, Esher, Sept. 1840, *H. C. Watson* * (Herb. Watson, at Kew). Kingston-upon-Thames, 1881, *G. Nicholson*. Ponds, Richmond Park, Aug. 1882, *G. Nicholson* *; Aug. 1939, *G. Taylor*. Ditch by R. Thames, Kew, Richmond, June 1878, *T. R. Sim* (Herb. Univ. Aberdeen); July 1894, *J. H. Morgan*. Pond by Kew Green, Richmond, July 1904, *H. S. Thompson*. Gravel pit, Mitcham, Aug. 1930, *J. E. Lousley* (Herb. Lousley). Domewood Lake (Hedgecourt Mill Pond), Horne, *H. T. Mennell*; Sept. 1915, *C. E. Salmon*; Sept. 1920, *M. L. Wedgwood* *; July 1934, *J. E. Lousley*, Ref. F.30 *; Sept. 1937, *A. H. Carter*.

(18) South Essex. Near Barking, June 1833, *T. Bell Salter* (Herb. Edinburgh). Ditch, Canvey Island, Sept. 1924, *J. E. Woodhead* (Herb. Woodhead).

(20) Herts. Wilstone Reservoir, Tring, Aug. 1939, *G. Taylor*. Old canal, Little Tring, Tring, July and Aug. 1939, *G. Taylor*. Grand Union Canal near The Hoggery, Abbots Langley, Aug. 1939, *G. Taylor*. Ditch by R. Lea near Ware, July 1881, *E. C. de Crespigny*.

(21) Middlesex. Hampton Court, Twickenham, July 1873, *B. D. Jackson* (Herb. Univ. Aberdeen). Grand Union Canal, Isleworth, Aug. 1939, *J. E. Dandy*, Ref. 774. Brick pits near Shepherd's Bush, Hammersmith, July 1833, *C. M. Lemann* (Herb. Univ. Cambridge). Kensington Gardens, 1871, *J. B. L. Warren*. Isle of Dogs, Poplar, *R. Rozea* *.

(22) Berks. Wytham, 1918, *G. C. Druce* *. R. Thames, Cliveden Reach, Cookham, July 1939, *J. E. Dandy & G. Taylor*.

(23) Oxford. Oxford Canal, Wolvercote, Oxford, July 1938, *J. F. G. Chapple* * (Herb. Chapple). Gravel pit near Cassington, July 1938, *J. F. G. Chapple*, Ref. 38131 *. R. Thames, Whitchurch, July 1938, *J. E. Dandy*, Ref. 757.

(24) Bucks. Boarstall, June 1894, *H. J. Riddelsdell*. Grand Union Canal, Aylesbury, Aug. 1939, *G. Taylor*. Grand Union Canal, Broughton, Aug. 1939, *A. H. G. Alston & N. Y. Sandwith*.

(25) East Suffolk. Lound, *D. Turner* (Herb. Kew). Benacre Broad, July 1917, *A. R. Horwood*. Aldeburgh Marshes, Aug. 1939, *F. Druce*.

(27) East Norfolk. Swainsthorpe, 1919, *G. C. Druce* *. Ditches, Surlingham, Aug. 1883, *G. C. Druce* (Herb. Druce).

Dyke, Breydon Water, Aug. 1915, *M. Pallis* (Herb. Univ. Cambridge). Salt marshes, Great Yarmouth, *J. Paget* (Herb. Kew); July 1883, *F. J. Hanbury* in *Herb. Hanbury*. Ditch, Acle, July 1883, *A. Bennett* *. East Caister, *J. Paget* (Herb. Watson, at Kew). Horning, 1887, *H. T. Mennell*; July 1888, *H. T. Mennell* (Herb. Univ. Cambridge). Ditches near Horsey, July 1912, *J. Groves* *; Aug. 1915, *M. Pallis*. Very brackish ditch, Brograve Level, Waxham, Aug. 1909, *C. E. Moss* *. Dyke between Ingham and Palling, Aug. 1897, *J. Groves* *. North Walsham & Dilham Canal (R. Ant), Honing, Aug. 1893, *H. Groves*. Pool among shingle, Weybourne, July 1877, *A. Bennett*. Near Cley-next-the-Sea, July 1883, *F. J. Hanbury*.

(28) West Norfolk. Brackish dyke, Holkham, Aug. 1922, *J. E. Little* * (Herb. Univ. Cambridge). Ditch near sea, Wolferton, June 1884, *G. C. Druce* * (Herb. Druce); July 1884, *G. C. Druce* *.

(29) Cambridge. Wisbech, July 1888, *A. Balding* in *Herb. A. Fryer*, Ref. 1250 *. Drain by Puttocks Toll, Benwick, June 1884, *A. Fryer*, Ref. 775 *. Chatteris, July and Aug. 1884, *A. Fryer* *. The Wash, Mepal, 1884, *A. Fryer*, Ref. 774 *; Aug. 1888, *A. Fryer*, Ref. 1211 *. Old Bedford R., Sutton Gault, *A. Fryer* *. Soham Lode, June 1884, *H. & J. Groves* *.

(30) Bedford. Lake, Southill Park, June and July 1913 *, and July 1930, *J. E. Little*.

(31) Hunts. Holme Lode, Aug. 1888, *A. Fryer*, Ref. 1145. Great Raveley Drain, Aug. 1888, *A. Fryer*, Ref. 1146. Backwater of R. Ouse, Godmanchester, Aug. 1939, *J. E. Dandy & G. Taylor*.

(32) Northampton. Kilsby, *G. C. Druce* (Herb. Druce). R. Cherwell, Franklow Knob, Warkworth, July 1869, *A. French* *. Lake, Deene Park, Deenethorpe, Aug. 1938, *A. B. Jackson*.

(33) East Gloucester. Ditch in meadows adjoining Gloucester, Aug. 1882, *A. Ley* *. Coombe Hill Canal, Leigh, 1862, *W. L. Notcutt* (Herb. Cheltenham Coll.). Canal near Stroud, June 1900, *G. C. Druce* *.

(34) West Gloucester. Chalford, June 1911, *E. M. Day*.

(35) Monmouth. Brecon Canal near Pontypool, *C. Conway*.

(37) Worcester. Stratford-on-Avon Canal near Lifford, King's Norton, Aug. 1894, *H. Groves*.

(38) Warwick. Coventry Canal, Atherstone, *J. A. Power* *. Oxford Canal near Rugby, 1867, *H. P. Reader* (Herb. Univ. Bristol); July 1881, *J. E. Bagnall* *. Grand Union Canal near Warwick, Aug. 1897, *A. B. Jackson*. Stratford-on-Avon Canal near Stratford-on-Avon, July 1881, *J. E. Bagnall* *. Stoke Heath, Coventry, June 1853, *T. Kirk*.

(39) Stafford. R. Trent, Burton-upon-Trent, Sept. 1937, *G. Taylor*. Marl pits, Fradley, Alrewas, *J. A. Power* *. Lichfield, July 1920, *G. C. Druce*.

(40) Salop. Buildwas, *H. Moseley*.

(41) Glamorgan. Aberavon Marshes, Port Talbot, July 1904, *H. J. Riddelsdell*. Port Talbot Docks, July 1904, *H. J. Riddelsdell*. Kenfig Pool, *E. Vachell* * (Herb. Vachell). The Lake, Roath Park, near Cardiff, *E. Vachell* (Herb. Vachell). Glamorganshire Canal, Cardiff, July 1833, *D. Steuart*; Aug. 1932, *E. Vachell* *.

(46) Cardigan. Borth, Aug. 1936, *F. Druce*; June 1937, *J. H. Salter*.

(48) Merioneth. Ditches near Towyn, July 1878, *H. E. Fox* (Herb. Druce); Aug. 1886, *A. Ley*.

(49) Carnarvon. Pond, Llanfairfechan, Sept. 1939, *F. Talfourd Jones*. Flats near river-mouth, Traeth Mawr, Aug. 1886, *A. Ley*.

(52) Anglesey. Llyn Coron, Aug. 1886 and July 1892, *J. E. Griffith* *; Aug. 1901, *H. J. Riddelsdell*; July 1918, *G. C. Druce & M. L. Wedgwood* *; July 1930, *G. C. Druce* *.

(53) South Lincoln. By road to Postland Station, Crowland, July 1892, *A. Fryer*, Ref. 2141.

(54) North Lincoln. Near Grimsby, *H. C. Watson* (Herb. Watson, at Kew). North Idle Drain, Haxey, Aug. 1939, *C. I. & N. Y. Sandwith*. Pond, Trusthorpe, Aug. 1910, *C. I. Sandwith* (Herb. Sandwith).

(55) Leicester. Lake, Abbey Park, Leicester, July 1905, *W. Bell* * (Herb. Leicester Lit. & Phil. Soc.). Grand Union Canal, Loughborough, Aug. 1891 and July 1892, *E. F. Cooper* *.

(56) Nottingham. Nottingham Canal, Wollaton, Nottingham, Sept. 1937, *G. Taylor*. Lake, Newstead Abbey, Sept. 1937, *G. Taylor*. Chesterfield Canal, Gringley-on-the-Hill, Aug. 1939, *C. I. & N. Y. Sandwith*.

(57) Derby. Cromford Canal, Cromford, July 1937, *E. S. Todd* *. Cromford Canal between Cromford and Whatstandwell, July 1884, *C. Bailey*.

(59) South Lancaster. Canal near Reddish, Sept. 1883, *C. Bailey*; Aug. 1891, *J. A. Wheldon* (Herb. Druce); July 1939, *F. L. Stephens*. Arpley Meadows, Warrington, July 1886, *C. R. Billups* in *Herb. A. Fryer*, Ref. 779; July 1887, *C. R. Billups* in *Herb. A. Fryer*, Ref. 780.

(60) West Lancaster. Lancaster Canal near Lancaster, June 1865, *W. P. Hiern*. Lancaster Canal, Myerscough, Oct. 1939, *J. E. Dandy*, Ref. 785.

(61) South-east York. Hornsea Mere, July 1938, *A. H. G. Alston*.

(63) South-west York. Calder & Hebble Navigation, Salterhebble, Halifax, June 1897, *W. B. Crump*; Aug. 1930, *G. C. Druce* * (Herb. Druce). Calder & Hebble Navigation, Dewsbury, July 1885, *P. F. Lee*, Ref. 3.

(64) Mid-west York. Pond near R. Ouse, York, Aug. 1931, *T. J. Foggitt*.

(65) NORTH-WEST YORK. Aske Pond, 1822, *H. P. B.* ex *Herb. R. B. Bowman* (Herb. Hancock Mus., Newcastle-upon-Tyne).

(68) CHEVIOTLAND. Holy Island, *G. Johnston* * (Linn. Soc. Brit. Herb.); Aug. 1894, *D. Oliver*.

(69) WESTMORLAND. Lily Bay, Windermere, Aug. 1895, *C. Waterfall* *. Esthwaite Water, Hawkshead, June 1932, *W. A. Sledge* *; July 1934, *G. Taylor*; Aug. 1934, *T. J. Foggitt*.

(70) CUMBERLAND. Derwent Water, Aug. 1883, *H. Groves*.

(73) KIRCUDBRIGHT. Carlingwark Loch, Kelton, July 1939, *G. Taylor*.

(74) WIGTOWN. R. Bladnoch, July 1883, *G. C. Druce*. Pond, Baldoon, Kirkinner, July 1883, *G. C. Druce* * (Herb. Druce). Pond near Sandhead, Stoneykirk, July 1934, *G. Taylor*.

(77) LANARK. Glenbuck Loch, Douglas, June 1934, *G. Taylor* *.

(80) ROXBURGH. Yetholm Loch, 1831, *R. C. Embleton* (Herb. Hancock Mus., Newcastle-upon-Tyne).

(83) EDINBURGH. Dunsapie Loch, Edinburgh, July 1935 and July 1937, *G. Taylor*.

(85) FIFE. Morton Lochs, Forgan, June 1939, *G. Taylor*. Lochmill Loch, Newburgh, July 1937, *G. Taylor*. Loch Gelly, Aug. 1868 and Aug. 1869, *J. T. I. Syme* in *Herb. Boswell*. Kinghorn Loch, July 1935, *G. Taylor*. Loch Leven, Aug. 1870, *J. T. I. Syme* in *Herb. Boswell*; Aug. 1909, *G. West* *.

(86) STIRLING. Wood ponds, Grangemouth, July 1934, July 1935, and July 1937, *G. Taylor*. Forth & Clyde Canal, Lock 17, Falkirk, June 1891, *R. Kidston & J. S. Stirling* *. Forth & Clyde Canal, Underwood, Falkirk, Aug. 1892, *R. Kidston & J. S. Stirling*.

(88) MID PERTH. Loch of Balloch, Muthill, Aug. 1884, *A. Sturrock* * (Herb. Perth Mus.). Pond of Drummond, Muthill, Aug. 1884, *R. Kidston*, *A. Sturrock* * (Herb. Perth Mus.), and *F. B. W. White* * (Herb. Perth Mus.). White Moss Loch, Dunning, Sept. 1883, *F. B. W. White* * (Herb. Perth Mus.); Sept. 1913, *J. R. Matthews* *; Aug. 1926 and July 1937, *G. Taylor*. Dupplin Loch, Forteviot, July 1937, *G. Taylor*. Loch near Forgandenny, July 1937, *G. Taylor*. King's Myre, Kinclaven, Aug. 1885, *A. Sturrock* * (Herb. Perth Mus.).

(89) EAST PERTH. Loch of Clunie, Aug. 1932, *J. E. Lousley* (Herb. Lousley). Marlee Loch, July 1881, *A. Sturrock* * (Herb. Perth Mus.); July 1883, *G. C. Druce* (Herb. Druce); July 1937, *G. Taylor*. Monk Myre, Bendochy, Aug. 1902, *F. C. Crawford*.

(90) FORFAR. Loch of Forfar, *G. A. W. Arnott* * (Herb. Kew; Herb. Univ. Glasgow). Loch Fithie, Forfar, Aug. 1907, *R. & M. Corstorphine* (Herb. Corstorphine). Rescobie Loch, July 1903, *A. Somerville* (Herb. Somerville, at Edinburgh); July 1908 and Aug. 1913, *R. & M. Corstorphine* (Herb. Corstorphine). North pond, Monikie, Sept. 1937, *A. Stewart Sandeman*.

(93) NORTH ABERDEEN. Mill dam, Collieston, Slains, Aug. 1917, *J. W. H. Trail* (Herb. Univ. Aberdeen). Cotehill Loch, Slains, Aug. 1917, *J. W. H. Trail* (Herb. Univ. Aberdeen).

(95) ELGIN. Pond, Cooper Park, Elgin, June 1939, *G. Taylor*. Spynie Canal, Lochspynie, Drainie, June 1939, *G. Taylor*.

(96) EASTERNESS. Near Beauly, Kilmorack, Aug. 1892, *E. S. Marshall*, Ref. 794 *.

(102) SOUTH EBUDES. Loch Fada, Colonsay, Sept. 1908, *M. McNeill* *.

(109) CAITHNESS. Loch Heilen, Dunnet, July 1928, *R. W. Butcher*. Loch Scarmclate, Bower, Aug. 1914, *G. Lillie* *. Loch of Wester, Wick, Aug. 1938, *E. S. Todd* * (Herb. Todd). Loch of Winless, Wick, July 1928, *R. W. Butcher*.

(111) ORKNEY. Loch of Harray, Harray, Sept. 1927, *H. H. Johnston*, Ref. 3711 (Herb. Johnston; Herb. Edinburgh) and 3712 (Herb. Johnston; Herb. Druce; Herb. Kew). Loch of Stenness, Aug. 1876, *J. W. H. Trail* *. Loch of Kirbister, Orphir, Aug. 1878, *H. H. Johnston* *; Aug. 1880, *H. H. Johnston* * (Herb. Johnston), and *J. T. I. Syme* *. Loch of Ayre, Holm, Aug. 1922, *H. H. Johnston*, Ref. 1997 *; Aug. 1937, *H. H. Johnston*, Ref. 5045 *, and *J. Sinclair*, Ref. 1215 (Herb. Johnston).

(112) SHETLAND. Cloka Burn, Walls, Aug. 1890, *W. H. Beeby* *. Bardister Loch, Walls, 1920, *G. C. Druce* *. Tingwall, 1920, *G. C. Druce* *. Loch of Asta, Tingwall, 1920, *G. C. Druce* * (Herb. Druce).

NOTES ON BRITISH EUPHRASIAS.—V.

BY H. W. PUGSLEY, B.A., F.L.S.

(Continued from Journ. Bot. 1936, p. 75.)

THE Revision of the British Euphrasiae, published in the 'Journal of the Linnean Society,' xlviii. pp. 439 *seq.* (1930), included a complete vice-comital distribution of each species in Great Britain, as then known, and two supplementary lists of vice-county records were embodied in subsequent papers printed in this Journal in 1933 and 1936. In recently laying in my British specimens that have accumulated since the latter date a number of further records have been observed, and these are shown below. A few may have appeared in other publications.

E. micrantha Rchb.—40. Salop: Whixall (*Burgess*); 67. Northumberland: Harbottle (*Miss Blackburn*); 94. Banff: Ben Avon—f. *simplex* Pugsl. (*Sandwith*).

E. scotica Wettst.—52. Anglesea: Arthur's Seat (*Simpson*); 101. Cantire—v. *purpurascens* Pugsl. (*Fisher*); 106. E. Ross: Lake Ussie—v. *purpurascens* (*Miss Todd*); 109. Caithness: Holborn Head (*Lousley*).

The record for N.E. Yorks is erroneous and should be deleted: Fisher's specimen is *E. confusa* Pugsl.

E. frigida Pugsl.—104. N. Ebudes : Rhum (*Miss Blackburn*).

E. foulaensis Towns. ex Wettst.—104. N. Ebudes : Skye (*Lousley*). The typical form was also collected by Mr. Lousley on Holborn Head, Caithness, where var. *maritima* Pugsl. was originally found.

E. Marshallii Pugsl.—109. Caithness: John o'Groats (*Edees*); 110. Outer Hebrides : Lewis (*Miss Campbell*).

E. curta (Fries) Wettst.—3. S. Devon: Beesands (*Chapple*); 10. Wight : Freshwater (*Chapple*); 96. Easterness : Boat of Garten (*Corstorphine*); 110. Outer Hebrides: S. Uist (*Miss Blackburn*).

E. occidentalis Wettst.—61. S.E. Yorks: Flamboro' Head—v. *calvescens* Pugsl. (*Edees*); 69. Lake Lancs: Walney (*Mrs. Foggitt*); 71. I. of Man—v. *calvescens* (*Paton*); 104. N. Ebudes: Pabay (*Miss Blackburn*); 108. W. Sutherland: Inchnadamph (*Edees*); 110. Outer Hebrides : Barra (*Watson*).

E. nemorosa (Pers.) Löhr.—104. N. Ebudes : Raasay—v. *sabulicola* Pugsl. (*Cooke*); 110. Outer Hebrides: N. Uist—v. *sabulicola* (*Miss Campbell*); Lewis—v. *collina* Pugsl. (*Miss Campbell*). The variety *collina* has been collected in several stations in the island of Lewis by Miss Campbell and Mr. Wilmott.

E. confusa Pugsl. f. *albida*—7. N. Wilts : Whitefield Hill (*Grose*); 8. S. Wilts : Longleat (*Grose*); 57. Derby : Matlock High Tor !; 64. M.W. Yorks : Ingleboro' !; 86. Stirling : Sheriffmuir (*Callen*); 88. Mid Perth : Fearnan (*Edees*); 89. E. Perth : Ben Vrackie (*Callen*); 92. S. Aberdeen : Braemar !; 97. Westerness: Urquhart (*Callen*); 103. Mid Ebudes : Iona (*Callen*); 105. W. Ross : Ullapool (*Callen*); 107. E. Sutherland: Golspie !; Brora—f. *grandiflora* Pugsl. (*Miss Todd*).

E. confusa proves to be one of the most widely distributed species in Great Britain, and is now known from 48 vice-counties, ranging from Cornwall to Shetland.

E. borealis Towns. ex Wettst.—39. Stafford : Morridge (*Edees*); 94. Banff : Tomintoul (*Sandwith*); 104. N. Ebudes : Rhum (*Miss Blackburn*).

E. brevipila Burn. & Gr.—69. Westmorland : Dufton (*Chapple*); 89. E. Perth : Killiekrankie—var. *notata* Pugsl. (*Callen*); 103. Mid Ebudes : Iona—f. *gracilior* Pugsl. (*Callen*).

E. rivularis Pugsl.—48. Merioneth : Llanfachreth (*J. B. Marshall*); 70. Cumberland : Honister (*Sandwith*).

E. anglica Pugsl.—34. W. Glo'ster: Lancaut (*Riddelsdell*); 39. Stafford : Cheedle (*Edees*).

A number of forms examined are of presumably hybrid origin. These include *E. brevipila* × *confusa* from five, and *E. brevipila* × *micrantha* from seven Scottish vice-counties.

The Irish Eyebrights have only been partially examined, a large proportion of the specimens seen being from County Wicklow. In addition to the stations given in 'The Botanist in Ireland' *E. occidentalis* has been seen from vice-counties Wexford, Wicklow and East Donegal; *E. nemorosa* from West Galway and Antrim ; *E. confusa* f. *albida* from Carlow and Antrim ; *E. brevipila*, which seems to be widely distributed in Ireland, from West Cork, East Cork and Clare ; and *E. Rostkoviana* from Wicklow and Sligo. A fine form of *E. scotica* var. *purpurascens* was collected in 1937 by Mr. N. D. Simpson in Sligo. Of the many specimens of *E. Rostkoviana* received from County Wicklow, the great majority are stunted or depauperate plants, sometimes not readily distinguishable from *E. anglica*. A form seemingly referable to the Welsh *E. rivularis* grows on Lugnacullia and above Lake Ouler. No Irish examples of *E. borealis* have been observed, and the record of *E. Pseudo-Kerneri* for Sligo appears to be founded on Miss Roper's specimen from Rosses Point, which is not that species but probably of hybrid origin, *E. brevipila* × *nemorosa*. Most of the Irish *E. nemorosa* belongs to the variety *collina*.

A NEW *RUBUS* FROM CORNWALL.

By F. Rilstone, A.L.S.

The bramble described and named below, which I have had under observation since 1921, occurs with considerable frequency over an area of Cornwall comprising the Lizard and Land's End peninsulas and extending eastwards at least forty miles. I can find no named species with which it can be identified ; it is obviously one of the several endemic Cornish brambles. The eastern portion of its territory, where I have seen it more frequently than elsewhere, comes within the bounds of the ancient domain of Pydar, the lands of the monks of St. Petrock—hence the epithet.

Rubus pydarensis, sp. nov.

Turiones obsolete angulati vel teretiusculi, pilosi, parce tomentosi, aculeis subæqualibus reclinatis armati. Folia plerumque quinata, parva vel mediocria, subtus dense albo-tomentosa pilosa. Foliolum terminale late ellipticum vel suborbiculare vel interdum obovatum, breviter acuminatum. Inflorescentia angusta, inferne interrupta foliosa, apicem versus congesta. Rachis cum pedicellis pilosa, dense tomentosa, glandulis stipitatis raris vel nullis, aculeis reclinatis instructa. Sepala triangularia tomentosa plerumque inermia post anthesin reflexa. Petala mediocria sat anguste obovata. Stamina alba stylos superantia. Carpella glabra.

Stem bluntly angled or roundish with numerous clustered hairs and some pubescence, dull greenish grey or dull green mottled with dull red or variously mottled or tinged with purple. Prickles usually with bright red bases and yellowish points,

mainly confined to the angles, declining or almost patent, either fairly even in size or somewhat unequal. Leaves rather small or small, mostly 5-nate digitate or pedate with close white felt and some white hair beneath, moderately to finely toothed, wavy edged with compound teeth towards the point. Terminal leaflet almost orbicular or broadly oval or sometimes obovate, shortly acuminate, with emarginate or subcordate base. Panicle narrowly cylindrical, dense above, interrupted and leafy below with leaves chiefly 3-nate and white-felted beneath. Rachis wavy ; rachis and pedicels hairy and densely felted with declining prickles and few or no stalked glands. Sepals white-felted without acicles or stalked glands, short-pointed, reflexed in fruit. Petals rather small, pink becoming almost white, rather narrowly oval-obovate with ascending points. Stamens white exceeding the pale styles. Fruit almost spherical, of fair size, but composed of comparatively few large drupelets, clear translucent red changing to glossy black. Carpels glabrous.

Type in Herb. Rilstone, Ref. no. 1080 (Lambourne Hill, Perranzabuloe, West Cornwall, September 2nd, 1938).

The plant is one of the Vestiti group with some affinities to the Discolores. The few drupelets of the fruit may suggest hybridity, but it is very constant in its characters over the whole area and the fruit is fairly large and of excellent quality. Counts of drupelets of various species of *Rubus* in the same area gave the following averages per fruit :—*R. argenteus* 41, *R. griseoviridis* 36, *R. dumnoniensis* 30, *R. rusticanus* 36, but *R. pydarensis* only 18. In all our *Rubus* species, however, there are numerous small, but apparently healthy, carpels hidden under the drupelets, and the total of fully developed and partly developed carpels is much the same in all species except in the Caesii where they appear to be constantly fewer. If their appearance is to be trusted, these hidden carpels are normal except for the lack of the enlarged pulpy outer envelope, but I have never tested them for viability.

REPORT UPON A COLLECTION OF PLANTS FROM ANGUILLA, B.W.I.

By Harold E. Box.

The island of Anguilla, one of the most northerly of the Virgin Islands group of the Lesser Antilles, is situated in lat. 18° 13′ 12″ N., and long. 65° 4′ 22″ W., at a distance of about sixty miles north-west of St. Kitts. It is approximately 28 km. long by 6–8 km. in breadth, with an area officially recognized at 35 square miles (9100 hectares). According to Sir Algernon Aspinall " It consists of coral lying on trap rock and covered at irregular intervals by a mixture of red or yellow clay with coralline débris. Over about one-third of its area the coral is seen jutting out in boulders of various sizes, or stretching in

belts from one side of the island to the other, and over another third there is but a thin layer of soil which is not sufficiently deep for agricultural purposes. The remaining third is very fertile." The population is said to be about 4400. The only industries are the cultivation of Sea Island Cotton (*Gossypium barbadense* L.) and the production of salt.

Apart from the fact that Anguilla is the type-locality of the Morris Palmetto (*Thrinax Morrisii* H. Wendl.), little appears to be known of its vegetation*, and it seems desirable to place on record a small collection, in the British Museum, made by W. R. Elliott † in March 1892, which I have been privileged to examine.

Thirty-three species are represented, all Dicotyledones. Mr. Elliott's original numbers are placed against the species concerned :—

NYCTAGINACEAE.

Pisonia subcordata Sw.—54.

CAPPARIDACEAE.

Gynandropsis gynandra (L.) Briq.—59.

PORTULACACAE.

Portulaca halimoides L.—69.

PAPAVERACEAE.

Argemone mexicana L.—80.

LEGUMINOSAE.

Cassia bicapsularis L.—58.
Pithecellobium unguis-cati (L.) Benth.—57.

MALPIGHIACEAE.

Heteropteris purpurea (L.) Kunth.—41.
Byrsonima lucida (Mill.) Rich. ex Juss.—36.

RUTACEAE.

Amyris Elemifera L.—38.

SIMAROUBACEAE.

Suriana maritima L.—51.

EUPHORBIACEAE.

Phyllanthus epiphyllanthus L.—33.
Croton balsamifer Jacq.—39.
Euphorbia buxifolia Lam.—48.

* D. Morris gives some general notes and mentions certain species by name in Bull. Misc. Inf. Kew, 1891, 129–132.

† William Robert Elliott (1860–1908). A gardener at the Royal Botanic Gardens, Kew, who was later sent out as a collector for the West Indian Exploration Committee, and afterwards appointed to take charge of the Botanic Station at Grenada, B.W.I. He collected a considerable number of Cryptogams in the West Indies.

CELASTRACEAE.

Rhacoma Crossopetalum L.—56.

RHAMNACEAE.

Colubrina ferruginosa Brongn.—34.

MALVACEAE.

Malvastrum coromandelianum (L.) Garcke.—46.

STERCULIACEAE.

Melochia tomentosa L.—60.
Waltheria indica L. (*W. americana* L.).—43.

THEOPHRASTACEAE.

Jaquinia Berterii Spreng. var. *portoricensis* Urb.—61.

CONVOLVULACEAE.

Cuscuta americana L.—31 (parasitic on *Croton balsamifer*).
Ipomoea Steudelii Millsp.—35.

ASCLEPIADACEAE.

Asclepias curassavica L.—47 (native of S.E. Asia).

BORAGINACEAE.

Tournefortia gnaphalodes (L.) R. Br.—52.
Heliotropium angiospermum Murr. (*H. parviflorum* L.).—45.

VERBENACEAE.

Lantana involucrata L.—44.

SOLANACEAE.

Solanum racemosum Jacq. var. *igneum* (L.) O. E. Schulz.—53.

BIGNONIACEAE.

Tecoma stans (L.) Juss.—42.

RUBIACEAE.

Exostema caribaeum (Jacq.) Roem. & Schult.—37.
Erithalis fruticosa L.—40.
Strumpfia maritima Jacq.—49.
Ernodea littoralis Sw.—32.

COMPOSITAE.

Parthenium hysterophorus L.—30 (common in cultivated fields).

Borrichia arborescens (L.) DC.—50, 55.

These plants, with the exception of *Argemone mexicana*, *Parthenium hysterophorus*, and the introduced *Asclepias curassavica*, which are weeds, are typical constituents of the type of xerophytic bushlands seen in Barbuda and the limestone region of Antigua, though the presence of *Thrinax Morrisii* and *Ipomoea Steudelii*, which do not occur in Antigua, suggests a closer relationship with the former island.

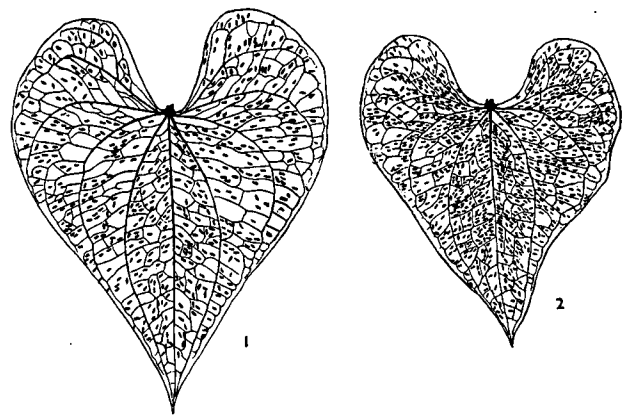
THE DISTRIBUTION OF RAPHIDES IN THE LEAVES OF *TAMUS COMMUNIS* LINN.

By I. H. Burkill.

There is order in the arrangement of raphides in the leaves of *Tamus*, although not very precise; and a similar measure of order can be seen in the leaves of such species of *Dioscorea* as hold them. This note relates to *Tamus* only.

The raphides begin to form in rudimentary leaves not yet 1 mm. long and just before vasculation appears. The first-formed crystals lie under the margins with the long axis parallel to the margin, *i. e.*, in the long axis of the rudimentary leaf.

When the midrib and the thickening of the lamina at its back has appeared, raphides appear under the epidermis of this thickening; and, again, the crystals lie with their long axes in the long axis of the rudimentary leaf.



Figs. 1 & 2.—Fully grown leaves, × 1/3, with all the raphides indicated except the small early-formed bundles of crystals in the margins and on the backs of the larger nerves. It has been necessary to exaggerate the size of the raphides in this and the following figures.

With the appearance of further nerves, raphides are formed at the back of them as at the back of the midrib, their long axes parallel to the nerve. But this formation soon wanes. All these early-formed raphides remain of small size and make a class apart from the larger and later raphides produced in the assimilating parenchyma between the nerves. It is the larger and later bundles of crystals whose positions and angles, relative to the long axis of the leaf, are shown in the four accompanying figures.

Figs. 1 and 2 were drawn from leaves 11 and 9 cm. long, the one with about 450 and the other with about 840 of these

larger bundles of raphides. The smaller bundles of the margins and larger veins are not indicated.

Inasmuch as the cells which hold raphides are commonly elongated in one dimension and since the raphides always lie in that dimension, the angle indicated by the crystals is the angle of the greatest dimension of certain ideoblastic cells dispersed through the tissues. Two groups of questions arise, the one bearing on the dispersal of these crystal-holding cells, which are more abundant in the leaves of some plants than in the leaves of others, and occasionally absent from scattered

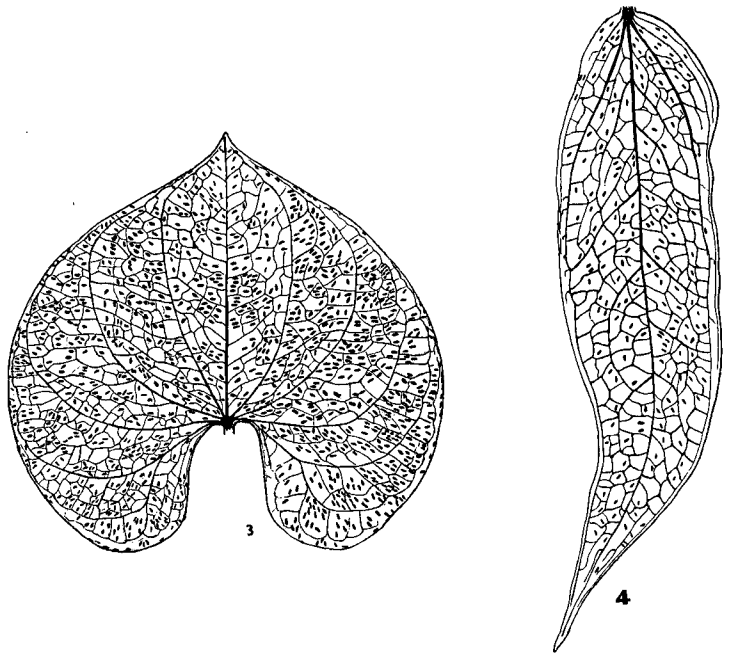


Fig. 3.—The first foliage leaf of a seedling of *Tamus*, × 20/3, with all the raphides indicated.
Fig. 4.—A leaf from the base of a vigorous panicle, × 10/3, with all the raphides indicated.

lozenges in the reticulum, but always separated from one another ; the other on the angle at which they lie, *i. e.*, the angle of greatest elongation of the cells holding them. It is on the latter that the following remarks bear.

Examination of figs. 1 and 2 shows that :—

(1) the raphides near the midrib are scarcely ever parallel to it, but the angle between their long axis and it tends to be less towards the apex of the leaf than towards the base ;

(2) the raphides at the opposite sides of the lateral nerves differ markedly in the angle they take, those of the inner side being much oftener parallel to the nerve than those on the outer side ; and this much more so in the basal part of the leaf-blade than in the apical part ;

(3) the raphides within the lozenges of the tertiary nerves tend to lie in the long axis of the lozenge.

The cotyledon of *Tamus* functions as an adsorbent organ within the seed. It is succeeded by a foliage leaf which is reniform. Fig. 3 shows the position of the raphides in such a reniform leaf. Again, we observe the raphides close to the midrib scarcely ever parallel to it, and the raphides inside the arcuate nerves parallel to them and the raphides in the lozenges among the tertiary nerves chiefly in the long axis of the lozenge. But in association with the proportionately greater transverse growth of the leaf, there are more bundles of crystals lying at 90° to the midrib than in figs. 1 and 2.

It is natural, and probably right, to maintain that the axis in which the raphides lie is the direction of a tension on the cells holding them at the time when these cells are set apart for the purpose of holding them. If that be so, the raphides are pointers to the play of forces most difficult to measure, operative in the expansion of the lamina. The angles at which they lie, let us say in the neighbourhood of the first lateral nerves, suggest a push upwards from the base and a pull outwards at the middle where the arcuation makes the first lateral nerve most remote from the midrib.

At the base of large male panicles *Tamus* at times produces lanceolate or lanceolate-ovate leaves of relatively small size—leaves transitional towards bracts. Fig. 4 is one of these which was 2·5 cm. long. In such a leaf where the direction of growth is mainly elongational, the raphides are apt to point forwards and there is no marked difference in angle between the raphides within the lateral nerves and those outside. In the leaf figured, on the left-hand side there are some secondary arcuations ; and in connection with them, be it noted, are a few bundles of raphides at an angle of about 90° to the midrib.

In this Journal (1939, p. 329) is a figure showing the microscopic nervules of the leaf such as could not be inserted in the four figures of this paper ; the raphides are also shown in that figure. It will there be noticed that nervules may actually cross cells containing raphides.

The study of the position of the raphides makes a clear impression that eddies exist in the building-up of the leaf-blade connected with elongation of the larger nerves and that there is very much as yet inexplicable (even theoretically) in the evolution of the Dioscoreaceous leaf from the very simple elongated structure of the typical Monocotyledon.

AN UNDESCRIBED SPECIES OF *ASPLENIUM* FROM ARGENTINA.

By A. H. G. Alston.

I received about a year ago from Señor A. Ruiz Leal specimens of a species of *Asplenium* which I was unable to match. It appeared to be the *A. Trichomanes* of Argentine authors. A request to Señor Ruiz Leal for more material produced three further gatherings, and I also received specimens from the Instituto Miguel Lillo.

Microscopic examination of the scales of these specimens showed that they were unlike those of *A. Trichomanes* and resembled those of *A. resiliens* Kunze, a species occurring from Virginia to Kansas, and southwards to Jamaica, Mexico, and Guatemala. The scales of *A. resiliens* Kunze have, however, more hyaline cells on the margin than the Argentine specimens.

It is proposed to call the Argentine plant :—

Asplenium Lealii, sp. nov.

Rhizoma breviter suberecta, paleacea, palcis persistentibus, dense imbricatis, nigris, opacis, margine nonnunquam reticulata, anguste lineari-lanceolatis, c. 3 mm. longis, apice attenuato capilliforme ; stipes 2–6 mm. longus, niger, vix alata. Frondes sub-numerosæ, 7–20 mm. longæ, ambitu anguste oblongæ, pinnatæ, basin versus vix attenuatæ, apice attenatæ. Pinnæ 12–15-jugis sessiles, opacæ, coriaceæ, glabræ, circa 3 mm. latæ, 7 mm. longæ, oblongæ, leviter curvatæ, lateris superioris basi rectangulare auriculatæ, lateris inferioris basi cuneatæ, marginibus leviter crenatis ; pinnæ inferiores, plus-minusve reductæ, subtriangulares, basi truncatæ ; venulæ pinnatæ, laterales unifurcatæ vel basi anteriore simplices ; sori breves, lineares, supra-mediales, indusiis albidis firmis, integris.

Argentina : Mendoza : Las Heras, near Ida de la Casa de Piedra, 1800 m., *A. Ruiz Leal* 4762 (type) ; Las Heras, near Cacheuta (Minas de petroleo), *R. Lauzin* 1340 ; Lujan, near La Crucezita, *G. Semper* 4156 ; Las Heras, Quebrada del Potrero Puerta, in shade near Azua de las Avispas, 1700–1800 m., *A. Ruiz Leal* 6114.

Catamarca : Quebrada del Yacimiento, *Castillon* 11577 B ; El Potrero, Ambato, *Castillon* 9632, 11578.

Tucuman : Barrancas coloradas, Dept. Capital, 700 m., *Venturi* 803 ; Tafi-La banda, *Lillo* 8887 ; La Hoyada, Tafi, *Venturi* 1830 ; Escava, Rio Chico, 650 m., *Monetti* 1656.

SHORT NOTES.

In Mr. H. W. Pugsley's review of the 'Flora of Devon' which appeared in a recent number of this Journal (October 1939), reference is made to "a unique system of recording by parishes, often with no further details," the reviewer going on to state that "This method of parish records . . . is an innovation in works of this kind." It is probably true that no area so large as the county of Devon has hitherto had its plant records reported in this way, but there is nothing new in the adoption of the parochial system for recording plant distribution. The *method* of "parish records" was systematically employed by the late Prof. Trail in his investigations of the flora of the north-east of Scotland. In his 'Flora of Buchan' (1902) the district is divided into twenty-six parishes, and plant records are entered under the parish names in tabular form. A similar method is adopted by Prof. Craib in the 'Flora of Banffshire' (1912) with twenty-seven parishes, and the parochial system is used also in the more recent 'Flora of Moray' (1935). It may also be noted that Trail's 'Flora of the City Parish of Aberdeen' published in the *Trail Memorial Volume* (1923) is more than a flora of a single parish, since it gives the distribution of plants in seven adjacent parishes.—J. R. Matthews.

Equisetum trachyodon A. Br. in Britain.—Some time ago Dr. Lloyd Praeger invited me to enquire into the occurrence of *Equisetum trachyodon* in north-east Scotland. The plant is not infrequent in Ireland, but the only record for Britain is an old one based on the excellent description of the species in 'The Phytologist' (1842), p. 369, by the Rev. J. B. Brichan as he found it "on the banks and in the bed of the River Dee," within the parish of Banchory, Kincardineshire. After a prolonged search I found, in September 1935, a good colony of the plant near the Bridge of Potarch in the parish of Birse. Since this locality is in south Aberdeenshire the species may be definitely put on record for v.c. 92. Although I was not successful in refinding the plant near Banchory, I have seen one of Brichan's gatherings in Herb. Backhouse, and in Aber. Univ. Herb. there is a specimen, dated 16 Aug. 1842, collected from the "banks of the River Dee at Banchory," unfortunately without collector's name. Brichan's original record for v.c. 91 Kincardine should, therefore, be allowed to stand, although my careful search along the river bank in the neighbourhood of Banchory leads me to believe that the plant may have become extinct in some if not all of the stations mentioned by Brichan.—J. R. Matthews.

REVIEWS.

A Flora of Cambridgeshire. By A. H. Evans, Sc.D., F.R.S.E. Pp. 223. Geological Map (opp. p. 190). London: Gurney & Jackson, 1939. Price 7*s.* 6*d.* net.

It is some eighty years since Babington published his 'Flora of Cambridgeshire' which set the standard for the county Floras of his day, and even then it was two centuries since John Ray published his 'Catalogus Plantarum circa Cantabrigiam nascentium.' The flora of the county in general has, therefore, been well known for a long time, and with a standard Flora already in existence, albeit old, the author has preferred to bring our knowledge up to date in the form of a low-priced small book which contains much summarized information, rather than in that of a large high-priced, very detailed Flora. Although this is the first time that such a summarized county Flora has been produced, such small works may prove to be the natural sequels to the larger standard works. The ability to carry the book into the field should be of considerable advantage to any botanist visiting a county with the flora of which he is not familiar, for the present type of standard Flora has grown so large that it must remain in the library. The four blank pages (225–228) headed "Addenda" will be welcomed by those who make much use of the book.

The six short chapters (pp. 1–30) introductory to the plant list contain much interesting matter. The first—topography—is to be commended for its short gazetteer of local place-names not to be found on the maps commonly used. In this connexion I would draw attention to a too frequent localization of specimens by minor place-names which do not occur in the standard gazetteers, a practice which entails much waste of time: the name of the parish or nearest larger town sure to be found in a gazetteer should always be added. The second chapter outlines the geology and drainage: the third the botanical history: the fourth the floras of the special areas—chalk, boulder clay, fen-lands, greensand, Chippenham sands, maritime and others. The fifth tells of the losses, chiefly due to drainage, and gains; and the sixth contains remarks on the flora in general and its more interesting components.

Having seen the work in MS. and proof I have little comment to make on the plant list. I do not like the alphabetical arrangement of localities, for which the difficulty of making any good subdivisions of the country is responsible, but possibly a visitor may find that it assists consultation.

The plant list is followed by Appendix I (24 pages) containing an interesting account of the "Origin and Drainage of the Fens," and by Appendix II "Charophyta."

The Index is unfortunately incomplete, referring only to the plant list and not also to the references to plants in the other chapters.

The type is clear and the general effect of the page very pleasing. The paper is rather heavy for a pocket book, but possibly that aspect was not considered. Altogether it is an interesting addition to the series of county Floras which have appeared in the last few years.—A. J. W.

A Book of Roses. By J. Ramsbottom. Small 8vo, pp. 30, with 16 colour plates after the originals in Redouté's Roses. Harmondsworth: The King Penguin Books. Price 1*s.*

This is a charming little book written round sixteen plates from Redouté's well-known drawings of roses selected so as to give a general idea of varieties.

In his twenty-five pages of text Mr. Ramsbottom provides an interesting account of the artist with his portrait and a description of his work. Redouté was Court painter to the French Court, and, after the Revolution, to the Empress Josephine, who we are told, in the preface to Graveraux' 'Roses de la Malmaison,' bore the expense of the preparation and publication of his great work, 'Les Roses.'

Mr. Ramsbottom then gives a short account of the history of the Rose in classical and medieval times, down to the end of the first quarter of the XIX Century, when Redouté's books appeared (1817 to 1824).

This sketch of the history of the Rose is followed by short detailed notices of the roses in the sixteen plates. The first is the dwarf American rose, *R. nitida*, an altogether delightful little rockery rose; the plate in the original edition is called *Rosa Redoutea* var. *rubescens*, but is, however, that called in the octavo edition, "var. *glauca*": it is the pink form (perhaps var. *rubescens*) which is to be found in English gardens to-day, and it is doubtful whether the variety "*glauca*" is now in cultivation.

Then follow the yellow and copper Austrian Briars, the Apple Rose (*R. pomifera*), the Dog Rose, and amongst others some of the Gallicas, the semi-double form of the Musk Rose, the China Rose, the Cabbage Rose (*R. centifolia*) and its dwarf form the Pompom de Meaux, and the Moss Rose.

We thus find the selection is fairly representative of the garden forms grown at the beginning of the last century.

It will be noticed that all the double roses illustrated are of the cup-shaped class with short centre petals, a form which with little variation apparently came down from very early days. They make no suggestion of the modern type with its high centre petals and pointed shape which we now find so beautiful. This lengthening of the centre petals and pointed shape did not appear

till fifty years after Redouté, in the improvement by cross-fertilization of the Tea Rose, and later, in the Hybrid Tea.

Much interest has of late been taken in the old-fashioned roses, and those who can afford to devote a quiet corner of the garden to them will be able to enjoy the delicate beauty of some of these old forms, and will not do amiss. No one would use them for a display such as our modern forms will supply, and attempts to exhibit these old roses in groups at our modern shows have generally been failures. They are summer flowering only (except the China Rose which ought to have a corner to itself with something grey for a background, say lavender). Therefore during the greater part of the year, like many flowering shrubs, they will show foliage only without flowers.

Hence the suggestion of a " quiet corner," where they can be visited and enjoyed when in flower, but will not detract in late summer and autumn from the floral display in the Rose garden.—H. R. DARLINGTON.

BOOKS-NOTES, NEWS, ETC.

BRITISH MYCOLOGICAL SOCIETY.—The postponed Annual Meeting was held in the rooms of the Linnean Society on December 16th. The President, Mr. E. W. Mason, gave an address " On Specimens, Species and Names ". Dr. H. Wormald was elected President for 1940.

BRITISH ASSOCIATION.—At a meeting of the General Committee held under the Presidency of Sir Richard Gregory to consider the arrangements to be made for 1940 it was provisionally agreed to hold a meeting at some place near London, but outside the evacuated area, to last two or two and a half days. It is suggested that there shall be a short general opening session and then the meeting shall divide into four groups :—1. Intellectual Co-operation, 2. Natural resources and wartime needs, *a*. Minerals, *b*. Plant products. 3. Social aspects of Human Nutrition. 4. Scientific Discovery and Progressive Industry. It is obvious that there would be much in such a programme to interest all except the most " academic " botanist.

VIITH INTERNATIONAL BOTANICAL CONGRESS.—The Organizing Committee of the Seventh International Botanical Congress which was to be held in Stockholm 1940, has, on account of the present international situation and in conjunction with the Swedish Government, decided to postpone all preparations for the Congress until further notice. This means that there will be no Congress during 1940. The Organizing Committee and its Executive have not, however, been dissolved, but will continue in office, and will, at the first opportunity, communicate with the leading botanical circles in different countries with a view to ascertaining a suitable time for the Congress to be held.

THE

JOURNAL OF BOTANY

BRITISH AND FOREIGN.

ON *HYPERICUM QUADRANGULUM* L.

BY H. W. PUGSLEY, B.A., F.L.S.

FOR more than half a century I have been familiar with the two square-stemmed British Hypericums, the one known generally as *H. quadrangulum* L., *H. tetrapterum* Fr. or *H. acutum* Moench, the other as *H. quadrangulum* L., *H. dubium* Leers or *H. maculatum* Crantz. In 1913 another allied species, *H. Desetangsii* Lamotte, was reported as British by C. E. Salmon in this Journal, li. 317. I found this plant at Wimbledon in 1916, growing with *H. dubium* (which name I will tentatively use, to avoid confusion, instead of *H. quadrangulum*), and, noting the uncertain characters assigned to it, I suspected it to be a hybrid, *H. dubium* × *perforatum* L. Shortly afterwards I brought *H. dubium* into the garden, and crossing it with *H. perforatum* raised a batch of seedlings very close to *H. Desetangsii*. I have since met with other British plants that seem to be intermediate between *H. dubium* and *H. Desetangsii*. In 1928 I collected for the first time the Swiss subalpine plant referred to *H. quadrangulum* or *H. maculatum*, and noticed that it differed from the British forms. On attempting accurately to identify these specimens I have found an almost inextricable confusion of plants and names which cannot readily be followed. While refraining from any attempt to stabilize the nomenclature, I will try to show that *H. maculatum* Crantz differs from *H. dubium* Leers and is not a British plant, that *H. dubium* Leers is identical with *H. Desetangsii* var. *imperforatum* Bonnet, and that *H. Desetangsii* Lamotte is of hybrid origin, *H. dubium* × *perforatum*.

H. quadrangulum L. was published in Sp. Pl. 785 (1753) thus :—

" H. floribus trigynis, caule quadrato herbaceo. Hort. Cliff. 380. Fl. Suec. 624. Roy. Lugdb. 473. Dalib. Par. 234.

H. Ascyron dictum, caule quadrangulo. Bauh. Hist. iii. 382. Ascyron. Dod. Pempt. 78. Hab. in Europæ pratis."

Linnaeus gives no description, and his vague diagnosis is adopted from the Hortus Cliffortianus. In the present unfortunate conditions due to the war it is impossible to consult the Linnaean Herbarium or the pre-Linnaean authors cited, but the plant of the Hortus Cliffortianus appears to be the small-flowered species subsequently named *H. tetrapterum* by Fries. Linnaeus's herbarium is said to contain two sheets of the plant, the first of which is labelled "*quadrangulum*" by Linnaeus, while on the second the same name appears in the handwriting of Sir James Smith. The plant of the first sheet is thought to be *H. maculatum* or *H. dubium*, that of the second *H. tetrapterum*; and owing to the first sheet being labelled by Linnaeus the plant thereon has been frequently regarded as the specific type. But the application of the name depends on the account in 'Species Plantarum' rather than on the Linnaean Herbarium. Smith, who possessed the Herbarium, considered that *H. quadrangulum* L. was the small-flowered species, and presumably wrote up Linnæus's unnamed sheet accordingly. Not only Smith, but Hudson and De Candolle, as well as Crantz, Leers and Villars, who studied this group, used *H. quadrangulum* in this sense. In 1841 Babington wrote a paper "On the true *H. quadrangulum* L." in Trans. Bot. Soc. Edin. i. 83, maintaining a similar view, and adopted *H. quadrangulum* in the early editions of his Manual. On the other hand, Fries (Novit. 94 (1823)) pointed out that Linnaeus also cited Fl. Suec. 624 in Sp. Pl., and claimed that the large-flowered plant (which will be shown to be *H. maculatum* Crantz) was the common species in Sweden, and that *H. tetrapterum* was rare there and unknown to Linnaeus. It is possible that Linnaeus did not appreciate the difference between the form growing in Sweden and that which he had seen in Holland, and that his name should be regarded as a nomen ambiguum. The question is not a simple one, and it is clearly undesirable to adjudicate in the absence of the most important evidence. Names will therefore be used here solely with a view to clarity and without prejudice to their validity. It unfortunately happens that two other names in frequent use, *H. acutum* Moench and *H. quadratum* Stokes, are nomina illegitima (abortiva) under existing rules.

The next species to be distinguished is *H. maculatum* Crantz (Stirp. Austr. ed. 1, 64 (1762), ed. 2, 98 (1769)). This is briefly described "H. calyce, floribus, foliis, caule maculatis," and after some early synonyms, "crescit in subalpinis sylvis et pratis" is added. Crantz notes "H. Linnæi quod ? non scriptum est." This is a plant of subalpine woods and meadows in Austria.

The third species described is *H. dubium* Leers (Fl. Herbornensis, ed. 2, 169 (1789). The account is placed between that of *H. quadrangulum* L. and *H. perforatum* L., and runs thus :—

"Floribus trigynis, caule subquadrato herbaceo, foliis ovatis, calycibus obtusissimis. H. ad sepes am Sieghaus, am Homberg [Hessen-Nassau], ad vias passim.

Caules 2–3-pedales, erecti, subquadrangulares, punctis nigris adspersi. Folia magna, amplexicaulia . . . subtus nigro-punctata, apice subretusa cum acumine brevi. Flores majores quam in *H. perforato*, subcorymbosi, sæpius terni, pedunculati. Calyx . . . foliolis ovatis, integerrimis, obtusissimis . . . lineolis atris . . . notatis. Petala magna . . . supra lineolis, subtus margine punctis atris raris notata . . . Capsula . . . calyce reflexo ad basin cincta . . ."

The leaves of this plant are presumably without pellucid spots, for of the next species, *H. perforatum* L., Leers remarks, "foliis obtusis pellucido-punctatis." It will be observed that *H. dubium* is a tall plant of hedges and roadsides in western Germany, and is described in some detail.

In the same year (1789) *H. delphinense* was published by Villars (Hist. Pl. Dauph. iii. 497), seemingly identical with *H. maculatum* Crantz; and in 1794 Moench (Meth. Hort. Bot. Marburg. 129) created two further new names, *H. obtusum* and *H. acutum*, for *H. dubium* and *H. quadrangulum* respectively.

Somewhat later names are *H. quadratum* Stokes, Bot. Mat. Med. iv. 99 (1812), for *H. quadrangulum* L.; *H. tetragonum* Fries, Fl. Hall. 124 (1818), said to be identical with *H. dubium* Leers but ambiguously described; *H. Leersii* Gmelin, Fl. Bad. iii. 575 (1826), a nomen solum (=*H. dubium* Leers); and *H. tetrapterum* Fr. Novit. 94 (1823), and ed. 2, 236 (1828), for *H. quadrangulum* L. Of the last-named Fries writes (p. 236), as translated, "*H. tetrapterum*—a species never seen by Linnaeus, first collected by me in Sweden in 1819; very distinct; wrongly joined with *H. quadrangulum* in recent works;" and (p. 237), "*H. quadrangulum* (*tetragonum*) Linn. Suec. n. 679. *H. maculatum* Crantz. *H. dubium* Elwert. Smith. If not to be called *quadrangulum* I prefer *tetragonum* rather than *dubium* 'nomen omnino rejiciendum'." Fries does not cite Sp. Pl., Hort. Cliff. or Leers's Fl. Herbornensis, and gives no reasons for his rejection of Leers's name.

In De Candolle's Prodromus, i. 548 (1824) all of these plants appear as one species, *H. quadrangulum* L. (in the sense of *H. tetrapterum* Fr.), with four varieties, β. *dubium*: caule minus ramoso, corollâ nigro-punctatâ, foliis vix pellucido-punctatis, *H. delphinense* Vill.; γ. *maculatum*: Caule magis ramoso . . . foliis pluribus vix perforatis, floribus numerosioribus, *H. maculatum* All. Ped. n. 1433, t. 83, f. 1; δ. *confertum*: caule subsimplici alato, foliis brevibus confertioribus . . . calyce magis acuto, corollâ impunctatâ; ε. *undulatum*: . . . *H. undulatum* Schousb. Neither Crantz nor Leers is cited.

The next name to be traced occurs in Bellynck's Fl. Namur, 31 (1855). Bellynck does not use the name *H. quadrangulum*, but describes *H. tetrapterum* and *H. dubium*, with a third species *H. intermedium* nob. The description of the last is "Tiges de 3 10 déc., fermes, dressées, rameuses, à 4 angles peu saillants et

non ailés. Feuilles ovales-oblongues, toutes parsemées de gros points noirs et de points transparents très nombreux ; à nervures non réticulées. Sépales lanceolés, acuminés. Pétales striés de noir, dépassant longuement le calice. Fleurs assez grandes, d'un jaune doré, en panicules terminales." The plant is said to be rare, growing in damp places. Except for the 4-angled stem the description might be applied to *H. perforatum* L.

In 1874 M. Lamotte introduced another species in Bull. Soc. Bot. France, xxi. 121. This is *H. Desetangsii*, of which the description (abridged) is as follows :—" Tiges . . . munis dans le bas de 4 lignes saillantes dont deux presque membraneuses . . . Feuilles larges, ovales-elliptiques ou elliptiques-oblongues, arrondies au sommet, rétrécies à la base, couvertes de points translucides très fins, moins abondants dans les feuilles supérieures, garnies sur les bords de points noirs, à nervures secondaires transparentes peu ramifiées. Fleurs grandes . . . Sépales lanceolés-étroits, aigus, entiers ou subdentés au sommet . . . dépourvus de points noirs. Pétales d'un beau jaune doré . . . sans points noirs sur les faces . . . à bord . . . garni de quelques glandes noires." The plant is recorded from Allier (Auvergne), and Lamotte adds, " Il est possible que l'*H. Desetangsii* est une espèce assez repandue ; il existe sans doute dans toutes les localités de plaines où l'on indique l'*H. quadrangulum* L., et son aire d'expansion s'étendra aux dépens de ce dernier, qui est une plante essentiellement montagnarde." The *H. quadrangulum* here referred to is doubtlessly *H. maculatum* Crantz.

A " Révision des *Hypericum* sect. *Holosepalum* Spach," by E. Bonnet, followed in the same journal in 1878 (*l. c.* xxv. 277 *sq.*). Three species are given here, viz. :—*H. quadrangulum* L. (*H. maculatum* Crantz), with stems of 2–4 déc., *H. tetrapterum* Fr., of similar stature, and *H. Desetangsii* Lamotte, with stems of 3–8 déc.

The last-named species is divided into two varieties :—

" α *genuinum.*

H. intermedium Bellynck, Fl. Namur, 31 (1855) ; *H. quadrangulum* Des Etangs in Mém. Soc. Agric. de l'Aube, 24 (1841).

Feuilles à nervures non réticulées, criblées de ponctuations excessivement fines, très nombreuses sur les feuilles supérieures, moins fréquentes ou même très rares sur les inférieures ; sépales étroits, lanceolés-aigus, subulés.

β *imperforatum.*

H. dubium Duby, Bot. Gall. i. 96 (partim) ; Lejeune et Court. Comp. iii. 79 ; Bellynck, *l. c.* ; Coss. & Germ. Fl. Paris, ed. 1, 64 ; *H. quadrangulum* Coss. & Germ. *l. c.* ed. 2, 80 ; Bréb. Fl. Normand. ed. 3, 61 ; Lloyd, Fl. Ouest, ed. 3, 66 ; et auct. mult. (non L.).

Feuilles dépourvues de ponctuations pellucides, à nervures secondaires réticulées-transparentes ; sépales inégaux, souvent deux plus courts un peu obtus, entiers ou érodés au sommet, les trois autres plus étroits, acuminés, subulés ou denticulés . . . "

Bonnet states that *H. Desetangsii* inhabits France and Belgium, and that his variety β is commoner than the type. Many stations are cited for the variety from northern France. The account concludes " C'est la var. β que tous les floristes parisiens et que la plupart des auteurs français ont prise pour l'*H. quadrangulum* L. Cette plante figure sous le nom de *H. dubium* dans l'herbier de Botanicum Gallicum de De Candolle. Je n'ai point vu le véritable *H. quadrangulum* de Belgique, car les échantillons publiés sous ce nom par Lejeune et ceux que j'ai reçus de P. Bellynck appartiennent à ma var. β de l'*H. Desetangsii* . . . Quant à l'origine hybride de cette plante [var. α], je ne puis l'admettre, car cette variété ne presente aucun des caractères principaux de l'*H. perforatum* . . . Les capsules des deux variétés sont toujours pleines de graines fertiles."

Bonnet's work seems to form the basis of the account in Rouy and Foucaud's Fl. de France, iii. 334 *sq.* (1896). The synonymy of *H. quadrangulum*, however, is extended to include Eng. Bot. 296, Smith, Fl. Brit. ii. 802, and Bab. Man. ed. 8, 69 ; and a variety *occidentale* Franchet, Fl. Loire et Cher, 97, is added, with pellucid-punctate leaves. *H. Desetangsii* is made a subspecies of *H. acutum* Moench (*H. tetrapterum* Fr.), and Bonnet's variety *imperforatum* is maintained. The descriptions of the plants are clear and adequate. In Coste's ' Flore de France,' i. 259 (1901) the same three plants appear as species, *H. quadrangulum* L., *H. tetrapterum* Fr., and *H. Desetangsii* Lamotte.

In 1903 two fresh accounts of these plants were published. Tourlet (Bull. Soc. Bot. Fr. l. 307) divided *H. quadrangulum* (excluding *H. tetrapterum* Fr.) into three subspecies :—

(1) *H. quadrangulum* L., sensu stricto.—Plante des montagnes.

(2) *H. obtusiusculum* nob.—Sépales inégaux et dissemblables, très obtus-acuminés. Feuilles sans ponctuations translucides.—Plante des plaines, N. & méd. France.

α. *imperforatum* (*H. Desetangsii* var. *imperforatum* Bonnet). Feuilles toutes dépourvues de ponctuations translucides.

β. *perforatum.* Feuilles supérieures, les florales surtout, munies de ponctuations translucides ordinairement peu abondantes.

(3) *H. Desetangsii* Lamotte. Sépales très étroitement lanceolés-acuminés, aigus, subulés. Feuilles toutes munies de ponctuations translucides. Plante des plaines. N. & méd. France.

Professor Schinz's paper on *H. Desetangsii* was printed in Bull. Herb. Boissier, 2nd ser. iii. 10 *sq.* (1903), and according to Fröhlich actually appeared some months earlier than Tourlet's. The species, as var. *genuinum* Bonnet, is stated to be frequent in Canton Zurich, and elsewhere in northern Switzerland; the var. *imperforatum* Bonnet rare or doubtful. *H. quadrangulum* L. is treated as (1) var. *genuinum* Schinz—a plant of the higher mountain and subalpine region; (2) var. *erosum* Schinz, characterized by less clearly anastomosed but not pellucid-punctate leaves, sepals broader than in *H. Desetangsii* var. *imperforatum*, toothed and not smoothly rounded, and the black points of the petals running into lines—from mountains in Canton Zurich; and (3) var. *punctatum* Schinz, like var. *genuinum* but with pellucid-punctate leaves—from the Upper Engadine.

In the third edition of Schinz and Keller's 'Flora der Schweiz,' i. 359 (1909) we find *H. acutum* Moench (*H. tetrapterum* Fr.), *H. Desetangsii* Lamotte and *H. maculatum* Crantz (*H. quadrangulum* auct. non Crantz nec auct. brit.), divided into subspecies *maculatum* (Crantz) and *erosum* Schinz. The brief descriptions are clear and accord well with those in Rouy and Foucaud's 'Flore de France.' It will be noticed that the Linnaean name *H. quadrangulum* has been abandoned.

A lengthy account of these plants appeared two years later (1911) in Sitzber. Akad. Wiss. Math.-Nat. Kl. Wien, cxx. i. 505–598, by Dr. Anton Fröhlich ("Der Formenkreis der Arten *H. perforatum* L., *H. maculatum* Crantz, & *H. acutum* Moench, nebst den Zwischenformen innerhalb des Gebietes von Europa"). Under *H. maculatum* the author admits two subspecies from western Europe, viz.:—*typicum* m. and *erosum* (Schinz) m., citing as synonyms of the latter *H. Desetangsii* β *imperforatum* Bonnet and *H. quadrangulum* var. *erosum* Schinz. Two British stations are given for the latter subspecies from Cornwall and Berks. Fröhlich's succeeding group is *H. maculatum* × *perforatum*, with the synonyms *H. intermedium* Bellynck, *H. Desetangsii* Lamotte, *H. Desetangsii* α *genuinum* Bonnet, and *H. quadrangulum* subsp. *Desetangsii* Tourlet; this is followed by a second hybrid, *H. maculatum* subsp. *erosum* × *perforatum*, nov. hybr., for which a British station (Cornwall) is noted. Fröhlich does not adopt the name *H. quadrangulum* L.

The fourth edition of Schinz and Keller's 'Flora' (1923) gives (p. 451) *H. acutum* Moench, × *H. Desetangsii* (wahrscheinlich *maculatum* × *perforatum*) and *H. maculatum* Crantz, as subspecies *eu-maculatum* Schinz & Thellung and subspecies *obtusiusculum* Tourlet (subsp. *erosum* Schinz). The subsp. *obtusiusculum* is now described in agreement with the accounts of Bonnet and Tourlet.

The latest important work in which these plants are dealt with is Hegi's 'Illustrierte Flora von Mittel-Europa,' where

(v. i. 517 (1925)) *H. maculatum* is divided into six subspecies, of which three occur in western Europe. These are *eu-maculatum* Schinz & Thellung, *obtusiusculum* Fröhl. and *Desetangsii* (Tourlet) Fröhl. The two last-named are recognized as plants of France as well as South Germany and Switzerland.

In British botany this group has received comparatively little attention. The common small-flowered species was first published under a binominal name (*H. quadrangulum* L.) in Hudson's 'Flora Anglica,' ed. 1, 292 (1762), and fourteen years later this name was adopted in Withering's 'Arrangement,' p. 466. *H. dubium* Leers was introduced in 1796 by Smith in 'English Botany,' 296, from plants discovered in Worcestershire, and in Fl. Brit. ii. 802 (1800) Smith remarks, "Distinctissima species est, a nemine ante Leersium detecta." As already noticed, Babington wrote a paper in 1841 (Trans. Bot. Soc. Edin. i. 83) maintaining the validity of *H. quadrangulum* L. instead of the later *H. tetrapterum* of Fries, and describing *H. maculatum* Crantz as a British species in addition to *H. dubium*. This arrangement appears in the first edition of the 'Manual,' but *H. maculatum*, which proved not to be the plant of Crantz, was reduced to a variety of *H. dubium* in the second edition. In the third edition of 'English Botany' by Boswell-Syme (ii. 151 (1864)) we find *H. dubium* Leers α *genuinum* and β *maculatum*, followed by *H. tetrapterum* Fr., the Linnaean name being intentionally passed over; and in the sixth edition of the 'Manual' (1867) Babington admits *H. tetrapterum* in preference to *H. quadrangulum*. Hooker's 'Student's Flora,' ed. 3, 73 (1884) adopts *H. quadrangulum* L. (in part) (*H. dubium* Leers), with a var. *maculatum* Bab., and *H. tetrapterum* Fr. In the ninth edition of Babington's 'Manual,' edited by H. & J. Groves (1904), *H. tetrapterum* reverts to *H. quadrangulum*, and *H. dubium*, with var. *maculatum*, becomes *H. maculatum* Crantz, with var. *Babingtonii* Groves. *H. Desetangsii* was added to our flora by C. E. Salmon in 1913 (*l. c.*) on the basis of the accounts of Lamotte and Bonnet, but without reference to the then recent papers of Tourlet and Fröhlich. The latest edition of the 'London Catalogue of British Plants' (1925) gives *H. dubium* Leers, with b. *erosum* Schinz, *H. Desetangsii* Lamotte and *H. tetrapterum* Fries; Druce's 'British Plant List,' ed. 2 (1928) has *H. quadrangulum* L., with b. *erosum* Schinz, *H. Desetangsii* Lamotte and *H. acutum* Moench, and also admits the hybrids *H. acutum* × *perforatum* and *H. perforatum* × *quadrangulum*. The diversity of names is continued to the two most recent county floras, in which nomenclature has been treated as a special feature. The 'Flora of Sussex,' pp. 85–6 (1937), shows *H. maculatum* Crantz, *H. Desetangsii* Lamotte, and *H. quadrangulum* L. (*H. tetrapterum* Fr.); in the 'Flora of Devon,' pp. 167–8 (1939) we find *H. quadrangulum* L. (*H. maculatum* Crantz) and *H. acutum* Moench.

The identity of the British plants can now be considered. It has already been remarked that the descriptions in the French Floras of Rouy and Foucaud, and of Coste, as well as in Schinz and Keller's 'Flora von Schweiz,' evidently refer to the same three species, which are obviously distinct. The first, *H. tetrapterum* Fr. or *H. acutum* Moench, is generally recognized as a constant plant, subject to few variations. It is of medium height (30–60 cm.), with quadrangular, winged stem, broadly ovate or oval leaves, and normally a compact panicle of numerous, relatively small, light yellow flowers, with lanceolate, acuminate sepals and short styles. The foliar pellucid punctuations so general in the genus are very fine in this species and sometimes scarcely visible without a lens. As a frequent inhabitant of damp ground of the lowlands, *H. tetrapterum* is a widely spread and often common species of western Europe, but it is said to be not frequent in Denmark and rare in Scandinavia. It is a common plant in Britain.

The next species, *H. maculatum* Crantz, has been more commonly misunderstood. The original description (*l. c.*) is unsatisfactory, but it is undoubtedly an Austrian subalpine plant, with stem, leaves, flowers, and calyx all spotted. The *H. delphinense* of Villars (*l. c.*) is more fully described, and seems to be the same species. The modern French and Swiss Floras depict it as a plant of low or medium height (20–60 cm.), with quadrangular stem, simple or shortly branched above, oval to oblong leaves, with pellucid, strongly anastomosed veins but typically without pellucid dots, and a small panicle of few, relatively large, yellow, black-dotted flowers, with oval, usually rounded-obtuse sepals and longer styles. This plant is frequent though rather local in subalpine meadows, and I have collected it in recent years in five stations, ranging from Lautaret, in Dauphiny, to Preda, in eastern Switzerland. Schinz's variety *erosum* was described as a plant of the mountains of Canton Zurich, differing from typical *H. maculatum* by its more obscurely anastomosed foliage, toothed sepals, and petals marked with lines as well as spots; the var. *punctatum* Schinz was distinguished solely by its pellucid-punctate leaves. The variety *erosum* was subsequently raised to subspecific rank, with an amended description, and finally identified with the subspecies *obtusiusculum* Tourlet (*H. Desetangsii* β *imperforatum* Bonnet), which will be dealt with below. *H. maculatum* grows in the mountains of Central Europe and in France as far west as the Pyrenees; from Austria it extends northwards, according to Fröhlich, by way of Saxony and the Harz Mountains to Brandenburg, Denmark and Scandinavia, where it is said to be frequent in lowland stations; eastwards it seems to reach Russia. The identity of the Danish and Scandinavian plants with that of the Alps may be readily seen in the plates of 'Flora Danica' and 'Svensk Botānik.' The

species appears to be unrecorded for the lowlands of France, Belgium, and western Germany, and, as might be expected from such a distribution, so far as is known it is not British.

The third species of the modern French and Swiss Floras has been the main source of confusion. This has appeared as *H. Desetangsii* Lamotte or *H. acutum* Moench subsp. *Desetangsii* (Lamotte), but in the last edition of the 'Flora der Schweiz' it became ×*H. Desetangsii* (wahrscheinlich *H. maculatum*× *perforatum*). By general consent this is a larger plant than the two preceding (30–100 cm.), more branched, with longer branches and a laxer, many-flowered inflorescence. Its leaves may be pellucid-punctate or with pellucid, anastomosed veins; and the sepals of its large, deep yellow flowers may be equal and lanceolate-acute, or unequal and broader, partly acute and partly obtuse. It has long styles like those of *H. maculatum*. It resembles *H. acutum* in being usually a plant of the lowlands. It was first described from Belgium by Bellynck (*l. c.*) as *H. intermedium*, and afterwards from the French Dept. Allier by Lamotte (*l. c.*) as a plant characterized especially by its pellucid-punctate leaves and lanceolate, acute sepals. Bonnet extended its definition by the addition of a variety *imperforatum*, in which the leaves are pellucid-veined but without pellucid dots and the sepals unequal and partly obtuse. As already shown, this var. *imperforatum*, which is said to be commoner than typical *H. Desetangsii*, is stated by Bonnet to be the *H. dubium* or *H. quadrangulum* of most French botanists. While Bonnet admits this, however, and makes citations accordingly, he shows *H. dubium* Leers with *H. maculatum* Crantz, as synonyms of *H. quadrangulum* L. Tourlet and Schinz, in elaborating the group further, do not deal with *H. dubium* Leers, but Fröhlich makes it a synonym of *H. maculatum* Crantz, subsp. *typicum* m., and it is included among the numerous synonyms of *H. quadrangulum* L. by Rouy and Foucaud. No reasons are offered for supposing that the *H. dubium* of French authors is not the original plant of Leers. This treatment differs widely from that of the earlier botanists. Moench and Gmelin, in creating their names *H. obtusum* and *H. Leersii*, both recognized that they were renaming *H. dubium* Leers, and make no reference to *H. maculatum* Crantz. Smith, in adding *H. dubium* to the British flora, explicitly states that it was a new species discovered by Leers. And it is similarly treated by Bellynck (*l. c.*). It will now be seen, on referring to the abbreviated account of *H. Desetangsii* var. *imperforatum* given above, that while it agrees with the original description of Bonnet, it also offers no real contradiction to Leers's account of *H. dubium* as reproduced earlier in this paper, except for the shape of the sepals. Both are tall plants with a subcorymbose inflorescence of large flowers with ovate or oval sepals and lined rather than speckled petals. Hooker ('Student's Flora,' ed. 3, 73) remarks

that *H. dubium* has the habit of *H. perforatum*. And Fröhlich (*l. c.*) points out how the sepals vary and how their form is often obscured in exsiccatæ. In Britain the form of the sepals in *H. dubium* is certainly variable ; they are generally unequal, either all obtuse or with three slightly acute or apically denticulate ; and distinct variations may often be seen in a single plant. Seeing therefore that in other characters *H. dubium* and *H. Desetangsii* var. *imperforatum* appear inseparable, this variability in the form of the sepals cannot be held to constitute a valid objection to uniting them as one species. Their specific identity is further supported by their geographical distribution. *H. dubium* was originally described from Homberg, in Hessen-Nassau, and again from the botanical garden at Marburg, in the same vicinity, by Moench as *H. obtusum*. As *H. Leersii* it figures in Gmelin's ' Flora Badensis.' In Fröhlich's paper of 1911 *H. maculatum* subsp. *erosum* (*H. Desetangsii* var. *imperforatum* Bonnet) is recorded for Baden, Wurtemburg, Hanover, and Bremen, and not further eastwards in Germany, where *H. maculatum* Crantz takes it place ; and this range covers the localities reported by the older authors for *H. dubium*. It therefore seems clear that *H. dubium* Leers is actually the same plant as *H. Desetangsii* var. *imperforatum* Bonnet, as the older French authors supposed, and that on grounds of priority Leers's name should be used for it as a species.

Coming to typical *H. Desetangsii*, which is not readily separable from *H. perforatum* L. except for the squareness of its stem, and that according to Lamotte may be very obscure, one finds that it was first reported, under the name of *H. intermedium* Bellynck, as a rare plant in Belgium. Bonnet (*l. c.*) records it for Belgium and northern France, but remarks that it is rarer than his var. *imperforatum*. Tourlet (*l. c.*) gives it as a plant of northern and central France like his subsp. *obtusiusculum* (var. *imperforatum* Bonnet). Schinz reports it as frequent in Canton Zurich (and elsewhere in northern Switzerland) and the subspecies *obtusiusculum* from the same canton. It thus appears that, at least in France and Belgium, typical *H. Desetangsii* grows in the same regions as *H. dubium* (*H. Desetangsii* var. *imperforatum* Bonnet), but generally in less abundance. Similar conditions sometimes obtain in Britain, as at Wimbledon, where formerly a few typical plants grew in company with a larger number of individuals of *H. dubium*. Salmon found his *H. Desetangsii* growing with *H. perforatum*, and it is probable that this common species occurs in the vicinity of *H. dubium* in all of its stations, and hence not unreasonable to suppose that the plants of typical *H. Desetangsii* are everywhere the products of hybridity, as treated by Fröhlich. The occurrence in Britain of forms intermediate between *H. dubium* and *H. perforatum* was noticed by Syme (*l. c.*). Fröhlich (*l. c.*) includes Cornwall and Berks among the stations of his *H. maculatum* subsp. *erosum* (*H. dubium* Leers),

and Cornwall also for its hybrid with *H. perforatum*. His citation of *H. intermedium* Bellynck and *H. Desetangsii* Lamotte as synonyms of *H. maculatum* × *perforatum*, and not of *H. maculatum* subsp. *erosum* (Schinz) Fröhl. × *perforatum* (which appears as a "nov. hybr.") can hardly be correct, seeing that true *H. maculatum* Crantz is not known in Britain, Belgium, or the French lowlands, where *H. Desetangsii* grows in company with *H. dubium*. It is possible that *H. maculatum* Crantz also crosses with *H. perforatum* where their ranges meet, and that the plant first described by Schinz as var. *erosum* was really of this nature. In some places in Surrey, near well-known stations for *H. dubium*, forms occur with pellucid-punctate leaves but otherwise identical with the typical species, and similar plants grow in Scotland and probably other parts of Britain. Whether their pellucid points are due to crossing with *H. perforatum* or whether they represent a reversion to a character wanting in the normal species though general throughout the genus, seems doubtful. Tourlet (*l. c.*) distinguishes such a form as var. *perforatum* of his subspecies *obtusiusculum*, which would stand under *H. dubium* Leers as var. **perforatum** (Tourlet) comb. nov. Babington's *H. maculatum*, subsequently reduced to a variety of *H. dubium*, was distinguished by its narrower leaves and narrow, denticulate sepals, and may be another form of the hybrid with *H. perforatum*.

The synonymy of these plants is as follows :—

HYPERICUM TETRAPTERUM Fries, Novit. ed. i, 94 (1823) ; ed. 2, 236 (1828) ; Koch, Syn. Fl. Germ. 134 (1837) ; Bellynck, Fl. Namur, 31 (1855) ; Syme, E. B. ed. 3, ii. 152 (1864) ; Bab. Man. ed. 6, 67 (1867) ; Hooker, Stud. Fl. ed. 3, 73 (1884) ; Schinz & Keller, Fl. Schweiz, ed. 1, 326 (1900) ; Coste, Fl. Fr. i. 259 (1901) ; Lond. Cat. Brit. Pl. ed. 11, 11 (1925) ; *H. quadrangulum* Huds. Fl. Angl. ed. 1, 292 (1762) ; Crantz, Stirp. Austr. ed. 1, 64 (1762) ; ed. 2, 98 (1769) ; Withering, Arrangement, 466 (1776) ; Leers, Fl. Herborn, ed. 2, 169 (1789) ; Villars, Hist. Pl. Dauph. iii. 497 (1789) ; Smith, Fl. Brit. ii. 801 (1800) ; DC. Fl. Fr. 4, 862 (1805) ; Prodr. i. 548 (1824) ; Duby, Bot. Gall. i. 96 (1828) ; Bab. in Trans. Bot. Soc. Edin. i. 83 (1841) ; Man. ed. 1, 57 (1843) ; ed. 9, 73 (1904) ; *H. acutum* Moench, Meth. Hort. Bot. Marburg. 128 (1794)—nomen illegitimum ; Rouy & Foucaud, Fl. Fr. iii. 335 (1896) ; Schinz & Keller, Fl. Schweiz, ed. 2, i. 331 (1905) ; Fröhlich in Sitzber. Akad. Wiss. Math.-Nat. Kl. Wien, cxx. i. 580 (1911) ; Hegi, Illustr. Fl. Mittel-Europa, v. i. 520 (1925) ; Lindman, Svensk Fanr. ed. 2, 404 (1926) ; Druce, Plant List, ed. 2, 19 (1928) ; *H. quadratum* Stokes, Bot. Mat. Med. iv. 99 (1812)—nomen illegitimum.

Icones. E. B. 370 ; Rchb. Icon. vi. 5179 ; Fl. Dan. 640.

HYPERICUM MACULATUM Crantz, Stirp. Austr. ed. 1, 64 (1762) ; ed. 2, 98 (1769) ; Schinz & Keller, Fl. Schweiz, ed. 3, i. 358 (1909) ; Lindman, Svensk Fanr. ed. 2, 404 (1926) ; *H. maculatum* subsp.

typicum Fröhlich, *l. c.* i. 540 (1911); *H. maculatum* subsp. *eumaculatum* Schinz & Keller, Fl. Schweiz, ed. 4, i. 451 (1923); Hegi, *l. c.* v. i. 517 (1925); *H. delphinense* Villars, Hist. Pl. Dauph. iii. 497 (1789); *H. dubium* DC. Fl. Fr. iv. 862 (1805); *H. tetragonum* Fr. Fl. Hall. 124 (1818) ?; *H. quadrangulum* var. *dubium* DC. Prodr. i. 548 (1824); Duby, Bot. Gall. i. 96 (1828); *H. quadrangulum* Fries, Novit. ed. 2, 237 (1828); Bonnet in Bull. Soc. Bot. Fr. xxv. 277 (1878); Rouy & Foucaud, Fl. Fr. iii. 334 (1896); Coste, Fl. Fr. i. 260 (1901); Schinz & Keller, Fl. Schweiz, ed. 1, 326 (1900); Tourlet in Bull. Soc. Bot. Fr. l. 307 (1903).

Icones. Svensk Bot. 359; Rchb. Icon. vi. 5178; Fl. Dan. 2836.

HYPERICUM DUBIUM Leers, Fl. Herborn. ed. 2, 169 (1789); Smith, Eng. Bot. 296 (1796); Fl. Brit. ii. 802 (1800); Bab. Man. ed. 1, 57 (1843); Bellynck, Fl. Namur, 52 (1855); Syme, E. B. ed. 3, ii. 151 (1864); Lond. Cat. Brit. Pl. ed. 11, 11 (1925); *H. obtusum* Moench, Meth. Hort. Bot. Marburg. 129 (1794); *H. quadrangulum* var. *maculatum* DC. Prodr. i. 548 (1824); *H. Leersii* Gmelin, Fl. Bad. iii. 575 (1826)—nomen solum; *H. quadrangulum* Bréb. Fl. Normand. ed. 3, 61 (1859); Coss. & Germ. Fl. Paris, ed. 2, 80 (1861); Lloyd, Fl. Ouest, ed. 3, 66 (1876); Hooker, Stud. Fl. ed. 3, 73 (1884); Druce, Plant List, ed. 2, 19 (1928); *H. Desetangsii* var. *imperforatum* Bonnet, *l. c.* xxv. 277 (1878); *H. acutum* subsp. *Desetangsii* var. *imperforatum* Rouy & Foucaud, Fl. Fr. iii. 337 (1896); *H. quadrangulum* subsp. *obtusiusculum* Tourlet, *l. c.* l. 307 (1903); *H. maculatum* Bab. Man. ed. 9, 73 (1904); *H. maculatum* subsp. *erosum* Fröhlich, *l. c.* i. 550 (1911); *H. maculatum* subsp. *obtusiusculum* Schinz & Keller, Fl. Schweiz, ed. 4, i. 451 (1923); Hegi, *l. c.* v. i. 517 (1925).

Icon. E. B. 296.

HYPERICUM DUBIUM × PERFORATUM.

H. tetrapterum var. *intermedium* Coss. & Germ. Fl. Paris, ed. 1, 64 (1845); *H. intermedium* Bellynck, Fl. Namur, 31 (1855); *H. Desetangsii* Lamotte in Bull. Soc. Bot. Fr. xxi. 121 (1874); Coste, Fl. Fr. i. 259 (1901); Schinz in Bull. Herb. Boiss. 2nd sér. iii. 10 (1903); Schinz & Keller, Fl. Schweiz, ed. 2, i. 331 (1905); C. E. Salmon in Journ. Bot. li. 317 (1913); Lond. Cat. Brit. Pl. ed. 11, 11 (1925); Druce, Plant List, ed. 2, 19 (1928); *H. Desetangsii* var. *genuinum* Bonnet, *l. c.* xxv. 277 (1878); *H. acutum* subsp. *Desetangsii* var. *genuinum* Rouy & Foucaud, Fl. Fr. iii. 336 (1896); *H. quadrangulum* subsp. *Desetangsii* Tourlet, *l. c.* l. 307 (1903); *H. maculatum* × *perforatum*, quoad syn. Fröhlich, *l. c.* i. 557, et *H. maculatum* subsp. *erosum* × *perforatum* Fröhlich, *l. c.* i. 559 (1911); *H. maculatum* subsp. *Desetangsii* Hegi, *l. c.* v. i. 517 (1925).

Icones. Journ. Bot. tab. 528; Butcher & Strudwick, Further Illustr. 109.

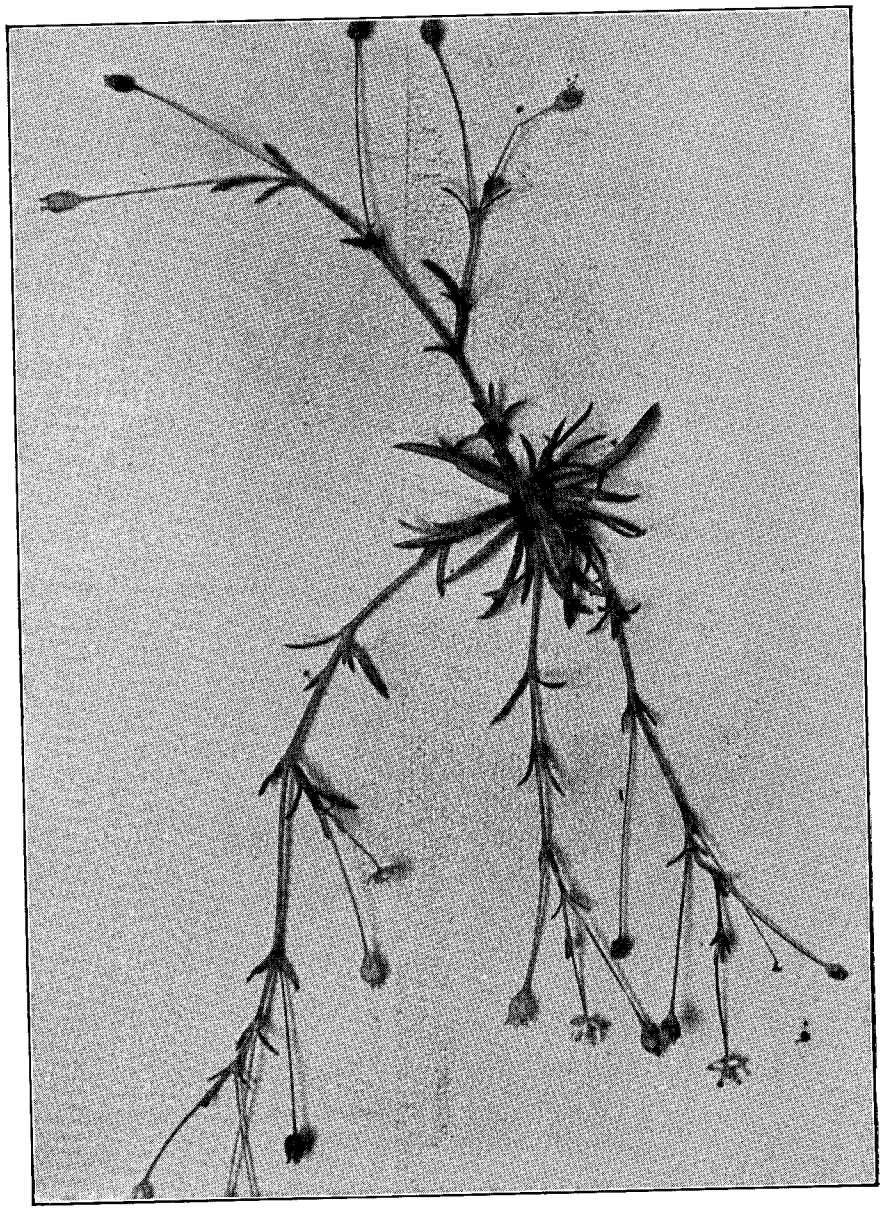


Fig. 1.—*Sagina maxima*, slightly reduced.

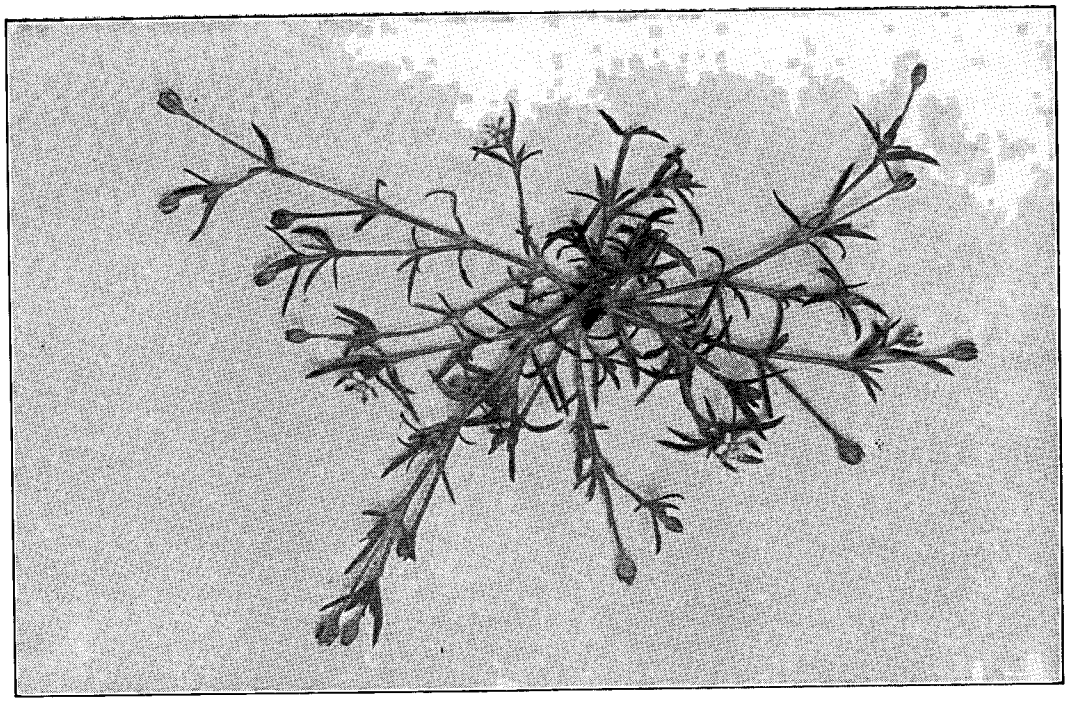


Fig. 2.—*Sagina sinensis*, natural size.

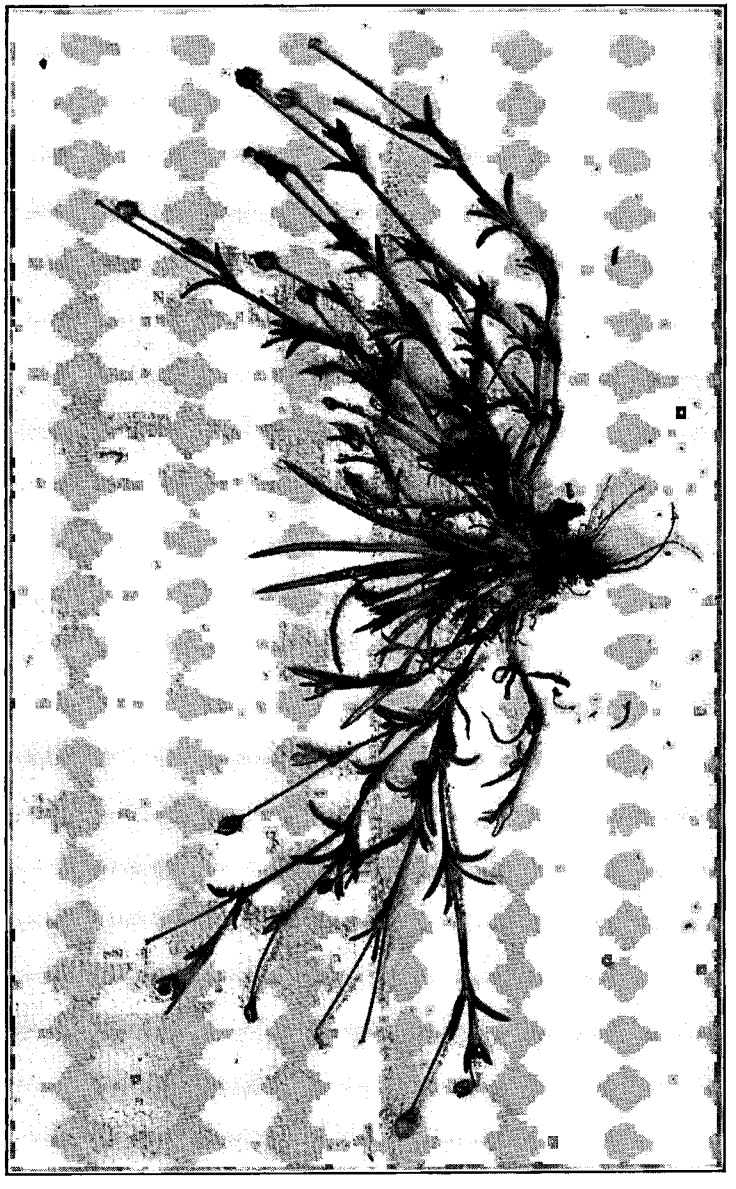


Fig. 3.—*Sagina maxima*, two years old, slightly reduced.

SAGINA MAXIMA GRAY AND *SAGINA SINENSIS* HANCE.

BY F. R. ELLISTON WRIGHT.

(PLATES 621–623.)

IN the course of studying Saginas from Asia with Dr. K. B. Blackburn, we have received, through the kindness of botanists in Tokyo and elsewhere, material of *Sagina maxima* Gray and *S. sinensis* Hance, under varying names, suggesting that there exists confusion in some quarters regarding these two plants. Handel-Mazzetti appears to regard them as one species. The original descriptions of Gray and Hance respectively of these two very distinct plants are perfectly good, but a note on their characters may be useful.

Both plants show on cultivation that they are capable of great variation of form to altered conditions of environment. *S. maxima* has behaved in Devon as feebly perennial, *S. sinensis* as an annual.

S. maxima is a larger plant than *S. sinensis* in all its parts. It has a well-marked central rosette of large leaves which are very characteristic of the plant, and these leaves are far larger than we have seen in any other *Sagina*. In winter the peripheral branches die back, but this central rosette is retained and from it branches are again thrown out the following year.

S. sinensis practically shows no real central rosette even when young, and frequently flowers quite early from a central shoot in the position of the wanting rosette. The peduncles and internodes in *S. maxima* are much longer than those of *S. sinensis*. The leaves of the flowering stems of *S. sinensis* are comparatively much smaller and more divaricate than those of *S. maxima*.

Both plants may produce their early branches in suberect position, but become more prostrate later. This is very marked in *S. sinensis*, which, when growing openly without competition in later stages, has all branches absolutely prostrate. The branches of *S. sinensis* show a definite thickening at the nodes, which character is much less noticeable in *maxima*.

In *S. maxima* the fruit-capsules, with their closely adpressed sepals, are normally sub-rotund, whereas in *S. sinensis* they tend to be parallel-sided, at least in their lower two-thirds.

These two five-partite Saginas are both densely clothed with stalked glands on sepals and peduncles, and with a few such additions sparsely scattered on the upper or more distal leaves. We have seen no simple hairs or cilia. This glandular clothing, apart from their other characters, particularly the petal shape, would separate both plants from *S. Saginoides* (L.) Dalla Torre, under which plant some botanists have placed them as varieties.

S. maxima is in my garden highly susceptible to the attack of *Puccinia Saginae*; of 150 plants not one was free from

infection by the late summer, and if no protective spraying measures are taken the plants are destroyed. A free supply of lime, which greatly increases the robustness and growth of *S. maxima*, acts as a partial protection against the fungus. *S. sinensis* is attacked by the *Puccinia*, but only rarely, and with little effect.

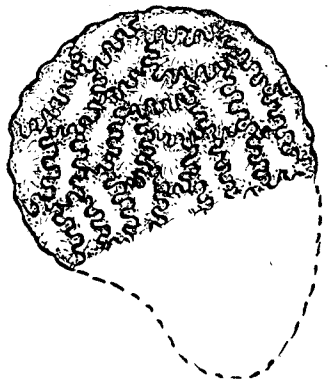


Fig. 4.—*Sagina maxima*, seed, greatly enlarged.

The most distinctive difference between the two plants is found in the seed.

The surface-pattern seen on the testa of the seed of *S. maxima* (fig. 4) of small areas arranged in a more or less radiating manner from the hilum, each bounded by a sinuous narrow groove, is reminiscent of the pieces of a jig-saw puzzle or the outlines

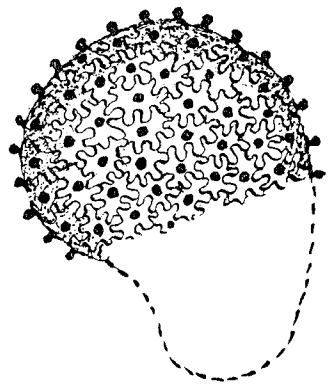


Fig. 5.—*Sagina sinensis*, seed, greatly enlarged.

of the epidermal cells on the leaves of many Dicotyledons. This is the surface-marking found on all British *Sagina* seeds.

S. sinensis shows a similar pattern (fig. 5). The surrounding sinuous groove is less strongly marked and the centre of each

enclosed area supports a minute stud or mushroom-shaped tubercle. We have seen no other *Sagina* with seeds showing this peculiarly shaped tubercle.

Dr. K. B. Blackburn has not yet completed the cytological examination of these two plants, but the chromosome count appears to be the same in each, $2n=42$ or 44.

THE PROBLEM OF INDIGENEITY OF A SCOTTISH *AQUILEGIA*.

By M. Skalinska, Ph.D. (Warsaw).

In the 1916 Report of the Botanical Society and Exchange Club of the British Isles, there is published by the late Dr. G. C. Druce a note concerning *Aquilegia alpina* L. found by him and Mr. and Mrs. Corstorphine in Caenlochan, Forfar. The specimen, now in the Oxford Herbarium, has been sent to me in connection with my studies on *A. alpina*, which are being carried on in the Herbarium of the Royal Botanic Gardens, Kew. In his paper Druce discussed the problem whether this plant ought to be considered as native in Caenlochan and concluded that it seemed best strongly to query for the present time the indigenous nature of *A. alpina* in Scotland (p. 401). He mentioned a note by F. Buchanan White (1885) concerning a number of alpine species sown intentionally by a horticulturist in Caenlochan; however, *Aquilegia* was not included among them.

As is well known, the continental distribution of *A. alpina* L. is limited to south-east France, Switzerland, and the north of Italy. *A. alpina* represents a derived species; the oldest and the most primitive of all species in Europe is probably *A. vulgaris* L. This latter species is widely distributed in the greater part of the European continent, including in its range also the southern part of Scandinavia and Great Britain. It is noteworthy that all other species of the genus are ranged exclusively at the southern limit of its area, chiefly in the mountain region of the Pyrenees, Alps, Transylvania, and the Balkan Peninsula (Zimmeter, 1875). The areas of all these mountain species are small, some of them being strictly endemic in small regions. They probably arose (directly or indirectly) from *A. vulgaris* through various genetical changes which enabled them to advance into mountain conditions. On the contrary, in the northern part of the area of *A. vulgaris*, no other species of this genus have been found. If the existence of a native species in that part of the area of *A. vulgaris* could be really established, it would make an essential alteration to the known very characteristic geographic distribution of the genus *Aquilegia*.

The results of my studies, however, have added some more details in favour of the assumption that the plants from Caenlochan ought to be considered as aliens—garden escapes or plants introduced intentionally.

As mentioned by Druce, the Scottish plant differs in some respects from the extreme form of *A. alpina* from the Canton Valais in Switzerland. This author remarked that it has smaller leaves, which are rather similar to those of *A. pyrenaica*. I can confirm his opinion and add that the Scottish plant is not identical with any form of *A. alpina* L. growing in different localities in South France, Switzerland, or Italy. Its general appearance corresponds, in my opinion, to a large plant of *A. pyrenaica* DC.

In order to determine exactly the species of the Scottish plant a detailed morphological analysis of *A. alpina*, *A. pyrenaica*, and of the Scottish plant has been carried out, on the basis of the study of specimens in the Herbarium of the Royal Botanic Gardens, Kew. It ought to be remarked, however, that there are some difficulties in comparing *A. pyrenaica* and *A. alpina* with the Scottish plant, on account of the highly different external conditions in which the plants are growing. The results of the analysis are given in the Table on p. 42.

1. *The shape of the basal leaves.*—The basal leaves of the Scottish plant are biternate, similar in shape to those of *A. pyrenaica*. The middle leaflets are sessile, like those of *A. pyrenaica*, and different from the petioluled middle leaflets of *A. alpina*. The lateral leaflets are usually of unequal width. Each leaflet is trilobed, owing to two main incisions. These incisions are less deep in the Scottish plant and in *A. pyrenaica* than in *A. alpina*, reaching usually about half of the length of the leaflet, while *A. alpina* has remarkably deeper main incisions, reaching two-thirds of the leaflet's length. Besides the main incisions, the leaflets carry additional incisions: in the Scottish plant and in *A. pyrenaica* their number is low and they are shallow and narrow; the lobes formed by them are not numerous (see Table) and are nearly rounded, often overlapping. On the other hand, in *A. alpina* the incisions are rather broad and deep; they help to dissect the border of the leaflets into a large number of long and narrow segments, by which the leaves of *A. alpina* can be easily distinguished from those of any other species; their segments usually do not overlap.

2. *Stem leaves.*—The flowering stems of the Scottish plant carry very reduced, small leaves. They correspond in this respect to *A. pyrenaica*, which also usually lacks typical stem leaves, only narrow bracts usually being present. On the other hand, *A. alpina* develops always one to three petioled stem leaves, similar in shape to the basal leaves, and, in addition, one to two narrow bracts.

3. *The flowering stem* of the Scottish plant is similar to that of *A. pyrenaica*. It is thin and more slender than that of *A. alpina*. In height it corresponds to the taller plants of *A. pyrenaica* or to the shorter plants of *A. alpina*.

4. The study of *the flowering time* of the herbarium specimens enabled me to establish that when growing in their native localities *A. pyrenaica* is later in flowering (second half of July to end of August) than *A. alpina* (second half of June to first half of August). Thus the later flowering Scottish plant is also in this respect more similar to *A. pyrenaica* than to *A. alpina*, though the flowering time in Scotland cannot be directly compared with that in the Pyrenees or in the Alps.

5. *Flower size.*—As Druce remarked, the flowers of the Scottish plants are smaller than those of *A. alpina*. Their diameter is only 50 mm. This corresponds to the large flowers of *A. pyrenaica*, the size of which ranges from 25 mm. (in the smallest high mountain specimens) to 55 mm. (in the larger plants). The flowers of *A. alpina* are larger, their diameter ranging from 55–95 mm.

6. *Flower shape.*—The shape of the flowers of the Scottish plant also corresponds to that of the flowers of *A. pyrenaica*. Like the sepals of this species and those of *A. alpina*, its sepals have a distinct claw. In *A. pyrenaica* and in the Scottish plant the sepals are relatively shorter and broader than in *A. alpina*, chiefly in their basal part. In the Scottish plant, their length (about 25 mm.) and width (18 mm.) correspond with those of *A. pyrenaica*, while *A. alpina* has longer and relatively narrower sepals (25–40 mm. long, 10–20 mm. wide).

The shape of the laminæ of the petals of the Scottish plant has been described by Druce as "truncate, not rounded." The laminæ of *A. pyrenaica* are usually described as rounded (Rouy and Foucaud) and therefore Druce considers their shape different from that of the Scottish plant. J. G. Baker, however, described the laminæ of *A. pyrenaica* as "obovate cuneate, rounded at the top"—this description exactly agreeing, in my opinion, with the shape of the laminæ in the Scottish plant. It ought to be mentioned that of the forty specimens of *A. pyrenaica* which I had the opportunity of studying in the Kew Herbarium most had completely rounded laminæ. Only in two specimens, one from Gavarnie (Pyrénées Centrales) and another from Houle du Marboré (Hautes Pyrénées), the laminæ were obovate cuneate, rounded at the top, thus being of exactly the same shape as those of the Scottish plant. This character seems to show some amount of variability within the species. Nevertheless, the shape of the laminæ is distinctly different from that of *A. alpina*, which has truncate (or sometimes subtruncate) laminæ, usually with a faint incision at their apex.

Character Differences between A. alpina, A. pyrenaica, *and the Scottish Plant.*

	A. alpina L.	*A. pyrenaica* DC.	Plant from Caenlochan.
Petiolules of the leaflets :	Middle leaflets petioluled, lateral leaflets sessile.	All leaflets sessile.	All leaflets sessile.
Middle leaflets, length :	14–30 mm.	8–15 mm.	13–16 mm.
Middle leaflets, width :	12–35 mm.	12–20 mm.	13–18 mm.
Lateral leaflets, length :	12–27 mm.	7–14 mm.	9–14 mm.
Larger latera leaflets, width :	14–35 mm.	9·5–16 mm.	10–17 mm.
Smaller lateral leaflets, width :	12–30 mm.	8–14 mm.	8–16 mm.
Main incisions :	Deep, reaching at least $\frac{2}{3}$ of the length of the leaflet.	Less deep, reaching usually $\frac{1}{2}$ of the length of the leaflets.	Less deep, reaching usually $\frac{1}{2}$ of the leaflets' length.
Number of lobes : middle leaflet :	9–22	6–12	5–9
larger lateral leaflet :	10–24	5–12	6–9
smaller lateral leaflet :	6–24	5–8	5
Height of the flowering stems :	20–55 cm.	3–25 cm.	20–25 cm.
Shape of the flowering stems :	Robust.	Slender.	Slender.
Stem leaves :	Present ; 1–3 (usually 2) similar to basal leaves.	Usually only narrow bracts, sometimes reduced leaves.	Very reduced leaves.
Flowering time :	18. vi.–8. viii.	15. vii.–25. viii.	viii., ix.
Flower diameter :	55–95 mm.	25–55 mm.	45–50 mm.
Shape of the laminæ :	Truncate or subtruncate with a faint incision at top.	Rounded or obovate cuneate, rounded at top.	Obovate cuneate, rounded at top.
Shape of the spurs :	Thicker, somewhat incurved.	Thinner, very slightly incurved.	Thinner, very slightly incurved.

The spurs of the Scottish plant are thin and very slightly incurved, like those of *A. pyrenaica*, while the spurs of *A. alpina* are thicker and usually more incurved.

The above comparison of characters of the Scottish plant with *A. pyrenaica* and *A. alpina* identifies the Scottish plant with the former of the two species, in spite of its primary determination as *A. alpina*.

Let us now return to the chief problem, considered by Druce, whether the Scottish plant is introduced or native in Caenlochan.

Its identity with *A. pyrenaica* gives in my opinion a further argument against its being native in Scotland. Along the southern limit of the area of *A. vulgaris* there occurs a large number of younger species crowded in the mountain regions and showing well-marked differences. Their areas are small and some of them are strictly endemic to relatively small regions. The genus shows here a high degree of morphological differentiation. The geographical distribution of this intra-generic differentiation suggests strongly that a derived species, native in Scotland, is unlikely to be identical with any of those produced in the southern region.

A further important detail in favour of the opinion that the plant represents a species introduced into Scotland has been derived from an examination of its pollen. All natural species of *Aquilegia* investigated up to now are uniform with regard to their chromosome number ($2n=14$). An examination of the pollen of plants of *A. alpina*, *A. pyrenaica*, and other species growing in their native localities proves that their pollen is normal and fertile ; each pollen grain has three pores. On the other hand, *A. pyrenaica* from Caenlochan has a relatively high percentage of abnormal pollen grains. Most of its fertile pollen grains are of the same size and shape as those of *A. pyrenaica* and *A. alpina* ; this permits the assumption that this plant has the typical number of chromosomes (comp. Skalinska, 1937) ; nevertheless, sometimes unreduced " giant " pollen grains with four pores can be found. Among the abortive pollen grains there are larger empty grains and, beside these, very small " dwarf " grains ; the presence of these " giant " and " dwarf " pollen grains leads one to think that there are irregularities in meioses. Usually the presence of abortive pollen grains is considered as a character that suggests hybrid origin. This is, however, not always so. It has been proved experimentally (Sakamura and Stow, 1926; Stow, 1927 ; Michaelis, 1926, 1928) that modified external conditions (higher or lower temperature) can cause some abnormalities in meioses ; they lead to partial abortion and also to the production of non-reduced (giant) pollen grains. In such cases abnormal meioses represent the reaction of the plants to modified external conditions. It is possible that the partially abnormal pollen of the Scottish *A. pyrenaica* is due to such a reaction to modified climatic conditions of a species introduced into a new locality. Another

factor too can play a part in causing abnormal meioses in non-hybrid plants. In allogamous plants which are isolated and repeatedly self-pollinated, after a number of generations, the pollen fertility becomes affected, owing to the abnormal retardation of development. Such behaviour has been observed by me in repeatedly self-pollinated plants, belonging to a strain of *Aquilegia chrysantha* A. Gr. (1937). Can the presence of abnormal pollen in the Scottish plant be due to this cause? If it is it would also favour the assumption of alien origin of *A. pyrenaica* in Caenlochan. The introduction of only a small number of plants may well have prevented the possibility of free cross-pollination, and led after a number of generations to partial pollen-sterility.

It ought to be added that unlike *A. alpina*, which is " tricky " in culture, *A. pyrenaica* in garden cultivation is capable of very extensive propagation by seeds. This detail may help to explain the occurrence of representatives of this species on precipitous rock sides, in places where these plants have been found by Druce, and where *A. alpina* would be unlikely to establish itself.

The present study, undertaken at the suggestion of Mr. N. Y. Sandwith, was carried out in the Herbarium of the Royal Botanic Gardens, Kew. I wish to express my sincere thanks to Sir Arthur Hill and to Mr. A. D. Cotton for the opportunity to continue my research work away from my own country. I am also much indebted to the Fielding Curator of the University Herbarium of Oxford for lending me the specimen of *Aquilegia* from Caenlochan Glen for this study. My thanks are due also to Dr. W. B. Turrill who kindly revised the English manuscript.

References.

(1) Baker, J. G. (1878.) " A Synopsis of the known Forms of *Aquilegia*." Gardener's Chronicle, xx. 19 etc.
(2) Druce, G. C. (1917.) " Plant Notes. *Aquilegia alpina* L. Native ?? " 1916 Report of the Botanical Society and Exchange Club of the British Isles, iv. 399.
(3) Michaelis P. (1926.) " Ueber den Einfluss der Kälte auf die Reduktionsteilung von *Epilobium*." Planta, i. 569.
(4) ——. (1928.) " Ueber die experimentelle Erzeugung heteroploider Pflanzen bei *Epilobium* und *Oenothera*." Biol. Zentr. xlviii. 370.
(5) Rouy, G. and Foucaud, J. (1893.) Flore de France, i. 128.
(6) Sakamura, T. and Stow, I. (1926.) " Ueber die experimentell veranlasste Entstehung von Keimfähigen Pollenkörnern mit abweichenden Chromosomenzahlen." Japan. Journ. of Bot. iii. 111.
(7) Skalinska, M. (1937.) " The Taxonomical Value of two Tetraploid Groups of *Aquilegia*." Bibl. Univ. Lib. Polonæ, Warsaw, xxvii. 1.
(8) Stow, I. (1927.) " A Cytological Study of Pollen Sterility in *Solanum tuberosum* L." Japanese Journ. of Bot. iii. 217.
(9) Zimmeter, A. (1875.) " Verwandtschafts-Verhältnisse und geographische Verbreitung der in Europa einheimischen Arten der Gattung *Aquilegia*." Steyr.

Addendum.

I am obliged to Mr. A. J. Wilmott (British Museum, Natural History) for calling my attention to the two following references :

(1) Corstorphine, R. H. (1916.) " *Aquilegia alpina* L. in Scotland." Journ. Bot. p. 337 ; a short note in which the author mentioned the first finding of the plant, determined as *A. alpina* L. in Caenlochan Glen by him and Dr. Druce.

(2) White, Buchanan F. (1885.) " *Myosotis alpestris* in Forfarshire." Journ. Bot. p. 26 ; a short note in which the author brought to light the fact that a number of alpine species had been sown intentionally in Caenlochan by a horticulturist.

NOTE ON THE NOMENCLATURE OF A SOUTHERN FUCOID.

By A. E. Else Dawson, M.Sc.

During the course of an investigation of a species of *Carpophyllum* Greville, a member of the family Sargassaceae which appears to be confined to the shores of New Zealand, an error in nomenclature emerged.

The species is generally known as *Carpophyllum Phyllanthus* (Turner) Hooker and Harvey, and appears under this name in the herbaria both of the British Museum (Nat. Hist.) (where access to the material was facilitated by the kindness of Mr. G. Tandy) and the Botanical Institute, Berlin (through the kindness of Prof. L. Diels and Prof. O. C. Schmidt). The name is used in most collectors' lists, including that of Mr. R. M. Laing, the well-known New Zealand algologist (1899), but according to the International Rules of Botanical Nomenclature it is not valid.

The earliest publication of a name for the species is Esper's *Fucus flexuosus* (1802), which he applied to specimens sent to him by Turner *. The latter, seventeen years later, published the name *Fucus Phyllanthus*, which was a later homonym, since he explained that his species was identical with Esper's. The epithet *Phyllanthus* is therefore illegal by Article 60 (1) of the Rules. Esper's specimens and figures and Turner's figures have been examined, as well as a range of herbarium specimens connecting the extreme forms and confirming the identity. The specimens which Esper named are fairly described by his epithet, being denuded, flexuose axes ; but *Phyllanthus* gives a better impression of the complete and luxuriant fronds which Turner figured, so that it is unfortunate that the name is not tenable.

* Incidentally, Turner received his specimens from Sir Joseph Banks, who had collected them on Captain Cook's first expedition in the ' Endeavour ' (1767–1771).

Agardh (1823) placed the species in his new genus *Sargassum*, as *S. Phyllanthus*.

Greville (1830) included the species in his new genus *Carpophyllum* as *C. flexuosum*, using Esper's valid epithet. *Sargassum* Agardh is characterized by a short main axis with long secondary branches, and *Carpophyllum* Greville is distinguished from it by an elongated main axis, longer than the lateral branches (*Cp.* De-Toni, 1895; Schmidt, 1938).

Richard (1832) redescribed the species and used Agardh's specific name and though citing Agardh wrote "*Sargassum phyllanthum*, Nob."

Hooker and Harvey (1845) followed Greville in placing the plants which they found in the genus *Carpophyllum*, and their names are usually accepted as authoritative because of their pioneer work in identifying and naming the seaweeds of New Zealand. They identified their species with that figured by Turner and Esper, and called it *Carpophyllum Phyllanthus*, justifying this usage by the fact that Esper received his specimens from Turner. De-Toni's adoption of the name (1895), superseding his own earlier acceptance of the correct one (1891), has further perpetuated the error.

Kutzing (1843–9 and 1860–1), so far as I know, is the only author who uses the valid name, *Carpophyllum flexuosum* (Esper) Greville.

References.

Agardh, C. A. (1823–1824). Species Algarum, 44. Systema Algarum, 309.

Agardh, J. G. (1848). Species, Genera et Ordines Algarum, 263.

De-Toni, J. B. (1891). Systematische Übersicht der bisher bekannten Gattungen der echten Fucoideen. Flora, lxxiv. 171.

De-Toni, J. B. (1895). Sylloge Algarum.—III. Fucoideae, 121.

Esper, J. (1802). Icones Fucorum. II. Sect. 1, 43, and Tab. 131.

Greville, R. K. (1830). Algae Britannicae, Fucoideae, p. xxxii.

Hooker, J. D., and Harvey, W. H. (1845). Algae Novae Zelandiae. Lond. Journ. Bot. iv. 525.

Kützing, F. T. (1843–9 and 1860–1). Phyc. Gen. 363. Sp. 636, and Tab. 51. Tabulae Phycologicæ, x.–xi.

Laing, R. M. (1899). Revised List of New Zealand Seaweeds.—Pt. I. Trans. N.Z. Inst. xxxii. 57.

Richard, A. (1832). Essai d'une Flore de la Nouvelle Zélande, 17; and Atlas, Tab. 7, in D'Urville: Voyage de 'l'Astrolabe.' xvi. Botanique.

Schmidt, O. C. (1938). Beiträge zur Systematik der Phaeophyten.—I. Hedwigia, lxxvii. 213.

Turner, D. (1819). Historia Fucorum, iv. Tab. 206.

BOOK-NOTES, NEWS, ETC.

The Ministry of Agriculture has published a Bulletin (No. 117) on "Diseases of Bulbs" by W. C. Moore, price 4*s*. This work is an excellent up-to-date summary of existing literature on the diseases of "bulbs"—the term being used in its horticultural sense. It deals with Liliaceae, Amaryllidaceae, and Iridaceae the diseases being listed under genera. The English name for the disease and the Latin name for the bacterium or fungus are given: virus and eel-worm diseases are also included. The descriptions are introduced with historical notes (necessarily giving emphasis to dates of publication) and are clear and concise: there are numerous excellent photographs. The "List of Literature References" deserves special mention; it comprises 709 items. There are 176 pages of text and 58 photographs. The volume has a cover of stiff boards.

Mr. A. W. Exell has been seconded to H.M. Foreign Office for duty.

Dr. S. P. Wiltshire has succeeded Dr. S. F. Ashby as Director of the Imperial Mycological Institute.

Censoring of Scientific Journals.—At the request of Sir Walter Monckton, Director-General of the Press and Censorship Bureau, Sir William Bragg, as President of the Royal Society, has undertaken the formation of a scientific panel to assist the bureau in arranging the censorship of papers in scientific journals. Professor V. H. Blackman is to serve on the panel for botany and agriculture.

British Association.—A conference of the British Association will be held at Reading, July 24–26, to discuss science in its national and international aspects. This is in place of the ordinary annual meeting which normally would have been held at Newcastle.

Forensic Science Laboratories.—Owing to the war the full scheme recommended by the Departmental Committee on Detective Work and Procedure cannot be carried out, but the Home Office has informed police authorities throughout the country that financial arrangements have been made to enable forensic science laboratories to be available to all forces for the prevention and detection of crime. Several botanists are already engaged in this work apparently with great success. There are many ways in which the application of botanical knowledge enables clues to be unravelled. Probably all botanists in official positions have had interesting problems brought to them in the past—whether plant hairs could suggest where a crime took place, how long an aquatic fungus had been growing, whether a splinter was from a certain piece of wood, and so on—but there can be no doubt that botanists devoting their whole time to such problems acquire an aptitude not only for interpretation, but for investigation. Obviously, however, the results of their

researches cannot be published in ordinary scientific journals; if they were they would make absorbing reading, not only for botanists but for that section of the public devoted to the exploits of certain fictitious scientific investigators.

LINNEAN SOCIETY OF LONDON.—At the General Meeting on November 9th, the President in the Chair, Sir A. W. Hill gave a lecture on "Desert transformation in Lybia." The magnificent ruins of the great cities Sabratha, Leptis Magna, and others show that there must have been a considerable population, and this must have lived on the products of the soil, a fact indicated by classical references. Later the country was left uncared for, and drifting sand gradually obliterated all marks of civilization and engulfed the great cities. The coastal region is Mediterranean in type, with cool wet winters and hot dry summers. The general vegetation of the area was described and the history and course of the colonization by the Italian government outlined. A series of lantern-slides illustrated the success of the efforts to transform desert into agricultural land.

At the General Meeting on November 23rd, the President in the Chair, Mr. A. D. Cotton gave an account of a paper by Dr. A. F. El-Helaby on "The Effect of *Rhizoctonia Solani* Kühn on the Germination of Lettuce Seed at somewhat high Temperatures." The presence of *Rhizoctonia Solani* in sterilized (autoclaved) soil increases the percentage of germination of lettuce seeds at 25–30° C. A number of other fungi were tried and of these only *Rhizoctonia Crocorum* and *Pythium spinosum* had any effect. The interest in the results is that here we have a fungus which at lower temperatures causes pronounced disease (damping off) of a plant, but which at temperatures too high for disease production stimulates germination.

Miss E. R. Saunders gave a paper on "The Significance of the unique Floral Construction characterizing a little-known Member of the Primulaceae—*Pelletiera verna* A. St. Hil." The unique feature of the corolla of this monotypic genus is a regular combination of complete polypetaly on some radii with retention of the gamopetalous condition on other radii. This results in the formation of three, very rarely four, separate segments of dissimilar form.

In the assymmetric corolla all three segments differ from one another in shape and size—one, formed of the anterior petal (simplex) is small, the other two consist of an antero-lateral petal fused with the postero-lateral petal on the same side (duplex). In the zygomorphic corolla three of the segments consist of similar single petals (simplex) and one of two conjoined petals (duplex).

The androecium consists of three, rarely of four, stamens all similar and functional. It differs from that of every other primulaceous type in being composed of some members of both whorls.

STUDIES OF BRITISH POTAMOGETONS.—XIII.

BY J. E. DANDY, M.A., AND G. TAYLOR, D.Sc.

XIII. *POTAMOGETON BERCHTOLDII* IN GREAT BRITAIN.

THIS study is complementary to the last (pp. 1–11 above), in which we dealt with the distribution of *Potamogeton pusillus* in Great Britain. The botanical history of *P. Berchtoldii* is closely bound up with that of *P. pusillus*, for until comparatively recently the two were generally united under one aggregate species; and even when it was recognized that two quite different species were involved the familiar species with open stipular sheaths (*i. e.*, *P. Berchtoldii*) was erroneously supposed to be the *P. pusillus* of Linnaeus, while the true *P. pusillus*, with closed sheaths, was called *P. panormitanus*. All this we have explained in the first of these notes (Journ. Bot. lxxvi. 90–92). In the present paper our purpose is to give some account of *P. Berchtoldii* as a British plant and to set out its distribution as indicated by the specimens so far examined.

Although the great majority of British specimens of *P. Berchtoldii* have been named *P. pusillus*, or regarded as subspecies, varieties, or forms of that species, there are many which have received different treatment, and the result is a synonymy even more extensive than that of *P. pusillus*. As long ago as 1894 certain specimens from West Kent were recorded as *P. Berchtoldii* by E. S. Marshall (in Journ. Bot. xxxii. 148), and in 1910 material from Northampton was listed under the same name by Druce (in Journ. Northampton. Nat. Hist. Soc. xv. 293). These specimens were correctly named; but there was scant justification at the time for using the name *P. Berchtoldii*, as it was intended to distinguish the plants not from the true *P. pusillus* but from the very species to which they in fact belong! Other specimens of *P. Berchtoldii* have been recorded under such erroneous names as *P. gramineus*, *P. compressus*, *P. panormitanus*, *P. mucronatus*, *P. Sturrockii*, *P. trichoides*, and *P. Friesii*. To these *P. rutilus* might be added, for F. A. Lees, in his 'Flora of West Yorkshire' (1888), p. 418, identified a plant of *P. Berchtoldii* with *P. rutilus*, which he reduced to a variety of *P. pusillus* *. As has happened with *P. pusillus*, and with as little justification, some specimens of *P. Berchtoldii* have been treated as hybrids. Hagström, in his 'Critical Researches' (1916), p. 104, referred specimens from Mid-west York and Salop to his *P. dualis*, which he regarded as *P. panormitanus* Biv. × *pusillus* L. [meaning *Berchtoldii*]"; and on p. 126 he included a plant from North Somerset under his variety *spicosus* of *P. franconicus*, which he considered to be *P. pusillus*" (*i. e.*, *P. Berchtoldii*) × *P. trichoides*. Under this latter combination Druce, in Bot. Soc. & Exch. Club Brit. Is.

* See the third of these studies (Journ. Bot. lxxvi. 239).

vi. 50, 152 (1921) & 751 (1923), subsequently recorded specimens from Bucks, East Norfolk, East Suffolk, North Hants, Northampton, and West Kent. In the same work Druce, on the authority of Hagström, referred a plant of *P. Berchtoldii* from Cardigan to " ×*P. trinervius* Fischer=*P. panormitanus*×*trichoides*", an identification which did not even recognize *P. Berchtoldii* as one of the supposed parent species. Other specimens of *P. Berchtoldii*, from Salop and Stirling, were recorded by A. Bennett (in Journ. Bot. lvii. 18 (1919)) as " *P. pusilliformis* Hagström (*P. pusillus* [*i. e.*, *Berchtoldii*]×*Friesii* Rupr.)". Four different " hybrids " have thus been recorded from British specimens of *P. Berchtoldii*.

Judged by the frequency with which it is collected, *P. Berchtoldii* is much the commonest " pusilloid " pondweed in Great Britain. So far we have seen specimens from 105 vice-counties, ranging from West Cornwall to East Kent and northwards to Shetland. The species grows in a great variety of waters, both acid and alkaline. Unlike *P. pusillus* it shows no preference for alkaline waters ; on the contrary, it flourishes in acid waters and is the usual " pusilloid " species of moorland pools and streams and many mountain lakes. There is great variation in *P. Berchtoldii*, as is to be expected from the diversity of habitat. The breadth, texture, and colour of the leaves, and the form of their apex, vary according to the depth, clarity, and chemical constitution of the water. Plants from shallow and muddy waters tend to have narrow dark-coloured leaves of comparatively firm texture : these include *P. pusillus* var. *tenuissimus* (*P. tenuissimus*) and *P. pusillus* var. (or f.) *pseudo-trichoides*, as well as plants which have been mistaken for *P. trichoides* and its " variety " *Trimmeri*. At the other extreme are states from the deep clear waters of mountain lakes, with relatively broad light-green translucent leaves which are delicate in texture and tend to be very obtuse or rounded at the apex. It is such states as these that have been confused with ×*P. Sturrockii*, a hybrid plant known only from Marlee Loch in East Perth. In Journ. Bot. lix. 163–164 (1921) the Pearsalls pointed out that the " *P. Sturrockii* " of the English Lake District was wrongly named ; they regarded it as a " beautiful and characteristic deep-water derivative of *P. pusillus* [meaning *P. Berchtoldii*]", and described it as a new subspecies, *P. pusillus* subsp. *lacustris*. This was subsequently raised to specific rank by Druce in his ' British Plant List', Ed. 2 (1928), p. 117, but we are unable to see in it more than a deep-water lacustrine state of *P. Berchtoldii*.

The synonymy and distribution of *P. Berchtoldii* which we give below follow the same arrangement as used for *P. pusillus* in the preceding study. A sign (†) is placed after a reference when we have not seen a specimen of every plant concerned therein, and a sign (*) is put after gatherings referred to in the cited literature. Unless otherwise indicated, the gatherings listed

are represented in the British Museum Herbarium (including the Boswell, Hanbury, and Sloane Herbaria). The species is so common and widely dispersed that the list of gatherings is unavoidably lengthy : it would lose much of its value to local workers if we were not to make it as complete as possible. Irish specimens are not included.

P. Berchtoldii Fieb. in Oekon.-techn. Fl. Böhm. ii. 1, 277 (1838).—E. S. Marshall in Journ. Bot. xxxii. 148 (1894).—Druce in Journ. Northampton. Nat. Hist. Soc. xv. 293 (1910).—Dandy & Taylor ex M. S. Campbell in Bot. Soc. & Exch. Club Brit. Is. xi. 554 (1938) ; *op. cit.* xii. 62 (1939) ; in A. H. Evans, Fl. Cambridg. 167 (1939).—Martin & Fras. Fl. Devon, 644 (1939) †.

P. pusillus (non L.) Winch Thornhill & Waugh, Bot. Guide Northumb. & Durham, i. 17 (1805) †.—Davies, Welsh Botanology, i. 18 (1813) pro parte.—A. Murr. Northern Fl. 110 (1836) pro parte †.—T. B. Hall, Fl. Liverpool, 89 (1839) †.—Leighton, Fl. Shropsh. 76 (1841) excl. var. †.—Bromfield in Phytologist, iii. 1012 (1850) pro parte †.—Dickinson, Fl. Liverpool, 124 (1851) †.—Bab. Fl. Cambridg. 250 (1860) †.—G. S. Gibson, Fl. Essex, 336 (1862) †.—Bak. North York. 290 (1863) † ; Fl. Engl. Lake Distr. 206 (1885) †.—Brewer, Fl. Surrey, 244 (1863) pro parte †.—H. C. Wats. in Journ. Bot. ii. 16 (1864).—C. B. Clarke, List Pl. Andover, 96 (1866).—Bak. & Tate in Nat. Hist. Trans. Northumb. & Durham, ii. 264 (1868) †.—Trim. & Dyer, Fl. Middlesex, 296 (1869) pro parte †.—Keys in Ann. Rep. & Trans. Plymouth Inst. iii. 250 (1872) †.—Mansel-Pleydell, Fl. Dorset. 251 (1874) †.—C. Bail. in Rep. Bot. Rec. Club, i. 47, 68 (1875).—W. West in Rep. Bot. Rec. Club, i. 242 (1878).—Briggs, Fl. Plymouth, 319 (1880) †.—W. M. Rogers in Journ. Bot. xx. 15 (1882) †.—Townsend, Fl. Hampsh. 331 (1883) pro parte † ; *op. cit.*, New Ed. 397 (1904) pro parte †.—Beeby in Journ. Bot. xxii. 20 (1884) pro parte.—A. Benn. in Rep. Bot. Rec. Club, iii. 62 (1884) ; in Journ. Bot. xxxvii. 246 (1899).—Druce, Fl. Oxford. 386 (1886) pro parte † ; in Journ. Bot. xl. 391 (1902) ; in Journ. Northampton. Nat. Hist. Soc. xv. 293 (1910) † ; in Bot. Exch. Club & Soc. Brit. Is. ii. 599 (1911) ; *op. cit.* iv. 377 (1916) ; *op. cit.* vi. 152 (1921) pro parte, 528 (1922) pro parte ; Fl. Buckingham. 357 (1926) †.—Pryor, Fl. Hertford. 391 (1887) †.—Hind, Fl. Suffolk, 362 (1889) pro parte †.—Purchas & Ley, Fl. Hereford. 288 (1889) †.—W. S. Duncan apud A. Benn. in Scot. Naturalist, xi. 180 (1891).—Bagnall, Fl. Warwick. 271 (1891) pro parte † ; in Journ. Bot. xxxix. Suppl. 58 (1901) †.—Robertson in Trans. & Proc. Bot. Soc. Edin. xx. 89 (1894).—J. E. Griff. Fl. Anglesey & Carnarvon. 141 (1895) pro parte †.—M'Andrew in Trans. & Journ. Proc. Dumfries. Nat. Hist. Soc. x. 103 (1895) pro parte † ; *op. cit.* xii. 23 (1897).—R. P. Murr. Fl. Somerset, 346 (1895) †. F. B. W. White, Fl. Perth. 312 (1898) pro parte.—Marshall

& Hanb. Fl. Kent, 365 (1899) pro parte †.—J. B. L. Warren, Fl. Cheshire, 287 (1899) †.—E. F. Linton, Fl. Bournemouth, 226 (1900) pro parte †.—J. Fras. Robinson, Fl. E. Riding York. 195 (1902) †.—Riddelsdell in Journ. Bot. xlv. Suppl. 63 (1907) †.—Britten in Journ. Bot. xlvi. 120 (1908) †.—E. S. Marshall in Journ. Bot. xlvi. 262 (1908); in Proc. Somerset. Archaeol. & Nat. Hist. Soc. lix. 3, 192 (1914) pro parte †.—Hiern in Rep. & Trans. Devon. Assoc. xlii. 128 (1910).—Little in Watson Bot. Exch. Club, ii. 511 (1915).—Hagstr. Crit. Res. 121, figs. 24 C, 54–55 (1916) †.—Pearsall in Bot. Soc. & Exch. Club Brit. Is. iv. 515 (1917); *op. cit.* v. 841 (1920); *op. cit.* x. 546 (1934) †, 844, 990 (1935); in Watson Bot. Exch. Club, iv. 143 (1932); ex Vachell in Bot. Soc. & Exch. Club Brit. Is. x. 731 (1934) excl. var.—Rilstone in Bot. Soc. & Exch. Club Brit. Is. v. 252 (1918).—Lousley in Watson Bot. Exch. Club, iv. 189 (1933).—Horwood & Noel, Fl. Leicester. & Rutland, 576 (1933) pro parte †.

P. pusillus var. *tenuissimus* Mert. & Koch, Röhl. Deutsch. Fl. i. 857 (1823).—R. Wood in Rep. Bot. Rec. Club, i. 182 (1877).—G. Webster in Bot. Exch. Club Rep. 1876, 35 (1878); *op. cit.* Rep. 1881, 57 (1882).—R. P. Murr. in Journ. Bot. xx. 45 (1882).—Davidson in Trans. & Journ. Proc. Dumfries. Nat. Hist. Soc. iv. 55 (1887).—F. A. Lees, Fl. W. York. 417 (1888) †.—E. F. Linton in Journ. Bot. xxxviii. 271 (1900) †.—Davey, Tent. List Pl. Cornwall, 223 (1902).—J. W. White, Fl. Bristol, 610 (1912) †.—Pearsall in Bot. Soc. & Exch. Club Brit. Is. x. 844, 990 (1935).

P. gramineus (non L.) Jones & Kingston, Fl. Devon. 31 (1829).

P. tenuissimus (Mert. & Koch) Reichb. Ic. Fl. German. & Helvet. vii. 14 (1845) saltem quoad pl. Mert. & Koch.—Davidson in Watson Bot. Exch. Club Ann. Rep. 4, 13 (1888).

P. compressus (non L.) Ravenshaw, New List Pl. Devon, 69 (1860) pro parte †.

P. panormitanus (non Biv.) A. Benn. in Journ. Bot. xix. 67 (1881) quoad pl. brit.; *op. cit.* lvii. 18 (1919) pro parte †; in Trans. & Proc. Bot. Soc. Edin. xxix. 56 (1924) pro parte; in Watson Bot. Exch. Club, iii. 493 (1929).—Druce in Bot. Soc. & Exch. Club Brit. Is. v. 581 (1920) pro parte.—I. M. Roper in Bot. Soc. & Exch. Club Brit. Is. ix. 240 (1930).

P. pusillus var. (*P. panormitanus* Biv.).—A. Benn. in Journ. Bot. xix. 242 (1881).

P. mucronatus (non Schrad.) F. A. Lees, Fl. W. York. 417 (1888) pro parte †.—J. B. L. Warren, Fl. Cheshire, 287 (1899).

P. pusillus var. *rutilus* (Wolfg.) F. A. Lees, Fl. W. York. 418 (1888) quoad pl. ex York.

P. pusillus var. *Sturrockii* (A. Benn.) Morong in Mem. Torr. Bot. Club, iii. 2, 46 (1893) quoad pl. amer.—Pearsall in Bot. Soc. & Exch. Club Brit. Is. iv. 76 (1915), 292 (1916).

P. Sturrockii (non A. Benn.) E. S. Marshall in Journ. Bot. xxxi. 234 (1893).—J. E. Griff. Fl. Anglesey & Carnarvon. 141 (1895).—Trail in Trans. & Proc. Bot. Soc. Edin. xxii. 304 (1904).—A. Benn. in McNeill, Colonsay, 181 (1910) †; in Journ. Bot. li. 279 (1913) pro parte †; *op. cit.* lii. 257 (1914).—Cowan in Bot. Exch. Club & Soc. Brit. Is. iii. 291 (1913).—Pearsall in Bot. Soc. & Exch. Club Brit. Is. v. 841 (1920).

P. trichoides var. *Trimmeri* (non Casp.) A. Benn. ex Dunn in Journ. Bot. xxxii. 23 (1894).—Dunn in Bot. Exch. Club Brit. Is. Rep. 1895, 497 (1897).

P. pusillus var. *pseudo-trichoides* A. Benn. in R. P. Murr. Fl. Somerset, 347 (1895).

P. pusillus var. *Berchtoldii* (Fieb.) Aschers. & Graebn. Synops. Mitteleur. Fl. i. 345 (1897).—Stirling & Waddell in Watson Bot. Exch. Club Ann. Rep. 15, 19 (1899).—Marshall & Hanb. Fl. Kent, 366 (1899).—Spence, Fl. Orcad. 71 (1914).—W. A. Nicholson, Fl. Norfolk, 155 (1914).—A. Benn. in Fryer & Benn. Pot. Brit. Is. 84 (1915).—Pearsall in Bot. Soc. & Exch. Club Brit. Is. iv. 292 (1916); *op. cit.* ix. 152, 154 (1930); *op. cit.* xi. 110 (1936).

P. pusillus f. *pseudo-trichoides* (A. Benn.) C. E. Salmon in Journ. Bot. xxxvii. 411 (1899).

P. pusillus var. ?—E. S. Marshall in Journ. Bot. xxxviii. 251 (1900).—Cryer in Bot. Exch. Club & Soc. Brit. Is. iii. 291 (1913).

P.———, sp.—E. S. Marshall in Bot. Exch. Club Brit. Is. Rep. 1899, 614 (1901).

P. trichoides (non Cham. & Schlecht.) Hiern in Victoria Hist. Devon. 68 (1906).—Druce in Bot. Soc. & Exch. Club Brit. Is. vi. 751 (1923).

P. pusilliformis Hagstr. Crit. Res. 97 (1916) saltem pro parte.—A. Benn. in Journ. Bot. lvii. 18 (1919).

P. dualis Hagstr. Crit. Res. 103 (1916) saltem quoad pl. angl.—A. Benn. in Journ. Bot. lxiv. 331 (1926).

P. franconicus var. *spicosus* Hagstr. Crit. Res. 126 (1916) saltem quoad pl. ex Somerset [sed excl. pl. ex Surrey quae est *P. trichoides*].

P. pusillus var.—F. Robinson in Bot. Soc. & Exch. Club Brit. Is. v. 527 (1919).

P. pusillus f. *obtusissimus* Hagstr. apud Pearsall in Bot. Soc. & Exch. Club Brit. Is. v. 841 (1920).

P. pusillus f. *acutissimus* Hagstr. *loc. cit.* (1920).

P. pusillus var. *brevifolius* Nolte ex J. E. Griff. in Watson Bot. Exch. Club, iii. 118 (1920).

P. pusillus subsp. *lacustris* Pearsall & Pearsall f. in Journ. Bot. lix. 163 (1921).—Pearsall in Watson Bot. Exch. Club, iii. 186 (1922); *op. cit.* iv. 143 (1932).

P. franconicus (an G. Fisch. ?) Druce in Bot. Soc. & Exch. Club Brit. Is. vi. 50, 152 (1921) pro parte.

P. trinervius (non G. Fisch.) Hagstr. ex Druce, *loc. cit.* (1921) pro parte.

P. pusillus × *trichoides* Druce in Bot. Soc. & Exch. Club Brit. Is. vi. 751 (1923).

P. lacustris (Pearsall & Pearsall f.) Druce, Brit. Pl. List, Ed. 2, 117 (1928).

P. Friesii (non Rupr.) E. C. Wallace in Watson Bot. Exch. Club, iv. 143 (1932) pro parte.

Vice-county distribution of gatherings examined :—

(1) WEST CORNWALL. Near Newquay, Aug. 1900, *C. C. Vigurs* *. Stream into Holywell Bay, Trebisken Moor, Cubert, Aug. and Sept. 1915, *F. Rilstone* * ; Aug. 1916, *E. Thurston* (Herb. Kew). Gunwalloe, Aug. 1887, *C. A. Wright*. Stream, Truro, Sept. 1913, *E. S. Todd* (Herb. Todd). Lake, Helston, Aug. 1914, *E. Thurston* (Herb. Kew). Pools, Loe Valley below Helston, June 1917, *E. S. Marshall*, Ref. 4396. Clay pit, Chyoone Farm, Penzance, July 1877, *W. Curnow* (Herb. Kew).

(2) EAST CORNWALL. Pencarrow Mill, Aug. 1818, *J. F. Young*. Pool near Roche, Aug. 1908, *H. Groves & C. C. Vigurs*. Withiel, 1873, *R. V. Tellam* (Herb. Edinburgh) ; 1875, *R. V. Tellam*.

(3) SOUTH DEVON. R. Exe (near Silverton), Rewe, Sept. 1900, *F. P. Savery* *. Wonford, Exeter, July 1850, *E. Parfitt* * (Herb. Mus. Torquay N. H. Soc.). Powderham Castle (Lord Courtney's park), collector not indicated * (Herb. R. Albert Mem. Mus., Exeter). Exeter Canal, Alphington, Aug. 1938, *G. T. Fraser* *. Bradmere Pool, Drewsteignton, Aug. 1893 and July 1895, *S. T. Dunn* *. Ponds and clay pits, Kingsteignton, Sept. 1911, *W. P. Hiern* * ; July 1938, *G. T. Fraser* *. Ditches and pools, Teigngrace, Aug. 1893, *S. T. Dunn* * ; Sept. 1936, *G. T. Fraser* * (Herb. Mus. Torquay N. H. Soc.). Stover Canal, Teigngrace, Aug. 1911, *C. E. Larter* * (Herb. R. Albert Mem. Mus., Exeter) ; Aug. 1932, collector not indicated * (Herb. Mus. Torquay N. H. Soc.). Mill stream, Bridgend, Holbeton, Aug. 1861, *T. R. A. Briggs* * (Herb. Watson, at Kew). Pond, Radford, Plymstock, Aug. 1876, *T. R. A. Briggs* *. Ditch, Chelson Meadow, Plympton St. Mary, June 1851, *I. W. N. Keys* * in *Herb. Boswell*.

(4) NORTH DEVON. Ditch near R. Yeo, Shirwell, Aug. 1869, *W. P. Hiern* * (Herb. R. Albert Mem. Mus., Exeter). Watermouth, Berrynarbor, Aug. 1834, *Herb. C. A. Wright* *. Ditches, Braunton Burrows, Aug. 1881, *W. M. Rogers* * ; Sept. 1882, *W. P. Hiern* * (Herb. R. Albert Mem. Mus., Exeter). Ditches, Braunton Marsh, July 1889 and Aug. 1896, *W. P. Hiern* * ; Aug. 1903, *A. Sharland* *. Mill stream, R. Yeo, Barnstaple, July 1864 and July 1867, *W. P. Hiern* *. R. Taw between Horestone and Chapelton, Bishop's Tawton, Aug. 1906 and Sept. 1907, *W. P. Hiern* *. Pond, Tapeley Park, Westleigh, Aug. 1918, *W. P. Hiern* * (Herb. R. Albert Mem. Mus., Exeter). Mill stream, Darkham Wood, St. Giles-in-the-Wood, July 1894 and Aug. 1895, *W. P. Hiern* * (Herb. R. Albert Mem. Mus., Exeter). R. Taw near Hawkridge Bridge, Chittlehampton, Aug. 1906, *W. P. Hiern* * (Herb. R. Albert Mem. Mus., Exeter). Mill leat, Head Mill, Chittlehamholt, July 1907, *W. P. Hiern* * (Herb. R. Albert Mem. Mus., Exeter). Backwater of R. Yeo, Molland, July 1893, *W. P. Hiern* *. Quarry, South Tawton, July 1937, *G. T. Fraser & W. K. Martin* *.

(5) SOUTH SOMERSET. Ditches, Decoy, near Porlock Weir, Aug. 1898, *C. E. Salmon* *. Pond, Hestercombe, Cheddon Fitzpaine, Aug. 1907, *E. S. Marshall*, Ref. 3220 *. Drake's Pond, Wellington, Sept. 1884, *F. Elworthy* *.

(6) NORTH SOMERSET. Sedgemoor, Westonzoyland, Sept. 1895, *G. R. Bullock-Webster*. Ditches, Barton St. David, July 1891, *R. P. Murray* *. Baltonsborough, Aug. and Sept. 1881, and June 1882, *R. P. Murray* *. Glastonbury, Aug. 1882, *R. P. Murray* *. Peat moor near Ashcott, Aug. 1920, *C. I. Sandwith*. Ditches, Cheddar Moor, July 1903, *C. Bucknall*. Cattle pond, Blagdon, July 1929, *I. M. Roper* *. Ditch, Nailsea Moor, Sept. 1904, *J. W. White*. Tickenham Moor, Aug. 1909, *M. A. G. Livett* * (Herb. Univ. Bristol). Walton Moor, Walton-in-Gordano, Aug. 1919, *H. S. Thompson*.

(7) NORTH WILTS. Kennet & Avon Canal, Crofton, Great Bedwyn, Aug. 1939, *G. Taylor*.

(8) SOUTH WILTS. Kennet & Avon Canal, Wilton, Grafton, Aug. and Sept. 1939, *G. Taylor*. Chalk pit, Salisbury, Sept. 1933, *B. Gullick* (Herb. Kew).

(9) DORSET. Wool, Sept. 1893, *E. F. Linton*. Ditches near Wareham, Aug. 1882, *R. P. Murray* ; July 1892 and July 1893, *E. F. Linton* * ; Sept. 1916, *C. B. Green*. Crichel, More Crichel, Aug. 1881, *H. E. Fox*. Near Shapwick, 1893, *R. P. Murray*. R. Stour, Wimborne Minster, July 1863, *J. C. Mansel-Pleydell* * in *Herb. Boswell*. Stream on way to Ridge Farm, Arne, Aug. 1917, *C. Bucknall*. Pool near Ridge, Arne, Sept. 1934, *P. M. Hall*, Ref. 1276 * (Herb. Hall ; Herb. Kew). Pond, East Creech, Church Knowle, Aug. 1917, *C. B. Green*.

(10) ISLE OF WIGHT. Banks of R. Yar, Freshwater, 1849, *I. J. Hambrough* (Herb. S. Lond. Bot. Inst.). Marshes, Freshwater, Aug. 1861, *H. C. Watson* (Herb. Watson, at Kew) ; June 1927, *E. & H. Drabble* ; Sept. 1933, *P. M. Hall*, Ref. 979 * (Herb. Hall). Pool in R. Medina, July 1926, *E. S. Todd* (Herb. Todd). Near King's Quay, Cowes, Aug. 1868, *F. Stratton* (Herb. Druce). Ditches by Dover, Ryde, July 1838, *W. A. Bromfield* * (Herb. Edinburgh). St. John's, Ryde, *Mrs. Robinson*.

(11) SOUTH HANTS. Moors R., Palmer's Ford, St. Leonards & St. Ives, July 1939, *P. M. Hall*, Ref. 3670. Sopley, Aug. 1893, *E. F. Linton*. Nea Brook, Sept. 1878, *C. E. Palmer* (Herb. Druce). Pool near Lymington, Aug. 1881, *H. Groves*. R. Test above Mottisfont, Aug. 1939, *P. M. Hall*,

Ref. 3690. Romsey, Aug. 1876, *H. Groves* *. Pond, Botleigh Grange, Hedge End, Aug. 1934, *P. M. Hall*, Ref. 1248 *.

(12) NORTH HANTS. Fullerton, Wherwell, Aug. 1863, *C. B. Clarke*, Ref. 789 * (Herb. Kew). Leckford, Aug. 1863, *C. B. Clarke*, Ref. 791 *; 1865, *C. B. Clarke* *. Basingstoke Canal, Odiham, July 1931, *E. C. Wallace* * (Herb. Wallace; Herb. Kew; Herb. Univ. Cambridge); July 1934, *P. M. Hall*, Ref. 1215 *. R. Whitewater, North Warnborough, Odiham, Aug. 1897, *C. E. Palmer* *. R. Whitewater, Hook, June 1893, *C. E. Palmer* * (Herb. Druce).

(13) WEST SUSSEX. Ditch near old mill, Sidlesham, June 1901, *E. S. Marshall* *. Barnetts Mill Pond, near Lavington Common, East Lavington, Aug. 1901, *E. S. Marshall*, Ref. 2608. Drain between Arundel Castle and R. Arun, Arundel, Sept. 1938, *A. H. G. Alston*. Amberley Wild Brooks, Aug. 1926, *J. E. Woodhead* (Herb. Woodhead). Ditch, Lancing, *T. Hilton*. Ditches between Lancing and Shoreham-by-Sea, Aug. 1849, *T. Moore*. Salt-water drain, Shoreham-by-Sea, 1850, *H. C. Watson* (Herb. Watson, at Kew).

(14) EAST SUSSEX. Cuckfield, Aug. 1902, *G. C. Druce* (Herb. Druce). Ditches, Malling, Lewes, July 1850, *W. C. Unwin*. Ditches, Pevensey Levels, July 1924, *D. P. Murray*. Ditches near Camber, Apr. 1882, *H. T. Mennell*.

(15) EAST KENT. Near Faversham, Aug. 1933, *F. Druce* (Herb. F. Druce). Margate, *Herb. Hooker* (Herb. Kew). Deal, Sept. 1856 and Aug. 1863, *J. T. I. Syme* in *Herb. Boswell*; Aug. 1875, *F. J. Hanbury* * in *Herb. Hanbury*. Ham Ponds, 1883, *F. J. Hanbury* * in *Herb. Hanbury*; Aug. 1883, *H. T. Mennell*. Ditches near Preston, July 1890, *E. S. Marshall*, Ref. 223. Great Stour below Grove Ferry, Wickhambreux, Aug. 1938, *C. Norman*. Dykes north of Seaton, Ickham & Well, June 1939, *C. Norman*. Yalding, Aug. 1838, *H. Baber*; *C. A. Stevens*. Staplehurst, Aug. 1902, *S. J. ff. Chamberlain*, Ref. 7171 (Herb. Univ. Bangor).

(16) WEST KENT. Northfleet, July 1852, *J. T. I. Syme* in *Herb. Boswell*. Pond, Leigh, Apr. 1881, *A. Bennett*. Pool by R. Medway above Wateringbury, Aug. 1935, *E. C. Wallace* (Herb. Wallace; Herb. Edinburgh). Ponds, Marden, July 1893, *E. S. Marshall*, Ref. 1096 and 1097 *; Sept. 1937, *L. H. J. Williams*, Ref. 1047.

(17) SURREY. Mytchett Lake, Frimley, July 1881, *W. H. Beeby* (Herb. S. Lond. Bot. Inst.). Virginia Water, Egham, Oct. 1939, *A. H. G. Alston & N. Y. Sandwith*. Near Thorpe, Egham, *H. C. Watson* * (Herb. Watson, at Kew). Outlet of Frensham Great Pond, Sept. 1873, *H. C. Watson* (Herb. Watson, at Kew). Stream into Hammer Ponds, Thursley, Sept. 1888, *W. F. Miller*. Shalford Meadows, Sept. 1888, *A. Bennett*. R. Wey near Guildford, July 1885, *H. T. Mennell*. Ditch, St. Catherine's, Guildford, *F. Clarke* * (Herb. Druce). R. Wey Navigation near Send, July 1931, *E. C. Wallace* (Herb. Wallace). Basingstoke Canal, Brookwood, Woking, Aug. 1879, *J. Groves*. Basingstoke Canal near Woking, Sept. 1891, *J. Groves & R. F. & F. P. Thompson*. Basingstoke Canal ($\frac{1}{2}$ mile west of Byfleet), Chertsey, Aug. 1932, *J. E. Lousley* (Herb. Lousley). Weybridge, Aug. 1861, *H. C. Watson* * (Herb. Watson, at Kew). Pits near R. Wey Navigation below Weybridge, June 1886, *W. H. Beeby*. Nutfield Marsh, 1868, *N. E. Brown*; Sept. 1879, *W. H. Beeby* (Herb. S. Lond. Bot. Inst.). Pendell Court, Blechingley, Aug. 1884, *J. Fraser* (Herb. Kew). Ditch by R. Mole above West Molesey, Esher, 1850, *H. C. Watson* * in *Herb. Boswell*. Richmond (opposite Isleworth Church), 1824, *J. Smith* *. Camberwell (near New Cross), July 1864, *W. W. Newbould*. Chiddingfold, July 1911, *A. & M. L. Wedgwood* (Herb. Wedgwood).

(18) SOUTH ESSEX. Brook crossing Lea Bridge Road near Sybourn Corner, Leyton, *E. Forster* *.

(19) NORTH ESSEX. Paper mills, Greenstead Green, Halstead, 1845, *E. Forster*. Kelvedon, comm. *Lond. Bot. Soc.* 1850 (Herb. Hancock Mus., Newcastle-upon-Tyne). Colchester, 1857, collector not indicated.

(20) HERTS. Cold Harbour, Harpenden, July 1904, *D. M. Higgins*. Ditch near Ware Mill, June 1841, *W. H. Coleman* * (Herb. Druce).

(21) MIDDLESEX. Grand Union Canal near Yiewsley, Oct. 1934, *J. E. Lousley* (Herb. Lousley). River, Hounslow Heath, July 1705, *A. Buddle* * in *Herb. Sloane*, vol. 117, fol. 29.

(22) BERKS. Kennington Lane, Sept. 1892, *G. C. Druce* *. Pool, Hampstead Marshall, Aug. 1935, *J. D. Grose*, Ref. 1371 (Herb. Grose). Thatcham, 1921, *T. Gambier-Parry* *. Kennet & Avon Canal, Burghfield, June 1939, *T. M. Harris*, Ref. 5.

(23) OXFORD. Brook between R. Cherwell and Oxford Canal, Bodicote, *T. Beesley* * (Herb. Druce). Lake, Blenheim Park, Aug. 1938, *J. E. Dandy*, Ref. 759. Oxford, June 1847, *C. C. Babington* (Herb. Univ. Cambridge); July 1880, *G. C. Druce* *.

(24) BUCKS. Pond near Oakhill Wood, Shenley Church End, 1835, *J. L. Knapp*. Near Marsh Gibbon, June 1913, *G. C. Druce* * (Herb. Druce). Ditches near Datchet, 1847, *T. Cox*. Chalfont St. Giles, *G. C. Druce* * (Herb. Druce). R. Chess, Chenies, Aug. 1901, *A. Loydell*.

(25) EAST SUFFOLK. Ditches, Beccles, Aug. 1887, *W. M. Hind* *. Wortham (near Bressingham), Aug. 1883, *G. C. Druce* * (Herb. Druce). Redgrave, Sept. 1881, *W. M. Hind* *; Aug. 1882, *W. M. Hind* * (Herb. Univ. Cambridge). Bawdsey, July 1887, *W. M. Hind* *.

(26) WEST SUFFOLK. Weston Fen, Market Weston, June 1883, *J. D. Gray*. Ixworth, Aug. 1881, *W. M. Hind* *. Stream, Exning, Newmarket, July 1887, *H. & J. Groves*.

(27) EAST NORFOLK. Swainsthorpe, 1919, *G. C. Druce* *.

Buckenham, 1919, *G. C. Druce* *. Near Great Yarmouth, *G. C. Druce* (Herb. Druce). Ranworth, Aug. 1919, *G. C. Druce*. Horning, 1887, *H. T. Mennell*. Hickling Broad, July 1890, *C. Cotton*. Ditch near R. Bure, Lamas, Aug. 1900, *C. E. Salmon* *. Brumstead, July 1923, *F. Druce*. Alderford, Sept. 1886, *E. F. Linton* *. Bogs, Newton St. Faith, 1815, *J. Backhouse* (Herb. Edinburgh). Hellesdon, Aug. 1885, *E. F. Linton* *.

(28) WEST NORFOLK. Ditch, Scoulton, Aug. 1918, *F. Robinson*, Ref. 4 and 403 *. Thompson Water, Sept. 1897, *G. R. Bullock-Webster*. Drain between R. Nar and Shouldham Warren, Wormegay, June 1914, *J. E. Little* *. Ditches, Hunstanton, Sept. 1884, *A. Fryer*. Holme-next-the-Sea, Sept. 1897, *H. W. & M. Pugsley* (Herb. Pugsley). Titchwell, Aug. 1836, collector not indicated (Herb. Univ. Glasgow). Brancaster, Aug. 1836, *K. Trimmer* (Herb. Univ. Cambridge).

(29) CAMBRIDGE. Drain near Chatteris, Aug. 1897, *A. Fryer* *. Ely, July 1823, *L. Jenyns* * (Herb. Univ. Cambridge). Ditches near Upware, Wicken, Sept. 1838, *W. Borrer* * (Herb. Borrer, at Kew). Wicken Sedge Fen, Sept. 1880, *W. J. Cross* *; July 1938, *T. G. Tutin* *. Drove by Burwell Lode, Aug. 1882, *A. Bennett* *. Near Waterbeach, July 1856, *W. W. Newbould* *. Isleham Fen, Sept. 1883, *A. Fryer*, Ref. 773 *. Chippenham Fen, Sept. 1883, *A. Fryer*, Ref. 772 *; July 1885, *A. Fryer*, Ref. 776 *; June 1886, *N. E. Brown* *. Snailwell Fen, July 1852, *C. C. Babington* * (Herb. Univ. Cambridge). Swaffham Prior, Aug. 1826, *G. B. Jermyn* * (Herb. Univ. Cambridge). Bottisham Fen, Lode, June 1833 and July 1847, *C. C. Babington* * (Herb. Univ. Cambridge); July 1847, *W. W. Newbould* *; Aug. 1849, *C. C. Babington* * (Herb. Univ. Cambridge), and *F. J. A. Hort* *. Sawston, July 1844, *G. S. Gibson* * (Herb. Univ. Cambridge). Gamlingay, Aug. 1828, *J. S. Henslow* * (Herb. Univ. Glasgow).

(30) BEDFORD. R. Ivel, Gravenhurst, Aug. and Sept. 1884, *J. Saunders*.

(32) NORTHAMPTON. Wakefield Pond, near Potterspury, Sept. 1879, *G. C. Druce*. Peakirk, Aug. 1910, *G. C. Druce* *; Sept. 1910, *G. C. Druce*, Ref. 4311 *. Eye Green, Sept. 1909, *G. C. Druce* * (Herb. Druce). Mason's Drain near Eye, Sept. 1909, *G. C. Druce* *. Near Peterborough, 1919, *G. C. Druce* * (Herb. Druce).

(33) EAST GLOUCESTER. Ponds near Gloucester, July 1864, *G. A. O. St. Brody* (Herb. Gloucester Mus.). R. Evenlode, 1885, *G. C. Druce* (Herb. Druce).

(34) WEST GLOUCESTER. Lydney, Aug. 1865, *W. H. Purchas* (Herb. Gloucester Mus.). Stream, Soudley, East Dean, July 1850, *Cotswold Club & W. H. Purchas*. Newland, Oct. 1850, *F. J. A. Hort*. Woodchester Park, 1885, *H. P. Reader* (Herb. Univ. Bristol); July 1887 and Aug. 1900, *H. P. Reader*.

(35) MONMOUTH. Near Llanvihangel, Aug. 1866, *A. Ley* in *Herb. Boswell*. Brecon Canal near Pontypool, July 1837, *C. Conway* in *Herb. Boswell*. Monmouthshire Canal, Crumlin, Abercarn, Aug. 1858, *G. Bentham* (Herb. Kew).

(36) HEREFORD. Gorsley Pool, July 1850, *W. H. Purchas*. Devereux Pools, near Woolhope, Oct. 1885, *A. Ley*. Canal, Leominster, Aug. 1841, *H. Neuman*. Pool, Wormbridge, Aug. 1876, *A. Ley* *.

(37) WORCESTER. Golden Valley, Bewdley, Aug. 1899, *J. B. Duncan* (Herb. E. C. Wallace).

(38) WARWICK. Oldbury Reservoir, Aug. 1884, *J. E. Bagnall* *.

(39) STAFFORD. Knypersley Pools, Biddulph, Sept. 1890, *R. F. & F. P. Thompson* *. Pool near Walsall, May–June 1834, *H. E. Lowe* (Herb. Kew).

(40) SALOP. Blake Mere, Ellesmere, 1885, *W. E. Beckwith*. Baschurch, Sept. 1882, *W. E. Beckwith* *. Near Shrewsbury, Aug. 1881, *W. Phillips*. Near Eaton Constantine, Sept. 1884, *W. E. Beckwith*. Cressage, Sept. 1885, *W. E. Beckwith*. Snowdon Pool Marshes, Beckbury, July 1831, *G. Lloyd* * (Herb. Kew).

(41) GLAMORGAN. Swansea, Aug. 1848, *Herb. Boswell*. Vale of Neath, 1918, *J. A. Webb*. Margam Moors, Port Talbot, July 1904, *H. J. Riddelsdell* *. Mynydd-y-Glew, Pendoylan, Aug. 1920, *A. B. Rendle*. Lake, Courtyrala, Michaelston-le-Pit, Aug. 1932, *E. Vachell* * (Herb. Vachell). Near Penarth, Aug. 1905, *A. H. Trow*. Glamorganshire Canal, Cardiff, Aug. 1932, *E. Vachell* * (Herb. Vachell). Pond, Radyr, Aug. 1913, *H. J. Riddelsdell*. Glamorganshire Canal, Nantgarw, Caerphilly, July 1938, *E. Vachell*. Penrhiwceiber, Mountain Ash, Sept. 1905, *H. J. Riddelsdell* *. Aberdare, Sept. 1899, *H. J. Riddelsdell* *.

(42) BRECON. Brook dividing Brecon and Glamorgan near Hirwaun, Penderyn, July 1883, *A. Ley* *.

(43) RADNOR. Llandrindod Wells, Aug. 1890, *G. C. Druce*; Sept. 1939, *E. S. Todd*.

(44) CARMARTHEN. River near Kidwelly, *W. Borrer* (Herb. Borrer, at Kew).

(45) PEMBROKE. Bog hole, Dowrog Common, St. David's, Aug. 1935, *J. E. Lousley* (Herb. Lousley). R. Alan, St. David's, Aug. 1848, *C. C. Babington* (Herb. Univ. Cambridge); Aug. 1882, *H. N. Ridley*. Tenby Marsh, Aug. 1867, *H. Trimen*.

(46) CARDIGAN. Aberystwyth, 1846, *H. Moseley*. Pool above Aber-Arth, Llanddewi Aberarth Upper, Aug. 1899, *E. S. Marshall*, Ref. 2278 *; June and Aug. 1937, *J. H. Salter*. Pond, Ty'n-rhos Farm, Llanllwchaiarn, Aug. 1937, *J. H. Salter*.

(47) MONTGOMERY. Shropshire Union Canal, Newtown, Aug. 1939, *J. A. Webb*.

(48) MERIONETH. Llanaber, June 1921, *G. C. Druce*.

(49) CARNARVON. Pit, Llandudno, Aug. 1869, *C. Bailey* *. Llyn Padarn, near Llanberis, July 1886, *J. E. Griffith* *; Aug. 1916, *M. L. Wedgwood.*

(50) DENBIGH. Shropshire Union Canal, Llangollen, Sept. 1938, *J. A. Crabbe.*

(51) FLINT. Ditch, Rhuddlan Marsh, July 1832, *J. E. Bowman* in *Herb. Boswell.*

(52) ANGLESEY. Ty-fry Pond, Pentraeth, 1799, *H. Davies* *. Llanddyfnan (incl. Cors Bodeilio, between Pentraeth and Llangefni), July 1802, *H. Davies* *; Oct. 1884, *C. Bailey*; July and Aug. 1892, and July 1918, *J. E. Griffith* *. Rivulet crossing road from Bodorgan to Trefdraeth Church, Trefdraeth, Aug. 1795, *H. Davies* *. Llyn Coron, Aug. 1886, *J. E. Griffith* *; Aug. 1901, *H. J. Riddelsdell*; *G. C. Druce* (Herb. Druce). Lake, Anglesey, Aug. 1886, *J. E. Griffith* *.

(53) SOUTH LINCOLN. Deeping Fen, Deeping St. Nicholas, July 1883, *W. H. Beeby* *; Aug. 1883, *W. H. Beeby* * (Herb. S. Lond. Bot. Inst.).

(54) NORTH LINCOLN. Dyke near Godknow Bridge, Crowle, Aug. 1939, *C. I. & N. Y. Sandwith.* Cleethorpes, Aug. 1881 and Aug. 1884, *H. Searle.*

(55) LEICESTER. Near Market Bosworth, *A. Bloxam* (Herb. Univ. Cambridge). Lubenham, *Herb. Kirby* * (Herb. Leicester Lit. & Phil. Soc.). R. Glen, Essendine, Aug. 1915, *A. R. Horwood** (Herb. Leicester Lit. & Phil. Soc.).

(56) NOTTINGHAM. Beauvale Reservoir, Greasley, Sept. 1937, *G. Taylor.* Barnby Moor, Aug. 1911, *N. D. Simpson*, Ref. 11017 (Herb. Simpson). Ditches near Nottingham, Aug. 1849, *J. Mitchell.*

(57) DERBY. Pond near Repton Rocks, Aug. 1861, *Herb. Hanbury.*

(58) CHESTER. Pits, Seamon's Moss, Altrincham, Sept. 1862, *G. E. Hunt* *. Hale Moss, Sept. 1863, *G. E. Hunt* * (Herb. Kew). Backwood, Neston-cum-Parkgate, July 1887, *M. Rathbone.* Bromborough, Sept. 1906, *E. & H. Drabble.* Pits, Woodside, Birkenhead, *T. B. Hall* * (Herb. Watson, at Kew).

(59) SOUTH LANCASTER. Pit between Accrington and Whalley, July 1874, *R. H. Alcock.* Farington, Aug. 1908, *W. E. Evans.* Pit, Euxton, July 1904, *F. J. George.* Crosby Marsh, Great Crosby, Aug. 1838, *J. Dickinson* * (Herb. Edinburgh). Leeds & Liverpool Canal near Liverpool, 1814, collector not indicated (Herb. Druce). Ponds near Liverpool, June 1854, *H. S. Fisher* (Herb. Druce). Clubmoor, Liverpool, Aug. 1813, *W. Swainson* (Herb. Univ. Cambridge). Ashton Moss, July and Aug. 1882, *H. Searle.* Canal, Reddish, Oct. 1883, *C. Bailey*; 1901, *G. C. Druce* (Herb. Druce). Ditch, Woolston, July 1822, *W. Wilson* (Herb. Univ. Glasgow). Warrington, Aug. 1822, *W. Wilson* (Herb. Univ. Cambridge).

(60) WEST LANCASTER. Silverdale, June 1910 * and Aug. 1911, *J. Cryer.* Fulwood, Aug. 1874, *E. F. Linton.*

(61) SOUTH-EAST YORK. Gravel pit, Kelsey, Burstwick, July 1901, *C. Waterfall* *.

(62) NORTH-EAST YORK. Ditch parallel to Sea Cut near Scalby, Aug. 1913, *J. E. Little.* Forge Valley, Aug. 1911, *J. Cryer.* Pond, Seamer Moor, July 1914, *E. C. Horrell* (Herb. W. A. Sledge). Newsham Carr, Sept. 1851, *J. G. Baker* * in *Herb. Hanbury*; Aug. 1852, *J. G. Baker* *. Little Gormire Lake, Sutton-under-Whitestone Cliffe, Sept. 1932, *G. Taylor.* Brick pond near Thirsk Junction, Carlton Miniott, Sept. 1880, *G. Nicholson.*

(63) SOUTH-WEST YORK. Bradford Canal, Manningham, Bradford, July 1876, *W. West* *. Pond by Soothill Wood, Batley, *P. F. Lee*, Ref. 38 (Herb. Cartwright Mem. Hall, Bradford). Ditch, Coxley Valley, Shitlington, July 1885, *P. F. Lee* *. Dyke, Black Carr, Cantley, Aug. 1870, *F. A. Lees* * (Herb. Cartwright Mem. Hall, Bradford). Dykes, Hatfield Moors, Sept. 1887, *P. F. Lee* (Herb. Cartwright Mem. Hall, Bradford).

(64) MID-WEST YORK. Pond near Clapham, June 1881, *H. T. Mennell* *. Pools, Austwick Moss, Sept. 1909, *C. A. Cheetham.* Peat holes, Lawkland Moss, June 1891, *R. F. & F. P. Thompson.* R. Ribble, Gisburn, Aug. 1933, *J. N. Frankland* (Herb. Kew). Pond near R. Ure, Ripon, 1870, *F. A. Lees* * (Herb. Cartwright Mem. Hall, Bradford). R. Ure Navigation, Littlethorpe, Oct. 1939, *G. Taylor.* Pond, Harrogate, Dec. 1939, *G. Taylor.* Ditch, Wetherby, July 1881, *F. A. Lees* * (Herb. Cartwright Mem. Hall, Bradford). Pool by R. Wharfe, Hornbank Fields, near Wetherby, 1880, *F. A. Lees* * (Herb. Cartwright Mem. Hall, Bradford). Pond, Wharfeside, 1880, *J. Jackson* *. Near York, Aug. 1872, *G. Webster* (Herb. S. Lond. Bot. Inst.); Aug. 1876 and Aug. 1881, *G. Webster* *. Brick ponds, Dringhouses, Aug. 1881, *F. A. Lees* * (Herb. Cartwright Mem. Hall, Bradford). Malham district, 1869, *W. Todd* * (Herb. Cartwright Mem. Hall, Bradford). R. Aire, Scalegill Mill Race, near Hanlith, July 1890, *R. F. & F. P. Thompson.*

(65) NORTH-WEST YORK. Richmond, July 1835, *J. Ward* (Herb. Univ. Cambridge).

(66) DURHAM. Pond, Ravensworth Castle, Lamesley, Aug. 1807, *W. Robertson* (Herb. Hancock Mus., Newcastle-upon-Tyne). Mordon Carrs, *W. Backhouse* * (Herb. Edinburgh); *J. I'Anson.*

(67) NORTHUMBERLAND. Meggie's Burn. *H. Ibbotson.* Pond near Hartley, Seaton Delaval, 1844, *J. Storey* (Herb. Kew).

(68) CHEVIOTLAND. Dunstanburgh, Dunstan, 1832, *R. C. Embleton* (Herb. Hancock Mus., Newcastle-upon-Tyne); 1848, *D. Oliver* *; Aug. 1856, *D. Oliver* * (Herb. Univ. Cambridge). Streamlet on moor, Roddam Glen, July 1905, *H. N. Dixon.* Near Alnwick, 1831, *R. C. Embleton* (Herb. Hancock Mus., Newcastle-upon-Tyne).

(69) WESTMORLAND. Windermere, Aug. 1919, *W. H. & W. H. Pearsall* * ; Sept. 1937, *R. Ross*. High Dam, Windermere, Sept. 1913, *W. H. Pearsall* *. Ditches, Middlebarrow Wood, Arnside, July 1874, *C. Bailey* *. Ullswater, Aug. 1919, *W. H. Pearsall* *. Coniston Water, Aug. 1911, *J. Comber*; Aug. 1915 and Sept. 1919, *W. H. Pearsall* *; Oct. 1919, *W. H. Pearsall* * (Herb. Druce); Sept. 1920, *W. H. Pearsall* * (Herb. Univ. Cambridge). Esthwaite Water, Hawkshead, Aug. 1914, Aug. 1915, Aug. and Sept. 1919, and Sept. 1921, *W. H. Pearsall* *; July 1919, *R. S. Adamson*; July 1934, *G. Taylor*; Aug. 1934, *T. J. Foggitt*. Higher Lath Tarn, Osmotherley, Sept. 1913, *W. H. Pearsall*. Poaka Beck Reservoir, Dalton-in-Furness, July, Aug., and Sept. 1913, and Aug. and Sept. 1919, *W. H. Pearsall* *. Pond, Green Haume, Dalton-in-Furness, Oct. 1913, *W. H. Pearsall* * (Herb. Univ. Cambridge). Elliscales, Dalton-in-Furness, Oct. 1919, *W. H. Pearsall*. Peaty ditch near Dalton-in-Furness, July 1913, *W. H. Pearsall*.

(70) CUMBERLAND. Reservoir, Workington, Aug. 1884, *W. Hodgson*. Bassenthwaite, Aug. 1933, *W. A. Sledge* (Herb. Sledge). Derwent Water, Aug. 1883, *H. Groves*; 1902, *G. C. Druce* * (Herb. Druce); Aug. 1916 and Aug. 1918, *W. H. Pearsall* *. Loweswater, Aug. 1868, *M. Edmonds* (Herb. Watson, at Kew). Crummock Water, Buttermere, Aug. and Sept. 1919, *W. H. Pearsall* *. Ennerdale Water, July 1921, *W. H. Pearsall*. Pond, Low Ling, Westward, July 1876, *R. Wood* *. Near Old Carlisle, Westward, July 1854, *D. Oliver* (Herb. Watson, at Kew). Ullswater, Sept. 1920, *W. H. Pearsall* * (Herb. W. A. Sledge). Honeypot, Edenhall, July 1919, *A. Wallis* (Herb. Kew).

(71) ISLE OF MAN. Near Sandygate, Jurby, Sept. 1934, *C. I. Paton*.

(72) DUMFRIES. Near Moffat, July 1891, *J. M'Andrew*. Townfoot Loch, Closeburn, Aug. 1884, *J. Fingland* *. Near Dumfries, Aug. 1839, *J. Cruickshank* (Herb. Edinburgh). Lochar Water, Dumfries, July 1939, *G. Taylor*. Mill dam, Wyseby, Kirkpatrick Fleming, Sept. 1825, *D. Steuart*.

(73) KIRKCUDBRIGHT. Pools at edge of Carlingwark Loch, Kelton, July 1883, *F. R. Coles* (Herb. Fraser, at Edinburgh). Kelton, Aug. 1884, *F. R. Coles* *. R. Dee, The Doachs, Tongland, Sept. 1883, *F. R. Coles*.

(74) WIGTOWN. Lochnaw, Leswalt, Aug. 1835, *J. H. Balfour* (Herb. Edinburgh); July 1895, *J. M'Andrew* *. Ravenstone Loch, Glasserton, Aug. 1893, *J. M'Andrew* *. Ersock Loch, Glasserton, July 1889, *J. M'Andrew* *.

(75) AYR. Pond, Whitehill Smithy, Ayr, July 1854, *I. M'M.*

(77) LANARK. Possil Marsh, Glasgow, Sept. 1881, *Gibson*, Ref. 6. Near Hillhead, Glasgow, Sept. 1895, *A. Somerville*.

(79) SELKIRK. Small loch beside Selkirk-Hawick road, Selkirk, July 1937, *G. Taylor*.

(80) ROXBURGH. Small pond beside Kelso-Town Yetholm road, Linton, July 1935 * and Oct. 1937, *G. Taylor*. Pools near Yetholm, July 1872, *A. Brotherston*. Yetholm Loch, 1831, *R. C. Embleton* (Herb Hancock Mus., Newcastle-upon-Tyne). The following belong to v.-c. 80 though now politically in Selkirkshire :—Faldonside Loch, Galashiels, Aug. 1933, *G. Taylor* *. Cauldshiels Loch, Galashiels, Oct. 1880, *D. Douglas*. Mossend Loch, Synton, Ashkirk, July 1938, *J. S. C. Alexander*.

(81) BERWICK. Pond, Blanerne, Bunkle & Preston, *W. MacRitchie*. Whiteadder Water, Edrington, Mordington, Aug. 1839, collector not indicated (Herb. Univ. Coll. Dundee). Gordon Moss, July 1881, *R. Renton*. R. Tweed, Birgham, Eccles, 1831, *R. D. Thomson*.

(82) HADDINGTON. Gosford, Aberlady, Sept. 1831, *Herb. Dunsmure* (Herb. Edinburgh). Longniddry, Gladsmuir, July 1852, *G. S. Blackie*.

(83) EDINBURGH. Quarry, Cramond, Edinburgh, July 1839, *W. MacGillivray* (Herb. Univ. Aberdeen). Musselburgh, Inveresk, *G. Lloyd* (Herb. Watson, at Kew); *Barry* in *Herb. Hanbury*. Pool, Roman Camp, near Newbattle, July 1831, *W. A. Stables* (Herb. Edinburgh ; Herb. Hancock Mus., Newcastle-upon-Tyne). Gorebridge, Borthwick, June 1851, Ref. 16, collector not indicated (Herb. Druce). Pool beside road above Heriot Station, Aug. 1933 and Oct. 1937, *G. Taylor*.

(84) LINLITHGOW. Philpstoun Loch, Abercorn, 1825, *J. L. Knapp* (Herb. Edinburgh). Carlowrie, Kirkliston, *T. W.* in *Herb. G. Lloyd* (Herb. Kew).

(85) FIFE. Loch Gelly, *A. Robertson* * (Herb. Univ. Glasgow). Ditch near Aberdour, July 1906, *R. S. Adamson*. Otterston Loch, Dalgety, July 1869 and July 1871, *J. T. I. Syme* in *Herb. Boswell*. Inverkeithing, Aug. 1837, *J. H. Pollexfen* (Herb. Edinburgh). Pool near Dunfermline, July 1888, collector not indicated (Herb. Univ. Glasgow).

(86) STIRLING. Near Gargunnock, Sept. 1881, *A. Croall*. Stirling, Aug. 1890 and Sept. 1892, *R. Kidston*; July 1898, *J. S. Stirling & C. H. Waddell* *; June 1907, *R. S. Adamson*. Quarry, Raploch, Stirling, Aug. 1891 and Sept. 1892, *R. Kidston*. Lade, Cultenhove, St. Ninians, Aug. and Sept. * 1892, *R. Kidston & J. S. Stirling*. Pool, Milton, St. Ninians, Aug. 1892, *R. Kidston*. Carron Lade, Larbert, Aug. 1891, *R. Kidston*. Craigallian Loch, Strathblane, July 1891, *R. Kidston & J. S. Stirling*. Mugdock Loch, Strathblane, July 1891, *R. Kidston & J. S. Stirling* (Herb. Univ. Glasgow); July 1893, *R. Kidston & J. S. Stirling* *. Pond at west end of Bardowie Loch, Baldernock, 1847, collector not indicated.

(87) WEST PERTH. Pool, old quarry, Gartur, Port of Menteith, Aug. 1884, *R. Kidston* *. Blairdrummond Moss, Kincardine, July 1882, *F. B. W. White* * (Herb. Perth Mus.). Loch Lubnaig,

Aug. 1887, *H. & J. Groves*. The following belongs to v.-c. 87 though now politically in Fifeshire :—Tulliallan Loch, July 1858, Ref. 12, collector not indicated (Herb. Druce).

(88) MID PERTH. Kincardine Glen, Blackford, May 1884, *F. B. W. White* * (Herb. Perth Mus.). Loch Monzievaird (Ochtertyre Loch), Aug. 1884, *R. Kidston, A. Sturrock* * (Herb. Perth Mus.), and *F. B. W. White* * (Herb. Perth Mus.). Pond of Drummond, Muthill, Aug. 1884, *F. B. W. White* * (Herb. Perth Mus.). Dunning, Aug. 1914, *W. Barclay & J. R. Matthews*. Pool on west side of Water of May, Forteviot, Aug. 1881, *F. B. W. White* * (Herb. Perth Mus.). Forteviot, Sept. 1883, *A. Sturrock*. Dead Water of Earn, Forgandenny, Sept. 1886, *R. H. Meldrum* (Herb. Meldrum, at Edinburgh), and *F. B. W. White* * (Herb. Perth Mus.) ; Aug. 1892, *W. Barclay*. Quarry, Woodlands, Tibbermore, July 1885, *F. B. W. White* * (Herb. Perth Mus.). Pools and ditches between Tyndrum and Crianlarich, Killin, Aug. 1891, *E. S. Marshall*, Ref. 95 *. Loch Dochart, Killin, July 1887, *S. Grieve*.

(89) EAST PERTH. Loch of Clunie, Aug. 1882, *A. Sturrock* * ; Aug. 1911, *McT. Cowan* * ; Aug. 1932, *J. E. Lousley*, Ref. D. 31 * (Herb. Lousley) ; Aug. 1933, *G. Taylor* *. Lunan Burn, July 1882, *A. Sturrock* (Herb. Univ. Glasgow) ; Aug. 1882, *A. Sturrock* * ; Sept. 1882, *A. Sturrock* * (Herb. Perth Mus.). Marlee Loch, July 1881, *A. Sturrock* * (Herb. Perth Mus.) ; Aug. 1882, *A. Sturrock* ; Sept. 1882, *A. Sturrock* * (Herb. Perth Mus.) ; July 1883, *G. C. Druce & J. Knox & A. Sturrock* (Herb. Druce) ; July 1892, *E. S. Marshall*, Ref. 798 ; Aug. 1911, *McT. Cowan* * ; July 1938, *P. M. Hall*, Ref. 3251. Fingask Loch, Kinloch, Aug. 1881, *F. B. W. White* * (Herb. Perth Mus.). White Loch, Blairgowrie, Sept. 1881, *A. Sturrock* *. Loch Bog, Blairgowrie, Aug. 1882, *A. Sturrock* *. Monk Myre, Bendochy, July 1882 and Aug. 1883, *A. Sturrock* ; Sept. 1884, *A. Sturrock* * (Herb. Perth Mus.). Oliver Burn, Pitroddie, Kilspindie, Nov. 1874, *F. B. W. White* * (Herb. Perth Mus.). Mill dam above Balthayock, Kinfauns, Oct. 1874, *H. M. Drummond-Hay* * (Herb. Perth Mus.). R. Tay, Derry Island, Kinfauns, *F. B. W. White* * (Herb. Perth Mus.). Loch of Lowes, Dunkeld & Dowally, Sept. 1876, *H. M. Drummond-Hay* * (Herb. Perth Mus.), and *J. W. H. Trail*; *F. B. W. White* * (Herb. Perth Mus.). Loch Schechernich, Kirkmichael, July 1892, *E. S. Marshall*, Ref. 797 * ; July 1912, *C. E. Salmon*. Blair Atholl, *R. Wight* (Herb. Edinburgh).

(90) FORFAR. Logie Pert, Aug. 1837, *J. Cruickshank* (Herb. Edinburgh). Near Montrose, 1834, *J. H. Balfour*. Loch of Lintrathen, Aug. 1933, *R. & M. Corstorphine*, and *G. Taylor* *. Restenneth Moss, Forfar, Aug. 1882, *A. Sturrock*. Quarry pool, Turin Hill, near Rescobie, July 1913, *R. & M. Corstorphine* (Herb. Corstorphine). Rescobie Loch, *J. H. Balfour* (Herb. Kew) ;

July 1839, *A. Kerr* (Herb. Univ. Bangor) ; July 1882, *A. Sturrock* ; Aug. 1895, *R. Dow* (Herb. Univ. Glasgow). Pool near Rescobie Loch, Aug. 1843, *W. Gardiner*. Lunan Water between Gallowhill and Lunan Bay, Aug. 1908, *R. & M. Corstorphine* (Herb. Corstorphine). Pool, Carmyllie Moor, July 1914, *R. & M. Corstorphine* (Herb. Corstorphine). Pond, Gwynd, Carmyllie, July 1915, *R. & M. Corstorphine* (Herb. Corstorphine). Crombie Den Reservoir, Monikie, 1936, *A. Stewart Sandeman*. Pond northwest of Wellbank, Monifieth, Sept. 1937, *A. Stewart Sandeman*. Long Loch, Lundie, Aug. 1937, *A. Stewart Sandeman*. Laird's Loch, Kettins, Aug. 1883, *A. Sturrock*.

(91) KINCARDINE. Nigg, Aug. 1849, *I. Farquharson* (Herb. Univ. Aberdeen). Kingcausie, Maryculter, July 1850, *J. T. I. Syme* (Herb. Watson, at Kew). Corbie Burn, Maryculter, Aug. 1850, *J. T. I. Syme* in *Herb. Boswell*. Pond near St. Cyrus, Aug. 1834, *J. H. Balfour* * (Herb. Edinburgh). Pool near mouth of R. North Esk, St. Cyrus, July 1876, *J. H. Walker* (Herb. Univ. Aberdeen) ; July 1897, *J. W. H. Trail* (Herb. Univ. Aberdeen).

(92) SOUTH ABERDEEN. Ditch, South Kirktown, Echt, Sept. 1934, *G. Taylor*. Loch Kinord, Glenmuick, July and Aug. 1883, *J. W. H. Trail*. Loch of Park (Loch of Drum), Drumoak, Aug. 1848, *A. Mactier* ; Aug. 1849, *A. Mactier* (Herb. Edinburgh) ; July 1850, *J. T. I. Syme* (Herb. Watson, at Kew) ; Aug. 1850, *P. MacGillivray* (Herb. Univ. Aberdeen).

(93) NORTH ABERDEEN. R. Deveron, Milltown, Huntly, June 1939, *G. Taylor*.

(95) ELGIN. Near Elgin, July 1869, *N. E. Brown*.

(96) EASTERNESS. Loch Alvie, July 1891, *A. Somerville*. Loch Morlich, Aug. 1894, *H. Groves*. Loch Loy, Auldearn, 1936, *A. Stewart Sandeman*. Pool by R. Nairn above Nairn, Aug. 1898, *E. S. Marshall*, Ref. 2187, and *W. A. Shoolbred*.

(97) WESTERNESS. Arisaig, Aug. 1903, *G. C. Druce* (Herb. Druce). Loch na Bairness, Moidart, July 1894, *S. M. Macvicar*. Loch a Bhassery, Moidart, Aug. 1894, *S. M. Macvicar*. Pond, Dorlin, Moidart, June 1895, *S. M. Macvicar*. R. Shiel, Acharacle Ford, Moidart, Sept. 1894, *S. M. Macvicar*.

(98) ARGYLL. Loch Baile a Ghobhainn, Lismore, Aug. 1898, *S. M. Macvicar* *. Lusragan Burn, South Connel, July 1885, *C. Bailey*. Loch Crinan, Kilmartin, Sept. 1889, *H. T. Mennell*.

(99) DUMBARTON. Dam, Kilpatrick Hills, Sept. 1890, *L. Watt*.

(100) CLYDE ISLES. Pool, Great Cumbrae Island, Cumbrae, Aug. 1936, *R. Mackechnie* (Herb. P. M. Hall ; Herb. E. C. Wallace).

(101) CANTYRE. Crinan Canal, Auchindarroch, South Knapdale, Aug. 1897, *C. E. Salmon*. Gigha Island, 1897, *A. Somerville* ; Sept. 1898, *A. Somerville* (Herb. Somerville, at Edinburgh).

(102) SOUTH EBUDES. Loch Fada, Colonsay, Aug. 1906, *A. Somerville* ; July 1908 and July 1910, *M. McNeill* *.

(103) MID EBUDES. Tiree, July 1896, *S. M. Macvicar.*

(105) WEST ROSS. Loch near Badachro, Gairloch, July 1937, *A. Stewart Sandeman.* Loch Dughaill, Lochcarron, July 1937, *A. Stewart Sandeman.*

(106) EAST ROSS. Loch Eye, near Tain, Aug. 1937, *A. Stewart Sandeman.* Loch na Crann, Contin, Aug. 1937, *A. Stewart Sandeman.* Loch Kinellan, Contin, 1936 and Aug. 1937, *A. Stewart Sandeman.* Burn from Loch Ussie, Fodderty, Aug. 1933, *G. Taylor* *.

(109) CAITHNESS. Halkirk, Aug. 1886, *A. Davidson* *; Aug. 1938, *E. S. Todd* *. Pond near Loch of Wester, Wick, Aug. 1938, *E. S. Todd* * (Herb. Todd). Loch of Winless, Wick, *R. Meinertzhagen* (Herb. Meinertzhagen). Near Wick, July 1881, *J. Grant.* Loch Stemster, Latheron, Aug. and Sept. 1913, *G. Lillie.*

(110) HEBRIDES. Scarp, Harris, 1890, *W. S. Duncan* *. Loch south of Carloway, Uig, Lewis, July 1937, *A. J. Wilmott*, Ref. 370713G *.

(111) ORKNEY. Peerie Water, Rousay, Aug. 1921, *H. H. Johnston*, Ref. 1398 (Herb. Johnston). Pool, Cruland, Sandwick, Aug. 1922, *H. H. Johnston*, Ref. 1952. Cairston Mill Pond, Stromness, Sept. 1911, *J. Grant* in *Herb. M. Spence*, Ref. 641 * (Herb. Johnston); Aug. 1921, *H. H. Johnston*, Ref. 1358 (Herb. Johnston). Peat moss, The Loons, Stromness, July 1877, *H. H. Johnston* (Herb. Johnston; Herb. Univ. Aberdeen). Peat bog, Vensilly, South Ronaldsay, July 1914, *H. H. Johnston*, Ref. 270 (Herb. Johnston). Orkney (locality not indicated), 1817–18, *Gillies* *.

(112) SHETLAND. Burga Water, Walls, Aug. 1890, *W. H. Beeby* (Herb. S. Lond. Bot. Inst.). Tingwall, *G. C. Druce* * (Herb. Druce). Loch of Clickhimin, Lerwick, July 1886, *W. H. Beeby*, Ref. 703 *.

P. pusillus L.—The following additional county record should be inserted on p. 9 above:—

(58) CHESTER. Canal, Marple, July 1918, *R. S. Adamson.*

BIBLIOGRAPHICAL NOTES.

CX. SCHNEEVOOGT AND SCHWEGMAN'S 'ICONES PLANTARUM RARIORUM.'

BY WILLIAM T. STEARN.

(Lindley Library, Royal Horticultural Society.)

THE 'Icones Plantarum rariorum delineavit et in Aes incidit Henricus Schwegman; edidit et Descriptiones addidit G. Voorhelm Schneevoogt,' with an alternative Dutch title

'Afbeeldingen van zeldzaame en fraaje Bloem- en Plant-Gewassen . . . door Hendrik Schwegman, met derzelver Beschryving . . . door G. Voorhelm Schneevoogt,' is a rare and beautiful folio work published in parts at Haarlem between 1792 and 1795. As the title indicates, the plates were drawn, coloured, and engraved on copper by Hendrik SCHWEGMAN, while the accompanying descriptions were written by G. Voorhelm SCHNEEVOOGT of Haarlem under the eye of S. J. van GEUNS (1767–95), Professor of Medicine, Botany, and Physiology at the University of Utrecht. They depict new and rare plants cultivated in Holland; a few of them were from the Utrecht botanic garden, but most of them were probably from the celebrated Voorhelm and Schneevoogt nursery at Haarlem. Several of these, notably South African species, had been introduced direct to Holland and thence to England; others, notably Australian species, were introduced to Holland from England. They passed through the hands of nurserymen and were known to gardeners in both England and Holland some years before they came to the notice of botanists and were first formally named and described by Schneevoogt and William CURTIS (1746–99). As the publications of Curtis and Schneevoogt were independent and more or less contemporaneous, some of their names conflict, and it is desirable to ascertain which has priority. The plates of Curtis's 'Botanical Magazine' are dated at the bottom so as to conform with the British print copyright Acts of 1734, 1766, and 1777 †, under which legal protection was secured by engraving on the plate and printing on each print the proprietor's name and the date of first publication; moreover, the 'General Indices to . . . the first 42 Volumes of the

† The 1734 Act of Parliament ("Hogarth's Act") entitled *An Act for the Encouragement of the Arts of Designing, Engraving, and Etching Historical and other Prints* (*Anno Regni Georgii II octavo*, 215–218; *Statutes at Large 3rd to 20th Year Reign George II*, vi. 184–185, cap. 13) gave to the inventors, designers, and engravers of prints the sole right of printing and reprinting the same for the term of fourteen years "to commence from the Day of the first publishing thereof, which shall be truly engraved with the Name of the Proprietor on each Plate, and printed on every such Print or Prints." The 1766 *Act to amend and render more effectual an Act . . . for Encouragement of the Arts of Designing, Engraving, and Etching* (*Anno Regni Georgii III septimo*, 503–506; *Statutes at Large 5th to 10th Year Reign George III*, x. 321–322) extended protection to 28 years. The 1777 *Act for more effectually securing the Property of Prints to Inventors and Engravers* (*Anno Regni Georgii III decimo septimo*, 1175–1176; *Statutes at Large 16th to 20th Year Reign George III*, xiii. 151–152, cap. 57) maintained the 28 years' protection and prohibited the copying of a print in whole or in part without the written and witnessed consent of the proprietor. The first Act resulted from an appeal to Parliament by the celebrated artist William Hogarth (1697–1764), the second from an appeal by his widow, Jane Hogarth (c. 1709–1789); they covered such botanical publications as Miller's 'Illustrations' and Curtis's 'Botanical Magazine' in Britain, but, as there were then no international copyright laws, they gave no protection against Continental copyists such as A. J. G. K. Batsch (1761–1802) of Jena and J. S. Kerner (1755–1830) of Stuttgart.

Botanical Magazine,' 68–111 (1817), give the date and contents of each part. Thus Curtis's work presents no difficulty.

The publication of Schneevoogt's 'Icones,' on the other hand, has hitherto been rather obscure. Fortunately the Technische Hochschule in Dresden possesses parts 1–14 in original wrappers as issued. Parts 1–7 are dated "1792"; 8–12, "1793"; 13, "1794"; 14, "1795." There are also some contemporary reviews. Thus a review of parts 1–6, containing plates 1–18, in 'Göttingische Anzeigen von gelehrten Sachen' (Göttingen), **1792**, iii. 2067–8 (29 Dec. 1792), establishes their issue in 1792. Presumably part 7, containing plates 19–21, appeared at Haarlem too late for inclusion in the 1792 Göttingen journal. This part and parts 8–9, containing plates 22–27, are reviewed in Gött. Anz. **1793**, iii. 1488 (16 Sept. 1793). A review of parts 1–2, containing plates 1–6, also appeared in Usteri, 'Annalen der Botanick' (Zürich), v. 54–59 (1793), of parts 3–8, containing plates 7–24 in *op. cit.* vi. 94–110 (1793), and of parts 9–10, containing plates 25–30, in *op. cit.* ix. 74–79 (1794). Parts 10–11, containing plates 28–33, are reviewed in Gött. Anz. **1794**, i. 688 (28 April 1794). In collating the dates of these reviews with the dates on the wrappers the lack of rapid transport at this period between Haarlem, Göttingen, and Zürich must not be forgotten. I have not found any reviews of parts 12–14, containing plates 34–42. The dates on their wrappers are to be accepted in the absence of other evidence. The Dutch text to plate 44 states that the plant figured (*Rosa semperflorens*) was introduced into Holland in 1794; the German text states that it was introduced the previous year ("erst in vorigen Jahre"); hence the text to this plate was written in 1795. Professor van Geuns died on 16 May 1795. Under plate 48, the last in the work, Schneevoogt refers to him as "Feu mon ami M. le Professeur S. J. van Geuns," "der verstorbene Prof. S. J. van Geuns," and he mentions 1794 as "l'année passée," so that it is evident that this last part (no. 16) was prepared in 1795, sometime after 16 May; Pritzel gives 1795 as the date of the last part. Volume i., containing plates 1–36, dated "1793," has a half-title, title, index, and list of subscribers, judging from which there were at least 205 copies issued. Volume ii., containing plates 37–48, was never completed and lacks both title-page and index. In January 1795 the French republican army under Charles Pichegru overran Holland. The unsettled conditions in Europe during the next few years did not favour such luxury publications as Schneevoogt's 'Icones,' and, together with the death of van Geuns, they probably brought the work to its abrupt end.

The list below gives the contents of the parts (fascicules) and their dates as revealed by the evidence above. The name used by Schneevoogt is followed [in square brackets] by the name preferred nowadays, when different, and a reference to a plate

of the same plant in Curtis's 'Botanical Magazine.' It will be noted that *Cistus formosus* Curtis (1794) antedates *C. formosissimus* Schneevoogt (1795); *Gladiolus cardinalis* Curtis (1790) antedates *G. cardinalis* Schneevoogt (1793); *Rosa semperflorens* Curtis (1794) antedates *R. semperflorens* Schneevoogt (1795); *Glycine rubicunda* Schneevoogt (1793) antedates *G. rubicunda* Curtis (1794); *Glycine violacea* Schneevoogt (1793) antedates *G. bimaculata* Curtis (1794); *Iris longifolia* Schneevoogt (1792) antedates *I. longifolia* Andrews (1799); *Ixia tricolor* Schneevoogt (1794) antedates *I. tricolor* Curtis (1797). An asterisk * indicates new names published by Schneevoogt.

VOLUME I.

Fasc. 1. **1792.**

Pl. 1. *Ixora coccinea* [? *I. javanica* (Blume) DC. †; *B.M* lxxvii. 4586 (1851)].
Pl. 2. *Cypripedium album* [*C. reginae* Walter ‡; *B.M.* vi. 216 (1793)].
Pl. 3. *Erica speciosa* [*E. mammosa* L.].

Fasc. 2. **1792.**

Pl. 4. *Portlandia grandiflora* L. [*B.M.* viii. 286 (1795)].
Pl. 5. *Limodorum Tankervilliae* [*Phaius grandifolius* Lour.; *B.M.* xliv. 1924 (1817)].
Pl. 6. **Ixia maculata viridis* [*I. viridiflora* Lam.; *B.M.* xv. 549 (1802)].

Fasc. 3. **1792.**

Pl. 7. *Camellia japonica* L. [*B.M.* ii. 42 (1788)].
Pl. 8. *Hyacinthus orientalis* L. var. "Madame de St. Simon."
Pl. 9. *Illicium floridanum* Ellis [*B.M.* xiii. 439 (1799)].

Fasc. 4. **1792.**

Pl. 10. *Orobi angustifolii* varietas [*Lathyrus pannonicus* (Kramer) Garcke var. *versicolor* (Gmelin) Maly §; *B.M.* xviii. 675 (1803)].

† The monographer of *Ixora*, Prof. C. E. B. Bremekamp of Bilthoven, Holland, writes that as the plant figured by Schwegman and Schneevoogt has rose-coloured flowers with very obtuse corolla-lobes it cannot be *Ixora coccinea* L. (which has scarlet flowers with acute corolla-lobes), while the rather large leaves and loose inflorescence are unlike those of *I. chinensis* Lam. (*I. stricta* Roxb.). On the other hand, it agrees well with *I. javanica* (Blume) DC.—for synonymy etc., see Journ. of Bot. lxxv. 170 (1937), Bull. Jard. Bot. Buitenzorg, (3) xiv. 253 (1937)—and although this species is seldom cultivated it was not infrequent near Batavia, Java, up to twenty years ago and thus may have been introduced into Holland from there by 1792. These red-flowered Ixoras are much alike; very accurate and detailed figures are needed to bring out their distinctive features. Hence, although Schneevoogt's figure probably portrays *I. javanica*, an absolutely definite identification cannot be made (Bremekamp, *in litt.*).

‡ Syn. *Cypripedium spectabile* Salisb.; *cf.* Ames, Enum. Orchids U.S. & Canada, 30 (1924).

§ Syn. *Orobus varius* Hill; *O. varius* Solander apud Curtis; *Lathyrus varius* (Curtis) C. Koch; *L. versicolor* (Gmelin) G. Beck; *cf.* Širjaev in Rozpravy Věd. Spol. Bad. Ruské Univ. Praze (Bull. Assoc. Russ. Recherch. Bot. Prague), v. 244 (1937) as *L. pannonicus* var. *varius* (Hill) Fiori.

Pl. 11. *Pitcairnia bromeliaefolia* L'Hérit. [*B.M.* xxi. 824 (1805)] †.
Pl. 12. *Gladiolus alatus* [*G. carinatus* Aiton].

Fasc. 5. **1792.**

Pl. 13. *Erica baccans* L. [*B.M.* x. 358 (1797)].
Pl. 14. *Amaryllis vittata* [*Hippeastrum vittatum* (L'Hérit.) Herb.; *B.M.* iv. 129 (1790)].
Pl. 15. *Pyrus spectabilis* [*Malus spectabilis* (Aiton) Borkh.; *B.M.* viii. 267 (1794)].

Fasc. 6. **1792.**

Pl. 16. *Ixia villosa* [*Babiana rubro-cyanea* (Jacq.) Ker-Gawl.; *B.M.* xii. 410 (1798)].
Pl. 17. *Erica empetrifolia* L. [*B.M.* xiii. 447 (1799)].
Pl. 18. *Asclepias procera* [*Calotropis procera* (Aiton) Aiton; *B.M.* cxii. 6859 (1886)].

Fasc. 7. **1792.**

Pl. 19. *Gladiolus undulatus* [*G. vittatus* Hornem.; *B.M.* xv. 538 (1801)].
Pl. 20. **Iris longifolia* [*Moraea edulis* (L.) Ker-Gawl.; *B.M.* xvii. 613 (1803)].
Pl. 21. **Nahusia coccinea* ‡ [*Fuchsia coccinea* Aiton; *B.M.* xciv. 5740 (1868)].

Fasc. 8. **1793.**

Pl. 22. *Clethra arborea* Aiton [*B.M.* xxvi. 1057 (1807)].
Pl. 23. *Erica abietina* [*E. mammosa* L.].
Pl. 24. *Begonia obliqua* [*B. nitida* Dryand.; *B.M.* lxix. 4046 (1843)].

Fasc. 9. **1793.**

Pl. 25. *Ixia maculata* [*I. columellaris* Ker-Gawl. sec. Baker; *B.M.* xvii. 630 (1803)].
Pl. 26. *Polygala Heisteria* [*Muraltia Heisteria* (L.) DC.; *B.M.* x. 340 (1796)].
Pl. 27. **Gladiolus cardinalis* [*G. cardinalis* Curtis; *B.M.* iv. 135 (1790)].

Fasc. 10. **1793.**

Pl. 28. **Glycine rubicunda* [*Kennedia rubicunda* Vent.; *B.M.* viii. 268 (1794)].
Pl. 29. **Glycine violacea* [*Hardenbergia violacea* (Schneev.) Stearn §; *B.M.* viii. 263 (1794)].
Pl. 30. *Phyllanthus speciosus* Jacq. [*B.M.* xxvi. 1021 (1807)].

† Mez (1935) refers these two plates to *Pitcairnia platyphylla* Schrader.

‡ The name *Nahusia* is cited here from " S. J. van Geuns in de Verhand. van het Provinc. Utr. Genootsch. VI Deel " as if it had been published already, but search through the periodical mentioned (' Verhandelingen van het Provinciaal Utrechtsch Genootschap van Kunsten en Wetenschappen; Utrecht) has failed to reveal anything relating to it there.

§ **Hardenbergia violacea** (Schneev.) Stearn. LEGUMINOSAE.
Glycine violacea Schneevoogt, Icon. Pl. Rar. i. pl. 29 (1793).
Glycine bimaculata Curtis, Bot. Mag. viii. t. 263 (May 1794).
Kennedia monophylla Ventenat, Jard. Malmaison, ii. pl. 106 (1805); R. Brown in Aiton, Hort. Kew., ed. 2, iv. 299 (1812).
Hardenbergia monophylla (Ventenat) Bentham in Endlicher, Enum. Pl. Novæ Holland. Huegel. 41 footnote (1837); Bentham, Fl. Austral. ii. 246 (1864); Nicholson, Illust. Dict. Gard. ii. 112 (1885); Maiden, Fl. Pl. N.S. Wales, 55, pl. 20 (1896); F. M. Bailey, Queensland Fl. ii. 424 (1900); Rodway, Tasmanian Fl. 37 (1903); Sulman, Wild Fl. N.S. Wales, i. 131, pl. 37 (1913); Rehder in L. H. Bailey, Stand. Cyclop. Hort. iii. 1432 (1915); J. M. Black, Fl. S. Austral. 325 (1924); Ewart, Fl. Victoria, 678, fig. 275 (1930); Rehnelt in Bonstedt, Pareys Blumengärt. i. 823 (1931).
Caulinia monophylla (Ventenat) F. Mueller, Fragm. Phyt. Austral. vii. 128 (1871).
Caulinia bimaculata (Curtis) O. Kuntze, Revis. Gen. Pl. i. 171 (1891); Britten, Illust. Bot. Capt. Cook's Voy. i. 22, pl. 68 (1900).
Hardenbergia bimaculata (Curtis) Domin in Bibliotheca Bot. xxii. 773 (Heft lxxxix. 219) (1926).
Hardenbergia bimaculata var. *typica* Domin, *op. cit.* xxii. 774 (Heft lxxxix. 220 (1926).
This species was introduced by Sir Joseph Banks into English gardens in 1790 from Botany Bay, New South Wales. It was thus among the first Australian plants cultivated in Europe. The epithets *violacea*, *bimaculata*, and *monophylla* are all based on this original introduction. It occurs in Tasmania, Victoria, New South Wales, South Australia, and Queensland, but is not recorded from Western Australia and the Northern Territory. Popular names are " Native Lilac," " Purple Coral-pea," " Sarsaparilla," and " False Sarsaparilla." There are two colour-forms, f. *alba* (floribus albis) and f. *rosea* (floribus roseis), in gardens. *H. ovata* (Sims) Bentham, figured in Bot. Mag. xlvii. pl. 2169 (1820), *H. cordata* (Lindley) Bentham, figured in Bot. Reg. xi. pl. 944 (1826), and *Kennedia longiracemosa* Loddiges, Bot. Cab. xx. pl. 1940 (1833) are generally reckoned conspecific; Domin, *op. cit.* 774 (1926) gives them varietal rank as vars. *ovata*, *cordata*, and *longiracemosa*.
The other generally accepted species of *Hardenbergia* is the " Blue Kennedya ", *H. Comptoniana*, named after Mary Compton, née Smith (d. 1843), first Marchioness of Northampton. It is figured in Andrews, Bot. Repos. ix. pl. 602 (1810) and Bot. Mag. cxlix. pl. 8992 (1924), and is a native of Western Australia with three or five leaflets instead of one and a somewhat inflated pod devoid of pith between the seeds.
Hardenbergia retusa Bentham, figured in Icones Bogor. iii. pl. 265 (1908), Britten, Illust. Bot. Capt. Cook's Voy. i. pl. 68 (1900), and F. M. Bailey, Compr. Cat. Queensland Pl. pl. 5 (1913), a native of Queensland and southern New Guinea, has been placed by Domin (Bibliotheca Bot. Heft. lxxxix. 220 (1926)) in a genus by itself, *Vandasia* Domin, as *V. retusa* (Bentham) Domin; it is named after Karel Vandas (d. 15 Sept. 1923 at Skoplje, Jugoslavia), for many years a professor at the Technische Hochschule, Brno, author of Reliquiae Formanekianae (Brno, 1909) and various papers on east European plants; Domin separates it from *Hardenbergia* on account of its leaflets being peculiarly veined, obcordate, and retuse and the wings of the papilionate flower being scarcely longer than the keel.

† Syn. *Hydrangea hortensis* Smith; *H. opuloides* (Lam.) C. Koch; *cf.* E. H. Wilson in Journ. Arnold Arb. iv. 234 (1923).

Fasc. 11. **1793.**

Pl. 31. *Erica concinna* [*E. verticillata* Bergius].
Pl. 32. *Ixia aristata* [*I. patens* Aiton; *B.M.* xv. 522 (1801)].
Pl. 33. *Justicia coccinea* [*Jacobinia coccinea* (Aubl.) Hiern; *B.M.* xii. 432 (1799)].

Fasc. 12. **1793.**

Pl. 34. *Cytisus purpureus* L. [*B.M.* xxix. 1176 (1809)].
Pl. 35. *Gloriosa superba* L.
Pl. 36. **Hortensia mutabilis* [*Hydrangea macrophylla* (Thunb.) DC. var. *Hortensia* (DC.) Rehder †; *B.M.* xiii. 438 (1799)].

VOLUME II.

Fasc. **13.** **1794.**

Pl. 37. *Erica cerinthoides* L. [*B.M.* vii. 220 (1793)].
Pl. 38. *Passiflora laurifolia* L.
Pl. 39. **Ixia tricolor* [*Sparaxis tricolor* Ker-Gawl. ; *B.M.* xi. 381 (1797)].

Fasc. **14.** **1795.**

Pl. 40. *Gladiolus tenellus* Jacq. var. flore majore.
Pl. 41–42. **Moraea Northiana* [*Neomarica Northiana* (Schneev.) Sprague † ; *B.M.* xviii. 654 (1803)].

Fasc. **15.** **1795.**

Pl. 43. *Sophora microphylla* Aiton ‡ [*B.M.* xxxv. 1442 (1812)].
Pl. 44.**Rosa semperflorens* [*R. chinensis* var. *semperflorens* (Curtis) Koehne ; *B.M.* viii. 284 (1794)].
Pl. 45. *Erica Bergiana* L.

Fasc. **16.** **1795.** (after 16 May 1795.)

Pl. 46. *Xeranthemum proliferum* [*Phaenocoma prolifera* (L.) D. Don ; *B.M.* t. 2365 (1822)].
Pl. 47. **Cistus formosissimus* [*Helianthemum lasianthum* (Lam.) Pers. var. *formosum* (Curtis) P. Coutinho § ; *B.M.* viii. 264 (1794)].
Pl. 48. **Protea calycina* [? *P. longiflora* Lam.].

INDEX.

AMARYLLIS vittata 14 ; Asclepias procera 18. BABIANA rubro-cyanea 16 ; Begonia nitida 24 ; B. obliqua 24. CALOTROPIS procera 18 ; Camellia japonica 7 ; Cistus formosissimus 47 ; Clethra arborea 22 ; Cypripedium album 2 ; C. reginae 2 ; C. spectabile 2 ; Cytisus purpureus 34. EDWARDSIA microphylla 43 ; Erica abietina 23 ; E. baccans 13 ; E. Bergiana 45 ; E. cerinthoides 37 ; E. concinna 31 ; E. empetrifolia 17 ; E. mammosa 3, 23 ; E. speciosa 3 ; E. verticillata 31. FUCHSIA coccinea 21. GLADIOLUS alatus 12 ; G. cardinalis 27 ; G. carinatus 12 ; G. tenellus var. 40 ; G. undulatus 19 ; G. vittatus 19 ; Gloriosa superba 35 ; Glycine rubicunda 28 ; G. violacea 29. HARDENBERGIA monophylla 29 ; H. violacea 29 ; Helichrysum proliferum 46 ; Helianthemum formosum 47 ; H. lasianthum formosum 47 ; Hippeastrum vittatum 14 ; Hortensia mutabilis 36 ; Hyacinthus orientalis 8 ; Hydrangea hortensis 36 ; H. macrophylla Hortensia 36 ; H. opuloides 36. ILLICIUM floridanum 9 ; Iris longifolia 20 ; Ixia aristata 32 ; I. columellaris 25 ; I. maculata 25 ; I. maculata viridis 6 ; I. patens 32 ; I. tricolor 39 ; I. villosa 16 ; I. viridiflora 6 ; Ixora coccinea 1 ; I. javanica 1. JACOBINIA coccinea 33 ; Justicia coccinea 33. KENNEDIA monophylla 29 ; K. rubicunda 28. LATHYRUS pannonicus versicolor 10 ; L. varius 10 ; L. versicolor 10 ; Limodorum Tankervilliae 5. MALUS spectabilis 15 ; Marica Northiana 41–42 ; Moraea edulis 20 ; Moraea Northiana 41–42 ; Muraltia Heisteria 26. NAHUSIA coccinea 21 ; Neomarica Northiana 41–42. OROBUS angustifolius 10 ; O. varius 10. PASSIFLORA laurifolia 38 ; Phaenocoma prolifera 46 ; Phaius grandifolius 5 ; Phyllanthus speciosus 30 ; Pitcairnia bromeliaefolia 11 ; P. platyphylla 11 ; Polygala Heisteria 26 ; Portlandia grandiflora 4 ; Protea calycina 48 ; ? P. longiflora 48 ; Pyrus spectabilis 15. ROSA chinensis semperflorens 44 ; R. semperflorens 44. SPARAXIS tricolor 39 ; Sophora microphylla 43. XERANTHEMUM proliferum 46.

† Syn. *Marica Northiana* (Schneev.) Ker-Gawl. ; *cf.* Sprague in Kew Bull. 1928, 280 ; pl. 42 is uncoloured.
‡ Syn. *Edwardsia microphylla* (Aiton) Salisb.
§ Syn. *Helianthemum formosum* (Curtis) Dunal.

The keen interest of eighteenth century gardeners in Cape plants is well reflected in this book. Twenty of the plants figured are from South Africa, but only two (pls. 28 & 29) from Australia which during the next twenty years yielded so many to European glasshouses ; five (pls. 5, 7, 15, 36, & 44) are from China and Japan, five (pls. 4, 11, 24, & 30) from the West Indies, four (pls. 8, 10, 34, & 47) from Europe, four (pls. 14, 21, 33, & 41) from South America, two (pls. 1 & 35) from the East Indies, two (pls. 2 & 9) from eastern North America, one (pl. 18) from western Asia, one (pl. 34) from New Zealand, one (pl. 22) from Madeira. It thus belongs very definitely to the Cape period of plant introduction into European gardens †.

This book is the most important memorial of the old Dutch nursery firm of Voorhelm and Schneevoogt. The founder of the firm, D. J. Voorhelm, came to Haarlem in the early seventeenth century from the village of Vorhelm in Westphalia. His great-grandson, George Voorhelm (1711–1787), became famous through a ' Traité sur la Jacinte ' (Haarlem, 1752); translated into English as ' A Treatise on the Hyacinth ' (London, 1753), which is probably the first published work devoted entirely to the Hyacinth alone. George Voorhelm's daughter married Gottfried Schneevoogt and by 1774 the firm had become Voorhelm and Schneevoogt. George's grandson, G. Voorhelm Schneevoogt (1775–? 1871), was the author of the ' Icones ' ; his great-grandson, Carl Gottfried Voorhelm Schneevoogt (1802–1878), left no descendants, but the trade-name of Zocher and Voorhelm Schneevoogt was in use until the beginning of the present century. These particulars are taken from an account of " The Voorhelms of Haarlem " by William Roberts in Journ. Royal Hort. Soc. lx. 199–208 (1935). For a biographical note on the artist, Hendrik Schwegman (1761–1816), see Molhuysen and Kossmann, ' Nieuw Nederlandsch Biograpsch Woordenbock ',

† *Cf.* G. K. M. Kraus, ' Der botanische Garten der Universität Halle,' ii. 109–126 (1894) ; Stearn in Cactus Journ. vii. 107 (1939), but for " twentieth century " in lines 19–20 from top of p. 107 read " nineteenth century."

x. 902 (1937). I am indebted to Prof. Friedrich Tobler for information about the copy of Schneevoogt's 'Icones' at the Technische Hochschule, Dresden, and to Prof. Cornelis E. B. Bremekamp for his comments on the *Ixora* depicted in pl. i.

On *PROTIUM SERRATUM* (Wall. ex Colebr.) Engl.

By J. J. Swart (Utrecht).

Colebrooke (in Trans. Linn. Soc. Lond. xv. 361 (1827)) writes, concerning *Bursera serrata*, "A very large tree, native of forests bordering on Bengal, near Gwalpara and the Garrow hills; whence it was introduced by seed into the Botanic Garden at Calcutta in 1808 by Dr. F. Buchanan Hamilton; and young plants in 1810 by Mr. R. Kyd," and further on in his description, p. 362, "Germ .... with one to two ovules in each cell." On p. 356 he had already remarked, "It was first delineated solely from the flower; the fruit not having ripened on the trees where I observed the blossom." So it appears that Colebrooke made his first description from the living material in the Botanic Garden at Calcutta and that no type-specimen of this exists. He also states, however (*loc. cit.* p. 356), "Dr. Wallich, having been more fortunate than myself in this respect, has since furnished me with a particular description of the ripe fruit, and has proposed the name of *Bursera serrata* for my plant." Wallich thus supplied the name, which should be cited *Bursera serrata* Wall. ex Colebr.

Wallich's 'A numerical List of dried specimens of plants in the East India Company's Museum' (started 1828) is a catalogue of the material collected by many different botanists, assembled in the herbarium of the East India Company and afterwards distributed by Wallich, who kept the most complete and valuable set for the Linnean Society. This set is now preserved as a separate collection in the Kew Herbarium. Both in the numerical list and in the collection *Wallich* 8492 (published between 1847 and 1849) is named *Icica indica* Wight & Arn.* In both *Wallich* 8492 consists of six parts marked A to F, some of more than one sheet, being different specimens which Wallich considered to be all the same species.

Of these *Wallich* 8492 C consists of three sheets (54, 54 *a*, 54 *b*) collected by Hamilton at different places and on different dates. *Wallich* 8492 C 54, "Schinus Niara, Goalpara, 21 August, 1808," is the only fruit-bearing one, and may be considered as corresponding with the seed sent by Hamilton to the Calcutta Botanic Garden in 1808, from which grew the tree that provided Colebrooke with the flowering material which he described.

* Wight & Arnott, Prodr. Fl. Penins. Ind. Or. i. 177 (1834), use this name in place of *Bursera serrata*.

Wallich 8492 F, first sheet in Herb. East India Company at Kew, bearing in Wallich's handwriting "Bursera serrata Wall. H.B.C.," with typical male inflorescence, rudimentary ovary containing two ovule-rudiments in each loculus (and also some detached fruits), agrees wholly with the original definition, and is probably from the same tree as that from which Colebrooke drew up his first description. This specimen may be designated as neotype. A duplicate of it is in Herb. Delessert at Geneva,

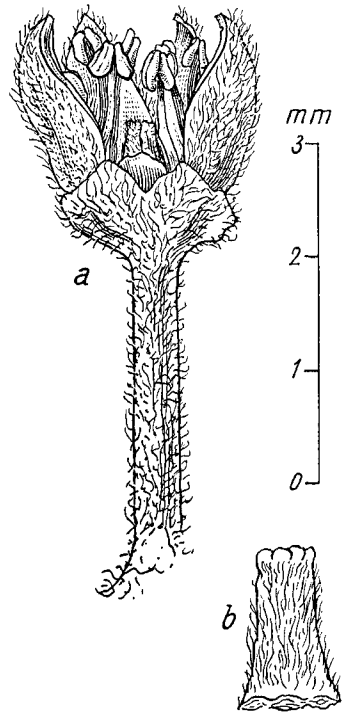


Fig. 1.—*Protium serratum* (Wall. ex Colebr.) Engl., ♂.
(Wallich 8492 F in herb. Kew.)

but with structureless rudimentary ovary. Hamilton's material (in *Wallich* 8492 C 54) agrees well with *Wallich* 8492 F.

Roxburgh ('Hortus Bengalensis, or a Catalogue of the Plants growing in the Honourable East India Company's Botanic Garden at Calcutta' (1814)) mentions on p. 32 "Limonia pentagyna, R. T. Chitreka. India. S. Harris, Esq. 1796. T[ree]," but only in his 'Flora Indica,' ii. 382 (1832) is this name validated by a short description. Without further explanation Kurz (in Journ. As. Soc. Bengal, xxxix. 2, 70 (1870)) states that *Limonia*

pentagyna=Bursera serrata. Now *Wallich* 8492 A, being a somewhat less hairy male *Protium serratum*, with entire margins of the leaflets and a wholly rudimentary ovary, bears the inscription " Ailanthus lanceolata John Roxb., ex. H.B. Calc.," and in the herbarium of the British Museum there is a corresponding specimen of Roxburgh's labelled "♂ Limonia pentagyna, R. Chitraka." These may both be considered as having originated

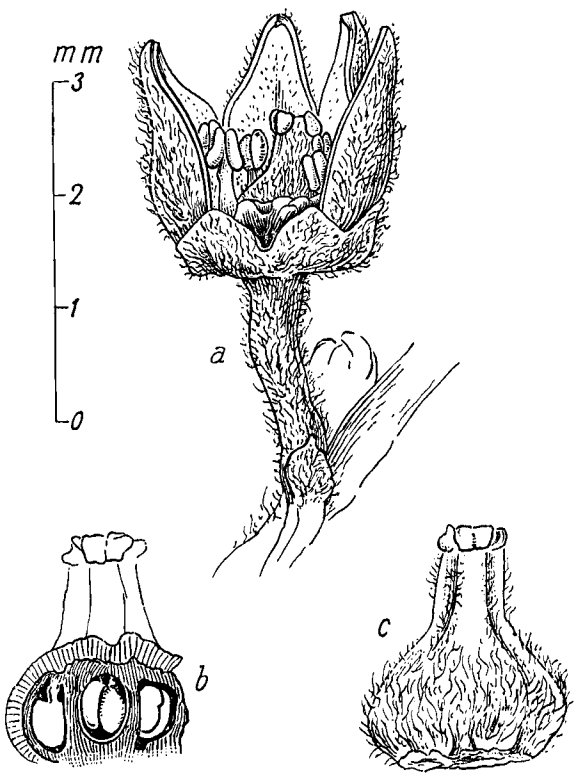


Fig. 2.—*Protium serratum* (Wall. ex Colebr.) Engl., ♀.
(Wallich 100 " B " in herb. Brit. Mus.)

from the tree in the Calcutta Botanic Garden mentioned in Roxburgh's Catalogue, and so the statement of Kurz can be confirmed.

The same construction of the male flower, but with wholly structureless rudimentary ovary, I saw in the herbarium of the East India Company, under *Wallich* 8492 B " Samulcottah, April 26 '95," " Hb. Wight ex. Herb. Madrasa " ; *Wallich* 8492 C 54 *a* " Schinus Saheria integerrima. Amjbor Ghat, 9 April 1811," " Herb. Hamilton " ; *Wallich* 8492 C 54 *b* " Schinus bengalensis, Rangamati, 16 April 1808," " Herb. Hamilton " ; *Wallich* 8492 D " 26 April '95," " Hb. Wight " (probably=8492 B).

Elsewhere than in the herbarium of the East India Company at Kew I have seen specimens :—" H. Bot." [*Wallich*] in Herb. Brit. Mus. (" 100," sheet " A," May 1815), Herb. Copenhagen, Herb. Delessert (Geneva), and in Herb. Vienna, all like the above-mentioned male material of Wallich but containing in the few weakly developed loculi of the rudimentary ovary only one ovule-rudiment.

The British Museum Herbarium contains under " H. Bot." [*Wallich*], May 1815, " 100," sheet " B," a distinctly female specimen (with shorter and heavier inflorescences, somewhat heavier flowers of entirely *Protium*-structure). The abundant material of later collections has either female or male flowers ; the latter of all the three types of ovary-construction described before. In regard to the generative and the very variable vegetative characters it agrees in such a way that it belongs undoubtedly to the same species, and so it may be stated that, in general contrast to the characters of the Burseraceae and as a unique fact in the genus *Protium*, the loculi of the rudimentary ovary of the male flowers may occasionally contain only one rudimentary ovule.

With regard to the vegetative characters the material shows all kinds of transitions between the normal type, such as *Wallich* 8492 F, and that with larger (up to 13·5×5·5 or 15×4·5 cm.) leaflets or with leaflets whose margins are serrate to the base, and only there obscurely serrate, or with an apex nearly as broad as long and very obtusely acuminate, or with more nerves. The specimen " *Wallich* 8492 F, second sheet " (without further indications) in the herbarium of the East India Company bears both normal leaflets and others showing the most considerable variation on the same branch ; both types bearing normal male inflorescences in their axils.

Owing to this striking example of the transitions possible in the vegetative region of this species there is no objection to identifying " *Wallich* 8492 E," " Garuga pinnata R. ?, Bursera serrata Wall. ?, sine fl. v. fr. legi ad Rajemahl, Aug. 1820," with only large multinerved distinctly serrate leaves, as *Protium serratum* (Wall. ex Colebr.) Engl. Hamilton (in Trans. Linn. Soc. Lond. xvii. 193–194 (1835)) in ' A Commentary on the Fourth Part of the Hortus Malabaricus ' refers to the three names, reproduced by Wallich in his ' Numerical List ' sub 8492 C. According to this author " Schinus Saheria " (=*Wallich* 8492 C 54 *a*) is doubtfully the same as " Ben Kalesjam " Hort. Malab. iv. 71, t. 34 ; this plate, however, is so lacking in detail that it seems to me to be taking too great a risk to support this doubtful identification of Hamilton's.

SHORT NOTE.

SPHAEROCARPOS TEXANUS Aust. in Dorset.—The British records of this hepatic are few, for until last year it has been noted in but six vice-counties in southern England. It was first recorded as a British plant under the name of *Sphaerocarpus californicus* Aust. in this Journal for 1909, p. 306, where S. M. Macvicar described its discovery in Surrey. The question of the plant's status in the Surrey locality was discussed at some length because of the nature of the habitat—sandy cultivated and nursery ground.

It was in precisely similar surroundings that I lighted upon it at Ferndown in Dorset in April 1939. A few years ago the early spring grass *Mibora minima* Desv. was noticed in a plant nursery near Ferndown, and I was being shown the grass when I noticed the perianths of the *Sphaerocarpos*. It was fairly frequent on ground which had remained undisturbed since at least the previous autumn, and was associated with a species of *Riccia* and some *Lunularia cruciata*, both hepatics of cultivated soil. This is the first record for any of the south-western counties, the nearest recorded area being in Gloucestershire, where H. H. Knight has seen the plant together with the closely allied, but quite distinct species *S. Michelii* Bellardi. Mr. Knight tells me that he does not often find ripe perianths, as the fallow fields in which the two species occur are ploughed up during the winter.

In 'The Students' Handbook of British Hepatics' Macvicar states that though *S. texanus* was collected in Europe over a hundred years ago, it was not recognized as European until 1907. A fruiting example of the Dorset plant has been deposited in the British Museum Herbarium.—E. C. WALLACE.

REVIEW.

Gardening in East Africa. A Practical Handbook. Edited by A. J. JEX-BLAKE. Second Edition. 8vo, pp. xiv+388, 10 coloured plates. London: Longmans, Green & Co. Price 12*s.* 6*d.*

THIS handbook by members of the Kenya Horticultural Society and of the Kenya, Uganda, and Tanganyika Civil Services is rather a surprising effort. The first edition was sold out two years after publication, and the present edition is "enlarged and considerably re-written." Its twenty-six chapters cover all aspects of horticultural theory—climate, soil, factors of plant growth, manuring and tillage, garden planning, elementary horticulture, propagation, insect pests, diseases—as well as the different branches of practical horticulture. The fact that the chapters are by different authors makes varied reading, but the whole reaches a high standard. A word of special praise must be given to the ten excellent coloured plates illustrating fifty-five native flowers: these are by Mr. and Mrs. F. R. O. Bally and Mrs. Graham, and give the book an added value. The end papers have a decorative map of East Africa.

BOOK-NOTES, NEWS, ETC.

LINNEAN SOCIETY OF LONDON.—At the General Meeting on January 18th, the President in the Chair, Dr. T. A. Sprague gave an account of "A triploid Aspen—*Populus tremula*—from Sweden." Herbarium specimens were shown of this giant form which was first found in South Sweden in 1935. It has since been found in Central and North Sweden and is now in cultivation. The trees are male, and, compared with the normal diploid form, have larger darker leaves, longer petioles, thicker branchlets, larger buds and longer stamens: the annual rings are broader, it grows much more quickly and more straight, has a considerably larger timber yield and a higher resistance to fungal attack. As the aspen is much used commercially the giant triploid may be of considerable economic importance.

Mr. A. H. G. Alston gave a paper "Notes on the supposed Hybrids on the Genus *Asplenium* found in Britain." In it he outlined the characteristics that fern hybrids usually possess and then described eleven putative hybrids recorded from this country and four additional ones from the Continent. The main object of the paper was to point out possible hybrids among British species in the hope that greater attention would be paid to the conditions of their occurrence in the field and to their artificial production.

At the General Meeting on February 1st, the President in the Chair, Mr. A. W. Exell showed specimens and photographs of Foxglove with abnormal inflorescences. It was considered that the abnormality, which varies greatly in complexity, is due to suppression of the internodes at the apex of the inflorescence and consequent synanthy involving two or more flowers and producing a monstrous structure resembling an actinomorphic flower.

Dr. C. T. Ingold followed with an account of "A New Chytridiaceous Fungus parasitizing *Eudorina elegans* Ehrenb." The fungus resembles *Polyphagus Englenae*. The zoospore encysts on the surface of the *Euglena* and forms a sac-like thallus within the host coenobium. Asexual reproduction is by uniciliate zoospores produced in an elongated zoosporangium which arises immediately to one side of the originally encysted zoospore and projects from the host. A thick-walled, spiny zygospore follows

the fusion of two thalli within the same coenobium, being budded off from the fusion-cell.

Mr. I. H. Burkill then gave a paper "Varthema's Corcopal, at one time said to be the Papaya, was the Fruit of *Garcinea indica*." The point of interest is that Varthema was in India about 1506 which would mean that if Corcopal was *Carica Papaya*, an American plant, this had reached Malabar in an incredibly short time. The fact that it is *Garcinia* removes many difficulties of explanation.

Dr. Roger Heim, Assistant Director at the Muséum National d'Histoire Naturelle, has written a volume "La reproduction chez Plantes" in the collection Armand Colin, Paris. Dr. Heim is primarily a mycologist, and is known for his philosophic outlook on problems of classification, particularly those of Basidiomycetes. It is therefore interesting to have his ideas on plant reproduction in general. The views of French botanists are not, as a rule, so well known here as those of Germans, probably as a result of the influence of the outstanding figures of fifty years ago. Here and there in Dr. Heim's popular account are indications of this different outlook, and for this, as well as for its survey of the whole field, this volume of 224 pages, with 32 figures, should prove profitable reading for botanical students in this country.

Royal Society.—Amongst the names recommended by the Council for admission to the Fellowship of the Society are those of Professors P. H. Gregory and W. H. Pearsall.

Dr. C. W. Wardlow has been appointed Barker Professor of Cryptogamic Botany at Manchester University in succession to Prof. W. H. Lang who retires at the end of the present session.

Earl of Crawford and Balcarres.—By the death of Lord Crawford on March 8th both the Arts and Sciences suffered a great loss, for in these days, either in peace or in war, there are few with such catholic interests and such willingness to give practical help in all that affects the real welfare of the nation. As President of the Council for the Preservation of Rural England, Lord Crawford did great work in saving the countryside from unintelligent exploitation and gave every help he could in all efforts made to preserve natural vegetation from wanton destruction. He was a Trustee of the British Museum and I should like to place on record how much the Department of Botany owed to his understanding support.—J. Ramsbottom.

We regret to record the deaths of Dr. R. T. Gunther, Mr. H. Stuart Thompson, and Dr. T. W. Woodhead.

A NEW BRITISH SPECIES OF *EPIPACTIS*.

By B. J. Brooke and Francis Rose.

In the *Journal of Botany*, lvi. 1 (1918), there appeared the description, by Drs. T. and T. A. Stephenson, of a hitherto unrecognized form of *Epipactis*, to which the authors gave the name *Helleborine viridiflora* (Rchb.) Wheldon and Travis forma *vectensis*. Their use of Reichenbach's specific epithet referred in this context not to the "*E. viridiflora*" of Continental botanists *, but to a British *Epipactis*, mistakenly equated, at the time, with "*viridiflora*," and afterwards established, by Col. Godfery, as a separate species under the name of *E. dunensis*. Later, "forma *vectensis*" was transferred to the subsequently discovered *E. leptochila* (Godfery) as a variety (Journ. Bot. lix. 205 (1921).

The plant described by the Stephensons was originally discovered by the late Mr. Hunnybun in a chalky wood in the Isle of Wight, where it flowered towards the end of July. The colony was a small one, and its existence appeared to be threatened by a dense undergrowth of ivy; it has never been rediscovered, and in all probability is now extinct.

In 1919, near Mold, Col. Godfery found a small colony (five plants) of an *Epipactis* which was closely similar to the forma *vectensis*, as illustrated in Fig. D, Journ. Bot. lvi. 3 (1918). This colony, however, like the one in the Isle of Wight, was probably on the verge of extinction, since Col. Godfery never succeeded in finding it again (Godfery, 'Monograph and Iconograph of Native British Orchidaceae,' p. 74).

In August 1927, a further colony was discovered near Nonington, Kent, by Mr. John Jacob. This was admitted by the Stephensons as being "in exact agreement" with their forma *vectensis* so far as the leaves and stem were concerned, but unfortunately the flowers were already withered in the specimens which they examined (Godfery, 'Monograph,' p. 74).

On August 8, 1931, a similar plant was found by Mr. P. M. Hall, near Winchester. Godfery remarks ('Monograph,' p. 74) that in this form the labellum was small and triangular, not acuminate as in the type—*i. e.* (presumably) *E. leptochila*—almost flat, and not properly developed into epichile and hypochile.

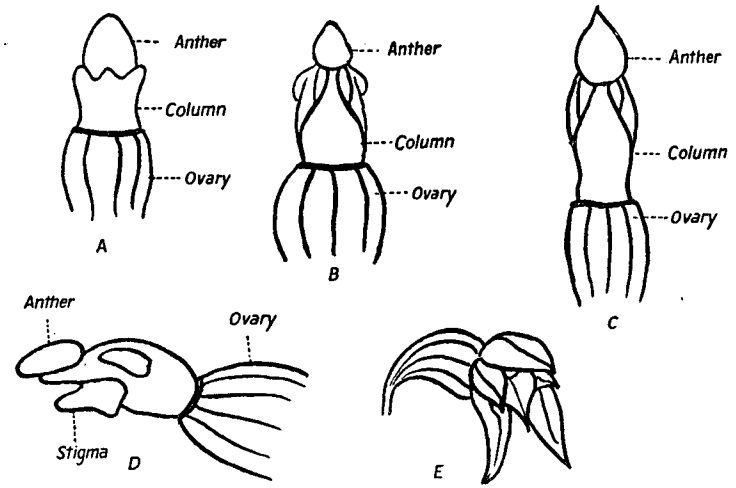
Godfery ('Monograph,' p. 74) concludes that all these plants were probably degenerate and dwindling forms of *E. leptochila*, rather than true varieties. The chief argument in support

* According to Col. Godfery, the "*E. viridiflora*" of Reichenbach can no longer be retained as a species. The name seems to have been used indiscrimately to cover two distinct plants: one, a mere varietal form of *N. latifolia* Allioni, the other a previously unrecognized species to which Godfery gave the name of *E. Muelleri*. Neither plant occurs in Britain. (Journ. Bot. lix. 101 (1921).)

of this hypothesis seems to be that in two of its known habitats—in the Isle of Wight and near Mold—the plant appeared to be dying out, presumably owing to an unsuitable environment. Further investigation, however, during the summer of 1939, has convinced us that :—

(1) Godfery's theory of " degeneration " cannot be upheld, and
(2) that the plant in question can no longer be related, either as form or variety, to *E. leptochila.*

On August 17, 1939, we visited the " Nonington " station (actually in the parish of Womenswold) referred to above, the exact spot having been kindly pointed out to us by Mr. John

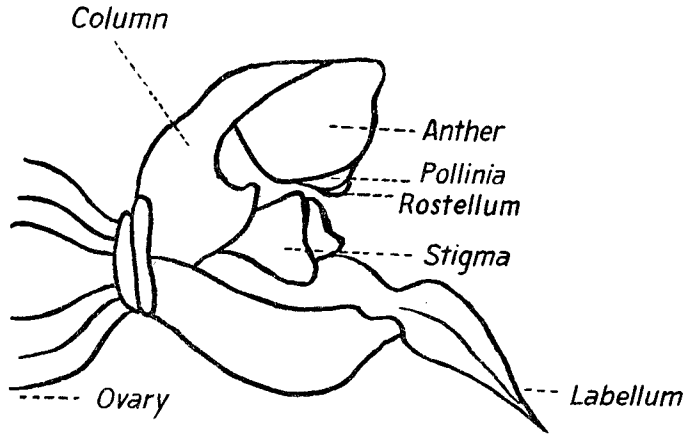


A. Top view of column of *E. dunensis*; B. Top view of column of *E. vectensis*; C. Top view of column of *E. leptochila*; D. *E. vectensis*: side-view of column; E. *E. vectensis*: enlarged flower.

Jacob, the original discoverer of the colony. Here we found about fifteen spikes of an *Epipactis* which closely agreed with the description of " *vectensis* ". (It will be remembered that in the specimens from Nonington examined by the Stephensons themselves in 1927, the flowers were already withered, and that their equation of the Nonington plant with that from the Isle of Wight rested merely on a comparison of the leaves and stem. In 1939, however—the season being a late one—the Nonington plant was only just coming into flower at the time we found it, thereby enabling us to confirm the conclusion of the Stephensons that it was, in fact, identical with their original " forma *vectensis.*") The plants were scattered widely over a fair-sized area, sparsely

shaded by beeches and low-growing bushes; like the Isle of Wight colony, they grew characteristically among a dense undergrowth of ivy, though they scarcely appeared to be seriously " threatened " by it, since (according to Mr. Jacob) the colony has not sensibly diminished over a period of twelve years. Moreover, *Cephalanthera grandiflora* (in the fruiting stage at this date) grew abundantly (and robustly) in the same spot—hardly an indication that the environment was an unhealthy one.

At this point it is relevant to mention that we had, on the same day, gathered specimens from a colony of *E. leptochila* near Kingston, about two miles from the Nonington station. This plant differed in certain important respects from the " typical " form, found at Horsley, Surrey, from which Col.



Epipactis vectensis: side-view of flower, with sepals and upper petals removed.

Godfery made his original diagnosis—and with living specimens of which, a week or two previously, we had carefully compared it. The Kentish form was distinguished from the type by its solitary (*not* tufted) growth, short (*not* deeply-descending) rhizome, elliptic-lanceolate (*not* broadly-ovate) lower leaves, lax, few-flowered raceme, blunter sepals (seldom opening widely), and more cordate, less acuminate labellum *. The plant grew sparsely in deep shade in a hazel-thicket, and by its slighter growth and other divergent characters had inclined us to believe that it might be what Godfery terms a " degenerate " form of *E. leptochila.* It seemed not unlikely, too, that since it grew so near to the Nonington station, it might turn out to be identical with Mr. Jacob's " *vectensis.*" Moreover, we were told by Mr. and

* The labellum differed further from that of the Horsley plant in having a remarkably shallow hypochile.

Mrs. Hyland of Kingston, who had observed the colony for some years, that a more robust form, with ovate lower leaves, had formerly occurred near by, but had now disappeared, a fact which seemed to give further support to our idea that the Kingston *E. leptochila* was " degenerate."

Comparison, however, of the Kingston *E. leptochila* with the Nonington " *vectensis* " soon showed us that the two plants were totally distinct. If both were " degenerate " forms of *E. leptochila*, then it seemed odd, to say the least, that any species should " degenerate " in two such different directions. Closer examination showed, in fact, that the Nonington plant could not reasonably be related to the Kingston *E. leptochila*, still less to the " classical " type from Horsley. It appeared, moreover, to be equally distinct from the Lancashire species, *E. dunensis* Godf., which Mr. Rose had had the opportunity to study carefully *in situ* a week or two before : and to which " forma *vectensis* " had been assigned, originally, by the Stephensons.

The following description was made from living specimens of the Nonington plant :—

Rhizome short, deeply buried in soil, more or less descending, or spreading laterally ; *rootlets* rather thick, spreading. *Stem* short, slender, 15–30 cm., solitary, with one or two brownish sheaths at base, glabrous or very slightly pubescent above, tinged with violet below. *Leaves* few (4–6) ; lowest very small (2–3 cm.), sheath-like, adpressed, concave, tinged with violet ; upper leaves in two nearly opposite ranks, small (about 6 × 2 cm.) elliptic-lanceolate, uppermost lanceolate, light green, faintly ribbed, upright, often wavy-edged, rather stiff, faintly hairy at edges. *Bracts* narrow, rather short, lowest hardly exceeding flower. *Raceme* short (5–10 cm.), one-sided, few-flowered. *Flowers* a light, clear green outside (uniform with upper part of stem), pendulous, hanging almost parallel with stem, or projecting at a slight angle, never opening fully, sometimes not opening at all. *Ovary* short-stalked, large (1 cm. × 6 mm.), pear-shaped, with prominent ridges, tapering abruptly to base, with a prominent " hump " above, glabrous or nearly so, but appearing rather rough from the presence of minute tubercles. *Sepals* long and narrow, as long or nearly as long as ovary, acuminate, turning outward at tip, keeled, green outside, greenish white within. *Petals* broader and shorter than sepals, greenish white, central nerve green. *Lip* greenish white, sometimes tinged very faintly with pink, cordate, more or less acuminate, flat, pointing forward, of a thin papery texture, with two small, obscure bosses at base ; hypochile shallow, yellowish within ; lip usually withering soon after the flower opens, sometimes before. *Column* short, with a slender, semi-detached stalk at back supporting the anther. *Pollinia* friable. *Stigma* quadrangular, almost resting in hypochile (owing to imperfect opening of flower). *Rostellum* obscure, evanescent, withering in the bud.

Since in the past " *vectensis* " has been assigned as a variety or varietal form both to *E. dunensis* and to *E. leptochila*, it will be of interest if we append to the above description the following tabular comparison of the three plants * :—

E. leptochila.	*E. dunensis.*	*E. vectensis.*
Root-system strongly developed ; roots stout, numerous. Rhizome large, knotted, descending.	Very poorly developed. Roots thin, few. Rhizome a small, irregular mass, very deeply buried in soil.	Moderately developed ; roots thick, spreading. Rhizome short, deeply buried, descending or spreading.
Stem 20–50 cm., strong, curved slightly from node to node ; tufted; tinged at base with brown ; downy. Bears brown scales at base.	20–40 cm., moderately stout, or rather slender, straight ; tufted ; tinged at base with pinkish brown ; downy above. Bears brown scales at base.	15–30 cm., slender, straight. Solitary ; tinged with violet at base ; glabrous. Bears brown scales, and one or two violet tinged, funnel-shaped leaves at base.
Leaves large, numerous. Lower ovate, upper elliptic-lanceolate ; strongly veined; yellowish green ; acuminate ; flat, not clasping.	Large, widely spread ; lower broadly ovate, upper bract-like, shorter than in *leptochila* ; strongly veined, light green, acute, stiff, often keeled ; not clasping.	Small, few (4–6) : lowest sheath-like, tinged with violet ; upper in two opposite ranks (6 × 2 cm.), elliptic to lanceolate, light green, very faintly veined, stiff, keeled, upright ; edges wavy, slightly hairy.
Flowers large, wide-open; ovary long, slender, pubescent. Raceme dense, long. Flowers erect. Sepals long, broad at base, acuminate ; petals long, slender, acuminate. Whitish green.	Smaller, not wide-open; ovary medium length, slender, pubescent. Raceme lax, long. Flowers drooping. Sepals short, broad, tapering suddenly to an obtuse point ; petals similar, but shorter. Whitish green or pinkish.	Small, hardly open at all ; ovary stout, pear-shaped, glabrous. Raceme lax, short. Flowers very much drooping. Sepals long, slender, acuminate, tip outturned ; green. Petals broader and shorter, greenish white.

* It is perhaps worth noting that " *vectensis*," in its general habit, bears a certain resemblance to the rare Northern species *E. rubiginosa* Crantz. In both plants the stem is slender, glabrous, short and solitary, with a sheath-like, funnel-shaped basal leaf, tinged with violet ; the ovary in both is large and pear-shaped. The leaves of both plants are alike in being glabrous, often wavy-edged and (which is more striking) *weakly nerved* : in all other British species of *Epipactis* the leaves are characteristically *strongly nerved*.

E. leptochila.	*E. dunensis.*	*E. vectensis.*
Lip. Epichile long, narrow, straight, acuminate, with a central groove and two prominent bosses ; greenish white. Hypochile deep, coloured within.	Epichile as broad as long ; tip recurved ; bosses prominent ; greenish pink. Hypochile deep, coloured within.	Epichile cordate, as broad as long, acuminate, flat, pointing straight forward; bosses obscure ; greenish white ; withering prematurely. Hypochile shallow, uncoloured or yellowish.
Column short, slender, with a curved semi-detached stalk at back supporting the anther.	Short, stout, with the anther almost sessile.	Short, rather stout at base, with a slender stalk at back supporting the rather blunt anther.
Rostellum rudimentary.	Ditto, usually absent.	Obscure, withering in the bud.
Stigma quadrangular, leaning slightly backwards.	Quadrangular, upper edges sloping downwards.	Quadrangular, nearly resting in hypochile owing to imperfect opening of flower.
Pollinia friable, but covered by anther-sheath.	Friable, falling into flower in small globules.	Very friable, falling forward as in *E. dunensis*.
Fertilization : Normally self-fertilized, but crossing possible.	Normally self-fertilized, but crossing possible.	Self-fertilized ; crossing almost certainly impossible.
Habitat : Woods on chalk, S. England.	Dunes, S. Lancs. and Anglesey, among *Salix repens*.	Woods on chalk, especially among ivy ; Kent, Isle of Wight, Hants, etc.
Flowering season : July–August.	June–July.	August.

It will be evident, from the above table, that "*vectensis*" differs in a marked degree, both in general habit and internal structure, from the two species to which it has previously been related * ; nor does there seem good reason for assigning it to one rather than the other, though undoubtedly it belongs to the same subgeneric group (characterized by partial or complete self-fertilization) which also includes the Continental *E. Muelleri* Godf. As Godfery has pointed out ('Monograph,' p. 59), the genus *Epipactis* exhibits a complete evolutionary range from total self-fertilization (*E. Muelleri*) to entire dependence on insects (*E. latifolia*, *E. violacea*, etc.). Intermediate between the two extremes are *E. leptochila* and *E. dunensis* (normally self-fertilized, but capable of occasional crossing), and the Continental *E. microphylla* (normally cross-fertilized, but capable of

* Particularly noteworthy is the difference in the shape and structure of the column, in the three species under notice. The column of *vectensis* is similar in structure to that of *leptochila*, from which, however, it may be distinguished by its shorter, blunter shape ; both differ from *dunensis* in having a slender, semi-detached stalk at the back, supporting the anther.

self-pollination if suitable insects do not visit the flower). The position to which "*vectensis*" should be assigned in this series cannot, at the time of writing, be established with absolute certainty ; but in view of the fact that its flowers never open widely and frequently do not open at all, it seems fairly safe to assume that it is entirely self-fertilizing. If this is so it might be expected that "*vectensis*" would show affinities with the totally self-fertilized *E. Muelleri* ; and one finds, in fact, on comparing it with Godfery's description of *E. Muelleri* (Journ. Bot. lix. 106 (1921)) that the two plants are very similar in habit and flower-structure. Godfery remarks that *E. Muelleri*, as he found it at Thorenc, above Grasse, appeared to him to be a "remnant of a disappearing species" (one factor which distinguished it from the cross-fertilized plant known as *E. viridiflora*, which Godfery was investigating at the time) ; and the same assumption might well be made regarding "*vectensis*," whose general appearance may fairly be termed "degenerate," though not in the sense of being a "dwindling form" of any other known species. Apart from its other structural peculiarities, a unique feature of "*vectensis*," which is worth emphasizing, is the abortive character of the lip, which often withers in the bud, and seldom persists long after the flower has opened. In this it differs from *E. Muelleri*, which, though it has dispensed with the internal mechanism of cross-fertilization, does at least retain the external characteristics of an insect-fertilized plant, in the shape of a normally developed and persistent labellum. "*Vectensis*," by dispensing with this last, otiose relic of cross-pollination, appears to have reached a still further stage of "degeneration."

It will be seen that the description given above of the Nonington "*vectensis*" agrees closely with the original diagnosis by the Stephensons of the plant found originally in the Isle of Wight. Mr. P. M. Hall, who saw a specimen from Nonington in 1939, informed us that so far as he could tell it was the same as that found by him near Winchester in 1931 ; unfortunately, it was not possible to compare living specimens, as the Winchester colony had been grubbed up by poultry *. Examination of other available descriptions and *exsiccatæ* by Mr. Rose, with the kind assistance of Mr. A. J. Wilmott, showed further that our

* It may be recalled that Mr. Hall's plant was described by Godfery as differing from the "type" (presumably *E. leptochila*) in the smaller, more triangular, less acuminate labellum. Godfery points out, too ('Monograph,' p. 74), that although the labellum of "*vectensis*" is described as "acuminate" in the Stephensons' diagnosis, the statement is contradicted by the accompanying figure, in which the lip appears to be nearly as broad as long. No doubt the lip in "*vectensis*" is somewhat variable, as in other members of the genus ; moreover, its abortive nature makes accurate observation difficult. In the Nonington plant the lip was typically cordate, tapering rather abruptly to a sharp point, but shorter, broader, and flatter than in *E. leptochila*.

plant was identical with one recorded by Borrer from Phyllis Wood, W. Sussex, and also with specimens recently sent to Mr. Wilmott from Devonshire. If we include, in addition, Col. Godfery's plant from near Mold, it appears, from the above evidence, that no fewer than six colonies have occurred, in widely separated localities, of an *Epipactis* identical with that described by the Stephensons; furthermore, as we have already shown, this plant can no longer be related as a variety either to *E. leptochila* or to *E. dunensis* *. What, then, is the exact status of "*vectensis*" in relation to the other members of the genus? As Godfery remarks ('Monograph,' p. 59), "the *generic* characters [in *Epipactis*] are so striking that they quite eclipse the much less conspicuous characters which distinguish the various species from each other." In studying the genus *Epipactis*, one is insistently brought up against the old and thorny question of "What is a species?" It is a question which probably cannot be satisfactorily answered till further work on the chromosomes has been completed, and the whole subject of plant-classification reconsidered from a strictly cytological angle. At present, any taxonomic system must remain more or less tentative: especially where such a critical genus as *Epipactis* is concerned. In the circumstances there seems a good case for adopting the methods of earlier botanists such as Sowerby and Babington, and "lumping" such closely related forms as *E. leptochila*, *E. dunensis*, and *E. Muelleri* under an aggregate title. Since, however, these plants are regarded, by most contemporary authorities, as good species, it seems only logical, in the light of the investigations detailed above, to raise the Stephensons' "forma *vectensis*" to the same rank. Accordingly, it is proposed to name the plant *Epipactis vectensis*: retaining, as a specific epithet, the name given to it by the Stephensons.

Epipactis vectensis (T. & T. A. Stephens.) Brooke & Rose, comb. nov. [=*Helleborine viridiflora* (Rchb.) Wheldon and Travis forma *vectensis* Stephenson=*Epipactis leptochila* Godf. var. *vectensis* Stephenson].

Rhizoma breve, descendens aut in latitudinem eminens, radiculis subspissis et in latitudinem eminentibus. *Caulis* brevis (15–30 cm.) gracilis, solitarius, glaber aut supra paululum pubescens, violaceo-tinctus infra, una aut altera ad imam partem vagina. *Folia* pauca (4–6) quorum ima minima, vaginata, complexa, concava, violaceo-tincta, superiora ordinibus duobus pæne inter se oppositis exstantia. Hæc brevia (circiter 6×2 cm.) elliptico-lanceolata (supremis lanceolatis), pallido-viridia, exiliter venata, erecta, subrigida, sæpe undulata et subplumosa ad margines. *Bracteæ* angustæ, sub-breves, imæ vix flore ipso longiores. *Racemum* breve (5–10 cm.), paucis floribus, ad unum modo latus pendulatis præditum. *Flores* extrinsecus pallido-lucidoque virides (ut quoque summa pars caulis), penduli pæne cum ipso caule paralleli aut minimum angulum efficientes; numquam plene aperti, interdum omnino clausi. *Ovarium* brevi caule præditum, magnum (1 cm.×6 mm.), pyriformatum, jugis eminentibus, valde acuminatum prout ad caulem descendit, supra prominente gibbo præditum, glabrum aut pæne glabrum, nisi quod surgunt tubercula quædem minuta. *Sepala* longa et angusta, vix breviora quam ipsum ovarium, acuminata, ad extremam partem floris flexa, carinata, extrinsecus viridia, introrsum virideo-alba. *Petala* et breviora et latiora quam sepala, virideo-alba, medio nervo viridi prædita. *Labellum* virideo-album, epichilio plano, sine ullo flexu eminente, interdum subroseo, cordato, acuminato. Hæc pars textura gracili quasi papyri est, et ad imam partem habet duos umbones pæne celatos. Hypochilium gracile et introrsus luteum. Labellum plerumque flore aperto inarescit, interdum etiam antea. *Columna* brevis, caule gracili et ad mediam partem disjuncto a tergo prædita, antheram sustinens. *Pollinia* fragilia. *Stigma* quadrangulare, pæne in hypochilio latens, flore non aperto. *Rostellum* obscurum, evanidum, inarescens in gemma *.

* Nor, it is safe to assume, can it be so related to the non-British *E. Muelleri*, though the two plants are in some respects closely similar.

NOTES ON BRITISH EUPHRASIAS.—VI.

By H. W. Pugsley, B.A., F.L.S.

(Continued from p. 13.)

Since writing the last list of vice-county records for this genus I have received two large collections made in the summer of 1939 in the Outer Hebrides, the one from Miss M. S. Campbell and Mr. Wilmott, the other from Dr. K. B. Blackburn and Mr. R. B. Cooke, working in collaboration with Professor J. W. Heslop-Harrison. The former set was obtained mainly in Harris and the south-west part of Lewis, the latter in South Uist, Barra, and the adjacent smaller islands. The novelties are *Euphrasia frigida* Pugsl. and *E. confusa* Pugsl., each collected by both parties, and an unknown form obtained by Miss Campbell, which will be described below as a new species.

As might be expected, *E. micrantha* Rchb., often occurring as f. *simplex* Pugsl., is widely spread, and its large-flowered variety *Johnstonii* Pugsl. was found in Lewis, S. Uist, and Barra. Typical *E. scotica* Wettst. appears to be rare, as it is in Orkney, but the variety *purpurascens* Pugsl. grows on most of the hills of North Harris and in the Uig district of Lewis, as well as on Mhor, in S. Uist. *E. frigida* var. *laxa* Pugsl. was collected as

* The authors are indebted to Mr. Harold Whyte for his kind assistance in preparing this diagnosis.

a dwarf form on Clisham and Sgaoth Ard, in North Harris, and on Hecla in S. Uist. *E. foulaensis* Towns. ex Wettst. is frequent on sea-cliffs in the north and south islands, and the variety *maritima* Pugsl. was seen at Uig, in Lewis, and on Fiaray, by Barra. Two additional stations for the very distinct *E. Marshallii* Pugsl. were discovered, Muldoanich and Flodday, in the Barra group. No examples of *E. curta* (Fr.) Wettst. or of *E. borealis* Towns. ex Wettst., which have been previously recorded for v.c. 110, were included in either of the two collections. *E. occidentalis* Wettst., in different forms, was found rarely in Lewis and North Harris, and rather more frequently round Barra. The feature of both collections, and especially Dr. Blackburn's, is the abundance and variability of large-flowered forms of *E. nemorosa* (Pers.) Löhr, which can only be referred to var. *collina* Pugsl. Some of these recall *E. curta* var. *glabrescens* Wettst. except for their larger flowers, while others, with coarser foliage and mauve-coloured corollas, suggest an admixture of *E. brevipila* Burn. & Grml. This latter plant, however, at least in its typical form, appears to be absent as in Orkney, and few specimens were present that could be referred to f. *subeglandulosa* Bucknall. Of the second species now recorded for the first time, *E. confusa* Pugsl. f. *albida*, four stations were found in Uig, Lewis, and eight in the neighbourhood of S. Uist and Barra.

The succeeding table contrasts the *Euphrasia* flora of the Outer Hebrides with that of the Orkneys, Shetlands, Faroes, and St. Kilda, as at present known. St. Kilda, which for convenience is included in v.c. 110, lies more than forty miles to the westward of the Outer Hebrides, and geographically must be regarded as constituting a separate group of islands.

Outer Hebrides species:—

E. micrantha. In Orkneys, Shetlands, Faroes, and St. Kilda.
E. scotica. In Orkneys, Shetlands, and Faroes.
E. frigida (rare). Only in Faroes.
E. foulaensis. In Orkneys, Shetlands, Faroes, and St. Kilda.
E. Marshallii. In Orkneys and Shetlands. Rarer in all the islands than in West Sutherland.
E. curta (rare). In Shetlands and Faroes.
E. occidentalis. In Orkneys and St. Kilda.
E. nemorosa (locally abundant). Only rarely in Orkneys.
E. confusa. In Orkneys, Shetlands, and Faroes (nowhere common ?).
E. borealis (rare ?). In Orkneys, Shetlands, and Faroes, abundant; also on St. Kilda.
E. brevipila (rare and untypical). In Orkneys (likewise untypical and not common); St. Kilda.

The following new species is described in the same form as those in my 'Revision of the British Eyebrights" (Journ. Linn. Soc., Bot. xlviii. 467 *sq.* (1930)) and subsequent papers in this Journal.

Euphrasia Campbellae Pugsl., sp. nov.

Exsicc. M. S. Campbell, Mealista, Uig, 390725 Bc (type); Wilmott, Mangersta, Uig, 390719 Bd.

Caulis erectus, *satis gracilis*, 5–12 cm. altus, fuscescens, pilis crispulis deflexis albidis dense vestitus, *foliis caulinis internodos breviusculos subæquantibus* (rarius paulo brevioribus) et floralibus vix imbricantibus præditus; e foliorum pare quinto ad septimo florens; *simplex vel* e nodis caulinis sæpius superioribus *paucos* (1–4) *ramos suberectos emittens*. *Folia* obscure vel griseo-viridia, erecto-patentia, maxima ad 9 mm. longa sed plurima multo minora; *caulina* facile caduca, vulgo subopposita, *oblonga ad oblongo-obovata* vel ovalia, basi ±cuneata, apice obtusissima, utrinque 1–3 dentibus obtusis prædita; *floralia* latiora, utrinque 3–5 dentata, inferiora *ovalia ad ovata*, inferne abrupte angustata, dentibus obtusiusculis obtusa, superiora late ovata, basi subtruncata vel rotundata, dentibus argutis apice subacuta: omnia (præsertim caulina) *superne apicem versus breviter pubescentia, et in paginæ inferioris nervis marginibusque setis albidis crassiusculis vestita*. *Calyx pubescens et in nervis nigricantibus setosus*, dentibus breviusculis præditus, fructifer satis accretus. *Corolla mediocris*, dorso 6–8 mm. longa, *præter labium superius violaceum alba* striis purpureis picta, in labio inferiore luteo-maculata; *labio superiore lobis angustis retusis conspicue porrectis*: *inferiore superius superante*, lobis satis angustis apice dilatatis emarginatis (medio longissimo) trilobato. *Capsula mediocris*, circa 6 mm. longa, *oblonga ad elliptico-oblonga, retusa* vel leviter emarginata, margine ciliato apicem versus parce pilosa, calycis dentes subæquans vel paululum brevior.

Stem erect, *rather slender*, 5–12 cm. high, dusky purplish, densely clad with crisped, deflexed, whitish hairs; *cauline leaves nearly equalling the rather short internodes* or rarely a little shorter, floral closer, but scarcely imbricated; flowering from the fifth to seventh pair of leaves; *simple or producing* 1–4 *suberect branches* usually from the upper nodes. *Leaves* dark or greyish green, erect-spreading, the largest up to 9 mm. long, but most much less; *cauline* readily caducous, commonly subopposite, *oblong to oblong-obovate* or oval, ±cuneate-based and apically very obtuse, with 1–3 obtuse teeth on each side; *floral* broader, with 3–5 teeth on each side, the lower *oval to ovate*, abruptly narrowed below, obtuse with rather obtuse teeth, the upper broadly ovate, with subtruncate or rounded base, subacute with sharply acute teeth; all (and especially the cauline) *shortly pubescent on the upper surface towards the apex* and clothed on *the lower surface with rather thick, whitish setæ along the nerves and around the margins*. *Calyx pubescent and with setose hairs*

along the blackish nerves, with rather short teeth, somewhat enlarged in fruit. *Corolla of medium size*, dorsally 6–8 mm. long, *white* marked with purple lines, *with a violet upper lip* and a median yellow spot on the lower : *upper lip with narrow, retuse, and conspicuously porrect lobes* ; *lower*, which is *longer than the upper*, trilobed with three rather narrow, apically dilated, emarginate lobes, the median longest. *Capsule of moderate size*, about 6 mm. long, *oblong to elliptic-oblong*, retuse or slightly emarginate, sparingly pilose above and with ciliate margin, subequalling or a very little shorter than the calyx-teeth.

E. Campbellae shows an affinity with the species of the Series *Latifoliae* in its slender, little-branched, and somewhat early-summer habit, but its foliar indumentum recalls *E. rotundifolia* Pugsl. and *E. Marshallii* Pugsl. of the Series *Nemorosae*, although the characteristic setose hairs are much more sparingly produced. Its calyx and capsules are somewhat similar in form to those of *E. nemorosa* (Pers.) Löhr, and the dark-coloured nerves of the calyx likewise are reminiscent of that species. It is not easy to see from what Hebridean species it may have arisen through hybridity, and it appears to be perfectly homogeneous in the two cited stations, in both of which a reasonable number of specimens were obtained. A further single specimen was found to be mixed with material of *E. scotica* from a third station, Brenish, in the same vicinity. The general facies of the specimens is very distinct, and they can readily be recognised in a dried state. The plant is therefore treated as a new species, which seems best placed in the British flora at the end of the Series *Latifoliae* and immediately preceding *E. rotundifolia*. It is dedicated to Miss M. S. Campbell, F.L.S. The three localities, Mealista, Brenish and Mangersta, are on the south-west coast of Lewis, to the south of Uig Bay.

Since the above was written a specimen of *E. Campbellae* has been received from Dr. W. A. Clark, collected at Breasclett, in Lewis, some distance to the north of the other stations. Dr. Clark also sends *E. curta* from Great Bernera, Lewis.

SAFEGUARDING OF TYPES.

By B. P. G. Hochreutiner (Geneva).

I have read with much interest the article by Prof. F. R. Fosberg concerning the concentration of valuable collections in a particular place for safeguard in case of war (Journal Bot. lxxvi. 327 (1938)).

As far as botany is concerned, that would mean sending all types available in the world to a place far from the operations of war and of no military importance.

Prof. Fosberg later sent a circular to botanists in charge of important institutions to find out their " reaction toward the idea of a central type-herbarium " as he expresses himself.

Being in the above-mentioned class, I have already answered Prof. Fosberg personally, but it is perhaps not superfluous that botanists in general should know the " reaction " and the reason for it. It is perhaps also useful to publish my own proposals, considering that I cannot adopt those of Prof. Fosberg.

1. Concentration of all types of the world in one place, supposing it should be possible, would mean that all systematists would have to make long and very expensive journeys in order to write a monograph of even a flora. The only possibility of avoiding this would be to send the types on loan all over the world, and the risks of such constant travelling would equal, if not exceed, the risk of destruction by war.

2. It is most doubtful whether the owners of big herbaria—most of them being political or administrative bodies—would consent to sending abroad on permanent loan the most precious part of their collections.

3. Prof. Fosberg asks further : What localities would you consider suitable for such an institution ?

I can answer with conviction : None in the world, with the exception perhaps of the South Pole—which is rather out of the way. Nobody can be certain to-day that a place or a nation will be spared by war. It is sad to have to remind Prof. Fosberg of the fact that in time of war the most solemn promises are worth precisely nothing.

Moreover, Prof. Fosberg forgets that war is exactly barbarism in action, and therefore the concentration of precious objects (collections or any others) in one locality might very well induce attacking nations to destroy the place in order to have means of pressure on people wishing to protect such objects.

On the other hand, one may imagine the difficulty for studies if that central museum should be located somewhere in Arizona or on a lonely island in the Pacific, as Prof. Fosberg proposed, supposing even that the naturalists could go there. A city would need to be built not only for lodgings, but in order to have on hand the furniture and instruments required, the accommodation for repairing them, and so forth.

4. What I suggest for saving botanical documents is very simple and has been started already in our institution in Geneva. It is the scattering of types and cotypes all over the world.

There are several methods of doing this. We began by exchanging collections, like most museums do, but we are also exchanging either duplicates of types or scraps of those which are very small and which have been photographed. Experience shows that a good photograph accompanied by some scraps,

a piece of a leaf and maybe a little flower and fruit, can be as useful as the type itself.

As for cotypes of all sorts, there may also be duplicates. These are got together so as to constitute some parallel sets, generally, of course, in very small numbers, but still enough to be sent to a few very scattered museums, some in the U.S.A., the security being the maximum there, and some others in Africa, Europe, Asia, the Pacific.

Obviously, this does not exclude the ordinary exchanges we make with other institutions, which have sets available of the collections made by their particular collectors.

5. I believe the method of scattering types as much as possible is the only practical way of protecting them ; it is the method adopted by many governments after much consideration for protecting mankind in case of war and aerial bombing.

Various nations have made great financial sacrifices to evacuate their cities, and it seems that they are more confident in that method of protection than in expensive and uncomfortable underground shelters.

AN OVERLOOKED *SILENE* IN DEVON.

By H. W. Pugsley, B.A., F.L.S.

When recently perusing the new 'Flora of Devon' I was surprised to find no allusion to the red-flowered Bladder Campion that grows on Plymouth Hoe. I first collected it there in May, 1921, again in September of the following year, and subsequently in September, 1925; and I learn from Dr. W. B. Turrill that he also has seen it *in situ* and now has it under cultivation at Kew. It thus appears to have existed on the Hoe for at least eighteen years. Red or pink flowers have been noted in this species by various observers. In De Candolle's 'Prodromus,' i. 368 (1824), under *S. inflata* Sm., is a "γ *rubra* (Ram. pyr. ined.) petalis purpureis. In Pyrenæis et alpibus Bernensibus." Rohrbach's Monograph gives the corolla as white, pink, or reddish (rubella) ; Rouy and Foucaud, Fl. France, iii. 104 (1896), say "fleurs blanches, plus rarement roses ou purpurines" ; and Moss (Camb. Brit. Fl. iii. 82 (1920)) states that the petals are white, pale yellowish, or rarely purplish. There are a few definite records of the occurrence of red-flowered plants in Britain. In the B. E. C. Report, iv. 188 (1916) Druce reports *S. Cucubalus* var. *rubra* (DC.) from the edge of Loch Tay near Fearnan, Mid Perth, and introduces a description "... . lower leaves obovate, upper ovate, glabrous ; .... inflorescence many-flowered ; flowers rose-purple ; calyx large, 17×14 mm., strongly veined," adding that the plant had been known to Mr. D. A. Haggart for many years.

In a later Report (vi. 115 (1921)) *S. Cucubalus* var. *rosea* DC. was recorded from Colchester (coll. Brown), the varietal name being corrected the following year to var. *rubra* (DC.) Druce. A *S. angustifolia* S. & T. var. *rubra* (DC.) Dr., grown from a specimen found near Welbeck, Notts, is reported in vol. viii. of the Report (p. 728) ; and *S. Cucubalus* var. *rubra* (DC.) (var. *carneiflora* Legr.) in Mrs. Sandwith's paper on the Adventive Flora of Bristol (*l. c.* x. 326). Of the plants thus recorded I have seen only specimens of the Loch Tay form, of which there are two sheets in Herb. Mus. Brit., one collected in 1916 by T. J. Foggitt, the other by Mr. Francis Druce in 1922. I understand that, like the Plymouth form, it is now being grown at Kew. This plant differs from that found on the Hoe by its much broader leaves and more strongly anastomosed veins of the calyx, and except for the colour of its flowers it seems scarcely separable from forms of the polymorphic *S. Cucubalus* Wibel.

The Plymouth plant is characterized by very narrow, glabrous foliage, the lower leaves linear-oblong or narrowly oblanceolate, attenuate below and ciliate-serrulate, the upper linear-lanceolate, and all acute. The calyx (14–16 mm. long) is more herbaceous and more umbilicate, but less globular and less clearly anastomose-veined, than in typical *S. Cucubalus*, and the fairly large corolla is of a dull red colour. Dr. Turrill informs me that in the garden it develops stolons such as he has not seen in any other form—a feature that may account for its persistency on the Hoe. On comparing my specimens with the exsiccatæ in Herb. Mus. Brit. and Herb. Kew. I find that the plant is a red-flowered form of *S. angustifolia* Guss. (*S. Tenoreana* Colla). It agrees, except for the seed-characters, which are indeterminable from my material, with Gussone's description (Fl. Sic. Prodr. i. 500 (1827)) and with that of Colla (Herb. Pedem. 328 (1833)), as well as with the account of *Cucubalus angustifolius* Tenore (Fl. Nap. i. 233, t. 37 (1811–15)) on which these species are founded. It also seems identical, except for its red flowers, with an authentic example of *C. angustifolius* Miller in Herb. Mus. Brit. The descriptions of the three Italian authors do not mention a red-flowered form, but this was distinguished by Legrand in a paper on plants growing around Perpignan in Bull. Soc. Bot. Fr. xvi. 386 (1869). Legrand wrote "*S. inflata* var. *carneiflora* nob.—Diffère du type par ses fleurs roses, ses feuilles oblongues bien plus allongées, fortement rétrécies à la base ; le dernier caractère le rapprocherait du S. Tenoreana." There are two specimens in Herb. Kew. that appear identical with the Plymouth plant, viz. :—Delacour, Villeneuve-les-Avignon, 1879, as *S. inflata* f. *legitima* Schur ; and Ellman and Sandwith, no. 600, Guadix, Granada, 1926. At South Kensington there are numerous examples of this plant :—Sennen, no. 2981, Baléares, as *S. vesicaria* var. *serratifolia* f. *roseiflora* ; Gadeceau, Bonifacio, 1856, as

S. Tenoreana; Lojacono, Pl. Siculæ, no. 642, and Todaro, Pl. Siculæ, no. 495, both as *S. Tenoreana*; Bornmüller, Iter Græcum, 1926, no. 203, Kephalonia, as *S. vulgaris* subsp. *angustifolia* f. *rubella*; and numerous examples from Malta (Duthie, 1874, Bankart, 1927–30, and Price, 1928), where plants with red and white flowers seem to grow in company. The account in the 'Cambridge British Flora' (*l. c.*) includes a var. *angustifolia* (*S. angustifolia* Guss.) as an alien from Woolwich Arsenal. This presumably bore white flowers.

If *Silene angustifolia* is regarded as specifically distinct from *S. Cucubalus* Wibel, and there appear to be good grounds for this view, the Plymouth plant would stand as

S. angustifolia (Ten.) Gussone, var. **carneiflora** (Legrand) Pugsl., comb. nov.

S. inflata var. *carneiflora* Legr. in Bull. Soc. Bot. Fr. xvi. 386 (1869).

S. Cucubalus var. *Tenoreana* subvar. *carneiflora* (Legr.) Rouy & Fouc. Fl. Fr. iii. 104 (1896).

The older varietal name, *rubra* DC., is of vague application and appears to have been intended for a mountain form. As shown above, it has been used in a different sense by Druce to describe the Loch Tay plant.

S. angustifolia, both in its white and red-flowered forms, has an extensive Mediterranean range from Spain to Greece. It appears to have been introduced at Plymouth at a relatively recent date, for it is not noticed by Archer Briggs, whose attention it would hardly have escaped had it grown on the Hoe in his time. Its prevalence at Malta suggests that its presence at Plymouth may be due to naval agency, and the earlier introduction on the Hoe of another Mediterranean and Maltese species, *Carduus pycnocephalus* L., now similarly naturalized, may have a like origin.

NEW SPECIES OF *COCCOLOBIS* FROM ANTIGUA.

By N. Y. Sandwith, M.A., F.L.S.

Before leaving for the Gold Coast last autumn Mr. Harold Box invited me to examine some material of *Coccolobis* which he had collected in Antigua and was unable to match in London. He was anxious for the identifications to be settled, in view of the approaching publication of his flora of this West Indian island. The study of the material, lent by the British Museum Herbarium, has been made both easier and more interesting by the excellence of Mr. Box's field-notes and by his own previous investigations at the British Museum and Kew. Two undescribed entities are involved, and in each instance, but particularly in one of them,

there is a possibility of hybrid origin. I have been unable to trace any evidence of hybridity between species of this large genus, but this is not surprising when we consider how rarely hybrids are recorded from the tropics, although there is no reason to suspect that they occur less frequently there than in temperate regions, where they become a favourite *deus ex machina* for the solution of botanical difficulties. Only the prolonged residence in tropical countries of such careful and enthusiastic observers as Mr. Box will enable the taxonomist to deal satisfactorily with variable and critical plants collected in those areas. Pending the completion of the evidence it is proposed to describe both of Mr. Box's plants as new species, as follows :—

Coccolobis Boxii Sandwith sp. nov.; *C. diversifoliae* (Jacq.) Britton affinis, ab omnibus hujus formis ramulis crassioribus, ochreis persistentibus, petiolis conspicue pubescentibus, forma foliorum, rhachi necnon bracteis ochreolisque inflorescentiæ conspicue pubescentibus differt.

Arbor parva, circiter 8 m. alta; ramuli annotini summi cinerei, striati, sulcati, pubescentes, 4–5 mm. diametro. *Ochreæ* ad 1·5 cm. longæ, dense pubescentes, lobis ad 7 mm. longis, basibus persistentibus. *Folia* cordiformi-ovata, apice late obtuse cuspidato-acuminata, basi obliqua, variabilia, majora semper profunde (sæpe ad 2 cm.) auriculato-cordata, minora rotundata sensim vix cordata, summa etiam nonnunquam tantum obtusa, 9·23·5 cm. longa, 5·8–17·5 cm. lata, coriacea, lævia, supra costa basi pubescente excepta glabra, subtus costa nervisque primariis lateralibus inferne pubescentibus exceptis glabra, costa nervisque primariis utroque costæ latere 8–12 supra prominulis subtus prominentibus, nervis ceteris venulisque utrinque obscuris vix obviis sed sub lente intricatissime reticulatis; petiolus dense pubescens, 0·7–1·3 cm. longus. *Inflorescentia* solitaria, simplex, 17–22 cm. longa; pars basalis nuda circiter 1 cm. longa; rhachis 1·5–2 mm. lata, sulcata, dense minute patule pubescens, nodulis 1·2-floris; bracteæ late triangulari-ovatæ, rotundato-obtusæ, 1·3 mm. longæ, 2 mm. latæ, extra conspicue pubescentes; ochreolæ 2 mm. longæ, membranaceæ, vix usque medium bilobæ, basi glabræ, lobis hic illic tantum extra pubescentibus; pedicelli perianthiorum femineorum circiter 0·75 mm. longi, masculorum evidenter longiores. *Perianthium* glabrum, femineum tantum visum; tubus campanulatus, circiter 1·3 mm. longus; lobi ovati obtusi, exteriores 2 mm. longi, 1·75 mm. lati, interiores minores. *Filamenta* staminodiorum 0·6 mm. tantum longa. *Ovarium* ovoideo-ellipsoideum, 2·3 mm. longum, 1·3 mm. diametro, glabrum; styli ovario multo breviores, circiter 0·75 mm. longi, stigmatibus discoideis integris. *Fructus* non visus.

Antigua: Pelican Bay (Five Islands), in coastal thickets on the sea-shore, Feb. 1937, *Harold E. Box* 539 (Herb. Mus. Brit.,

Herb. Kew.); *ibid.* July 10th, 1938, *Box* 1497 (typus in Herb. Mus. Brit.).

Mr. Box writes that there was only a single tree, about 25 feet high, in this locality, but that he has noted others which appear to be conspecific in a few other stations in the central region of Antigua, *e. g.*, near Piccadilly and at English Harbour. It is a small, much stunted and distorted tree, presenting characters which would suggest a hybrid between *C. diversifolia* and *C. uvifera*, both of which grow in the coastal thickets at Pelican Bay. The tree is easily recognized in the field by the broadly cuspidate-acuminate leaf which somewhat resembles that of the Jamaican *Coccoloba litoralis* Urb.

It is possible that *Coccolobis Boxii* may represent a hybrid between *C. diversifolia* and *C. uvifera*. The latter species would contribute to such characters as the thicker branchlets with persistent bases of the ochreæ, the deeply cordate base of the larger leaves, their venation and texture, the shortly pedicellate flowers, and, perhaps, the indumentum of the branchlets, ochreæ and the rhachis of the inflorescence. It is unfortunate that the male perianths have all fallen, and that it is impossible to estimate the length of their pedicels. Again, there are no fruits present on the material, but the single ovary that was dissected bore an apparently healthy ovule. I do not think that the evidence for treating this very distinct-looking plant as a hybrid is quite conclusive, and prefer to describe it provisionally as a new species.

Coccolobis antiguensis Sandwith, sp. nov.; *C. pubescenti* (L.) Sandwith * affinis, foliis supra subplanis lævibus neque rugosis subbullatis, venis secundariis tertiariisque utrinque tenuibus præsertim supra valde inconspicuis neque supra conspicue canaliculato-impressis neque subtus valde prominentibus, venulis ultimis laxius reticulatis scilicet rete minus brunnescens tenuissimum arcte intricatissimum formantibus.

Arbor parva, circiter 10 m. alta; ramuli summi anfractuosi, internodiis brevibus 1–2·8 cm. longis, 4–5 mm. diametro, sulcatis, ut in *C. pubescente* glanduliformi-verruculosis et pilis inæqualibus conspicue fulvo-pubescentibus. *Ochreæ* 1–1·3 cm. longæ, dense pubescentes, basibus persistentibus. *Folia* majora late ovato-suborbicularia, ad 29 cm. longa et 31 cm. lata, minora ovata vel suborbicularia, circiter 12 cm. longa, 8·5–11 cm. lata, omnia apice rotundata vel contracta et latissime brevissime cuspidata, basi profunde (ad 2·5 cm.) cordata, coriacea, firma, supra subplana lævia costa nervisque primariis utroque latere 6–8 pubescentibus ceterum glabra, subtus nervis omnibus validioribus pubescentibus, supra nervis secundariis tenuibus planis neque canaliculato-impressis venulis tenuissimis verruculosis sub lente tantum distinguendis, subtus costa nervisque primariis valde prominentibus venulis tenuissimis sub lente pallidis crebre furfuraceiformi-verruculosis; petiolus dense fulvo-pubescens, 1·2–2 cm. longus. *Inflorescentia* solitaria, simplex, 20–30 cm. longa; pars basalis nuda 1–2 cm. longa; rhachis circiter 2·5 mm. lata, sulcata, dense minute patule pubescens, nodulis 3–4-floris; bracteæ extra pubescentes, 1·2 mm. longæ; ochreolæ ad 1·5 mm. longæ, bilobæ, lobis late triangulari-ovatis obtusis extra secus medium conspicue pilosulo-pubescentibus; pedicelli pubescentes, 3–3·5 mm. longi, supra medium apicem versus articulati. *Perianthium* extra papilloso-puberulum, femineum tantum visum; tubus campanulatus, circiter 0·6 mm. longus; lobi ovato-suborbiculares, rotundato-obtusi, ad 1·6 mm. longi, ad 1·5 mm. lati. *Filamenta* staminodiorum perianthii lobis multo breviora, 0·6 mm. longa. *Ovarium* ovoideo-ellipsoideum, trigonum, 1–1·5 mm. longum, 1 mm. diametro, glabrum; styli ovario fere æquilongi, stigmatibus apice bilobis. *Fructus* non visus.

ANTIGUA: Carr's Ghaut, at side of brackish stream near the coast, sea-level, July 4th, 1938, *Harold E. Box* 1496 (typus in Herb. Mus. Brit.; dupl. in Herb. Kew. et U.S. Nat. Herb.). A small tree, 30–40 ft. high, growing with *C. uvifera* in fringing forest (*Bucida–Annona* association). Very rare, and known to the collector from a single tree only, which was first pointed out to him as distinct by Mr. C. F. Charter. Mr. Box writes that his no. 301, consisting of leaves only, was collected from the same tree, the whole of the material being sent to the United States National Herbarium in 1932.

This is certainly closely allied to *C. pubescens*, but the characters of the leaf give it a very distinct facies. Most of the flowers have fallen from the inflorescences, and no male perianths are available for study. The bracts and ochreolæ appear to be longer, and the pedicels somewhat shorter, than those of West Indian material of *C. pubescens*. The possibility of hybrid origin, *C. uvifera* being the other parent, is not to be excluded, but Mr. Box notes that *C. pubescens* does not occur in this (the limestone) region of Antigua.

In conclusion, it may be pointed out, with regret, that *Coccolobis* P. Br., according to two good nomenclatural authorities, not merely antedates *Coccoloba* L. but must actually be treated as a different name. The two names are not orthographic variants, since *Coccolobis* has the termination of a diminutive, and *Coccoloba* is thus an illegitimate substitution. We are therefore faced with a very large number of necessary transfers from *Coccoloba* to *Coccolobis*, unless it is decided to conserve *Coccoloba*. The discovery of the earliest publication of some of these will not be an easy task, since the 'Index Kewensis' formerly treated the two names as orthographic variants, and so have the American writers (*e. g.*, Britton, Small), who have correctly adopted *Coccolobis*, attributing the binomial to the original author of the species under *Coccoloba*. Even apart from such unintentional

* **Coccolobis pubescens** (L.) Sandwith, comb. nov.—*Coccoloba pubescens* L. Syst. Nat. ed. x. 1007 (1759).

new combinations, considerably more than a hundred others will have to be made. I, cynically enough, can immediately dispose of one of them for a species of Guiana which I described some years ago :—

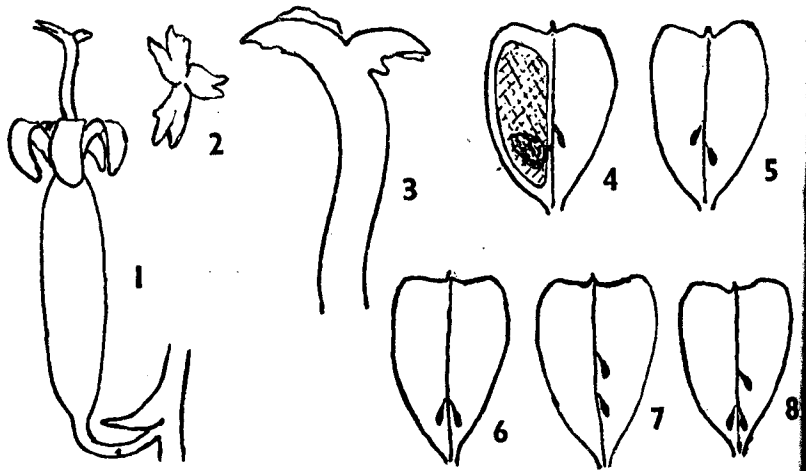
Coccolobis gymnorrhachis (Sandwith) Sandwith, comb. nov.—*Coccoloba gymnorrhachis* Sandwith in Kew Bull. 1932, p. 221.

SLIGHT ZYGOMORPHY IN *DIOSCOREA SYLVATICA* ECKLON.

By I. H. Burkill.

It is characteristic of the Dioscoreaceae to produce radially symmetric flowers, but I have detected departure from this in the South African *Dioscorea sylvatica* (*Testudinaria sylvatica* Hort. Berol. ex Kunth).

Numerous Dioscoreas carry their capsules reflexed on downwardly directed axes—a phenomenon which means that there is a physiological difference between the side of the pedicel over



1. A female flower from the side, drawn from life, ×10. 2. The stigma from above. 3. The style and stigmas, ×30. 4–8. Five valves from capsules, the first showing a ripe seed and an unfertile ovule, the others showing ovules, nat. size.

the bract and the side opposite. *D. sylvatica* is one of them. Compensatingly in this species—and as far as I am aware in it only—the style curves as shown in figs. 1 and 3. Of the three stigmas that which at flowering is nearest to the axis and least exposed is smaller than the other two (fig. 2). It is legitimate to regard the curvature of the style and the greater size of the more exposed stigmas as aids to pollination.

My observations were made in 1938 on a living plant at Kew. After flowering it fruited, and about fifty capsules were kindly given to me. Their valves, when ripe, are easily separable. Five are drawn here to show the distribution of ovules, two on each valve or sometimes three. In the material which I had three were never present except on the valve turned towards the axis, *i. e.*, the valve over the bract.

These observations should be extended in South Africa by study of plants in a wild condition.

NOTES ON OUTER HEBRIDEAN FLORA.

By M. S. Campbell.

A great deal of the material collected on last year's expedition to the Outer Hebrides still requires study, but some of the results concern non-critical species, of which the following are of special interest :—

Stellaria graminea L. N. H. [North Harris], grass by Amhuinnsuidh Castle (coll. A. J. Wilmott) ; not known to Sir Samuel Scott to have been in any way introduced. Apparently new to v.c. 110.

Radiola linoides (L.) Roth. L. [Lewis], Brenish, in two localities (*E. B. Bangerter & M. S. Campbell*) ; very scarce.

Geum rivale L. N. H., Creagan Leathan (Ulladale), high on rocks (*A. J. W.*) ; ? new to v.c. 110.

Epilobium angustifolium L. L., Valtos Glen, a few plants—none flowering—on a small rock ledge (*M. S. C.*) ; though found in North Uist in 1894 by Shoolbred this species seems to be very scarce in the Outer Isles and I do not know of it elsewhere in Lewis.

Hedera Helix L. Scalpay (*J. W. Campbell*).

Hichorium Intybus L. S. H. [South Harris], machair Luskentyre (*M. S. C. & A. J. W.*).

Ilex aquifolium L. S. H., rocks south of Loch Laxdale (*A. J. W.*); also seen near Geocrab (*J. W. C.*).

Gentiana septentrionalis (Druce) Pugsl. L., characteristic and in quantity in the fixed dunes at Gress (*A. J. W. & M. S. C.*); new to v.c. 110.

Centunculus minimus L. L., Brenish ; Grassavig (*M. S. C.*).

Polygonum viviparum L. L., about twenty plants among rocks by the sea, W. end of Uig sands (*E. B. B.*) ; new to Lewis ; N. H., Clisham (*M. S. C.*), confirming old record.

Malaxis paludosa (L.) Sw. L., Mealista (*J. A. Crabbe*) ; apparently new to Lewis.

Carex Bigelowii Torrey ex Schweinitz (*C. rigida* Good., non Schrank). On several hills, in L. (Uig) and N. H.

Phleum pratense L. Scalpay (*E. B. B.*, *M. S. C.*, *A. J. W.*).

Dryopteris Phegopteris (L.) C. Chr. L., in many places on the Uig hills.

OBITUARY.

Harold Stuart Thompson

(1870–1940).

By the death of H. Stuart Thompson at Clifton, Bristol, on March 3rd last, this Journal has lost one of its most prolific contributors. His earliest paper appeared in 1889, and reported his finding of *Cicuta virosa* and *Rhynchospora fusca* at Shapwick, Somerset, and *Polygonum maritimum* at Burnham, [redacted]. His last note drew attention to the abundance of *Orobanche Hederae* about Bristol in 1939. Between these dates his name figures in the index just one hundred times.

Thompson was born at Bridgwater in March, 1870, the son of William T. Thompson, a member of a Quaker family which had produced an earlier Somerset botanist of repute, Thomas Clark. He was educated at Sidcot and Bootham schools, where his interest in natural history was encouraged, and afterwards at University College, Bristol, whence he proceeded to Christ's College, Cambridge, in 1889. He remained there, however, for a year only, and did not obtain a degree. In the succeeding years he took up the work of a Surveyor (F.A.S.I., 1897) and resided at Birmingham till 1902. Afterwards he lived at York, Colchester, and London, and was working in the herbarium at Kew in 1904. From 1906 until the outbreak of the Great War he spent much time on the Continent, chiefly in Switzerland, where I met him in 1908 and again in 1913. He was employed as an official Timber Supply Officer for Somerset during the latter part of the war, and on its close settled at Clifton, where he remained a bachelor till his death.

In his early years Thompson was a keen field botanist, but never, I think, an all-round naturalist. His interest was centred in vegetation, and in the animal kingdom fishes alone claimed his attention, for he was ever a good scholar of Isaac Walton. His chief papers of this period were on the flora of Cyprus, written while he was at Kew, and on that of the island of Porquerolles, near Hyères, in which he described a new species of vetch, *Vicia monosperma*.

The first of his more important works, 'Alpine Plants of Europe,' was published by Routledge in 1911, and was an immediate success. It was fully illustrated by coloured plates adopted from Seboth's 'Alpine Plants,' and described accurately about 700 species, with their distribution and short cultural notes. A second volume of a similar character, 'Subalpine

Plants,' followed in 1912. This was adorned with plates after water-colour drawings by George Flemwell, which are attractive but not so uniformly satisfactory. In 1914 'Flowering Plants of the Riviera' appeared. This book, which furnishes a concise account of 1800 of the more interesting species, and is admirably illustrated by plates after water-colours by Clarence Bicknell, is perhaps his best work, and is still in great demand by English visitors to the Riviera.

A year after this publication Thompson made his most interesting discovery in the British flora, *Carex lasiocarpa*×*riparia* (*C. evoluta* Hartm.) on the Somerset peat-moor.

He joined the Watson Botanical Exchange Club in 1894 and became a Fellow of the Linnean Society in 1901, and as he had acted as Hon. Secretary and Editor for the former from 1900 to 1904, it fell to him in 1920, on the retirement of S. H. Bickham, to resume this post, which he continued to hold till the dissolution of the club in 1934. British botanists owe him a debt of gratitude for his work in this connection. His botanical papers of this later period, both in this Journal and elsewhere, show a declining interest in taxonomy, and are calculated rather to meet the less exacting requirements of ecology. The accounts of the changes in coast vegetation at Berrow, in Somerset, printed in the 'Journal of Ecology' in 1922 and 1930, are perhaps the most important. After resigning his fellowship of the Linnean Society he was elected an Associate in 1930. His name is commemorated in the Cyprian species *Euphorbia Thompsonii* Holmboe.

In his later years Thompson became interested in art as well as botany, particularly in water-colour drawings of the Bristol school, of which he wrote a history in 1926 which was printed in the Bristol 'Times and Mirror.' In 1928 he contributed an interesting account of the brother artists George A. and Alfred D. Fripp to the series of Walker's Quarterlies. He was a facile writer on many subjects and also a good photographer.

Another of his constant interests was education, and he made generous gifts of books and pictures to the University of Bristol and other provincial institutions. He was always anxious to help what he thought to be a good cause, and, a liberal in politics, he deplored the destruction of his party by the last war and the materialism that has involved us in the present one. Of a highly sensitive or possibly hypersensitive nature, he possessed a strong sense of justice and fair-play, and hated prevarication and hypocrisy. His collections of plants are mostly at Birmingham and Reading.—H. W. Pugsley.

SHORT NOTE.

Petasites japonicus Maxm. in Cheshire.—A well-established white butterbur in flower over a considerable area beside the lake at Thornton Hough, Vice-County 58, attracted

my attention in late March 1940. As there was then no specimen in the Liverpool Museum Herbarium it was sent on to Kew, where Dr. Turrill kindly identified it as *Petasites japonicus* Maxm., pointing out that there is a specimen in the Kew Herbarium from another locality beside the road at Clappersgate, Westmorland, and mentioned in Wilson's Flora. There is a specimen in the British Museum herbarium from Langsdale on the public road outside a garden in which it grows, collected in 1931, and it is also recorded from Denham Fisheries, where it is supposed to have escaped from a garden higher up the river. The Cheshire locality is a private part of Lord Leverhulme's estate where I had noticed the foliage in summer for some years but not previously had an opportunity to obtain it in flower.—ERIC HARDY.

BOOK-NOTES, NEWS, ETC.

LINNEAN SOCIETY OF LONDON.—At the General Meeting on February 29th, the President in the Chair, Sir Arthur W. Hill showed a lantern-slide of New Zealand vegetation where pollen of *Nothofagus* was in such dense clouds as to give the appearance of smoke.

Mr. W. R. Price showed a series of photographs illustrating the formation of ice on vegetation during the Ice Storm of January 27th.

Major A. Pam exhibited *Pamianthe peruviana* in flower.

The first paper was by Dr. R. W. Butcher on "Diversity of the reaction to submergence in the Batrachian Ranunculi." In it he described how he had grown different species and forms in a pit. His preliminary results showed that plants exposed to the air give rise to transitional states hardly worthy of taxonomic recognition. There are, moreover, too many forms already given specific rank, but to group all of them as *Ranunculus aquatilis* errs in the opposite direction; many so-called forms and varieties are simply states of the plants altering as conditions change. Although immature plants may lack the normal floating leaves produced by the mature healthy plant, they should not be given rank above that of form. It seems unlikely that species which do not produce floating leaves under optimum conditions will produce them at all.

Sir George C. Simpson followed with a lecture on "Possible causes of change in climate and their limitations." This will be read with interest and profit by biologists; faith which could remove mountains is infinitesimal compared with that which not only moves continents but modifies the solar system at will, and it is refreshing to have an authoritative simple statement about some of the aspects of changing climate.

NOTES ON *OROBANCHE* L.

BY H. W. PUGSLEY, B.A., F.L.S.

THE following notes are supplementary to the brief paper, "The British Orobanche List," printed in this Journal for 1926 (lxiv. 16 *sq.*). Since that date a second Monograph by Dr. Günther Beck-Mannagetta has been published ('Pflanzenreich,' iv. 261 (1930)), in which much information obtained since the appearance of his earlier Monograph (1890) has been incorporated. In his later work Beck has altered the sequence of the generic series of *Orobanche*, and this rearrangement is here followed.

Owing to the frequently inevitable obliteration of important characters in the process of drying these plants are often difficult to deal with as herbarium specimens, and it will be seen that some emendations of views hitherto accepted are now proposed. It is noteworthy that the early botanists paid little attention to this group, and Linnæus described but one species only (*O. major*) of what has now become the large subsection *Angustatae* of section *Osproleon*. During the last century, however, very many new species and varieties were established, and present-day synonymy is in some cases considerably involved.

Section TRIONYCHON Wallr.

OROBANCHE RAMOSA L.

This species, which formerly figured in British Floras, was omitted from the last edition of the London Catalogue, and appears only as an alien in Druce's Plant List. It was found at one time on *Cannabis* in Norfolk and Suffolk, where it was probably introduced with its host, and according to Hudson (Fl. Angl. ed. 2, i. 266 (1778)) it grew also in Kent, Hants, Somerset, and Devon. It is further recorded for Sark in Hooker's 'British Flora,' ed. 3 (1835), and for Jersey and Sark in ed. 7 (Hooker and Arnett, 1855), but there is no mention of it in Lester-Garland's more recent 'Flora of Jersey.' In Herb. C. E. Salmon, now in Herb. Mus. Brit., there is a specimen of this plant, labelled "*O. purpurea* Jacq. (*fide* G. C. Druce). La Moye, Jersey. A. Webster, 10.6.1913." The name of the host-plant is not stated. As *O. ramosa* is said, both by Beck and by Rouy, to inhabit the whole of France and to grow on a great variety of hosts besides hemp, it seems likely that it may be a native in Jersey and not a casual introduction there. Salmon's herbarium contains a second specimen, "B. Bray, Hemp field near Lynn, 1869," which is rightly named.

O. PURPUREA Jacq.

A variety *tapeina* Beck of this species was reported by C. E. Salmon in this Journal, lxv. 117 (1927), from wall-tops in Jersey.

It is doubtful whether the varietal characters of these specimens are not due to habitat-conditions, and probable that all the forms of this species seen in Britain and the Channel Islands show no more than individual variations. Lester-Garland seems to have held this opinion respecting the Jersey plants (*l. c.* xlii. 119 (1904)). Beck has allowed varietal rank to an unusual number of forms of this species, and is followed by F. N. Williams (Prodr. vi. 330 (1909)).

O. arenaria Borkh., which has been confused with *O. purpurea*, is readily distinguished when fresh by its colouring. The corolla, instead of being blue with a suffusion of pale or whitish yellow about the base, is pale purple or lavender, concolorous without any yellowish tinting, and with two conspicuous white basal hunches on the lower lip.

Section OSPROLEON Wallr., subsection ANGUSTATAE Beck.

Series GLANDULOSAE Beck.

O. ALBA Steph.

While the great majority of British specimens are of the deep reddish colour characteristic of *O. rubra* Sm. (*O. alba* f. *rubra* Beck), a few examples in herbaria, *e. g.*, Salmon, Cadgwith, 1926, appear to have flowers less intensely coloured and not concolorous, and hence more like the most usual continental form. I have not observed any examples of Beck's var. *bidentata*, with 2-fid sepals, which he notes as having seen from Scotland among other places ('Pflanzenreich,' iv. 261, p. 155). Arthur Bennett (Journ. Bot. xli. 380 (1903)) gives Skye as its station. As it is said by Beck to be found now and again with the type it seems doubtful whether it is not of the nature of an occasional sport.

O. RETICULATA Wallr. var. PROCERA (Koch) Beck.

In 1930 I saw this plant growing on thistles on a common near Leeds, where it looked native. It has now been recorded for several stations in Yorkshire, and is at least well established in that county. There is a fine early specimen in Herb. Mus. Brit., received from Bot. Record Club, and labelled "*O. minor*. Lotherton, M. W. Yorks. G. Webster. 7/81."

A second variety of this species, var. *pallidiflora* (Wimm. & Grab.) Beck, was reported as British by Druce in B. E. C. Report, vii. 778 (1926), and by Bennett in this Journal, lxvi. 168 (1928). It is included in the second edition of Druce's Plant List. The record was based on a specimen collected by Mr. H. H. Knight in Breconshire in 1905, which is said to have been determined by Beck. This statement is erroneous and is due to a mis-reading of the postcard (written in German) on which Beck sent his identification of the plant. Beck clearly named the specimen "*O. reticulata* var. *procera*," adding "Eine einschlepping ist

nicht ausgeschlossen, da *O. pallidiflora* und die ihr zunächst stehende *O. procera* gern auf Schuttplätzer vorkommt." The card is attached to the specimen, which is now in Herb. Mus. Brit. The variety *pallidiflora* must thus be deleted from the British list.

Series MINORES Beck.

O. AMETHYSTEA Thuillier.

This species was added to the British flora in 1845 by the Rev. W. S. Hore in a paper in the 'Phytologist' (ii. 239). The plant was found growing on *Daucus* at Whitsand Bay, in Cornwall, and was apparently identified by Hore himself. The identification was accepted by Babington in the early editions of the Manual, but not by Borrer, who wrote in Henfrey's 'Botanical Gazette' (ii. 96 (1850)) "I much doubt the correctness of the name." In the later editions of Babington's Manual "Perhaps a form of *O. minor*" was inserted, and in the third edition of 'English Botany' and Hooker's 'Student's Flora' the plant is made a subspecies of *O. minor* Sm. In Beck's Monograph, p. 231 (1890) South Britain is included in the geographical area of *O. amethystea* although the author had apparently seen no British specimens; and he adds *Eryngium maritimum* and *Daucus* to his list of host-plants on the authority of Sowerby and Hooker.

In my former paper I pointed out that the existence of *O. amethystea* Thuill. in Britain was open to question and that our plant did not agree with continental descriptions. A year later C. E. Salmon reported in this Journal (lxv. 117 (1927)) that Beck had confirmed as *O. amethystea* his specimens from East Kent and Dorset, the Dover specimen having been determined in November, 1926, as "*O. amethystea* Thuill. forma corollis minus genuflexis et filamentis in basi copiosius pilosis," and that from Winspit as "*O. amethystea* Thuill. typica." Meanwhile in 1913 Col. Wolley Dod, then working on the 'Flora of Gibraltar,' had sent to Beck two specimens exactly matching the British material and duly named "*O. amethystea*." These were returned with the naming corrected to "*O. Picridis* var. *Carotae* (Des Moulins)." All of these specimens are now in Herb. Mus. Brit.

The British *O. amethystea*, as seen in Kent, Dorset, Cornwall, and the Channel Islands, is a relatively uniform plant, closely allied to *O. minor* but seemingly with some constant points of difference. Its stem is shortly and finely glandular-pubescent, deeply coloured and often bulbous at the base; the bracts are dark and broad below, and do not exceed the flowers; the sepals are entire or bifid, but regularly broad-based and contiguous in front; the corolla is less arcuate than in *O. minor*, deeply tinted with dull violet, with the lobes of the lower lip (especially the median) broader than long and the margins of both lips glabrous

and less crenulate-dentate than in the allied species. The stigmas are less deeply lobed than in *O. minor*.

O. amethystea was originally described in Thuillier's ' Flore des Environs de Paris,' ed 2, 317 (1799), thus :—

" O. caule simplici, lucide violaceo; calycibus subulato-elongatis ; corollis subvinaceis tubo longiusculo glabello. Hab. in sylvis glareosis. Flores amethystei ut et tota planta."

Thuillier does not mention the host-plant.

In Grenier and Godron's ' Flore de France,' ii. 641 (1850), we read: " Sépales plus courts ou plus longs que la corolle . . . Bractées égalant ou dépassant la corolle . . . blanchâtre ou teintée de lilas sur le dos avec des veines plus foncées, ou entièrement de couleur lilas." Later French Floras and Beck's two Monographs agree in characterizing the plant as having long, narrow bracts commonly exceeding the flowers, sepals with long, finely pointed or subfiliform segments, a corolla distinctly larger than in *O. minor* (15–23 mm. long), of a whitish colour or tinted with lilac, with the tube curved at the base and straight or deflexed above, and large, spreading or even reflexed lobes to the lips. There are good authentic French specimens in Herb. Mus. Brit. *O. amethystea*, which appears to be found only on *Eryngium campestre* in France, is a widely spread and probably variable species, extending across southern Europe to Asia Minor, and Beck enumerates five varieties besides a number of forms. Several varieties are described from Portugal (as well as forms of *O. minor*) in Guimarães' monograph of *Orobanche* in 'Broteria,' iii. 81 *sq.* (1903), but none of these, judging by the descriptions, seems identical with the British plant. In 1925 I saw *O. amethystea* growing sparingly about Perpignan and Collioure in the south of France.

The British plant differs from *O. amethystea* in its darker, purplish colour, shortly pubescent and often bulbous-based stem, broader and shorter scales and bracts, shorter sepals with less acuminate segments, and smaller corolla (12–17 mm. long), of a darker colour suffused with violet, less bent towards the base and less patent, with smaller, less spreading and less crenulate-lobate lips.

As mentioned above, Beck in 1913 named specimens from Gibraltar identical with this British form, *O. Picridis* var. *Carotae* (Des Moulins) Beck. This variety is founded on *O. Carotae* Des Moulins, described as a new species in a paper (" Sur les Orobanches de Lanquais, Dordogne") in Ann. Scien. Nat. iii. 78 (1835). The description runs :—" O. scapo gracili, basi non aut vix incrassato . . . corollâ parvâ, cylindraceâ, gracili . . . staminibus longe supra basim affixis basi villosis, stigmate violaceo . . . *O. Hederæ* valde affinis. Tiges couvertes de poils blancs, glanduleux, entremêlés de quelques poils assez longs et secs . . . les deux sépales sont profondément divisés en deux lanières filiformes et très longues . . . Corolle jaune, excepté sur le dos d'un violet clair avec des linéoles plus foncées. Les étamines à base couverte de longs poils blancs." The characters given exclude the British plant, and recall *O. minor* and *O. Picridis* Hol., which are not mentioned in the paper. In Grenier and Godron's 'Flore de France,' ii. 641 (1850), *O. Carotae* becomes *O. minor* var. *flavescens*. At Kew there is an authentic specimen of *O. Carotae* sent by Des Moulins himself to Gay in 1834 from Lanquais, the type-locality. This bears no resemblance to our coast plant, and seems to be a slender form of *O. minor* with yellowish flowers. Reichenbach f. (Icon. Fl. Germ. xx. 104 (1862)) makes *O. Carotae* Desm. a synonym of *O. Crithmi* Bertol. ii. vi. 424, which is placed by Beck under *O. minor* as f. *Crithmi-maritimi*. This is figured (t. 184) as a yellow-flowered plant, and is represented in Herb. Mus. Brit. by a French specimen from Gadeceau (Pont Donant, Belleisle, 1902), growing on *Crithmum*, which is unlike *O. Carotae* and, except for its yellow colour, shows some resemblance to our British plant.

The description of *O. Carotae* (as a variety of *O. Picridis* Hol.) is essentially changed by Beck in his Monograph (*l. c.* 246). He writes : " Scapus sæpe firmus in basi sæpe bulbosus et copiose squamatus. Spica plurimum multi- et densiflora. Bracteæ sicut scapus breviter non copiose glanduloso-pilosæ, rubro-violaceæ in siccitate sæpe nigrescentes. Calycis partes bidentatæ rarius integræ, cum dentibus nervis conspicuis perductis. Corolla nervis etiam in siccitate violaceis prædita, subglabra. Sæpe vix ab var. α [*O. Picridis* typica] separanda." On page 253, under *O. minor*, he remarks that the form *procerior* (Rchb.) is " valde affinis *O. Carotae* Desm." The account is followed by Rouy (Fl. Fr. xi. 186 (1909)), and is repeated in ' Pflanzenreich ' (*l. c.* 203), with the addition " [calycis partes] sæpe intense violaceæ."

It will be seen that Beck's description of his var. *Carotae* agrees fairly well with the British " *O. amethystea*," and the remark under *O. minor* f. *procerior* is also apt, for specimens of this plant in English clover fields may closely resemble our coast form. But it is not easy to understand the notation " Sæpe vix ab var. α separanda ", for typical *O. Picridis*, with its light-coloured stem, yellowish, long or nearly filiform sepals, and almost white corollas, has an entirely different aspect. Still more difficult is it to see why this var. *Carotae* or "*O. amethystea*" should be placed as a variety under *O. Picridis* at all. And it must be remembered that while in 1913 Beck named specimens from Gibraltar that matched his description " *O. Picridis* var. *Carotae*," in 1926 he confirmed similar English examples as *O. amethystea*. It is clear that our coastal British plant is not *O. Carotae* Des Moulins, and if it is the plant intended by Beck for *O. Picridis* var. *Carotae* it is wrongly placed as a variety under *O. Picridis*, for it is actually nearer to *O. minor*. But it presents constant points of difference

from the last-named plant, and as I cannot match it with any other described form I propose to treat it as a new species :—

Orobanche maritima Pugsl., sp. nov.

O. amethystea auct. angl. pro maj. parte, non Thuillier ; *O. Picridis* var. *Carotae* Beck, Mon. Orob. 246 (1890), et ' Pflanzenreich,' 96, iv. 261, 203 (1930) ? ; Rouy, Fl. Fr. xi. 186 (1909) ? ; non *O. Carotae* Des Moulins.

Icon. Butcher and Strudwick, 275 (as *O. amethystea*).

Exsicc. Pugsley, no. 587, Seacombe, Dorset (type), in Hb. Pugsley ; Bennett, Dover to Folkestone, 1882 ; Briggs, Downderry, E. Cornwall, 1876 ; both in Hb. Mus. Brit.

Caulis firmus (10–)20–30(–50) cm. altus, *basi incrassatus* vel bulbosus, violaceo- vel *fusco-purpureus, breviter glanduloso-* pilosus vel *pubescens*, sæpe tandem glabratus, infra ±copiose sursum parce squamatus. *Squamæ ovato-* vel triangulariter *lanceolatæ*, acutæ, 5–20 mm. longæ, externe glanduloso-pubescentes. *Spica multiflora*, sæpissime densiflora,—30 cm. longa. *Flores* erecto-patentes vel pronus curvati, *12–17 mm. longi. Bracteæ violaceo-purpureae*, dense et breviter glanduloso-pubescentes, *e basi latâ lanceolato-subulatæ, corollam longitudine subæquantes. Calycis* purpurascentis *partes* separatæ, *antice contiguæ*, e basi ovali varie bidentatæ rarius integræ ; *dentes* subulato-acuminati, sæpe valde inæquales, infra obscure trinervii, supra nervo unico perducti, glanduloso-pubescentes, *corollæ tubo vulgo breviores. Corolla* tubulosa, præsertim ad basin curvata, limbum versus paulo ampliata et in apice dorsali arrecta, *sordide ochroleuca*, imprimis in nervis *valde violaceo-tincta*, externe parce glanduloso-pubescens vel glabrata, *in margine glabra, leviter* et irregulariter *crenulato-dentata* ; *labium* superum plicato-emarginatum lobis latis patentibus ; *inferum lobis* contiguis plicatis *latioribus quam longis* rotundatis (medio paulo majore plicis conspicuis prædito). Stamina oblique 2–3 mm. supra corollæ basin inserta ; filamenta infra ±pilosa, supra glabra. Stylus breviter et parce glandulosus. *Stigma* obscure purpureum, *quam in O. minore minus plane bilobum.*

Parasitica ad radices *Dauci Carotae* et *D. gummiferi*, rarissime *Plantaginis Coronopus* et *Ononis repentis.*

Hab. in declivis maritimis in comitatibus anglicis Kent, Dorset, Devon, Cornwall ; in insulis Cæsareâ et Sarniâ ; atque in Hispaniâ (Gibraltar).

The *Orobanche* growing on *Eryngium maritimum* at St. Helen's Spit, Isle of Wight, is *O. minor* Sm. f. *procerior* (Rchb.) Beck ; and that at St. Ouen's Bay, Jersey, and at Braye, Alderney, on the same host, a somewhat similar form of the same species.

O. MINOR Sm.

This species has been cited indifferently in literature as of Smith or of Sutton. It was described by Sutton in his paper on *Orobanche* in Trans. Linn. Soc. iv. 179, under date of 5 December, 1797, but it was also published in the same year by Smith as E. B. vi. 422, which is dated 1 July, 1797. The authority to be cited is therefore Smith. The possibility that this name may be superseded by *O. major* L. will be discussed under *O. elatior.*

O. minor, which grows on a great variety of host-plants though particularly on Leguminosae, is eminently polymorphic ; and it is not known how far this polymorphism is due to differences in the plants on which it feeds. Beck enumerates thirteen forms of his var. *genuina.*

An English plant that has been referred to *O. Picridis* by Marshall (Journ. Bot. xxv. 55 (1887)) and other authors appears to be a variety of *O. minor* that has not been distinguished by Beck, though in its main characteristic, a relatively narrow corolla, it resembles his f. *angustissima.* It occurs in West Surrey, about Brean in North Somerset, in Bedfordshire, Essex, East and West Suffolk, and other localities, growing generally on *Crepis virens, Hypochaeris radicata,* or *Cirsium* sp. As this plant seems to be a constant form, readily recognizable in herbaria, it is proposed to distinguish it as a variety, thus :—

β **compositarum** Pugsl. var. nov.

Exsicc. Pugsley no. 588, Bedford (type), in Hb. Pugsley ; E. Forster, Reigate, 1849 ; Trimen, Felixstowe, 1869 ; Bennett, Thorpe near Aldeburgh, 1901 ; all in Hb. Mus. Brit.

Caulis±rubescens, sæpius gracilescens. *Spica multiflora, floribus* leviter arcuatis *suberectis* potius quam erecto-patentibus vulgo densiflora. Calycis dentes longe subulati, corollæ tubum nonnunquam subæquantes. *Corolla* 12–18 mm. longa, *angusta* (3–4 mm. lata), ochroleuca *pallide* vel obscure *violaceo-tincta, quam in typo sæpissime glabrior.* Filamenta infra ± dense pilosa. Stylus parce glanduloso-pubescens ; stigma pallide purpureum. Aliter ut in typo.

Stem ±reddish, generally rather slender. *Spike many-* and usually dense-*flowered*, with the *flowers* less arched than in the type and *suberect* rather than erect-patent, in fruit especially often appressed to the stem. Calyx-segments bifid, with long, subulate teeth sometimes equalling the corolla-tube. *Corolla* 12–18 mm. long, ochroleucous, *with pale* or dull *violet tinting*, distinctly *narrower than in the type* (3–4 mm. instead of 5 mm. broad) and often *less glandular-pilose.* Filaments ±densely pilose towards the base. Style sparingly glandular-pubescent ; stigma dull or pale purple. Otherwise like var. *genuina* Beck.

A form of var. *genuina*, notable for its deep colouring, is shown in ' Pflanzenreich ' (*l. c.* p. 211) as f. *conchiliata* Beck ap. Murbeck in Ann. Scot. Nat. Hist. 64, 253 (1907). The plant was collected near Cupar, in Fifeshire, by Miss M. C. Murray and sent to Beck for determination. The note in Ann. Scot. Nat. Hist. is by

Miss Murray (not Murbeck), who quotes a letter from Beck suggesting the name *conciliata* [sic] and remarking that in Scotland Orobanches seem to be deeply coloured. The form does not seem worthy of a separate name.

O. HEDERAE Duby.

A subvariety *monochroa* Rouy and Fouc. of this species was recorded by Druce for Sark and South Devon in B. E. C. Report, v. 298 (1919), and a f. *stenantha* Beck for Guernsey and Surrey in vol. viii. 633 (1929) as well as in Journ. Bot. lxvi. 168 (1928). Beck does not admit any varieties, but only forms of *O. Hederae*, and treats as *forma typica* a plant with the corolla " albida vel flavescens, ad limbum versus rubescens vel lilacina." The plant whose corolla is " tota albo-lutea " is his form *monochroa*. At Bristol, in the Isle of Wight, and probably elsewhere the two forms, perhaps connected by intermediates, often grow together, the yellowish-flowered plant generally commoner in my experience than that in which the corolla is suffused with purplish or wine-red. The f. *stenantha* is an elongate plant with the spike lax-flowered throughout. There are several well-marked examples in Herb. Mus. Brit. from Guernsey and South Devon, and one from Conway (Griffiths, 1883). The Surrey record cited above (Salmon, Betchworth, 1899, on Foxglove) is due to an error of Bennett's. Beck's determination, which is now with the specimen in Herb. Mus. Brit., is *O. minor* Sutton, which is certainly correct. Another modification, f. *megaphyllon* Beck, with conspicuously long bracts, also grows at Conway.

Series CURVATAE Beck.

O. ELATIOR Sutton.

As was pointed out in my former paper the Linnæan name *O. major* has been applied to this species by Beck and many other authorities, while British and the older French botanists have used it to represent *O. Rapum-Genistae* Thuillier. It has also been understood in the sense of *O. lutea* Baumg., *O. gracilis* Sm., and *O. caryophyllacea* Sm. In ' Species Plantarum ' it is the only species described which falls within Beck's large subsection *Angustatae* of Section *Osproleon*, and it may be said to be intended to cover the whole of this subsection (numbering fifty-two species in Beck's later monograph), especially in view of the diversity of the synonyms cited. The account (*l. c.* 632) runs :—

O. major.
O. caule simplicissimo pubescente, staminibus inclusis.
O. caule simplicissimo. Hort. Cliff. 321. Fl. Suec. 519. Roy. Lugdb. 299. Dalib. Paris, 190. Gort. Gelr. 368.
O. caule simplici, bracteis longioribus. Sauv. Monsp. 51.
O. major garyophyllum olens. Bauh. Pin. 87.

Orobanche i. Clus. Hist. i. 270.
Rapum Genistæ Lob. ic. 2, p. 89.
Hab. in Europæ agris, pratis siccis.

In the second edition of Sp. Plant. Linnæus notes that the plant grows on the roots of Leguminosae.

The application of the name to *O. elatior* seems due to the citation of Fl. Suecica, for *O. elatior* is a Swedish plant and *O. Rapum-Genistae* is not ; and its reference to the latter species may be attributed to the citation from Lobel and the subsequent statement of Linnæus that leguminous plants formed its host. Sutton (Trans. Linn. Soc. iv. 179 (1797)) remarks that he saw a specimen in the Linnæan Herbarium, furnished by Loefling and inscribed by Linnæus " *O. major*," which he would refer to *O. minor*, and he cites as a synonym of *O. minor* " *O. major*, caule simplici, bracteis lanceolatis flore majoribus. Loefl. Pl. Hisp. rariores, No. 35." The existence of this specimen in the Linnæan Herbarium seems to have been subsequently overlooked up to the time of publication of my former paper, and Hooker (Stud. Fl. ed. 3, 309) actually says there is no specimen there. According to Jackson's Index it was present in 1753, and it thus seems available as a nomenclatural type. It certainly agrees with Linnæus's brief description, and when I examined it in 1925 I thought it to resemble *O. Picridis*, although it was annotated by Smith " *minor* Mr. Sutton." I was then unaware of Sutton's determination. It is unfortunate that at present this specimen cannot be consulted, for it should perhaps be regarded as the specific type of *O. major* L. under the current Rules of Nomenclature. If the specimen belongs to *O. minor*—and it is not always easy to distinguish this from *O. Picridis* in the dry state—*O. minor* Sm. would become *O. major* L. Meanwhile it is evidently undesirable to use the Linnaean name either for *O. elatior* or *O. Rapum-Genistae*.

An excellent plate of *O. elatior* accompanies Sutton's original description (Trans. Linn. Soc. iv. t. 17).

In B. E. C. Report iv. 424 (1917) Druce created a var. *citrinis* [sic] of *O. major* (*O. elatior* Sutt.), based on a specimen found near Aldbourne, Wilts, by Miss E. S. Todd, and said to be a smaller plant than the typical species, of a yellow colour. The epithet is corrected to *citrina* in the second edition of his Plant List. Beck gives the corolla of *O. elatior* as " primum ± rosea, deinde pallide luteola," but the flowers of British examples are normally of an orange-brown colour, which is characteristic. While botanizing with Mr. P. M. Hall in South Hants in 1934 I saw several individuals of a clear yellow colour among a large number of normal plants, and these would probably match Miss Todd's Aldbourne specimen. Such plants, however, seem to show no definite varietal characters, and can only be regarded as a colour form (forma **citrina** (Dr.), comb. nov.).

O. RITRO Gren. & Godr. f. HYPOCHAEROIDES Beck ex Druce.

This name was introduced into the list of British plants by G. C. Druce in 1907 (Journ. Bot. xlv. 425) and was founded on specimens that he had collected at St. Ouen's Bay, Jersey, in 1906, growing on *Hypochaeris radicata*. In 1911 he published another note on the plant (*l. c.* xlix. 300), stating that it had been gathered in the same place by Syme in 1866, and subsequently by Hanbury, and wrongly identified with *O. minor* var. *flavescens* Reuter by Bennett. Beck included the plant in a paper on *Orobanche* in Fedde's Repert. xviii. 36 (1922), and described it as "*O. major* f. *hypochoeridis* (Druce) Beck—Dilute lutea. Flores minores, 12–14 mm. longi. Corollæ laciniæ denticulato-crenatæ. Filamenta supra sicut stylus parce glanduloso-pilosa, subglabra. Formæ *ritro* (G. & G.) Beck proxima." The plant was again collected at St. Ouen's in 1923 by Mr. W. C. Barton, who distributed specimens under Druce's name through the two British Exchange Clubs. In 1926 Salmon sent to Beck specimens named *O. minor* var. *flavescens* which had been collected at the same station by H. F. Parsons in 1883. These were returned by Beck with the following determination:—"*O. minor* var. *concolor* (Duby) cum filamentis copiosius pilosis. Propter stigma luteum non ad varietatem *flavescentem* Reuter pertinet." Salmon reported this (Journ. Bot. lxv. 117 (1927)) as a new variety for Jersey. In the 'Pflanzenreich' (*l. c.* 251) the forma *hypochaeridis* from Jersey is inserted by Beck under *O. major* (*O. elatior* Sutt.), following forma *ritro* (Gren. & Godr.); and a variety *concolor* (Duby), which had been treated as a separate species in the earlier Monograph, appears under *O. minor* without reference to its occurrence in the Channel Islands.

There is now in Herb. Mus. Brit. a fine set of the plant from St. Ouen's from various collectors and of different dates, including an authentic example of Druce's original gathering of *O. Ritro* f. *hypochaeroides*. The specimens are all obviously identical, and a yellow form of *O. minor* Sm. (var. *concolor* (Duby)) as named by Beck for Salmon. It is difficult to understand how this plant could have been associated with *O. elatior* Sutt. (*O. major* Beck), to which it does not show the slightest resemblance, or yet with *O. Ritro* Gren. & Godr., which can be seen from Reichenbach's plate (Icon. Fl. Germ. xx. t. 170) to be a yellow plant allied to *O. elatior* as treated by Beck. The synonymy shown by Beck indicates that Duby's name *concolor* cannot stand when reduced to a variety of *O. minor*, for he cites earlier varietal names that are synonymous, and it thus becomes a nomen illegitimum. The correct name and synonymy would appear to be

O. MINOR Sm. var. FLAVA E. Regel in Otto & Dietrich Allg. Gartenzeit. 284 (1842).

O. concolor Duby Bot. Gall. i. 350 (1828); Reuter in DC. Prodr. xi. 23 (1848); Beck, Mon. 256 (1890); Rouy, Fl. Fr. xi. 176 (1909).

O. Columbariae Gren. & Godr. Fl. Fr. ii. 634 (1850).

O. minor var. *lutea* Tourlet in Bull. Soc. Bot. Fr. l. 421 (1903).

O. Ritro f. *hypochaeroides* Beck ex Druce in Journ. Bot. xlv. 125 (1907).

O. Ritro var. *hypochaeroides* Druce in Journ. Bot. xlix. 300 (1911).

O. major f. *hypochoeridis* (Druce) Beck in Fedde Repert. xviii. 36 (1922); Pflanzenr. iv. 261. 251 (1930), pro parte.

O. minor var. *concolor* (Duby) Beck in Pflanzenr. iv. 261. 214 (1930), pro parte.

This plant apparently grows also on sandhills at Bray Bay, Alderney (*cf.* Hanbury sp., 1884, in Herb. Mus. Brit.).

O. LUCORUM A. Braun.

In the 'Pflanzenreich' (*l. c.* 264) Beck mentions L. Keller as erroneously citing *Petasites albus* Gaertn. and *P. niveus* Baumg. as hosts for this species. In 1934 I saw a few miles from Oberammergau, in South Bavaria, an abundance of *O. lucorum* growing on *Petasites*, with an equal quantity of *O. flava* Mart. and almost as much of a third form which appeared intermediate between them. My impression of the third form was that it was a hybrid, *O. flava*×*lucorum*, but Beck apparently does not admit hybridity in the genus. I was unable to refer this third plant, which was quite uniform, to any described species. In meadows not far distant *O. gracilis* Sm. was growing in plenty.

Series ARCUATAE Beck.

O. RAPUM-GENISTAE Thuillier.

In the 'Pflanzenreich' (*l. c.* 271), as in his earlier Monograph, Beck omits *Ulex europaeus* from the list of host-plants. Specimens growing on furze in the Isle of Wight were distributed through the B. E. C. in 1938.

The variety *bracteosa* Reuter was reported by Bennett in Journ. Bot. lxvi. 168 (1928) and B. E. C. Report viii. 633 (1929), on the authority of Beck, as occurring at Llandovery, in Brecon. It is distinguished by a lax spike of very large flowers (25–27 mm.), with bracts often twice as long, and was originally described from Collioure, in the French Dept. Pyrénées-Orientales. The British record is founded on a specimen collected in 1905 by Mr. H. H. Knight, now in Herb. Mus. Brit. It is a fragmentary example, showing flowers of only average size for the species, with bracts barely exceeding the corollas, and cannot be held to belong to Reuter's variety.

The British list, as now amended, will stand as follows:—

Sect. TRIONYCHON Wallr.

O. ramosa L. (indigenous in Channel Is. ?). *O. purpurea* Jacq.

Sect. OSPROLEON Wallr., subsect. ANGUSTATAE Beck.

Series *Glandulosae* Beck.

O. alba Steph., with f. *rubra* (Sm.) Beck. *O. reticulata* Wallr. var. *procera* (Koch) Beck.

Series *Minores* Beck.

O. Picridis Hol. *O. maritima* Pugsl. (*O. amethystea* auct. angl. non Thuill.). *O. minor* Sm. (*O. major* L. ?), with f. *procerior* (Rchb.) Beck, var. *flava* E. Regel (*O. major* f. *hypochaeridis* Beck) and var. *compositarum* Pugsl. *O. Hederae* Duby, with f. *monochroa* Beck, f. *stenantha* (Loj.) Beck and f. *megaphyllon* Beck.

Series *Galeatae* Beck.

O. caryophyllacea Sm.

Series *Curvatae* Beck.

O. elatior Sutton, with f. *citrina* (Dr.) Pugsl.

Series *Arcuatae* Beck.

O. Rapum-Genistae Thuill.

NEW BORNEAN ARALIACEAE.

BY W. R. PHILIPSON, B.A.

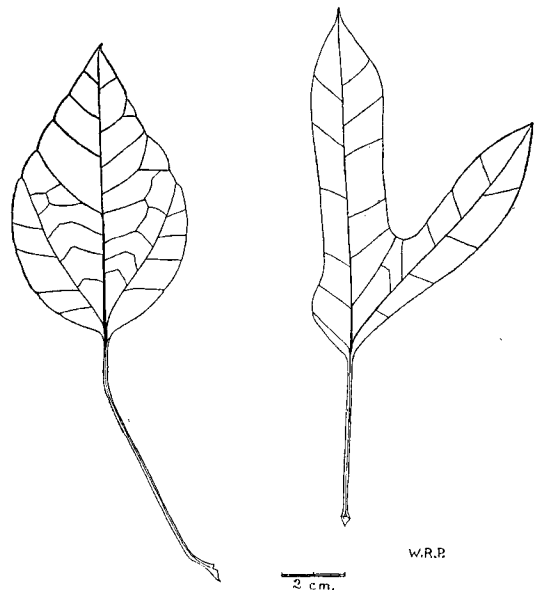
OF the Araliaceae collected by J. and M. S. Clemens on Mt. Kinabalu, British North Borneo, the most interesting is an undescribed species of *Gilibertia*. The occurrence of the genus in Borneo provides an interesting extension of its known range. Species of *Gilibertia* are known on the mainland of Asia from the Himalayas and the Malay Peninsula north-eastwards to Korea, but among the islands the genus has been known only from Formosa northwards, being unrecorded from the Philippines and all the Malay Archipelago.

This species is described below, as also is a species of *Polyscias*, another genus previously unrecorded from Borneo.

It has not been possible as yet to name all the material of the genus *Schefflera*, but those species which have been determined and which are new records for the Island are listed, together with *Aralidium pinnatifidum* Miq., at the end of this paper.

Gilibertia borneensis, sp. nov. *Frutex* attenuatus usque ad 1·5–2 m. altus, ramis paucis gracilibus. *Folia* 7×4 cm.–15×7 cm. simplicia, integra vel irregulariter lobata, petiolata; petiolus 2–30 cm. longus supra canaliculatus, basi dilatatus; lamina ovata, oblonga, vel 2–3-lobata, margine leviter undulato indurato, glandulis pellucidis prædita, costa nervisque prominentibus. *Umbella* simplex terminalis circa 10–20-flora; pedunculus circa 10 mm. longus, pedicelli circa 12 mm. longi. *Flores* 5-meri; calycis tubus 2·5 mm. longus, limbus minutus; petala triangula 2·5 mm. longa; antheræ 1 mm. longæ globosæ dorsifixæ; filamenta 2 mm. longa; ovarium supra conicum, stylis 5 superne liberis præditum. *Fructus* globosus 8 mm. longus, 5-sulcatus; styli recurvati persistentes.

BRITISH NORTH BORNEO: Mt. Kinabalu; Tenompok at 5000 ft., *J. & M. S. Clemens* s.n.; below Kamburanga, 7–8000 ft., *J. & M. S. Clemens* 28927; Dachang at 10,000 ft., *J. & M. S. Clemens* s.n.; Silau Basin, forest trail between caves, 6–7000 ft., *J. & M. S. Clemens* 29730 (type); Mt. Nunkok, in mossy scrub-forest on summit at 5500 ft., *J. & M. S. Clemens* 32680; Gurulau Spur at 7000 ft., *J. & M. S. Clemens* 51039.



Ovate and lobed leaves from two plants of *Gilibertia borneensis*.

This is the first species of the genus to be described from the Malay Archipelago. It resembles *G. Maingayi* (King) Philipson*, from the mainland of the Malay Peninsula, but that species has fruit without such prominent ridges, and its obovate or oblong-elliptic leaves are never lobed. The collectors describe the plant as a whip-like shrub 4–5 ft. high, with few or no branches,

* **Gilibertia Maingayi** (King), comb. nov.—*Dendropanax Maingayi* King in Journ. As. Soc. Beng. lxvii. 2, 58 (1898).

or occasionally sub-scandent, when it may attain 15 ft. in length. The leaves are variously lobed ; two extremes are shown in the figure.

Polyscias borneensis, sp. nov. *Arbor* usque ad c. 15 m. alta ; ramuli crassi glabri, foliorum cicatricibus numerosis crebris notati. *Folia* imparipinnata ; petiolus 10 cm. longus, basi dilatatus ; rhachis 20 cm. longa, articulata ; petioluli 1 cm. longis ; foliola ovata coriacea superne nitentia 6×3·5 cm., margine integra vel leviter undulata, costa prominenti nervis venulisque depressis. *Inflorescentia* magna (metralis) terminalis paniculata ; pedunculo primario basi circa 1 cm. diametro, ramis elongatis (usque ad 35 cm. longis) inferioribus distantibus supremis subumbellatim confertis ; rami basi nudi superne umbellulas numerosas racemosas gerentes ; umbellulæ pedunculatæ, pedunculis circa 2–3 cm., bracteis caducis circa 6 oblongis 4–6 mm. longis. *Flores* articulati 5-meri ; calycis tubus 2 mm. longus, limbus minutus undulatus ; petala oblonga 3 mm. longa ; antheræ oblongæ 2·5 mm. longæ dorsifixæ ; filamenta 2 mm. longa ; ovarium superne planum, stylis 4–5 liberis 2 mm. longis. *Fructus* ignotus.

British North Borneo : Mt. Kinabalu ; Marai Parai, on the Mt. Nunkok trail, at 4500 ft., *J. & M. S. Clemens* 32403 (type).

This species resembles *P. nodosa* Seem. in its 5-locular ovary, but is readily distinguished by its small coriaceous leaflets, which have an entire or only slightly undulate margin.

Aralidium pinnatifidum Miq.

British North Borneo : Mt. Kinabalu ; Penibukan, 4000 ft., *J. & M. S. Clemens* 31584 ; 32075 ; 40653.

Sarawak : near Kuching, *Haviland & Hose* 3367 B.

Previously known from the Malay Peninsula and Sumatra.

Schefflera singalensis (Miq.) Ridl.

British North Borneo : Mt. Kinabalu ; Dallas, 3000 ft., *J. & M. S. Clemens* 26291 ; 26973 ; 27400 ; Tenompok, in Minitindok Gorge, 3–4000 ft., *J. & M. S. Clemens* 29642.

Previously known from Sumatra and the Malay Peninsula.

Schefflera elegans (Ridl.) Ridl.

British North Borneo : Mt. Kinabalu ; Tenompok, 5–5500 ft., *J. & M. S. Clemens* 29557 ; 29794 ; Gurulau Spur, 5000 ft., *J. & M. S. Clemens* 50533.

Previously known from the Malay Peninsula.

Schefflera insularum (Seem.) Harms.

British North Borneo : Mt. Kinabalu ; Dallas, 3000 ft., *J. & M. S. Clemens* 26289 ; 27322 ; Tenompok, 4000 ft., *J. & M. S. Clemens* 26615 ; Penibukan, 5500 ft., *J. & M. S. Clemens* 50336.

Previously known from the Philippines.

Schefflera albido-bracteata Elmer.

British North Borneo : Mt. Kinabalu ; Tenompok, 5000 ft., *J. & M. S. Clemens* 28202 ; 29222 ; 29343 ; 29467.

Previously known from the Philippines.

RESULTS OF TWO BOTANICAL EXPEDITIONS TO SOUTH ALBANIA.

By A. H. G. Alston, B.A., F.L.S., and N. Y. Sandwith, M.A., F.L.S.

A study of Dr. Antonio Baldacci's chapter * on the history of botanical exploration in Albania shows that large areas of the south of the country (regarded as a political unit since 1921) have been either wholly untouched by collectors or merely visited on a single occasion and often for a single day. This has been due partly to the greater attraction of the mountainous regions of North and Central Albania as a stimulus to the imagination, and partly to the belief that the mountains of the south, such as they were, provided a northward extension of the comparatively well-worked flora of the Pindus Range and Greek Epirus, and had, moreover, been given sufficient attention in the past by Dr. Baldacci himself. As to the latter point, Baldacci and others have worked very thoroughly the district of Vlorë (Valona) and the Acroceraunian Mountains ; while Tomor has been ascended on several occasions by such botanists as Baldacci, Markgraf and Vandas, and its flora is now well known. Apart from this, it has perhaps not been realized—so well and so heavily did he collect—how few and how rapid were Baldacci's attacks on the high Lunxheriës and Nemerçka ranges. In 1894, between July 19th and 24th, he climbed Trebesin, explored Tepelen and the gorge of Klyssyra, ascended the Nemerçka from Prëmeti, and crossed over the Lunxheriës to Gjinokastrë, where he passed one night and did not stay to collect. In 1896, between July 7th and 9th, he ascended Nemerçka at its south-eastern end above Biovishd, and on July 4th he had sent his native assistant to collect on the picturesque knife-edged limestone mountain of Melesin, which rises immediately above the village of Leskovik.

To the explorations of Baldacci in South Albania may be added the journeys of Markgraf in 1928 eastwards from Tomor to the remote serpentine ranges of Kamia and Gora Topit, north-west of Korçë ; the earlier collection (now in the Paris

* A. Baldacci, 'Studi Speciali Albanesi,' vol. iii. cap. xxi., "Le Fonti della Flora Albanese." (1937.)

Herbarium) of Prof. Bourcart in the same district; the small collection of the geologists and geographers, Drs. Nowack and Louis, made on the Lunxheriës and Acroceraunian Mountains in 1923, and presented to the Berlin Herbarium; a set of 68 low-level species from Kastoration, east of Gjinokastrë, sent to Heldreich in 1878 by the schoolmaster N. K. Chodzes; flying visits in recent years up various mountains by Dr. P. L. Giuseppi; specimens recently collected by Mr. Ian Hepburn at Dardhë and by Mrs. R. V. Pennington at Gjinokastrë and Sarandë (now in the Kew Herbarium); and, lastly, an important journey in July 1938, lasting a fortnight, across the whole region, including the Gramos, Lunxheriës and Nemerçka ranges, by Dr. F. Lemperg. The collection of plants made on the last-named journey has recently been enumerated by Dr. K. H. Rechinger fil., in Fedde Repert. Sp. Nov. xlvii. 165–179 (1939).

While it is true that the limestone mountains of South Albania do reproduce the characteristic and interesting flora of the mountains of Greek Epirus and the Pindus, and that the vegetation of the higher serpentine areas is similar to that of Smolika or the parts of Central Albania explored by Markgraf, yet the Balkan Peninsula and especially, perhaps, Albania is rich in botanical surprises, and relict localities of species occurring normally at a great distance, or even new relict species, can still be discovered here and there in the region we are discussing. Moreover, tertiary relicts apart, it is clearly a meeting-point of several floras, for instance of that of the Pindus with that of Central Europe, or of both with the peculiar mountain flora of Macedonia; while a number of southern Mediterranean coastal species appear to reach their northern Adriatic limits on the broken limestone shores between Sarandë and Vlorë. Considering the nature of the distribution of species in the Balkan Peninsula, no such area with mountain ranges often reaching a height of from 5000–7000 ft. should have been so neglected by plant collectors and geographers.

The present writers undertook two expeditions to South Albania at different periods in the summers of 1933 and 1935, collecting about 1570 numbers of plants, and a *résumé* of the itineraries may be given as follows :—

I. Expedition of 1933.

May 30th–June 3rd. Sarandë (Santi Quaranta). The flora of the broken, rocky, limestone coast, most painful to traverse, has been neglected, and Baldacci wrote of his arrival here in 1896, "Santi Quaranta non offre alcuna attrattiva; si arriva e si parte." If this is still true of first impressions on landing at this rather squalid little port, its amenities become surprisingly welcome on returning from the rough life of the interior, and Baldacci would have appreciated the interest of the flora if he had seen it in the months of May and June. A fairly complete collection was made, and the vegetation, while consisting mainly of common Mediterranean, and especially Adriatic and Greek, low-level species, also includes plants of a more limited distribution, such as *Fumaria ragusina, Silene Ungeri, S. remotiflora, Trifolium xanthinum, Galium zacynthium, Cerinthe purpurea, Stachys spinulosa, Salvia triloba* (this and the dominant *Phlomis fruticosa* are the most striking shrubs), *Sideritis purpurea, Allium chamaespathum* and *Anthoxanthum gracile. Stachys decumbens* was also found, and can therefore no longer be claimed as one of the few Ionian Islands endemics. A day was spent in the marshy alluvial flats on the north side of Lake Butrinto, where *Periploca graeca* climbs over the alder-bushes, and the three allied Veronicas, *Anagallis-aquatica, aquatica* and *anagalloides*, may be seen growing side by side.

June 4th–6th. Borsh, between Sarandë and Vlorë (Valona). Ascent of Mali Lucës, but it was no use attempting the summit at this early date. Among the more interesting plants were *Veronica peloponnesiaca, Symphytum ottomanum, Ajuga orientalis*, and Lacaita's *Crepis rutilans* which was formerly supposed to be endemic in Corfu.

June 7th–10th. Gjinokastrë. Ascent of Mali Gjer, above the town on the west side. *Ranunculus psilostachys, Barbarea longirostris, Astragalus depressus, Achillea Fraasii, Scorzonera rumelica, Mercurialis ovata*, etc.

June 11th–14th. Lunxheriës Range, Çajup and Zhej. The huge lush meadow of Çajup (c. 4000 ft.), forming a cup half a mile or so in length in the summit ridges of the Lunxheriës Range, was pale lilac and gold with the flowers of *Scorzonera rosea* and *Ranunculus velutinus*. In July the inhabitants of the villages on the slopes of the range come up to the meadow and live in temporary booths while the hay is cut. We were told that the cutting of the hay takes about sixty days. Çajup, besides being a delightful spot for camping (although terribly cold at night), proved an excellent centre for the limestone flora of the summit ridge (c. 5500 ft.), including the peak of Strakavec, where *Geum heterocarpum* was discovered. Trees of *Aesculus Hippocastanum* survive in one or two of the ravines, and many other rare and interesting species were found, the most notable being *Cicer Montbretii* in a relict locality.

June 14th–16th. Gjinokastrë.

June 16th. Through the gorge of Klyssyra, and viâ Prëmeti to Leskovik, where we were given hospitality in the Bektashi tekke.

June 16th–20th. Leskovik. On the limestone cliffs of Melesin (c. 3600 ft.) grow such rare plants as *Cephalorrhynchus glandulosus, Crepis turcica, Moltkea petraea* and *Ramondia serbica*.

June 21st–23rd. Ascent of Nemerçka Range (c. 6500 ft.), at the south-eastern end above Biovishd. Among the many rare plants were *Astragalus Baldaccii*, possibly in its type and only recorded locality, *Cytisus pindicolus*, *Dianthus leucophoeniceus*, and *Asphodeline taurica*. A small quantity of the extremely rare relict *Ajuga Piskoi* was also seen.

June 24th. Leskovik.

June 25th–30th. Ersekë. Ascent of the high Gramos Range, not previously ascended by botanists, so far as records show. Rather disappointing, with bare slopes of sandstone and boggy spots near the summit ridge (6000 ft.). *Barbarea bracteosa*, *Cardamine acris*, *Thlaspi microphyllum*, *Cerastium cerastioides*, *Vaillantia aprica*, *Gentiana verna*, *Soldanella alpina* and *Crocus scardicus* were some of the more noteworthy species.

June 30th–July 3rd. Voskopoj (Moskopolë), c. 3700 ft., reached by road viâ Korçë. We were entertained at the Hagios Prodromos Monastery. This once prosperous centre of culture is now a village full of ruined painted churches and striving to become a *station d'été* for the *élite* of Korçë. The flora of the serpentine formation on the neighbouring mountain slopes is of great interest, and here we found the new endemic species, *Brachypodium serpentini* and *Arenaria serpentini*.

July 3rd–6th. Ascent of Ostrovicë, journeying on horseback viâ the deep gorge of Gjergjevicë to Marjan. Ostrovicë is a limestone range reaching 7000 ft., with some very steep cliffs. It had apparently never before been visited by botanists, but has since been climbed by Dr. Giuseppi. We found *Solenanthus scardicus*, *Silene ventricosa* and *Astragalus exscapus* on this journey.

July 7th. Voskopoj.

July 8th. By car to Korçë, and thence by 'bus to Prëmeti, stopping to gather *Convolvulus nitidus* var. *acutifolius* on a patch of serpentine by the roadside near Floq.

July 9th. Gjinokastrë.

July 10th–13th. Second expedition to Çajup, in the Lunxheriës Range. The great meadow had lost its fresh beauty and the hay was ready for cutting. Among other limestone species were *Minuartia stellata*, *Potentilla speciosa*, *Athamanta Haynaldii*, *Pterocephalus perennis* ssp. *bellidifolius*, and *Rhinanthus Hayekii*.

July 13th–14th. Gjinokastrë.

July 14th–15th. Sarandë.

II. Expedition of 1935.

The main purpose of this journey, made in the late summer when many additional species were to be expected, was to recollect and study the ecology and distribution of *Brachypodium serpentini* at Voskopoj. This was accomplished, and the results published at the time of the description of the species in Hooker's

'Icones Plantarum.' The journey in other respects was a little disappointing. Plants had been burnt up early in a prolonged drought, and the vegetation of the summit ridge of Tomor was dried-up and yellow. Worse still, a serious revolutionary disturbance started in the middle of August which spoiled our plans for exploring remote mountains of the interior, and we were eventually forced to confine our activities to the coast at Dürres, Vlorë and Sarandë.

Aug. 4th. Sarandë (Santi Quaranta).

Aug. 5th. Gjinokastrë.

Aug. 6th–9th. Third expedition to Çajup, in the Lunxheriës Range. The great meadow was still being cut, and among the hay were quantities of three interesting plants, *Filipendula Ulmaria* ssp. *denudata*, *Cirsium tymphaeum*, and *Rumex thyrsiflorus*, which is the counterpart here of *R. Acetosa*. The object of this visit was to collect fruiting material of a curious *Athamanta*, allied to *A. macedonica*, which appears to represent a distinct new species and is described in this paper.

Aug. 9th–11th. Gjinokastrë.

Aug. 11th. To Berat, viâ Tepelen and the Klyssyra gorge.

Aug. 12th–15th. Ascent of Tomor. We stayed for three nights at the Bektashi tekke at 5500 ft. on the mountain, and ascended the Abbas Ali peak (c. 8000 ft.). *Astragalus Autrani* was not found.

Aug. 15th–17th. Berat. News of a revolutionary disturbance came through on the 17th.

Aug. 17th. Berat to Tiranë, viâ Durrës (Durazzo).

Aug. 18th. Tiranë to Korçë, by 'bus.

Aug. 19th–25th. Voskopoj (Moskopolë), for the serpentine flora. Trees of *Prunus pseudarmeniaca*, covered with yellow fruit, were plentiful on some of the slopes. An expedition to Gora Topit had to be abandoned owing to political trouble.

Aug. 24th–27th. Dardhë, at about 4000 ft. on mountains (Morova Planina) near the Greek frontier S.W. of Korçë. This is a *station d'été* for Korçë, and was considered a safe place for foreigners. It was a good botanical centre, with streams, beech forests and cliffs in the immediate neighbourhood. The Central European element was conspicuous in the forests at this altitude, and there were also a few surprising discoveries, for instance, *Inula bifrons* and *Odontites glutinosa*.

Aug. 27th–29th. Voskopoj.

Aug. 29th. From Korçë to Durrës by 'bus, viâ Elbasan and Tiranë.

Aug. 29th–Sept. 3rd. Durrës (Durazzo).

Sept. 3rd–6th. Vlorë (Valona). *Petrosimonia crassifolia* was seen in Baldacci's locality in the salt-marshes towards Arta.

Sept. 6th. To Sarandë by 'bus, viâ Gjinokastrë.

Sept. 6th–9th. Sarandë.

A complete enumeration of these plant collections is not proposed, although a record of every identification, with locality and field-notes, has been kept. Instead, a selection has been made, comprising first published records for Albania as a political geographic (not ethnic) unit, and citations of plants noteworthy for their rarity, distribution, or critical interest. It has been somewhat difficult to decide when there is a first record for the political area now known as Albania, since the present southern frontier, as proposed by the Council of Ambassadors in November, 1921, and somewhat later fixed by the Commission they appointed, agrees with neither the political nor the botanical southern frontier of Albania given by Hayek on his map of the "territoria" which he adopted for the purposes of plant geography (see Prodr. Fl. penins. Balcan. i. v, map (1924)). Both of these frontiers on Hayek's map leave the Adriatic coast at a point lying between one-third and one-half of the way from Sarandë to Vlorë—the frontier of the " territorium " lies somewhat to the south of the political frontier—and stretch north-eastwards to Lake Ochrida and Korçë. Thus a large area of contemporary political South Albania, including Sarandë, Gjinokastrë, the Lunxheriës and Nemerçka ranges, Prëmeti, Leskovik, and Ersekë, undoubtedly belongs to Hayek's " territorium " of Epirus, and many species collected within it by Baldacci are consequently cited by Hayek from " Ep." alone when he has had no record for " A." More recently, writers such as Markgraf, Turrill and K. H. Rechinger have ignored this classification, and have treated as Albanian the plants occurring inside the present southern frontier of the political state of Albania. However we may speculate on the fluidity or fixity of Balkan frontiers in 1940, it certainly seems desirable at the moment to accept the present political frontiers of Albania as the basis for deciding whether a plant can be recorded for the flora of the country bearing this name.

In the following enumeration a number of the species were cited neither from " Albania " nor " Epirus " by Hayek, nor have they been recorded from Albania in the important lists which have appeared since the publication of Hayek's work. Many others were cited by Hayek from " Epirus " but not from " Albania," and have also not been cited from Albania by subsequent writers. Most of the latter species were collected by Baldacci in Greek Epirus, and it seems reasonable, where there is no evidence from his published work or exsiccata that he gathered them within modern Albanian territory, to treat these also as first records for Albania. We have naturally tried to avoid the enumeration of familiar species already collected by Baldacci in South Albania, but if in any instance there is some doubt on this point it is at least useful to establish a definite record for the country.

All such first records for Albania are indicated by an asterisk (*).

A few plants collected in Central Albania are also records and have therefore been included.

Our thanks are due to Messrs. B. L. Burtt, C. E. Hubbard, A. K. Jackson, E. Nelmes, C. Norman, H. W. Pugsley and V. S. Summerhayes for assistance with the identification of various groups ; and to Dr. W. B. Turrill for many determinations of critical species. Several of Dr. Turrill's notes on these are published in the course of this enumeration, others have already appeared in his papers in the 'Kew Bulletin,' and references to them are included here, while he has described and figured some of our plants in recent parts of Hooker's ' Icones Plantarum.' The identifications, except when accredited to other botanists, are our own. The material collected on these expeditions has been divided equally between the herbaria of the British Museum and Kew.

RANUNCULACEAE.

AQUILEGIA VULGARIS L.

Gramos range above Ersekë, open beech woods on lower slopes, 4000–4500 ft., 28. vi. 33, no. 1964. Flowers dark bluish mauve.

DELPHINIUM STAPHISAGRIA L.

Sarandë, waste place, sea-level, 3. vi. 33, no. 1351. Flowers dark blue.

Not recorded by Hayek from Albania or Epirus, but mentioned by Baldacci as growing near Vlorë (Valona), see It. Alb. 48 (1917).

PAEONIA OFFICINALIS L.

Above Leskovik, limestone slopes near summit of Melesin, 4000 ft., 19. vi. 33, no. 1775. Flowers crimson-red.

*RANUNCULUS NEAPOLITANUS Ten.

District of Sarandë, mountains above Borsh, grassy place, 3000 ft., 5. vi. 33, no. 1361.

RANUNCULUS SERBICUS Vis.

Voskopoj, by stream in pine woods near Hagios Prodromos Monastery, 4000 ft., 2. vii. 33, no. 2037. Flowers bright yellow.

PAPAVERACEAE.

GLAUCIUM FLAVUM Cr., approximating to var. *leiocarpum* (Boiss.) Stoy. et Steff.

Sarandë, sea-shore, sometimes on limestone boulders, sea-level, 1. vi. 33, no. 1310.

Variation in *Glaucium flavum* Cr. is considered in a paper in Kew Bull., 1933, 174. The Albanian material under no. 1310 has nearly glabrous stems, densely bristly leaves, glabrous flower-stalks, bristly sepals, petals 4–5 cm. long, petal colour not

given, blotch probably faint or absent, ovaries and young fruits more or less rough in the upper half, mature fruits not present. Material grown from seed collected in the same locality, on 16. vii. 33, and cultivated in the Herbarium Ground, Kew, as K. 1324, had much more glabrous leaves, yellow petals without a blotch, ovaries and young fruits rough, mature fruits nearly or quite glabrous and smooth, curved, 14·5 cm. long, 3 mm. diam. Obviously the petals show characters intermediate or intermediate in combination between the extreme western (type) and eastern (var. *leiocarpum*) material of the species.—W. B. Turrill.

FUMARIACEAE (det. H. W. Pugsley).

*Fumaria judaica Boiss.

Sarandë, limestone rocks, c. 300 ft., 30. v. 33, no. 1227. Flowers pale pink with purple tips. Native in this locality.

*Fumaria ragusina (Pugsl.) Pugsl. in Journ. Linn. Soc. Bot. xlix. 524 (1934).

Above Sarandë, on limestone rocks by the ruins of the Church of the Forty Saints, c. 500 ft., 30. v. 33, no. 1220. Flowers rather deep pink, tipped with black. Sepals small, sharply serrate. Fruits rounded.

Known elsewhere only near Ragusa in Dalmatia.

*Fumaria Schrammii Vel.

Leskovik, waste ground, 3000 ft., 17. vi. 33, no. 1695.

*Fumaria Thuretii Boiss. var. Pikermiana (Boiss.) Pugsl.

District of Sarandë; near Borsh, on limestone rock near sea-level, 5. vi. 33, no. 1401. Pedicels very thick. Flowers pink; upper petal not tipped with black. Fruit pointed.

CRUCIFERAE.

*Barbarea longirostris Vel. sens. Bornmüller in Engl. Bot. Jahrb. lix. 340–341.

Above Gjinokastrë, on upper grassy slopes of Mali Gjer, 4000–4500 ft., 9. vi. 33, no. 1526.

*Biscutella didyma L. var. leiocarpa DC.

District of Sarandë; near Borsh, rocky limestone slopes above road to Vlorë, near sea-level, 4. vi. 33, no. 1402. Flowers pale whitish cream.

*Capsella grandiflora (Ch. & B.) Boiss.

Sarandë, very common on bare ground on broken limestone, sea-level, 1. vi. 33, no. 1302. Petals large, emarginate.

(To be continued.)

REVIEW.

A Student's Book on Soils and Manures. By E. J. Russell. 3rd edition revised and rewritten. Small 8vo, pp. 296, 53 figs. Cambridge University Press, 1940. Price 8*s.* 6*d.*

Probably the name of no worker on soil problems is better known than that of Sir John Russell. His position as Director of the Rothamsted Experimental Station gives him of itself an international reputation, but he is widely known among farmers and agriculturists because of his constant efforts to give them in simple langugge, spoken or written, the latest results of scientific investigations.

The first edition of this book appeared in 1915, the second in 1919 (reprinted 1921 and 1928). As many students who use the book later take up overseas posts their future needs are kept in view by treating some subjects, such as soil erosion, more fully than would otherwise be warranted.

The book is divided into three parts: An Account of the Soil, The Control of the Soil, and Fertilisers. There are also Appendices on Field Experiments, Useful Data, and Fertiliser Substances contained in Crops.

The book is easy to read and contains much up-to-date information not readily available to the non-specialist. It is certain of a ready sale now everyone is interested in increased production, but the price is rather high.

BOOKS-NOTES, NEWS, etc.

The Field Museum of Natural History has done a good service to botanists interested in the history of travel by publishing the 'Travels of Ruiz, Pavon, and Dombey in Peru and Chile (1777–1788).' This is a translation by B. E. Dahlgren of a 'Relación del Viaje' which Ruiz had prepared from his diaries and completed for publication in 1793. It was lost sight of for almost a century and a half, and was traced with almost police-like methods by A. J. Barreiro, who published it, together with an epilogue and official documents in 1931. It should be pointed out that among the numerous manuscripts of Ruiz in the Department of Botany there is a "Relacion historica del Viage." It is not possible to collate the two accounts at present.

It was the intention of the Royal Academy of Science of Madrid that Ruiz's volume should be the first of a series of documents concerning the naturalists of past centuries who contributed so much to our knowledge of the American flora. Possibly the civil war in Spain stopped the scheme, but not, we hope, permanently. There were several who studied the flora of the former Spanish American possessions, and it would be valuable to have detailed accounts of their journeys and any official or other documents concerning their expeditions. The present volume has 372 pages and is well documented.

An address by Dr. Charles Thom, retiring president of the Botanical Society of Washington, is published in the Journal of the Washington Academy of Sciences for February 1940. The subject is "Naming Molds," and Dr. Thom has much to say both of general and particular interest. He is not the only mycologist who as a beginner "was about in the fix of the rookie cavalryman who had never learned to ride, but reported to the top-sergeant for training in horsemanship. That hard-boiled individual blurted out, 'What? Never been on a horse before! Fine! Here is a horse that's never been ridden. You two may begin together'." As will be surmised there is more banter in the address than is usual in this country, but sugaring the pill is probably as good a method as any for administering correctives. Much of the address is of too specialised a character to be summarized, but two paragraphs may be quoted because of the special need at present to understand the point they make.

Link described *Penicillium glaucum*, by which he understood what he called the common green mould. "Occasionally someone raised a doubt about a universally distributed green mold that grows upon and in everything, but the name was convenient; it satisfied the pedantic requirement for a Latin binomial to be applied to material that people were not willing to study. All local fungous floras report it. The popular writers accepted *P. glaucum* as *the green mold*; chemists took it up and tested 'its' activity against every kind of substratum and reagent. With probably a hundred green species to pick from, *at random*, each was able to expand the range of biochemical activity reported. Naturally with different agents, contradictions crept in and raised controversy between individuals, but the popularity of *P. glaucum* was not abated—the mistake was always charged against the worker." The second reads. "If you are to do technical work with a particular mold, the fundamental dictum is: Know your organism by name and relationship, know it morphologically and physiologically, macroscopically and microscopically—know it so well that if anything goes wrong, you will detect the abnormality and correct it or make an adequate record. That applies whether you are a mycologist, a pathologist, a chemist, a physiologist, or any other branch of specialist; the man who fails to know his organism thoroughly is helpless before contamination, losses or replacements, which often destroy the value of the results."

Austrian Academy in Great Britain.—An Austrian Academy has been founded so that many eminent exiled scientists and scholars at present enjoying the hospitality of this country may have an opportunity of spreading the knowledge of Austrian culture. The Academy will aim at being an Institute where lectures will be given on a strictly non-political basis. A Society of Friends of the Austrian Academy has also been formed with an annual subscription of one guinea. The address of the Academy is 15 Portman Square, London, W. 1.

LICHENOLOGICAL NOTES FROM THE BRITISH MUSEUM HERBARIUM.—IV. *RHIZOCARPON* SECT. *CATOCARPON* IN THE BRITISH ISLES.

By I. Mackenzie Lamb, B.Sc., F.L.S.

The following key and notes may be useful to those wishing to identify British species of *Rhizocarpon* (Sect. *Catocarpon*). This section has been included in the genus *Buellia* by A. L. Smith in her 'Monograph of British Lichens,' but the presence of the hyaline spore-halo and the striking parallel series exhibited by its species to certain members of the *Eurhizocarpon*-section show where its true affinity lies; see Th. Fries's remarks in Lichenogr. Scand. i. 611 (1874). Continental and Arctic species of *Rhizocarpon* have been partly dealt with by Lynge (1932, 1936), Malme (1914), Schade (1935), and Vainio (1922).

The revision of the British material brought to light several points of considerable taxonomic and phytogeographical interest, chief among which were the discovery in Scotland of *R. crystalligenum* Lynge, hitherto known only from E. Greenland (see p. 131), and the fact that most of the material formerly known as "*Buellia confervoides*" belongs to a distinct and hitherto undescribed species (see p. 132).

Except where otherwise stated the specimens listed are preserved in the British Museum Herbarium. My cordial thanks are due to Mr. E. C. Wallace, Dr. W. Watson, and Mr. W. Young for their kindness in sending me material for revision.

The numbers in brackets after the localities refer to the vice-county divisions of the British Isles elaborated by H. C. Watson and R. L. Praeger; a key to these will be found in the 'Census Catalogue of British Mosses,' compiled for the British Bryological Society by J. B. Duncan (1926).

Key to the Species of Rhizocarpon (*sect.* Catocarpon) *found in the British Isles**.

1.	Thallus bright yellow	2.
	Thallus whitish or brown	4.
2.	Thallus K−	*R. oreites* (Wain.) Zahlbr.
	Thallus K+red	3.
3.	Spores 13–18 × 7·5–8·5 μ	*R. crystalligenum* Lynge.
	(Spores 18–28 × 9–15 μ	*R. chionophilum* Th. Fr.).
4.	Medulla I+blue †	5.
	Medulla I−	6.
5.	Epithecium purple-red-brown.....	*R. polycarpum* (Hepp) Th. Fr.
	Epithecium æruginose-blackish or olivaceous-blackish	*R. atlanticum* M. Lamb.

* Species not yet recorded but which may probably be found in the British Isles are included in brackets.

† The medullary reaction with iodine should always be tested under the microscope.

6. Thallus whitish, of large areolæ	*R. deludens* (Nyl.) Zahlbr.
Thallus brownish, of small areolæ	7.
7. Epithecium æruginose-blackish or olivaceous-blackish	*R. Hochstetteri* (Kbr.) Vain.
(Epithecium purple-red-brown	*R. badioatrum* (Flk.) Th. Fr.)

1. R. OREITES (Wain.) Zahlbr. apud Engler & Prantl, Nat. Pflanzenfam. i. Teil, Abt. 1*, 138 (1905). *Lecidea oreites* Wain. in Medd. Soc. Fauna Fl. fenn. x. 126 (1883). "*Buellia alpicola*" in A. L. Sm. Mon. Brit. Lich. ii. 180 (1911) & ed. 2, ii. 196 (1926) *excl. descript.* (*non Lecidea atro-virens β. alpicola* Wbg. Fl. Lappon. 474 ; 1812).

Thallus K−, medulla I− ; epithecium purple-red-brown. The statement "K+deep yellow, at length orange-red" in A. L. Sm. Mon. Brit. Lich. ii. 180 (1911) and ed. 2, ii. 196 (1926) is a mistake, the result of a confusion with *R. chionophilum* Th. Fr., a species not yet found in the British Isles, but which should be sought for.

R. oreites does not appear to be common in the British Isles ; it seems to be restricted to the high mountains of the Scottish Highlands.

SCOTLAND : Perth, near summit of Ben Lui (87), coll. *W. Watson*, 1929 (Herb. Wats.) ; Perth, near Killin (88), coll. *J. Crombie*, 1878 ; Perth, summit of Ben Lawers (88), coll. *J. Stirton*, 1878 ; Aberdeen, Morrone near Braemar (92), coll. *J. Crombie* ; Inverness, Carn Mar Dearg by Ben Nevis (97), altit. about 1140 m., coll. *E. Wallace*, 1938 (Herb. Wallace, no. 129).

2. R. CRYSTALLIGENUM Lynge in Skr. Svalb. og Ishavet, no. 47, 19 (1932).

New to the British Isles. A specimen collected on Ben Nevis by Lauder Lindsay, and preserved in the Herbarium of the Edinburgh Botanic Garden, proved on critical examination to belong here. Previously Dr. Watson and myself had agreed to place it provisionally under the old comprehensive name of "*Buellia alpicola*," and as such it was recorded in Trans. bot. Soc. Edinb. xxxii. 512 (1939). The specimen agrees so well with Lynge's description that I have no doubt concerning the identification. It has externally much of the appearance of *R. oreites*, with lemon-yellow areolæ 0·4–1·0 mm. diam. either contiguous or dispersed on a conspicuous black hypothallus. Thallus K+yellow then blood-red, with precipitation of acicular crystals under the microscope ; medulla I−. Apothecia numerous, 0·6–1·0 mm. diam., arising between the areolæ, adpressed-sessile, not constricted at base, round or difform by mutual pressure, black, plane, matt, epruinose, with moderate, hardly prominent, finally evanescent, proper margin. Hypothecium dark reddish brown. Thecium 70–85 μ high, purple-red-blackish above, otherwise colourless or in places faintly sordid purplish. Paraphyses about 2 μ thick, embedded in mucilage. Spores 6–8 in ascus, 1-septate, ellipsoid, not constricted at septum, soon very dark and opaque blackish, 15–18 × 7·5–8·5 μ.—Epithecium sordid violet with K.

The only previous records for this species were from E. and S.E. Greenland, and hence the Scottish find is of great phytogeographical interest, and leads one to suspect that this species may occur also in Iceland and even in Scandinavia. Our plant was presumably collected at high altitude (Ben Nevis is 1343 m. high), but unfortunately Lauder Lindsay left no information on this point.

SCOTLAND : Inverness, Ben Nevis (97), coll. *Lauder Lindsay*, 1856 (Herb. Bot. Gard. Edinb.).

3. R. POLYCARPUM (Hepp) Th. Fr. Lich. Scandin. i. 617 (1874). *Lecidea confervoides* var. *polycarpa* Hepp, Abb. u. Beschr. Spor. Flecht. Europ. Heft 1, no. 35 (1853). "*Buellia badioatra*" in A. L. Sm. Mon. Brit. Lich. ii. 182 (1911) & ed. 2, ii. 198 (1926) *pro parte* (*non Lecidea badio-atra* Flk. apud Sprgl. Neue Entdeck. Pflanzenk. ii. 95 (1821)). "*Buellia confervoides*" in A. L. Sm. *loc. cit. pro min. parte* (*non Rhizocarpon confervoides* DC. Fl. Franç. ii. 366 (1805)).

Easily distinguished from *R. badioatrum* (Flk.) Th. Fr. by the positive reaction of the medulla with iodine, and from *R. atlanticum* M. Lamb by the purple-red-brown colour of the epithecium, which gives the reactions : K+purple-violet, HNO_3−.

Three specimens called "*Buellia badioatra*" in the British Museum Herbarium were reinvestigated ; the first, from Scotland, Loch-na-Cat, is one of the specimens of *R. polycarpum* listed in the next paragraph ; the second, from Eire, Killarney, is a species of *Lecidea* ; and the third, described by Nylander as *Lecidea atrobadia* (*Buellia badioatra* var. *atrobadia* A. L. Sm. Mon. Brit. Lich. ii. 183 (1911)) proved on examination to be a distinct variety of *R. polycarpum*, described below. Hence for the time being *R. badioatrum* must be expunged from the British lichen flora, although it will probably be found eventually.

R. polycarpum in its typical form is apparently rare but evenly distributed in the British Isles.

ENGLAND : Somerset, Bossington near Porlock (5), "common on shingle stones," coll. *W. Watson*, 1913 (Herb. Wats.) ; Flint, Bangor (51), coll. *W. Johnson* (Johns. Lich. Herb. exs. no. 511, as "*Buellia confervoides*") ; SCOTLAND : Perth, Ben Lawers, Loch-na-Cat (88), coll. *J. Crombie* ; Perth, Kinloch Rannoch (88), coll. *J. Stirton*, 1882.

Var. **atrobadium** (Nyl.) M. Lamb, comb. nov. *Lecidea atrobadia* Nyl. in Flora, lv. 361 (1872). *Buellia badioatra* var. *atrobadia*

A. L. Sm. Mon. Brit. Lich. ii. 183 (1911). *Rhizocarpon badioatrum* var. *atrobadium* Zahlbr. Cat. Lich. Univ. iv. 327 (1926).

Differs from the typical form in the dispersed, verrucose or areolate thallus on a conspicuous, more or less radiating, black hypothallus and in the convex-immarginate apothecia. The latter distinguish it from the f. *fallax* (Wain.) Vain., in which the apothecia are plane and marginate. In the type-specimen the verrucose areolæ are ±rounded, 0·3–0·6 mm. diam., brown or tawny brown, matt, epruinose; apothecia on or between the areolæ, round, 0·4–0·7 mm. diam., black, immarginate, not constricted at base, adpressed, soon convex and almost hemispherical. Thallus K−, C−, K(C)−; medulla I+blue (not I− as stated by Nylander in his original description), Pd+orange-red. Internal structure as in the typical species. The Dalwhinnie specimen has the areolæ less convex and the hypothallus less developed, but agrees well in all other respects; its medulla is Pd+pale orange.

The positive reaction of the medulla with Paraphenylenediamine in this variety may be an important taxonomic criterion, but further studies are necessary to determine if this is so. Lynge has investigated the Paraphenylenediamine reactions of the Greenland *Rhizocarpon*-species (Medd. Grønland, cxviii. no. 8, 93 (1937)), but did not obtain any very definite results, and considers the test to be unsatisfactory in this genus. I found that a Swedish specimen of *R. polycarpum ex herb.* A. H. Magnusson gave no Pd reaction, but the material from Tirol distributed in Krypt. exs. Vindob. no. 265 had the medulla Pd+orange. Arnold, Lich. exs. no. 559 (*a*, *b*, and *c*), from Tirol, has medulla Pd−. Räsänen, Lich. Fenn. exs. no. 301, from N.W. Finland, has medulla Pd+indistinctly yellow. All these specimens are undoubtedly the same species, *R. polycarpum*. There seems also to be some variability as regards the K(C) reaction; in *R. polycarpum* it appears to be almost always negative, thus affording another contrast with *R. atlanticum*, but in one specimen (from Somerset, Bossington) a distinct red reaction was obtained with K(C).

Var. *atrobadium* is known from the following two localities:—

Scotland: Perth, Ben-y-Gloe near Blair Athole (89), coll. *J. Crombie*; Inverness, Dalwhinnie (96), coll. *Lauder Lindsay*, 1867 (Herb. Bot. Gard. Edinb.).

4. **R. atlanticum** M. Lamb, sp. n.

"*Buellia confervoides*" in A. L. Sm. Mon. Brit. Lich. ii. 182 (1911) & ed. 2, ii. 198 (1926) *pro max. parte* (*nomen ambiguum*). "*Buellia atroalba*" in A. L. Sm. *op. cit.* ii. 183 (1911) & ed. 2, ii. 199 (1926) *pro max. parte* (*nomen dubium*). "*Lecidea atro-albicans*" in Leight. Lich.-Fl. Gt. Brit. ed. 3, 328 (1879) (*non Lecidea atroalbicans* Nyl. in Flora, lviii. 363 (1875)).

Diagn.: Sicut *R. polycarpum*, sed differt thallo plerumque K(C) rubescenti atque epithecio æruginoso-fuligineo (nec purpureo-fuligineo ut in *R. polycarpo*).

Descriptio typi: Thallus e plagulis confluentibus compositus, usque ad 6 cm. diam. vel etiam major, hypothallo atro, tenui, subfimbriato circumdatus; tenuis (0·1–0·25 mm. crassus), areolatus, lævigatus, pallide fuscescens vel rufofuscescens (nec cinerascens), K−, C−, K(C)+rubescens; areolis planis vel rarius convexis, 0·25–0·7 mm. diam., aut contiguis, angulosis ac rimis angustis separatis, aut (peripheriam versus) magis discretis, subrotundatis, hypothallo instratis; opacus, epruinosus. Isidia sorediaque desunt. Medulla Pd−, I+cærulescens. Thallus omnino paraplectenchymaticus, cellulis rotundatis, leptodermaticis, 4–5 μ diam., ubique flavocinereo-nubilatis; cortex 12–20 μ crassus; medulla ad 30 μ crassa, passim fere obsoleta; stratum gonidiale subcontinuum, 50–90 μ crassum; gonidia protococcoidea, læte viridia, discreta, leptodermatica, 9–15 μ diam.—Granula nubilantia corticis medullæque in KHO sese dissolventia.—Apothecia numerosa, irregulariter sparsa, inter areolas enata, thallum æquantia aut leviter prominentia, arcte adnata, basi haud constricta, rotundata vel obtuse angulosa, plana vel leviter convexa, 0·3–0·6 mm. diam., atra, opaca, epruinosa; margine proprio obsolescenti, interdum visibili, valde indistincto, haud prominulo. Excipulum lateribus evolutum (hypothecii continuatio), extus fusconigrum, intus obscure fuscum, paraplectenchymaticum, cellulis isodiametricis leptodermaticis 4–6 μ diam. Hypothecium obscure fuscum, inferne paraplectenchymaticum sicut excipulum, superne hyphis erectis adnatis 3–4 μ crassis formatum. Thecium 105–125 μ altum, superne æruginoso- vel sordide olivaceo-nigricans, ceterum incoloratum; paraphyses 2–3 μ crassæ, gelatinam percurrentes, ramoso-connexæ, septatæ (articulis 7–15 μ longis), apicibus obscuratæ et parum clavatæ (usque ad 4 μ). Sporæ 8næ in asco, subbiseriatæ, oblongo-ellipsoideæ, constanter 1-septatæ (cellulis æqualibus), ad septum sæpe constrictæ, incoloratæ (demum fuscescentes), 23–26 × 10–13 μ, corona hyalina 2–4·5 μ crassa indutæ.—Thecium I+cærulescens dein cæruleo-nigrescens; epithecium HNO_3+erubescens, KHO− vel magis viridescens.—[Pycnidia non visa.]

The above description is based upon the specimen Crombie, Lich. Brit. exs. no. 186 ("*Lecidea atro-alba*"), which has been selected as the type.

"*Buellia confervoides*" in A. L. Sm. *loc. cit.* is there said to be derived from Krempelhuber's epithet in Denkschr. bayer. bot. Ges. iv. 2. Abth., 200 (1861). Krempelhuber, however, does not there publish the epithet for the first time, but attributes it to Schaerer, referring presumably to *Lecidea confervoides* Schaer. Lich. Helv. Spicil. sect. 3, 128 (1828), which, according to the synonymy given, is based upon *Rhizocarpon confervoides* DC.

Fl. Franç. ii. 366 (1805). The latter has been taken up as another species, a *Eurhizocarpon*, in A. L. Sm. Mon. Brit. Lich. ii. 195 (1911) & ed. 2, ii. 211 (1926). Th. Fries (Lich. Scandin. i. 618 (1874)) has shown that the type material in the herbarium of De Candolle is heterogeneous, being composed of a mixture of *Rhizocarpon*- and *Lecidea*-species, and hence the names "*Buellia confervoides*" and "*Rhizocarpon confervoides*" must be rejected (*nomen ambiguum*; see Internat. Rules Bot. Nomencl. ed. 3, Art. 62 (1935)). Zahlbruckner (Cat. Lich. Univ. iv. 338 (1926)) enumerates the "*Buellia confervoides*" of A. L. Smith and others as a synonym of *Rhizocarpon polycarpum* (Hepp) Th. Fr., but the latter is specifically distinct, chiefly by reason of the purple-red-brown (not æruginose-blackish) epithecium.

The true *Lecidea atroalbicans* Nyl. is identical with *Rhizocarpon polycarpum*; it was based on the specimen Arnold, Lich. exs. no. 559, which is typical of the latter species. The British specimens formerly called "*Lecidea atroalbicans*," and included in A. L. Smith Mon. Brit. Lich. under "*Buellia confervoides*," are, however, not *R. polycarpum* but the new species *R. atlanticum*.

A. L. Smith (Mon. Brit. Lich. ii. 183 (1911) & ed. 2, ii. 199 (1926)) records "*Buellia atroalba*," supposed to be the *Lichen atroalbus* of Linnæus, from several British localities, stating in the second edition that the medulla reacts positively with iodine. The identity of the Linnæan specimen is uncertain and cannot be ascertained *, so that this epithet should be discarded as *nomen dubium* (Internat. Rules Bot. Nomencl. ed. 3, Art. 63 (1935)). The British specimens called "*Buellia atroalba*" were found, apart from two exceptions, to belong to *Rhizocarpon atlanticum*, the exceptions being two specimens of *R. Hochstetteri* (Kbr.) Vain.

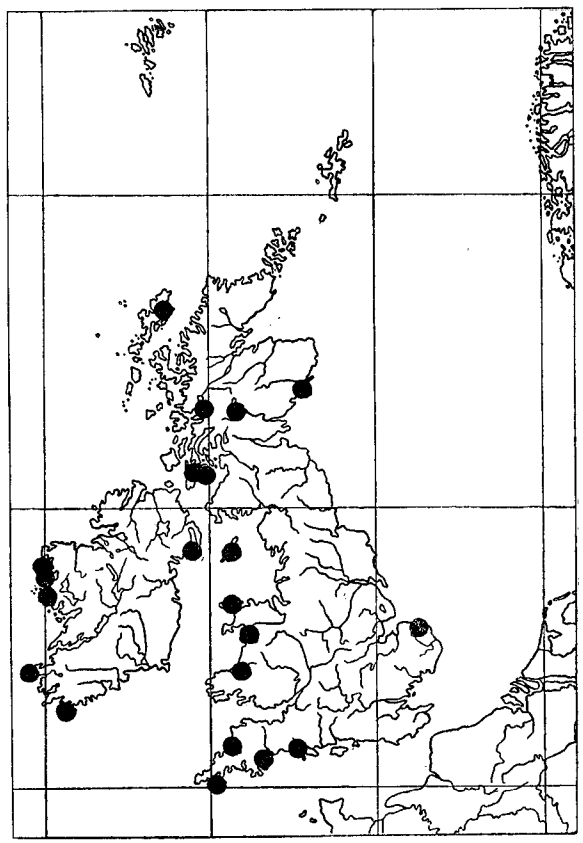
The distinction of the epithecium is a good systematic criterion, for the two types of coloration are due to different chemical substances; the purple-red-brown or purple-red-blackish pigment found in *R. polycarpum*, *R. geographicum*, and several other *Rhizocarpon*-species is the "Lecanora-red" of Bachmann (in Jb. wiss. Bot. xxi. 32 (1890)), and turns purple-violet on the application of KHO. *R. atlanticum*, on the other hand, produces in its epithecium the greenish fuliginous substance called by Bachmann "Lecidea-green," which is KHO−, HNO_3+ red, and occurs also in *R.* (*Eurhizocarpon*) *distinctum* and *R. obscuratum*.

R. atlanticum differs from *R. Richardi* (Lamy) Zahlbr. and *R. decinerascens* (Nyl.) Zahlbr. in the always brown (not ash-grey) thallus, and from the latter also in the larger spores. *R.* (*Eurhizocarpon*) *constrictum* var. *polycarpioides* Erichs., a variety which seems to furnish a connecting-link between the two sections

* There is no specimen of "*Lichen atroalbus*" in the Linnæan Herbarium.

Eurhizocarpon and *Catocarpon*, is outwardly and inwardly very similar to our species, but differs in the persistently hyaline, occasionally 3-septate, larger spores (24–40 × 10–20 μ).

The variability of the species is not great. The thallus is always a pale ashy brown, and matt; its areolæ are usually plane, seldom slightly convex. When growing on flint, as in a specimen seen from Blakeney Point, a strong, black, fimbriate



The known distribution of *Rhizocarpon atlanticum* M. Lamb.

and zonate, peripheral hypothallus may be developed. The red reaction with K(C) is almost constant, and rarely an orange colour may be produced by fresh C alone, as in a specimen from Douglas Bay. Spores usually a long time colourless, but occasionally the darkening may set in sooner.

I have seen *R. atlanticum* as yet only from the British Isles, where it occurs on siliceous rocks:

ENGLAND : Cornwall, the Lizard (1), coll. *W. Watson*, 1924 (Herb. Wats.) ; Cornwall, Rocky Valley near Boscastle (2), on cliff-top above the sea, growing together with *Caloplaca granulosa*, *C. flavovirescens*, *Lecanora helicopis*, and *Lecidea stigmatea*, coll. *I. M. L.*, 1939 (coll. no. 877) ; Devon, Torquay (3), coll. *R. Deakin* ; Dorset, Chesil Beach near Abbotsbury (9), coll. *W. Watson*, 1922 (Herb. Wats.) ; Norfolk, Blakeney Point (27), coll. *W. Watson*, 1934 (Herb. Wats.) ; Cardigan, Llandyssil (46), coll. *W. Joshua*, 1877 ; Merioneth, Barmouth (48), coll. *H. Holl* ; Anglesey, Rhosneigr (52), coll. *J. Fry*, 1925 ; Isle of Man, Port Soderick (71), coll. *J. Martindale*, 1873 ; Isle of Man, Douglas Bay (71), coll. *J. Martindale*, 1873 ; SCOTLAND : Perth, Ben Lawers, Loch-na-Cat (88), coll. *J. Crombie* ; Kincardine, Portlethen (91), coll. *J. Crombie* (Cromb. Lich. Brit. exs. no. 186, the syntype-material) ; Inverness, Loch Linnhe (97), coll. *H. Knight*, 1923 ; Bute, Arran (100), exact locality not given, coll. *J. Stirton*, 1871 ; Argyll, Carradale (101), coll. *J. Stirton*, 1894 ; Ross, Lewis, Stornoway (110), coll. *Lauder Lindsay*, 1866 (Herb. Bot. Gard. Edinb.) ; EIRE : Kerry, Dunmore Head (I. 1), coll. *W. Watson*, 1935 (Herb. Wats.) ; Cork, Cape Clear Island (I. 3), coll. *I. Carroll* ; Galway, Connemara, Cleghan (I. 16), coll. *C. Larbalestier*, 1875 (Larbal. Lich. Herb., without number) ; Mayo, Clare Island (I. 27), coll. *M. Knowles*, 1910 ; Mayo, Achill Island, base of Slievemore Mt. (I. 27), coll. ? ; NORTHERN IRELAND : Down, Ardglass (I. 38), coll. *W. Mudd*.

5. R. DELUDENS (Nyl.) Zahlbr. Cat. Lich. Univ. iv. 332 (1926). *Lecidea deludens* Nyl. in Flora, lvi. 296 (1873). *Buellia deludens* A. L. Sm. Mon. Brit. Lich. ii. 182 (1911) & ed. 2, ii. 197 (1926).

This species was gathered by Crombie in Scotland and sent by him to Nylander, who described it as new. It has never been found again since, and as a result of the imperfect descriptions of it given by Nylander and A. L. Smith its real nature has remained somewhat doubtful. Reinvestigation of the syntype-specimen in the British Museum Herbarium shows that it is a distinct and easily recognized species. My examination of the syntype gave the following data :—

Thallus effuse, indeterminate, composed of scattered or contiguous, plane or slightly convex, ±rounded or irregularly angular, smooth, matt, epruinose, whitish or cream-coloured areolæ 0·5–1·0 mm. diam. and up to 0·3 (–0·5) mm. thick, embedded in a conspicuous, thin, black *hypothallus*, which is in places irregularly branched and anastomosing at the periphery (following the minute depressions in the rock-surface). Areolæ K— or indistinctly yellowish, C—, K(C) as with K alone, Pd— or faint yellow ; medulla I—, K— or faintly yellowish, Pd+intense persistent yellow. Areolæ corticate, with upper

cortex 45–60 μ deep and densely yellowish-nubilated, composed of vertically parallel, conglutinated, palisade-like, very indistinct and gelatinized hyphæ about 3 μ thick ; gonidial stratum even, 45–60 μ deep ; gonidia protococcoid, 8–12 μ diam., discrete, thin-walled ; medulla compact, shallow, not over 45 μ deep, in places not developed at all, heavily nubilated and exactly similar in structure to the cortex ; grading into the dark hypothalline tissue below. Hypothalline tissue dense blue-black, paraplectenchymatic, with indistinct outlines of cells 3–5 μ diam.—In KHO upper half of cortex remains dull yellowish and semi-opaque ; rest of cortex and medulla become colourless and hyaline.—*Apothecia* numerous, immersed between or in thalline areolæ, level with thallus, ±round or irregularly angular, 0·8–1·5 mm. diam., black, matt, not pruinose, plane, with ill-defined, non-prominent, moderate, proper margin, usually divided by a deep crack from the thallus. *Excipulum* in section dark brown (in places with a purple tinge), entire but grading into hypothecium, 60–100 μ deep below, paraplectenchymatic, of ±isodiametric cells 4–5 μ diam. with fairly thin, brown or yellow-brown walls ; at sides, next to thecium, formed of parallel-adnate, flabellate-radiating, brown-walled hyphæ. *Hypothecium* dark brown (paler above), composed of vertically parallel, adnate hyphæ 2–3 μ thick with thin brown or yellow-brown walls. *Thecium* 125–150 μ high, purple-red-brown in upper 15–24 μ (KHO+purple-violet), otherwise colourless. *Paraphyses* embedded in copious mucilage, but very distinct, somewhat irregular in outline, 1·5–2·0 μ thick, branched and connected, septate with septa 6–12 μ apart, at tips slightly clavate (up to 3·5 μ) and purple-red-brown ; otherwise colourless. *Spores* 8 and irregularly biseriate in ascus, 1-septate, constricted at septum, with equal cells, soon dark greenish, 27–31·5 × 12–15 μ (Nylander gives 22–27 × 8–13 μ), clothed in a hyaline slime-sheath 3–5 μ thick.—Thecium blue then blue-black with I.—[No *pycnidia* seen.]

SCOTLAND : Perth, Ben-y-Gloe (=Cairn Gowar) near Blair Athole (89), coll. *J. Crombie*.

6. R. HOCHSTETTERI (Kbr.) Vain. Lich. Fennic. ii. 332 (1922). *Catillaria Hochstetteri* Kbr. Parerg. Lich. 195 (1861). *Lecidea colludens* Nyl. in Flora, liii. 38 (1870). *Buellia colludens* Arn. in Flora, liii. 479 (1870) ; A. L. Sm. Mon. Brit. Lich. ii. 181 (1911) & ed. 2, ii. 197 (1926). *Rhizocarpon applanatum* Th. Fr. Lich. Scandin. i. 618 (1874). *Lecidea applanata* Leight. Lich.-Fl. Gt. Brit. ed. 3, 327 (1879) (*non* Chev.). "*Buellia atroalba*" in A. L. Sm. *op. cit.* ii. 183 (1911) & ed. 2, ii. 199 (1926) *pro min. parte* (*nomen dubium*).

Hochstetteri is the earliest valid epithet for this species. *Rhizocarpon applanatum* Th. Fr. is based upon *Lecidea atroalba*

var. *applanata* Fr. Summa Veget. Scandin. 116 (1846), which was up to the time of its description by Th. Fries in 1874 a *nomen nudum*, and in any case subspecific in rank.

It appears to be as widely distributed in the British Isles as *R. atlanticum* ; I have seen specimens from eighteen localities. The typical state and the f. *colludens* (Nyl.) Vain. are about equally common ; the latter differs in its thin, smooth, subcontinuous thallus, a modification which according to Schade (1935) is probably the result of animal agencies (snails).

ENGLAND : Cornwall, Bodmin Moor, Rough Tor (2), coll. *E. M. Holmes* ; Devon, Cornwood (3), coll. *W. Watson*, 1932 (Herb. Wats.) (f. *colludens*) ; Brecon, Llanwrtyd (42), coll. *H. Knight*, 1921 (f. *colludens*) ; Merioneth, Dolgelley (48), coll. *H. Holl* (f. *colludens*) ; Merioneth, Cader Idris (48), coll. *H. Holl* (f. *colludens*) ; Merioneth, Capel Arthog (48), coll. *W. Leighton*, 1875 (f. *colludens*) ; Leicester, Bradgate Park (55), coll. *C. Larbalestier* (Larbal. Lich. Herb. no. 355) (f. *colludens*) ; Lancashire, Hindburndale (60), coll. *W. Watson*, 1934 (Herb. Wats.) (f. *colludens*) ; Westmorland, Nan Bield (69), coll. *J. Martindale*, 1886 ; Westmorland, Mardale (69), coll. *J. Martindale*, 1869 ; Cumberland, Eskdale (70), coll. *W. Johnson* (Johns. Lich. Herb. cxs. no. 391, as "*Lecidea colludens*") (f. *colludens*) ; Cumberland, Keswick (70), coll. *A. L. Smith*, 1922 (f. *colludens*), and *W. Watson*, 1933 (Herb. Wats.) (f. *colludens*) ; Cumberland, Thirlmere, Launchy Gill (70), coll. *W. Watson*, 1933 (Herb. Wats.) ; SCOTLAND : Perth, Ben Ladi (87), coll. *Lauder Lindsay*, 1867 (Herb. Bot. Gard. Edinb.) ; Perth, Ben Lawers (88), coll. *I. Carroll*, 1864, *J. Stirton*, 1870, and *J. Crombie* (the latter specimen f. *colludens*) ; Perth, Ben Lawers, Loch-na-Cat (88), coll. *H. Holl* ; EIRE : Cork, near Cork (I. 4 or I. 5), coll. *I. Carroll* (f. *colludens*) ; Galway, Connemara, Kylemore (I. 16), coll. *C. Larbalestier*, 1875 and 1878 (the latter specimen f. *colludens*).

LITERATURE CITED.

LYNGE, B. "A Revision of the Genus *Rhizocarpon* (Ram.) Th. Fr. in Greenland." Skr. Svalb. og Ishavet, no. 47 (1932).

——. "The Lichen Genus *Rhizocarpon* on the West and North Coast of Spitsbergen and Nordostlandet (the North East Land)." Svensk bot. Tidskr. xxx. 307 (1936).

MALME, G. O. "Västra Jämtlands *Rhizocarpon*-Arter." Svensk bot. Tidskr. viii. 273 (1914).

SCHADE, A. "Die sächsischen Arten der Flechtengattung *Rhizocarpon* (Ram.) Th. Fr." Beih. bot. Zbl. liv. Abt. B, 75 (1935).

VAINIO, E. "Lichenographia Fennica.—II." Acta Soc. Fauna Flora fenn. liii. no. 1 (1922).

STUDIES OF BRITISH POTAMOGETONS.—XIV.

BY J. E. DANDY, M.A., AND G. TAYLOR, D.Sc.

XIV. *POTAMOGETON* IN THE HEBRIDES (VICE-COUNTY 110).

DURING the last few years several scientific expeditions have visited the islands of the Hebrides to pursue biological studies. Much valuable botanical exploration has been carried out ; and in the extensive collections of plants which have been obtained the genus *Potamogeton* is well represented. Records of some of the pondweeds have already been published in papers dealing with the results of the expeditions, but as these and earlier records of *Potamogeton* from the Hebrides are scattered in various publications it is desirable that they should be brought together and correlated. Further, the published records concern only a proportion of the available material and give but an incomplete picture of the distribution of *Potamogeton* in the islands. In the present paper, therefore, as a contribution to the work now being done on the flora of the Hebrides, we bring together the published records and incorporate them in a systematic list of the Hebridean material which we have been able to examine. Our knowledge of the genus as it occurs in the vice-county is thus conveniently summarized.

The first records of *Potamogeton* from the Hebrides were published in 1830 by MacGillivray, who mentioned three species : *P. natans*, *P. lucens*, and *P. heterophyllus* (=*P. gramineus*). In 1844 Balfour and Babington recorded *P. natans* again, and added records of *P. oblongus* (=*P. polygonifolius*) and *P. perfoliatus* ; while in 1885 Stirton reported *P. filiformis* from Benbecula. Unfortunately we have not located vouching specimens gathered by any of these earlier authors, but of the six species which they recorded only *P. lucens* has not been confirmed for the Hebrides by later collectors. From 1886 to 1928 a number of records were published on the basis of specimens collected by A. Somerville, W. S. Duncan, and W. A. Shoolbred in the main islands, and by R. M. Barrington, A. H. Gibson, and J. Gladstone in the outlying island of St. Kilda. We have seen specimens of almost all the gatherings made by these collectors, whose efforts added *P. Friesii*, *P. pectinatus*, *P. Berchtoldii* ("*pusillus*"), *P. crispus*, and the hybrid ×*P. nitens* (*P. gramineus* ×*perfoliatus*) to the list of pondweeds known from the vice-county. The recent collections, whose study has inspired this paper, have come mainly from three series of expeditions. Specimens from Barra have been obtained by Dr. E. V. Watson during the Edinburgh University Biological Society's expeditions to that island. Representative collections from several islands have been made by Dr. K. B. Blackburn, Dr. W. A. Clark, Mr. R. B. Cooke, and Mr. J. Heslop Harrison, and are results of the King's College

(Newcastle-upon-Tyne) Biological Expeditions to the Inner and Outer Hebrides, organized by Prof. J. W. Heslop Harrison. Extensive collections from a number of islands have also resulted from the expeditions undertaken by Miss M. S. Campbell and Mr. A. J. Wilmott, of the British Museum (Natural History), who have been assisted by Messrs. E. B. Bangerter, J. W. Campbell, J. A. Crabbe, and F. Druce. Specimens have also been contributed by Messrs. U. A. Vincent and I. A. Williams. These recent collections include examples of two noteworthy plants: the true *P. pusillus*, which has not hitherto been reported from the Hebrides, and the hybrid $\times$*P. suecicus* (*P. filiformis* $\times$*pectinatus*), which, we believe, has not previously been recorded correctly from the British Isles.

Ten species of *Potamogeton* are now known to us from the Hebrides. Nine of them are widely dispersed over the British Isles. The tenth, *P. filiformis*, is much more restricted in its British distribution, being confined to Scotland, Anglesey, and the northern parts of Ireland. It is usually found in waters not far from the coast. An additional species, *P. lucens*, reported for the Hebrides by MacGillivray in 1830, requires confirmation: it was recorded from Barra in 1936, but this is an error for *P. gramineus*. A record of *P. praelongus* from Barra (1936) is also an error for *P. gramineus*, and in view of this misidentification we are unable to accept the record of *P. praelongus* from South Uist, published in 1939, without seeing a vouching specimen. *P. lucens* and *P. praelongus* are species which should be specially looked for in the Hebrides, as both are known from the North Ebudes (vice-county 104).

In the following enumeration certain abbreviations are used to indicate the herbaria in which we have seen specimens:—

BM=British Museum (Natural History);
E=Royal Botanic Garden, Edinburgh;
EUBS=Herbarium of the Edinburgh University Biological Society;
K=Royal Botanic Gardens, Kew;
KCN=Herbaria of King's College (Newcastle-upon-Tyne) collectors.

A sign (†) placed after a reference means that we have not seen a vouching specimen. For convenience in recording distribution the localities are arranged in parishes from north to south, Lewis being represented by Stornoway, Uig, and Lochs.

Our thanks are due to Prof. J. W. Heslop Harrison, Dr. E. V. Watson, and Prof. Sir William Wright Smith for the loan of specimens.

P. NATANS L.—MacGillivray in Edin. Journ. Nat. & Geog. Sci. ii. 92 (1830) †.—Balf. & Bab. in Trans. Bot. Soc. Edin. i. 151

(1844) †.—A. Benn. in Scot. Naturalist, ix. 257 (1888); in Ann. Scot. Nat. Hist. 1892, 61 (1892).—Somerville in Proc. & Trans. Nat. Hist. Soc. Glasg., New Ser. ii. 185, 188 (1890).—Shoolbred in Journ. Bot. xxxiii. 247 (1895).—Wats. & Barlow in Proc. R. Phys. Soc. Edin. xxii. 249, 250 (1936) †; in J. L. Campbell, Book of Barra, 314 (1936) †.—Wilmott ex M. S. Campbell in Bot. Soc. & Exch. Club Brit. Is. xi. 315 (1937).—M. S. Campbell, *tom. cit.* 553 (1938).

STORNOWAY. Loch near Geiraha Sands, July 1939, *A. J. Wilmott*, Ref. 390730Fa (BM).

UIG. Shallow trickles running into loch, Berie Sands, July 1939, *J. A. Crabbe*, Ref. 390726E (BM). Loch Sgailler, near Valtos, July 1939, *W. A. Clark* (KCN). Glen Valtos, July 1939, *A. J. Wilmott*, Ref. 390721E (BM). Near Miavaig, July 1939, *J. A. Crabbe*, Ref. 390721Fa (BM). Loch nam Faoileag, near Brenish, July 1939, *E. B. Bangerter*, Ref. 390725D (BM).

HARRIS. Scarp, *W. S. Duncan* (BM). Rudha Ruadh, Husinish, North Harris, Aug. 1939, *A. J. Wilmott*, Ref. 390808Fb (BM). Running water in ditch near Tarbert, South Harris, July 1894, *W. A. Shoolbred* (BM). Loch Airidh Iain Oig, South Harris, Aug. 1939, *A. J. Wilmott*, Ref. 390802B (BM). Berneray, July 1939, *W. A. Clark* (KCN). Loch Bhruist, Berneray, Aug. 1939, *A. J. Wilmott*, Ref. 390804Cf (BM).

NORTH UIST. Loch a' Chaolais, July 1937, *J. W. Campbell* (BM). Scolpaig, July 1937, *A. J. Wilmott*, Ref. 370704Ga (BM). Loch Veiragvat, July 1937, *J. W. Campbell* (BM). Small fresh-water loch adjoining Loch an Strumore, Aug. 1938, *I. A. Williams* (BM). Near Loch Maddy, July 1894, *W. A. Shoolbred* (BM).

SOUTH UIST. Loch Olavat, near Torlum, Benbecula, June 1938, *J. W. Campbell* (BM). Near Askernish, June 1936, *M. S. Campbell* (BM).

BARRA. Loch an Duin, July 1938, *A. J. Wilmott*, Ref. 380720Da (BM). Loch east of road at north-east end of Barra, Aug. 1939, *K. B. Blackburn* (KCN). Loch St. Clair, July 1887, *A. Somerville* (BM); July 1936, *E. V. Watson* (EUBS). Loch on peat, Barra, July 1936, *E. V. Watson* (EUBS). Sandray, Aug. 1939, *K. B. Blackburn* (KCN).

P. POLYGONIFOLIUS Pourr.—Barrington in Journ. Bot. xxiv. 215 (1886).—Shoolbred in Journ. Bot. xxxiii. 247 (1895).—Wats. & Barlow in Proc. R. Phys. Soc. Edin. xxii. 247 (1936); in J. L. Campbell, Book of Barra, 314 (1936).—Dandy & Taylor ex M. S. Campbell in Bot. Soc. & Exch. Club Brit. Is. xi. 315 (1937).—Wilmott ex M. S. Campbell, *tom. cit.* 553 (1938).—W. A. Clark in Proc. Univ. Durham Phil. Soc. x. 68 (1938) †. *P. oblongus* Viv.—Balf. & Bab. in Trans. Bot. Soc. Edin. i. 151 (1844) †. *P. natans* (non L.) A. H. Gibson in Trans. & Proc. Bot. Soc.

Edin. xix. 158 (1891). *P. polygonifolius* var. *ericetorum* Syme.—Turrill in Bot. Soc. & Exch. Club Brit. Is. viii. 434 (1928).

UIG. Near Miavaig, July 1939, *M. S. Campbell*, Ref. 390721Fb (BM). Near Uig Lodge, July 1939, *J. A. Crabbe*, Ref. 390721D (BM). Peat bog at foot of Suainaval, Aug. 1938, *U. A. Vincent* (BM). Ollashal, July 1939, *J. A. Crabbe*, Ref. 390722Ca (BM). Stream into Allt Bealach Raonasgail, Teinnasval, July 1939, *E. B. Bangerter*, Ref. 390721H (BM). Shallow water of bogs and trickles, Cracaval, July 1939, *J. A. Crabbe*, Ref. 390719G (BM).

LOCHS. Loch Soval, June 1937, *M. S. Campbell* (BM).

HARRIS. Scarp, 1890 and 1892, *W. S. Duncan* (BM). Small bog pool, Glen Laxadale, North Harris, July 1894, *W. A. Shoolbred* (BM). Scalpay, Aug. 1939, *J. W. Campbell*, Ref. 390802H (BM). St. Kilda, June 1883, *R. M. Barrington* (BM); Aug. 1889, *A. H. Gibson* (E); July 1927, *J. Gladstone*, Ref. 56 (K).

NORTH UIST. North Uist, July 1894, *W. A. Shoolbred* (BM). By stream above Newton towards Beinn Bhreac, July 1937, *M. S. Campbell & A. J. Wilmott*, Ref. 370705A (BM). Stream running north-west from Bealach na Beinne, July 1937, *A. J. Wilmott*, Ref. 370705B (BM). Stream from north side of Eaval, July 1937, *A. J. Wilmott*, Ref. 370707E (BM).

SOUTH UIST. South Uist, July 1888, *A. Somerville* (BM). Wiay, June 1938, *J. W. Campbell* (BM). Near Askernish, June 1936, *M. S. Campbell* (BM).

BARRA. Barra, July 1887 and July 1888, *A. Somerville* (BM); July 1935, *E. V. Watson* (EUBS). By Loch an Duin, July 1938, *A. J. Wilmott*, Ref. 380720Db (BM). Wet ground by road, North Bay, July 1936, *E. V. Watson* (EUBS).

P. GRAMINEUS L.—Wilmott & Dandy ex M. S. Campbell in Bot. Soc. & Exch. Club Brit. Is. xi. 554 (1938).—Dandy & Taylor ex E. V. Wats. in Journ. Bot. lxxvii. 7 (1939). *P. heterophyllus* Schreb.—MacGillivray in Edin. Journ. Nat. & Geog. Sci. ii. 92 (1830) †.—A. Benn. in Scot. Naturalist, x. 112 (1889); in Proc. & Trans. Nat. Hist. Soc. Glasg., New Ser. iii. 40 (1889).—Shoolbred in Journ. Bot. xxxiii. 247 (1895). *P. praelongus* (non Wulf.) Wats. & Barlow in Proc. R. Phys. Soc. Edin. xxii. 250 (1936); in J. L. Campbell, Book of Barra, 314 (1936). *P. lucens* (non L.) Wats. & Barlow, *locis cit.* (1936). *P. angustifolius* (an Bercht. & Presl ?) J. W. & H. Heslop Harrison, Cooke & Clark in Journ. Bot. lxxvii. 4 (1939).

HARRIS. Obbe, South Harris, Oct. 1892, *W. S. Duncan* (BM). Berneray, July 1939, *J. Heslop Harrison* (KCN).

NORTH UIST. Scolpaig, July 1937, *M. S. Campbell & A. J. Wilmott*, Ref. 370704Gb (BM). Balranald, Aug. 1938, *I. A. Williams* (BM).

SOUTH UIST. South Uist, Aug. 1938, *R. B. Cooke* (KCN). Lochs, Stoneybridge district, Aug. 1938, *W. A. Clark* (KCN); Aug. 1939, *K. B. Blackburn* (KCN).

BARRA. Barra, July 1888, *A. Somerville* (BM). Loch an Duin, July 1935, *E. V. Watson* (EUBS). Loch St. Clair, July 1894, *W. A. Shoolbred* (BM); July 1936, *E. V. Watson* (EUBS); July 1939, *K. B. Blackburn* (KCN). Sandray, July 1939, *K. B. Blackburn* (KCN).

×P. NITENS Weber (*P. gramineus*×*perfoliatus*).—A. Benn. in Journ. Bot. liii. 236 (1915).

STORNOWAY. Loch near Geiraha Sands, May 1939, *M. S. Campbell* (BM); July 1939, *A. J. Wilmott*, Ref. 390730Fb (BM).

HARRIS. Harris, 1891, *W. S. Duncan* (BM). Loch Uidemul, Scarp, Aug. 1905, *W. S. Duncan* (BM). Loch Bhruist, Berneray, Aug. 1939, *M. S. Campbell*, Ref. 390804Ba (BM). Little Loch Borve, Berneray, July 1939, *W. A. Clark* (KCN).

SOUTH UIST. Lochs, Stoneybridge district, Aug. 1938, *W. A. Clark* (KCN).

[*P. lucens* L. This species was recorded from the Hebrides by MacGillivray in Edin. Journ. Nat. & Geog. Sci. ii. 92 (1830) *. We have not located a vouching specimen; indeed, we have seen no specimen of *P. lucens* from the vice-county. The Barra plant recorded as *P. lucens* by Watson and Barlow in Proc. R. Phys. Soc. Edin. xxii. 250 (1936) and in the 'Book of Barra' (1936), p. 314, is *P. gramineus*; it came from Loch an Duin.]

[*P. praelongus* Wulf. This species has twice been reported from the Hebrides. The first record (from Loch an Duin, Barra) was published by Watson and Barlow in Proc. R. Phys. Soc. Edin. xxii. 250 (1936) and in the 'Book of Barra' (1936), p. 314: the plant is *P. gramineus*. The second record (from Loch Kearsinish, South Uist) appeared in Journ. Bot. lxxvii. 4 (1939) following one of the King's College expeditions; it is not supported by any vouching specimen among the material submitted to us.]

P. PERFOLIATUS L.—Balf. & Bab. in Trans. Bot. Soc. Edin. i. 151 (1844) †.—Somerville in Proc. & Trans. Nat. Hist. Soc. Glasg., New Ser. ii. 186 (1890).—Shoolbred in Journ. Bot. xxxiii. 247 (1895).

HARRIS. Loch, Obbe, South Harris, 1889 and July 1891, *W. S. Duncan* (BM). Berneray, July 1939, *J. Heslop Harrison* (KCN).

* This is obviously the record included in H. C. Watson's 'Outlines of the Geographical Distribution of British Plants' (1832), p. 289, and quoted by A. Bennett in Journ. Bot. liii. 236 (1915).

South Uist. South Uist, July 1888, *A. Somerville* (BM). Loch near Creagorry, Benbecula, July 1894, *W. A. Shoolbred* (BM). Howmore, Aug. 1939, *K. B. Blackburn* (KCN). Lochs, Stoneybridge district, Aug. 1938, *W. A. Clark* (KCN); Aug. 1939, *K. B. Blackburn* (KCN). Loch Ollay, Aug. 1939, *K. B. Blackburn* (KCN). Loch Ceann a' Bhaigh, Aug. 1939, *K. B. Blackburn* (KCN).

Barra. Loch east of road at north-east end of Barra, Aug. 1939, *K. B. Blackburn* (KCN). Loch St. Clair, July 1887, *A. Somerville* (BM); July 1894, *W. A. Shoolbred* (BM); July 1936, *E. V. Watson* (EUBS).

P. crispus L.—Shoolbred in Journ. Bot. xxxvii. 480 (1899).

Harris. Loch Bhruist, Berneray, June 1938, *J. W. Campbell* (BM); July 1939, *W. A. Clark* (KCN); Aug. 1939, *M. S. Campbell*, Ref. 390804Bc (BM). Little Loch Borve, Berneray, July 1939, *W. A. Clark* (KCN).

North Uist. Small loch, Baleshare, July 1898, *W. A. Shoolbred* (BM).

P. Friesii Rupr.—A. Benn. in Trans. Bot. Soc. Edin. xvii. 418 (1889).—Dandy & Taylor ex E. V. Wats. in Journ. Bot. lxxvii. 7 (1939); ex Wilmott in Journ. Bot. lxxvii. 194 (1939). *P. mucronatus* Schrad. ex Sond.—A. Benn. in Scot. Naturalist, x. 112 (1889); in Proc. & Trans. Nat. Hist. Soc. Glasg., New Ser. iii. 40 (1889).

South Uist. Pond near seashore on east side of South Uist, July 1888, *A. Somerville* (BM).

Barra. Loch na Doirlinn, July 1938, *A. J. Wilmott*, Ref. 380718Lb (BM; EUBS).

P. pusillus L.

South Uist. Stoneybridge, Aug. 1939, *K. B. Blackburn* (KCN).

This is a new vice-county record. The record of *P. pusillus* from Harris (Scarp), published by W. S. Duncan in Scot. Naturalist, xi. 189 (1891), and afterwards deleted by A. Bennett in Ann. Scot. Nat. Hist. 1893, 101 (1893), refers to *P. Berchtoldii*.

P. Berchtoldii Fieb.—Dandy & Taylor ex M. S. Campbell in Bot. Soc. & Exch. Club Brit. Is. xi. 554 (1938); in Journ. Bot. lxxviii. 51 (1940). *P. pusillus* (non L.) W. S. Duncan apud A. Benn. in Scot. Naturalist, xi. 189 (1891).

Uig. Loch 2 miles south of Carloway, July 1937, *A. J. Wilmott*, Ref. 370713G (BM). Loch na Bearnaidh Ruaidhe, near Mangersta, July 1939, *M. S. Campbell*, Ref. 390729C (BM).

Harris. Scarp, 1890, *W. S. Duncan* (BM). Little Loch Borve, Berneray, July 1939, *W. A. Clark* (KCN).

Barra. Lochan nam Faoileann, Aug. 1939, *K. B. Blackburn* (KCN).

P. pectinatus L.—A. Benn. in Proc. & Trans. Nat. Hist. Soc. Glasg., New Ser. iii. 40 (1889).—Wats. & Barlow in Proc. R. Phys. Soc. Edin. xxii. 249 (1936); in J. L. Campbell, Book of Barra, 314 (1936).—Dandy ex M. S. Campbell in Bot. Soc. & Exch. Club Brit. Is. xi. 554 (1938). *P. pectinatus* var. *genuinus* Syme.—A. Benn. in Scot. Naturalist, x. 112 (1889). *P. filiformis* (non Pers.) Shoolbred in Journ. Bot. xxxiii. 247 (1895) pro parte, quoad pl. ex N. Uist.

Harris. Small lagoon, Rudha Ruadh, Husinish, North Harris, Aug. 1939, *M. S. Campbell*, Ref. 390808Fa (BM). Loch Bhruist, Berneray, Aug. 1939, *A. J. Wilmott*, Ref. 390804Cd (BM). Little Loch Borve, Berneray, July 1939, *W. A. Clark* (KCN).

North Uist. Fresh-water loch near Newton, Nov. 1936, *J. W. Campbell* (BM). Dead Man's Loch, Loch an Duin, Sept. 1937, *J. W. Campbell* (BM); Aug. 1939, *J. W. Campbell*, Ref. 390807 (BM). Balranald, Aug. 1938, *I. A. Williams* (BM). Loch an Strumore, July 1894, *W. A. Shoolbred* (BM); Aug. 1938, *I. A. Williams* (BM). Loch Obisary, June 1938, *J. W. Campbell* (BM).

South Uist. East side of South Uist, July 1888, *A. Somerville* (BM). Loch north of Daliburgh, Aug. 1939, *K. B. Blackburn* (KCN).

Barra. Barra, July 1935, *E. V. Watson* (EUBS). Eoligarry, Aug. 1939, *W. A. Clark* (KCN).

P. filiformis Pers.—Stirton in Scot. Naturalist, viii. 182 (1885) †.—Shoolbred in Journ. Bot. xxxiii. 247 (1895) pro parte, excl. pl. ex N. Uist.—Wilmott & Dandy ex M. S. Campbell in Bot. Soc. & Exch. Club Brit. Is. xi. 554 (1938).—Dandy & Taylor ex E. V. Wats. in Journ. Bot. lxxvii. 7 (1939). *P. marinus* (non L.) A. Benn. in Fryer & Benn. Pot. Brit. Is. 89, t. 60 (1915).

Harris. Loch Bhruist, Berneray, June 1938, *J. W. Campbell* (BM); Aug. 1939, *M. S. Campbell*, Ref. 390804Bb (BM).

North Uist. Loch near Tighary, July 1898, *W. A. Shoolbred* (BM). Shallow loch east of Loch Scarie, July 1937, *A. J. Wilmott*, Ref. 370704K (BM).

South Uist. Lochs, Stoneybridge district, Aug. 1938, *W. A. Clark* (KCN); Aug. 1939, *K. B. Blackburn* (KCN).

Barra. Loch St. Clair, July 1894, *W. A. Shoolbred* (BM); July 1936, *E. V. Watson* (EUBS).

×P. suecicus Richt. (*P. filiformis*×*pectinatus*).

Harris. Loch Bhruist, Berneray, June 1938, *J. W. Campbell* (BM); Aug. 1939, *A. J. Wilmott*, Ref. 390804Ce (BM). Little Loch Borve, Berneray, July 1939, *W. A. Clark* (KCN).

"Undeniably this hybrid is among the more difficult ones to determine correctly." So wrote Hagström of ×*P. suecicus* in his 'Critical Researches' (1916), p. 20; and experience shows that the remark was well justified. Specimens of the hybrid bear such a close superficial resemblance to one or other of the parent species that their hybrid nature may easily be overlooked. Nevertheless there are certain combinations of characters by which it is possible to recognize ×*P. suecicus* on careful examination. The parent species, *P. filiformis* and *P. pectinatus*, differ in the structure of the leaf-sheaths: in *P. filiformis* the sheaths are tubular in the lower part, at least when young, whereas in *P. pectinatus* they are open and convolute throughout and normally have a more or less conspicuous whitish margin. The hybrid, as is to be expected, has sheaths which are tubular towards the base when young, so that by careful dissection it can always be distinguished from *P. pectinatus*. From *P. filiformis*, on the other hand, ×*P. suecicus* may be separated by the following characters: (1) the distinctive habit of *P. pectinatus* is always in some degree discernible, with the sheaths (which are often whitish-margined as in that species) showing a marked tendency to diverge from the stems; (2) the leaf-apex, though variable, commonly has the acute or cuspidate form of *P. pectinatus* rather than the obtuse or rounded shape characteristic of *P. filiformis*; (3) the carpels are more or less distinctly contracted into a style as in *P. pectinatus* or mis-shapen through abortion, whereas in *P. filiformis* there is no such noticeable contraction. Lastly, ×*P. suecicus* has a negative character which it shares with most other *Potamogeton* hybrids: it never, so far as we know, produces fertile fruit, and all the flower-spikes that we have seen have an appearance strongly suggestive of barrenness.

In examining British specimens hitherto referred to *P. filiformis* or *P. pectinatus* we have found examples of ×*P. suecicus* from three other vice-counties, all in Scotland:—

(93) North Aberdeen. Canal, St. Fergus, July 1876, *J. H. Walker* (Herb. Univ. Aberdeen).

(102) South Ebudes. Loch Fada, Colonsay, Aug. 1908, *M. McNeill* (BM).

(103) Mid Ebudes. An Fhaodhail, Tiree, July 1897, *S. M. Macvicar* (BM). Tiree, 1904, *S. M. Macvicar* (BM).

These plants, like the Berneray plant, have the characters of *P. filiformis*×*pectinatus*, including sheaths which are tubular towards the base. Similar plants should be looked for in all suitable waters where *P. filiformis* and *P. pectinatus* occur together.

The records of ×*P. suecicus* which we publish here are new. Hybrids of *P. filiformis* and *P. pectinatus* have, however, already been reported from Shetland (by Hagström ex Druce in Bot. Soc. & Exch. Club Brit. Is. vi. 51 (1921) & 529 (1922), as a new forma *pectinatioides* of *P. suecicus*); from Orkney (by A. Bennett ex H. Halcro Johnston in Trans. & Proc. Bot. Soc. Edin. xxix. 127–428 (1927)); and from Oxford (by Pearsall in Bot. Soc. & Exch. Club Brit. Is. ix. 410 (1931), as *P. suecicus* f. *Kerneri* *). The Oxford plant is clearly a state of *P. pectinatus*, and its identification as a hybrid of *P. filiformis* is quite inexplicable, as that species is not known from England. On the other hand, the Orkney and Shetland plants are from localities where ×*P. suecicus* might reasonably be expected to occur. Careful examination of them, however, fails to reveal any evidence of *P. filiformis*: they have open sheaths, and as they agree in every way with *P. pectinatus* we see no reason why they should not be referred to that species. The epithet *pectinatioides* given to the Shetland plant by Hagström is not without significance!

RESULTS OF TWO BOTANICAL EXPEDITIONS TO SOUTH ALBANIA.

By A. H. G. Alston, B.A., F.L.S., and N. Y. Sandwith, M.A., F.L.S.

(Continued from p. 126.)

Clypeola Jonthlaspi L. var. 1 (var. *pubescens* Car. et St. Lager) of Chaytor and Turrill in Kew Bull. 1935, p. 6.

Rocky slopes of Mali Gjer, above Gjinokastrë, c. 2500 ft., 9. vi. 33, no. 1514. Limestone slopes near summit of Melesin, Leskovik, 4000 ft., 19. vi. 33, no. 1769.

Var. 9 (var. **microcarpa* (Moris) Arcang.) of Chaytor and Turrill, *l. c.* p. 12. Mali Lunxheriës; among limestone rocks of summit ridge above Çajup, 5500 ft., 11. vii. 33, no. 2194.

Hesperis cladotricha Borbas, sens. Hayek.

Lunxheriës Range, in shady ravine on slopes between Çajup and Zhej, c. 3200 ft., 8. viii. 35, no. 2394. Lower leaves pinnatifid. Flowers purple.

*Hirschfeldia incana (L.) Lagrèze-Fossat.

Sarandë, broken limestone coast hills, looking native, sea-level, 3. vi. 33, no. 1360.

* *P. suecicus* f. *Kerneri* Hagstr. Crit. Res. 22 (1916) was based on *P. juncifolius* A. Kerner, which in turn was founded on a plant from the Tyrol. We cannot agree with Hagström that this Austrian plant is a hybrid: its essential characters are entirely those of *P. filiformis*, and we consider it to represent a state of that species. On the other hand, a plant from Denmark which Hagström also included in *P. suecicus* f. *Kerneri* has the characters of the hybrid *P. filiformis* × *pectinatus* and is correctly placed under ×*P. suecicus*.

*Isatis tinctoria L., sens. lat.

Lunxheriës Range, rocky limestone slopes near Çajup, 3800–5500 ft., fl. June 11th, 1933, no, 1590, fr. Aug. 7th, 1935, no. 2357. Nemerçka Range, grassy limestone slopes above Biovishd, 6000 ft., 22. vi. 33, no. 1819.

No. 1590 has the stem somewhat pilose at the base, and the lower leaves adpressed-pilose. No. 2357 bears siliquæ of the cuneiform type, glabrous, up to 18 mm. long and conspicuously emarginate at the apex. These plants should perhaps be placed under var. *canescens* (DC.) G. et G., in the light of Thellung's treatment in Hegi, Ill. Fl. Mittel-Europ. iv. i. 194–197, but the group requires a special investigation.

*Lepidium Draba L.

Çajup, Mali Lunxheriës, c. 4000 ft., native in damp bare gully, 13. vi. 33, no. 1650.

*Lepidium latifolium L.

Voskopoj, waste stony ground in the village, 3800 ft., 19. viii. 35, no. 2544.

Malcolmia bicolor Boiss. & Heldr. var. *veluchensis Boiss. & Heldr.

Sarandë, rocky limestone hill by sea, 200–500 ft., 30. v. 33, no. 1236. Flowers rosy mauve.

*Raphanus Landra Mor.

Sarandë, limestone rocks by sea, sea-level, 3. vi. 33, no. 1345 Flowers yellow.

*Thlaspi Kovatsii Heuff. sens. Halácsy.

Gramos Range above Ersekë, grassy slopes, 5000–6000 ft., 27. vi. 33, no. 1945. Lunxheriës Range, grassy limestone slopes above Çajup, 6000 ft., 12. vi. 33, no. 1627.

*Thlaspi rivale Presl.

Mali Gjer, above Gjinokastrë, open limestone slopes, 5000 ft., 9. vi. 33, no. 1525. Flowers white.

*Turritis glabra L.

Lunxheriës Range, on rocks near Çajup, 4000 ft., 11. vi. 33, no. 1563. Flowers white.

*Vogelia apiculata (F. M. et Avé-Lall.) Vierh.

Leskovik, cornfield, 3000 ft., 17. vi. 33, no. 1687.

CAPPARIDACEAE.

*Capparis rupestris S. & S.

Sarandë, limestone coast rocks, sea-level, 15. vii. 33, no. 2248. Leaves fleshy, glabrous. Petals white when fresh; filaments pinkish purple.

The very different *C. sicula* Duh. has been recorded from the Vlorë district by Baldacci.

CISTACEAE.

Helianthemum jonium Lacaita et Grosser var. psilosepalum Lacaita et Grosser; Chaytor et Turrill in Kew Bull. 1934, p. 438.

Durrës (Durazzo), sand-dunes, locally plentiful. 30. viii. 35, no. 2717. Flowers bright yellow. Leaves green.

VIOLACEAE.

*Viola pyrenaica Ram.

Ostrovicë Range, cracks in limestone cliffs, 6500 ft., 5. vii. 33, no. 2109. Flowers slaty blue with white centre, sweet-scented.

POLYGALACEAE.

*Polygala monspeliaca L.

District of Sarandë; between Nivicë e Bubarit and Lukovë, bushy sandstone slopes with *Cistus* etc., 1000–1500 ft., 4. vi. 33, no. 1408. Flowers white.

CARYOPHYLLACEAE.

*Arenaria serpentini A. K. Jackson, sp. nov. in Hook. Ic. Pl. t. 3326 (1937).

District of Voskopoj, W. of Korçë; near Gjergjevicë, on bare rubbly slopes of a deep gorge on serpentine, 4000 ft., 6. vii. 33, no. 2136.

Arenaria serpyllifolia L., forma pedicellis elongatis.

Above Voskopoj, bare places on serpentine in pine woods near Hagios Prodromos Monastery, c. 4200 ft., 30. vi. 33, no. 2012.

A form with very long slender branches, remarkably long pedicels, commonly 10–18 mm. in length, and short sepals 2·75–3·5 mm. long. This accompanied another form (no. 2010) which also bore elongate branches, but the pedicels were only 5–11 mm. long and the sepals up to 4·5 mm. long. No. 2012 is quite unmatched at the British Museum and Kew, and must be similar, to judge from the description, to the forma *transiens* Novak (of subsp. *leptoclados*) in Preslia, v. 82 (1927). Our plant, however, is certainly a form of *A. serpyllifolia* sensu stricto, and is not to be placed under *A. leptoclados*. Moreover, the sepals of Novak's form were described as much narrower (than those of *leptoclados*) and only 2 mm. long. *A. conferta* Boiss. is a similarly plastic species in Albania, Epirus and Thessaly.

Cerastium banaticum (Koch.) Heuff. subsp. alpinum (Boiss.) Buschm.

Nemerçka Range above Biovishd, limestone rocks, 5500 ft., 22. vi. 33, no. 1833.

This is conspecific with *Baldacci* 104 (published as *C. arvense*) from the same locality. Not recorded from either Albania or Epirus by Hayek, but recorded from Albania by Buschmann in Fedde Rep. Sp. Nov. xliii. 139 (1938).

*Cerastium campanulatum Viv.

Mali Lunxheriës Range, abundant on upper limestone slopes of Strakavec, 5800 ft., 12. vii. 33, no. 2208. Flowers large.

Dianthus haematocalyx Boiss & Heldr. subsp. pindicola (Vierh.) Hayek.

Voskopoj, locally plentiful on bare stony slopes on serpentine, 4000 ft., 20. viii. 35, no. 2566. Similarly at Gjergjevicë, under juniper bush in serpentine gorge, 4500 ft., 21. viii. 35, no. 2579. Leaves bluish-green. Petals very deep pink, yellow on back, hairy at base of lamina.

Subsp. *Sibthorpii (Vierh.) Hayek.

Lunxheriës Range, limestone rocks above Çajup, 5500 ft., 7. viii. 35, no. 2345. Petals intense bright pink, yellow on the back.

Dianthus leucophoeniceus Dörfl. & Hayek; Turrill in Hook. Ic. Pl. t. 3351 (1938).

Nemerçka Range, turfy upper limestone slopes above Biovishd, c. 5000 ft., 22. vi. 33, no. 1838. Scales of involucre whitish straw-coloured. Petals very deep, dark crimson.

Very rare, and collected hitherto in Albania only at the foot of Mt. Korab (*Kümmerle*), and in Macedonia.

*Dianthus stenopetalus Griseb.

Ersekë, sandy ground in dry field, 3300 ft., 26. vi. 33, no. 1929.

Gypsophila spergulifolia Griseb.; Turrill in Hook. Ic. Pl. t. 3352 (1938).

Voskopoj, locally plentiful on rocky serpentine slopes at head of ravine, only in one or two spots, c. 5000 ft., 20. viii. 35, no. 2552. Petals pale pinkish white above, pinkish maroon with white margin on back.

*Kohlrauschia velutina (Guss.) Rchb.

Sarandë, cornfield at sea-level, 3. vi. 33, no. 1372.

*Lychnis subintegra (Hayek) Turrill in Hook. Ic. Pl. t. 3228 (1934).

Voskopoj, damp fields by stream, 3700 ft., 19. viii. 35, no. 2509. Flowers white, turning pale pink, deeper pink on back; corona pink; collected with fairly advanced fruit. Petals spreading stiffly at right angles, or slightly deflexed.

*Queria hispanica L.

Lunxheriës Range, rocky limestone ground above Çajup, c. 4200 ft., 11. vi. 33, no. 1592.

*Saponaria glutinosa M. B., det. W. B. Turrill.

Seeds coll. near Dardhë, near Korçë, c. 4500 ft., 25. viii. 35, *Alston* and *Sandwith*, see Turrill in Kew Bull. 1939, p. 188. Grown in Herbarium Ground, Kew, 9. vi. 38, no. K. 1713.

Saponaria Haussknechtii Simmler var. major (Hsskn.) Hayek. *S. intermedia* Simmler.

Voskopoj, stony slopes on serpentine, only one patch seen, 4500 ft., 20. viii. 35, no. 2555. Leaves glaucous. Flowers pink.

Silene caesia Sibth. et Sm. var. pindica Hal.

Lunxheriës Range, broken sandstone slopes between Çajup and Zhej, 3200 ft., 8. viii. 35, no. 2371. Leaves glaucous, distinctly fleshy. Flowers white; anthers blackish.

Silene cephallenia Heldr.; Halácsy, Fl. Gr. i. 183. *S. linifolia* S. et S. var. *glandulosa* Baldacci.

Lunxheriës Range, limestone rocks on slopes above Erindi, c. 3500 ft., 10. vii. 33, no. 2168. Near Borsh, limestone rocks by road to Vlorë (Valona), near sea-level, 4. vi. 33, no. 1404. In great tufts, very sticky. Petals creamy white.

(To be continued.)

BOOK-NOTES, NEWS, etc.

Linnean Society of London.—At the General Meeting on March 14th, the President in the Chair, Miss M. S. Campbell gave an account of the work of the Phenological Committee of the Royal Meteorological Society. These observations, on plants, birds, and insects, have been made for about fifty years, and at present there are over four hundred voluntary workers engaged on the task. The work was revised and reorganized by Major H. C. Gunton in 1937. The botanical panel has examined the list of plants on which observations are made, and has left in only those about which there can be no doubt. The same individual plants are observed each year, so far as possible, and notes are asked for on habitat and special weather conditions. Each year the returns are analysed and diagrams made illustrating the results in their relation to temperature, rainfall, and sunshine recordings.

Major Gunton showed diagrams illustrating how earliness or delay in the arrival of weather with two spells of stimulating temperatures may cause two stations, on the average fourteen days apart, to be either twenty-eight days apart or only four days apart.

Dr. H. Godwin then gave an account of Pollen-analysis and the Forest History of England and Wales. The typical pollen diagram for the post-Glacial period shows a threefold divisibility into a first period of increasing warmth in which successive forest types extend their importance, a second period of optimum forest development, and a third period of diminishing warmth in which there is some sign of revertence in forest history and some extension of trees (beech and hornbeam) not previously of importance. In each part of England and Wales the forest history has followed an equivalent but not identical course. The correlation of the zones and subzones, which have been distinguished, with archæological horizons in the Fenland can be consistently extended to the rest of England and Wales.

Pollen-analysis has been applied with success to determination of the age of the submerged peat-beds round our coasts. It should be possible to apply this method to resolve the isostatic and eustatic components of land and sea-level movements, and it will certainly shed light on the former distribution of both fauna and flora.

Peziza repanda on sand-bags.—Anyone with the time to devote to investigating the flora which has appeared on sand-bags for A.R.P. would doubtless find much of interest. The dilapidation of untreated sand-bags has followed the course predicted, especially where soil has been used for filling the bags ; soil has a microflora capable of reducing any plant-remains. What has been remarkable is the crop of *Peziza repanda* appearing on the bags in many parts of London ; the fungi have usually been massed at ground-level. *P. repanda* is a woodland species, occurring most frequently in beech-woods, where it is found on the soil or on rotten trunks. It is one of the commonest of the larger Discomycetes, but I have seen more in South Kensington recently than elsewhere during thirty years.—J. R.

Psalliota villatica.—A typical specimen of the "giant mushroom" of newspapers was recently brought to the Department of Botany by Colonel W. B. Lane. The cap was eight to nine inches in diameter, the height eight inches, and the weight one and three-quarter pounds. It was found in the wine cellar of the Mercers' Company, and, in growing, overturned an open box containing a bag of lime, a total of fifty-two pounds, *i. e.*, almost thirty times its own weight.

The habitat is unusual for this species, if not unique. It may be that its spores were carried there in the straw envelopes round the champagne bottles.—J. R.

British Association.—It has been reluctantly decided to cancel the Conference on Science in National and International Aspects which was to be held at Reading, July 25–27.

NOTES ON THE FLORA OF THE ISLES OF SCILLY.—II.

By J. Edward Lousley.

Last summer I was in Scilly from July 14th–26th for the purpose of continuing the survey begun in 1936. The more important records then made, together with a few determinations of plants collected in previous years, are embodied in this paper. The flora of the islands in July appeared far less attractive than on my previous visits in May, June, and September, but much useful work was done in ascertaining the distribution of species in the various islands, and a number of new plants to Scilly were recorded. An exceptionally calm sea greatly facilitated inter-island transit, and with the help of friends lists have now been made of the flora of all the uninhabited islands. These will be the subject of a separate paper. During the first part of my stay I had the advantage of the company of Mr. J. D. Grose, who had arrived a few days earlier, and who gave me great assistance.

The same arrangement and abbreviations are used in these notes as in the previous paper in this Journal for 1939, pp. 195–203.

Ranunculus acer L. St. Mary's ; marshy meadow near Rocky Hill.

†Barbarea verna Mill, Aschers. Tresco ; Old Grimsby (31), whence it was recorded by J. Ralfs (*in litt.* to Townsend, 1877) : St. Martin's ; towards Lower Town (Hb. Dallas).

Cochlearia officinalis L. Local. St. Mary's ; near Pulpit Rock Peninnis ; Toll's Island ; near Halangy (Hb. Dallas) : St. Agnes ; plentiful in Priglis Bay (37) ; on the Gugh : Bryher ; only towards the north of the island—Shipman Head (35), Northward (337) : Melledgen and Rosevear (Hb. Dallas).

†Sisymbrium orientale L. St. Agnes ; near Gugh Farm (32) : Tresco ; New Grimsby (30)—it was noted for this island by Downes in 1921.

Crambe maritima L. St. Mary's ; 5 plants on shore E. of Tolman Point, 1 plant at Porthellick : St. Agnes ; Prislis Bay in fair quantity : Tresco ; Appletree Banks (Hb. D.-S.), New Grimsby : Great Ganilly.

Polygala serpyllifolia Hose. St. Mary's ; Pelistry Bay (81) ; Porthellick (79).

Melandryum album (Mill) Garcke. St. Agnes ; Higher Town, and near the Lighthouse : Tresco ; Cliff fields (Hb. D.-S.) : Bryher ; about the Town : St. Martin's ; noted by Miss M. Knox, 1938.

SPERGULARIA SALINA J. & K. Presl. Bryher; abundant around the Pool (59 and 334).

SPERGULARIA RUPICOLA Lebel * var. GLABRESCENS Brèb. St. Mary's; cultivated field at Normandy (60).

ELATINE HEXANDRA D.C. Tresco; still occurs abundantly on the sandy margin of Abbey Pool (369).

*†MALVA MOSCHATA St. Mary's; a single plant noted by Mr. Dallas near Old Town.

*†MALVA ROTUNDIFOLIA L. em. Fr. (*M. pusilla* (With) G. & G., *M. borealis* Wallm.). St. Martin's; near New Quay, 1936.

ONONIS REPENS L. St. Mary's; in quantity on a hedgebank at Borough (308).

†MEDICAGO SATIVA L. St. Agnes; field near Middle Town, probably as a relic of cultivation: Tresco; cultivated fields (Hb. D.-S.), well established on a roadside at Old Grimsby, which may well be the station where Lawson noted it in 1869 (Journ. Bot. 1870, 357).

†MEDICAGO HISPIDA Gaertn. var. DENTICULATA Willd. St. Mary's; bulbfield near Hugh Town (109): St. Agnes; in small quantity at Priglis Bay: St. Martin's; bulbfield near Middle Town—*var. *apiculata* (Willd.) Wohlfarth. St. Martin's; bulbfield at Middle Town (110)—*var. *confinis* (Koch) Burnat St. Mary's; bulbfield near Old Town (108).

TRIFOLIUM SCABRUM L. St. Mary's; a very small form on the sandy beach at Porthellick (300): Tresco; a specimen so labelled in Herb. Dorrien-Smith.

PEPLIS PORTULA L. Tresco; abundant around Abbey Pool.

LYTHRUM SALICARIA L. St. Mary's; in quantity on Higher Moors near Tremelethen: Tresco; In Duckery (Hb. D.-S.).

EPILOBIUM OBSCURUM Schreb. and E. PALUSTRE L. St. Mary's: together on Higher Moors (266 and 266 *a*).—Det. G. M. Ash.

ANGELICA SYLVESTRIS L. St. Mary's; Hugh Town marshes, Porthellick Bay and Higher Moors: St. Martin's; near Turfy Hill: Great Ganinick; abundant N. end (327).

*VALERIANELLA CARINATA Lois. St. Mary's; bulbfield near London (139).

SOLIDAGO VIRGAUREA L. St. Mary's; Road to Pelistry Bay, Toll's Island: Great Ganilly; common: Middle Arthur (Hb. D.-S.).

ARCTIUM VULGARE (Hill) Evans. This is the only *Arctium* I have seen in Scilly; it is frequent on all the inhabited islands, occurring also about the ruins on Samson. Voucher material has been collected from Bryher; Northward (336).

*†CREPIS TARAXACIFOLIA Thuill. St. Mary's; in quantity about Holy Vale, and at Porthloo. The very local distribution suggests that this species is a recent introduction.

*HIERACIUM UMBELLATUM L. St. Mary's; By path from Innisidgen Carn to Bar Point (279)—teste H. W. Pugsley; lane leading east from ¼ mile north of Old Town (Hb. Dallas).

PRIMULA VULGARIS Huds. Tresco; near Carn Near: Samson; specimen in Hb. Dorrien-Smith. The only previous record is the vague one by Townsend as "Found by Mr. Smith."

MYOSOTIS CAESPITOSA Schultz. St. Mary's; Roadside ditch near Tremelethen; Rocky Hill marshes; near Watermills (158): Tresco; shore of Abbey Pool.

SIBTHORPIA EUROPÆA L. St. Mary's; Shore at Tregear's Porth (261); corner of field near Watermill Cove; very fine on the sides of a shaded ditch in Pungie's Lane (289); also in a ditch in Lower Moors, where it was found by Mr. Dallas.

EUPHRASIA. All determined by Mr. H. W. Pugsley.

*EUPHRASIA CONFUSA Pugsley. St. Mary's; Peninnis Head—f. *albida*, "unusually robust" (311: St. Agnes; The Gugh—"doubtful, too young for certainty" (165).

*EUPHRASIA CURTA Fries ex Wettst. forma *glabrescens* (Wettst.). St. Mary's; Bar Point (282).

EUPHRASIA OCCIDENTALIS Wettst. *var. *minor* Pugsley Bryher; Samson Hill (331).

*EUPHRASIA ANGLICA Pugsley var. *gracilescens* Pugsley. St. Mary's; Salakee Downs (295).

SALVIA HORMINIOIDES Pourr. St. Agnes; on a bank near Higher Town.

CHENOPODIUM RUBRUM L. Tresco; in plenty on exposed mud on the shores of Abbey Pool, and also in Abbey Gardens: Bryher; around the large Pool: Samson; scattered along the east shore (a most unusual habitat), and with *Scutellaria galericulata* in damp places in the S.E. corner of the island.

*POLYGONUM HETEROPHYLLUM L. Common in all the inhabited islands. A rather stout, thick-leaved specimen from St. Mary's; sandy shore of Porthcressa—has been determined as var. *vulgare* Desv. by Mr. C. E. Britton.

*POLYGONUM ÆQUALE Lindman may be frequent. I have seen it as follows:—St. Mary's; track near Halangy: St. Agnes; occasional: Bryher; Northward. A specimen from Bryher;

bare ground near Pool (338)—was named *sub-var. *parvulum* Moss by Mr. Britton.

POLYGONUM HYDROPIPER L. St. Mary's; track near Bar Point: Tresco; track near Abbey Pool; hollow on Castle Down.

POLYGONUM PERSICARIA L. St. Mary's; Maypole (306)—ad var. *elatius* G. & G. vergens: Tresco; by Pool Road (364): Bryher; bulbfield, The Town (346)—*var. *elatius* G. & G.—all det. C. E. Britton: St. Martin's; field near New Quay.

POLYGONUM LAPATHIFOLIUM L. St. Mary's; Maypole (307); Holy Vale (173): Tresco; By Pool Road (363)—"fruits not typical." All named by Mr. Britton.

*†POLYGONUM CUSPIDATUM Sieb. & Zucc. St. Mary's; roadside near Rose Hill.

RUMEX CONGLOMERATUS Murray. St. Mary's; common: St. Agnes; occasional: Tresco; very common and not restricted to damp places: Bryher; local. *×*pulcher* L. ssp. *eu-pulcher* Rech. fil. Bryher; Southward (340).

*RUMEX PULCHER L. ssp. *eu-pulcher* Rech. fil.×. *rupestris* Le Gall: Tresco; New Grimsby (R. B. E. 270); Samson; east shore.

*RUMEX CRISPUS L. ×OBTUSIFOLIUS L. St. Mary's; common: St. Agnes; common: Tresco; Duckery shore, Old Grimsby: Bryher; very common; The Town (332).

RUMEX ACETOSA L. A variation with small fruits measuring only about 3×3 mm. occurs on two uninhabited islands—Great Ganilly (317) and Great Arthur (314)—and may be deserving of a new name.

HUMULUS LUPULUS L. St. Mary's; Hugh Town and Watermill Bay.

QUERCUS ROBUR L. In recording the discovery of a single small Oak on the uninhabited island of Great Ganinick I stated that I did not remember noticing the species even in gardens in Scilly. Mr. Dorrien-Smith now tells me that there are several trees in the grounds of Tresco Abbey, about two and a half miles from Great Ganinick. The acorn may have been carried over the intervening sea by a bird. Mr. H. N. Dixon has kindly sent me a reprint of a most interesting paper in 'The Antiquaries Journal,' xiv. 302 (1934) by C. F. Tebbutt, in which it is shown that carbonised wood of *Q. Robur* was found in a cist dating from the first century A.D. discovered on the small island of Old Man (adjoining Tean). If Oak did grow in the islands at that time it may well have been destroyed by ships' crews who are known to have been frequent callers in search of shelter and supplies throughout the ages. It is possible that the association of *Rubus* and *Pteridium* with a ground layer of *Scilla non-scripta* and *Hedera Helix, Nepeta hederacea*, and *Brachypodium sylvaticum*, and more locally *Euphorbia amygdaloides*, which is so characteristic of many of the wilder parts of Scilly, may be a relic of prehistoric Oakwood. On the other hand, the wood found in the cist may have been imported, but there is some historic evidence of the former existence of woodland. Mothersole ('The Isles of Scilly,' 1919, p. 66) states that Duke Cosmo III. of Tuscany recorded that in 1669 thick stumps of oak were found in many places in digging the ground, and she also observes that there is a tradition of an Abbey Wood on Tresco.

*ALLIUM BABINGTONII Borrer. St. Mary's; Hedgebank E. of Tolman Point: Tresco; Gimble Porth in very small quantity; School Green, about 30 plants (368); abundant in field near Dolphinstown. Davey claims this species as native on the mainland of Cornwall. In Scilly it occurs in the first two stations in circumstances which are open to no more suspicion than the localities about Pradannack and Gunwalloe at which I have seen it.

*ALLIUM VINEALE L. var. COMPACTUM (Thuill.) Bor. St. Mary's; Pelistry Bay; Holy Vale—shown to me at both stations by Mr. J. D. Grose.

ALLIUM URSINUM L. Davey's citation of Borlase for this species on which I relied in my previous paper (Journ. Bot. 1939, 201) is misleading. Borlase states "... Wild Garlick grows, as I was informed, in some of the off-islands, but I met with none" ('Observations on the ancient and present state of the Islands of Scilly,' 1756, p. 78)—the full quotation showing that the author had doubts about his record. But Leland, writing of *c.* 1533, says, "Diverse of (these) islettes berith wyld garlyk" ('Itinerary of John Leland,' written 1533–9; first published 1710—quoted from Mothersole, *op. cit.* p. 31). Woodley writes, "Garlick is much cultivated, although it also grows wild" ('A View of the present state of the Scilly Islands,' 1822, p. 78). It seems unlikely that any of these writers referred to *Allium ursinum* L., which has not been observed by any botanist. *Allium Babingtonii* is the most likely species of *Allium* to have occurred both cultivated and wild, but that is a Leek.

JUNCUS EFFUSUS L. em. Koch. St. Mary's; Lower Moors, near Rose Hill (305); Higher Moors (258, 271, and 276): Tresco; Swamp S.W. of Great Pool (358).

JUNCUS ACUTIFLORUS (Ehrh.) Hoffm. St. Mary's; Higher Moors (264, 267).

ZOSTERA MARINA L. Abundant in the shallow sea about the Eastern Isles and thence to St. Martin's (330).

SCIRPUS PYGMAEUS (Vahl) A. Gray. St. Mary's; Lower Moors (304); Higher Moors (277): St. Agnes; Hb. Downes, 1923.

ERIOPHORUM ANGUSTIFOLIUM Roth. St. Mary's; Higher Moors (273). This gathering is an interesting variation which bears superficial resemblance to *E. latifolium*, but lacks the asperous peduncles of that species. The plants are about 70 cm. tall, the spikelets mostly sessile, but a few with peduncles up to 6 cm., bristles 5–7 mm., and thus shorter than in the typical species. Two varieties differing from the typical species in the shortness of the bristles have been recorded from Britain :—

(1) var. TRIQUETRUM Fries sec. Davey in Journ. Bot. 1906, 279. This is said to have sessile or very shortly stalked spikes, and to be a diminutive plant. Two sheets collected by Davey in the herbarium of the South London Botanical Institute are immature, and it is therefore difficult to say whether they differ in these characters from my Scilly Islands plants. It was recorded from Cornwall.

(2) var. BREVISETUM Druce in B. E. C. 1925 Rep., 789, 1926. This had "more or less peduncled spikelets and very short bristles, 10–15 mm. only" and was a robust plant, from Jersey.

It seems doubtful whether these two varieties are worthy of separation, and the characters of both differ from my Scilly plant.

Lawson has recorded *E. latifolium* Hoppe for the islands in Journ. Bot. 1870, 358, and this record was entered by Townsend in a copy of his paper which is now at the South London Botanical Institute. Townsend lent this manuscript to Ralfs, and hence *E. latifolium* was attributed to "Townsend in Ralfs' Fl." by Davey (Fl. Cornwall, 1909, 471). It seems almost certain that Lawson collected a similar plant of *E. angustifolium* to my no. 273 upon which all records for *E. latifolium* were incorrectly based.

CAREX ARENARIA L. On Annet, a flat, uninhabited "bird-island," there is an interesting form or variety of this species with the spike reduced to one or two spikelets (Ref. 192 *b*) growing as a compact colony and without intermediates amidst masses of the typical species (Ref. 192 *a*).

CAREX PANICULATA L. em. Schk. St. Mary's; Higher Moors (275) growing with a state with congested panicles (272). The only previously printed record for this species from Scilly is that in Thurston and Vigur's 'Supplement to Davey's Flora of Cornwall,' 1922, 143 :—"St. Mary's Scilly, 1922, Downes." A sheet from Higher Moors in Herb. Dorrien-Smith is undated, but was probably gathered earlier. In the part of Downes's collection which is preserved at Yeovil Museum there are three sheets of this species from Scilly :—(1) Higher Marsh, June 14th, 1923,

the typical form. (2) Old Town Marsh, June 1922. This is a strongly cæspitose, short (*c.* 30 cm. tall) plant, which appears to be secondary growth after the plant having been previously injured by fire. Arthur Bennett saw this specimen and stated (*in litt.* to Downes, July 8th, 1922)—"I think your *Carex* is only a stunted or reduced state of *C. paniculata* L. . . . It may be the var. *brevis* Asch. & Graebner, Synopsis, 46, 1902." (3) Higher Marsh, June 14th, 1923, labelled var. *simplicior* And. These specimens are immature, and I should doubt if they justify varietal rank.

*CAREX OTRUBAE Podp. (C. VULPINA auct. angl.). St. Mary's; Higher Moors (278).

*CAREX PANICEA L. St. Mary's; Old Town Marsh, June 1923, Downes in Herb. Downes (Yeovil) as *C. flacca*.

*CAREX FLAVA L. var. ŒDOCARPA And. St. Mary's; Higher Moor, June 1923, Downes in Herb. Downes.

*†SETARIA VERTICILLATA (L.) Beauv. Tresco; weed in Abbey Gardens (352)—teste C. E. Hubbard.

*AGROSTIS GIGANTEA Roth. var. DISPAR (Michx.) Philipson. St. Mary's; roadside, Tremelethen (257)—teste C. E. Hubbard: Tresco; roadside near the Abbey (357).

FESTUCA RUBRA L. *var. GLAUCESCENS H. & H. St. Agnes; Priglis Bay (200): Little Innisvouls (322).—Both det. W. O. Howarth.

BROMUS MADRITENSIS L. *var. PUBESCENS Guss. Bryher; bulbfield, The Town (347).—Det. C. E. Hubbard.

AGROPYRON REPENS (L.) Beauv. *var. ARISTATUM Baumg. Bryher; Southward (342).—Det. C. E. Hubbard.

CALAMAGROSTIS EPIGEIOS (L.) Roth. Little Arthur (318): Little Ganilly (312): Great Ganilly (315). This was also seen on the Great Ganinick whence it was recorded by White (Journ. Bot. 1914, 19), but it grew abundantly on the northern slopes rather than on the top.

CHARA GLOBULARIS Thuill. var. FRAGILIS (Desv.). Tresco; Abbey Pool (186)—teste G. O. Allen.

The following hortal species have been determined by the staff of the Royal Botanic Gardens, Kew :—

*†OXALIS FLORIBUNDA Lehm. Bryher; well established under *Pteridium* on the track from the "Town" to the "Pool" (231 & 235). This was recorded by me in error as *O. violacea* L. in my previous paper (Journ. Bot. 1939, 199).

*†OXALIS CORNICULATA L. Tresco; Abbey Grounds as a weed on pathsides (236), and hollows on Appletree Banks (378)—in both places as small forms.

*†OXALIS CERNUA Thunb. St. Mary's ; roadside near Tremelethen (231)—also seen in many other places in the vicinity of houses.

*†BRACHYGLOTTIS REPANDA Forst. St. Mary's ; Lane from Normandy to Pelistry Bay (270) ; also planted as a " windbreak " near Old Town.

*†ALLIUM ROSEUM L. St. Mary's ; bulbfield near Tremelethen (228) as a weed.

*†GLADIOLUS sp. (probably a garden hybrid). St. Mary's ; hill above Hugh Town Church (227). Also seen abundantly as a weed (resulting from previous cultivation) in the bulbfields throughout the five inhabited islands, and at many places on the cliffs and waste ground.

*†AGAPANTHUS AFRICANUS (L.) Hoffmgg. Tresco ; many magnificent clumps on Abbey Farm sandhills, on the site of the old sea-plane base (367)—also seen in hollows on Appletree Banks, thoroughly established.

Herb. Downes.—Part of the herbarium of the late Dr. H. Downes of Ilminster is now in Yeovil Museum, but this portion consists almost entirely of *Cyperaceæ*. The remainder of the collection is likely to be rich in Scilly plants, but all efforts to trace it have failed.

In conclusion, I should like to express my indebtedness to Mr. J. D. Grose and Miss Anne Dorrien-Smith for a number of records, and to Messrs. G. M. Ash, G. O. Allen, C. E. Britton, C. E. Hubbard, H. W. Pugsley, and the Director of the Royal Botanic Gardens, Kew, for the identification of material.

THE CORRECT APPLICATION OF THE NAME *POLYSTICHUM ACULEATUM*.

BY A. H. G. ALSTON.

THE name *Polystichum aculeatum* is at present a source of confusion in systematic botany because it is used in two opposite senses. In Great Britain it is mostly applied to *P. lobatum* Huds. and on the continent to *P. angulare* Presl. The following references to standard works serve to show the divergence. The confusion has been increased because the generic name *Aspidium* Swartz, now regarded as a synonym of *Tectaria* Cav., has been applied to these plants.

1. POLYSTICHUM LOBATUM Huds. is called in standard works :—

P. aculeatum (L.) Roth apud Mertens in Röm. Arch. ii. 106 (1799) ; Tent. Fl. Germ. iii. p. 79 (1800) ; Britten, European Ferns, 141 (1881) ; Druery, Brit. Ferns, 188 (1910) ; Wilmott in Bab. Man. Brit. Bot. ed. 10, 526 (1922) ; F. J. Hanbury, London Catalogue, ed. xi, 53 (1925) ; Britten & Rendle, List Brit. Seed-plants & Ferns, 39 (1907).

P. lobatum (Huds.) Presl, Tent. 83 (1836) ; Druce, Brit. Plant List, ed. 2, 137 (1928) ; C. Chr. Ind. Fil., 538 (1906).

Aspidium lobatum (Huds.) Sw. in Schrad. Journ. 1800, pt. 2, 37 (1801) ; Christ, Farnkräuter der Schweiz., 115 (1900).

A. lobatum (Huds.) Mett. var. *genuinum* Luerssen in Rabenh. Krypt.-Fl., 331 (1889).

A. aculeatum subsp. *lobatum* (Sw.) Milde, Fil. Eur., 105 (1867) ; Rouy, Flore Française, xiv. 418 (1913).

Dryopteris lobata (Huds.) Schinz & Thellung in Schinz & Keller, Fl. Schweiz, 7 (1923).

2. POLYSTICHUM ANGULARE (Kit. ex Willd.) Presl is called :—

P. angulare (Kit. ex Willd.) Presl, Tent., 83 (1836) ; Britten, *l. c.* 144 ; Britten & Rendle, *l. c.* 39 ; Wilmott, *l. c.* 527 ; F. J. Hanbury, *l. c.* 53.

P. aculeatum (L.) Schott, Gen. Fil. ad t. 9 (1834) ; C. Chr. Ind. Fil., 575 (1906).

Aspidium lobatum var. *angulare* (Kit. ex Willd.) Mett. Fil. Hort. Lips., 88 (1856) ; Luerss. *op. cit.* 343.

A. aculeatum (L.) Swartz in Schrad. Journ. 1800, pt. 2, 37 (1801 ; Christ, *l. c.* 121 ; Rouy, *l. c.* 417.

Polystichum setiferum (Forsk.) Woynar in Mitt. Naturw. Ver. Steierm. xlix. 181 (1913) ; Druce, Brit. Plant. List, ed. 2, 137 (1928).

Dryopteris setifera (Forsk.) Woynar ex Schinz & Thellung in Vierteljahrschr. Zürich Naturf. Ges. lx. 340 (1915) ; Schinz & Keller, *l. c.* 7.

Now both *Polystichum aculeatum* Roth and *P. aculeatum* Schott were primarily based on *Polypodium aculeatum* L., and the application of the epithet therefore depends on the interpretation of Linné's species.

The original description of *Polypodium aculeatum*, in the Species Plantarum, ed. 1, p. 1090, no. 39 (1753), was based on Royen's ' Florae Leydensis Prodromus, exhibens plantas quae in Horto Academico Lugduno-Batavo aluntur,' p. 500, no. 6 (1740).

Linnaeus's definition and references were :—

" POLYPODIUM fronde bipinnata : pinnis lunulatis dentatis, stipite strigoso. *Roy. lugdb.* 500. *Dalib paris.* 314.

Filix aculeata major. *Bauh. pin.* 358. *prodr.* 151.

Habitat in Europa."

Royen's phrase name and references were :—

" POLYPODIUM fronde duplicato-pinnata, foliolis lunulatis dentatis, petiolo strigoso.

Lonchitis aculeata major. *Tourn. inst.* 538. *Boerh. lugdb.* 1. p. 25.

Filix aculeata major. *Bauh. Pin* 358."

Thus Linnaeus's definition was copied from Royen, with changes of a terminological nature only. Therefore, though Jackson [Index Linnean Herb. p. 120 (1912)] states that there is a specimen which was in the Linnean Herbarium in 1753, not this but Royen's type should be considered the type of Linnaeus's species. The specimen in Linné's Herbarium is labelled "*aculeatum* 39 [species number in Sp. Pl. ed. 1. M[=Magnol]." Smith presumably saw it and considered it the same as his *Aspidium aculeatum*, which judging by English Botany, ed. 2, t. 1417 (1841), appears to have been *P. angulare*. A letter to the Rijks Herbarium produced the following reply from Dr. Van Oostroom :—

" I have tried to trace the species of VAN ROYEN, mentioned in his Fl. Leyd. Prodr. as *Polypodium* fronde duplicato-pinnata, foliolis lunulatis dentatis, petiolo strigoso. There is, however, no specimen in our collection bearing this phrase name, but there are two sheets, both from VAN ROYEN's collection, which bear the Linnean name *Polypodium aculeatum* and the definition given by LINNAEUS : P. frondibus bipinnatis, pinnis lunulatis ciliato dentatis, stipite strigoso. These sheets are numbered H.L.B. 908, 311.70 and H.L.B. 908, 311.67.

" H.L.B. 908, 311.70 shows the apical part of a leaf of *Polystichum aculeatum* (L.) SCHOTT ssp. *lobatum*, and bears, as has been stated above, the names *Polypodium aculeatum* and P. frondibus bipinnatis, pinnis lunulatis ciliato dentatis, stipite strigoso, in a handwriting which, as far as I can see, is not that of VAN ROYEN. Moreover, the sheet bears the letter A, written with the same ink and the addition Ex Anglia p. D. Alexander and G. 11.9 n. 53 (or G. 1179 n. 53 ?), written in a different (not VAN ROYEN's) handwriting. I suppose that A is an abbreviation for Alexander.

" H.L.B. 908, 311.67 shows a leaf without top of *Polystichum aculeatum* (L.) SCHOTT ssp. *lobatum* and the basal and apical part of another leaf of the same species. There are three labels, two of which are placed in the lower right corner. These labels bear the indications : 1. Polypodium fronde bipinnata : pinnis lunulatis dentatis, stipite strigoso Linn : 1090. n. 39. Filix aculeata major C.B. In sylvis montosis umbrosis, humidis. Roy. Sp. 6. 2. Filix mas non ramosa foliis latis auriculatis spinosis.

" The third label has been affixed to the leaf without top and contains the indications : Filix aculeata. D.Al. (D.Al. may be an abbreviation for D. Alexander).

" Finally there is a sheet (and this is, in my opinion, the most important one) H.L.B. 908, 311. 72 with two leaves of *Polystichum aculeatum* (L.) SCHOTT ssp. *lobatum*, *bearing in* VAN ROYEN's *handwriting* the indication (copied as you see from BOERHAAVE's Index alter) : 1. Lonchitis ; aculeata ; major. T. 538. Filix aculeata ; major. C.B.P. 358. Filix mas, aculeata ; major. C.B. Prodr. 151. †. VAN ROYEN'S son (D. VAN ROYEN, 1727–1799 ; the father is A. VAN ROYEN, 1704–1779) added a label with : Filix aculeata major B.P. 358. Lonchitis aculeata major I.R.H. 538. Later on someone else added the name *Polypodium aculeatum*. I suppose that VAN ROYEN, the father, had this specimen before him when he distinguished his Polypodium fronde duplicato-pinnata etc. He did not add, however, this name. If this supposition is right, the sheet H.L.B. 908, 311.72 can be accepted as the type."

Tournefort's ' Institutiones Rei Herbariae,' i. p. 538 (1750), has no real description. It is only a transfer to *Lonchitis* as follows :— Lonchitis aculeata, major. *Filix aculeata, major C.B.Pin. 358. Filix mas, aculeata, major Prodr. 151.*

C. Bauhin's 'ΠΙΝΑΞ Theatri Botanici,' p. 358 (1623), refers back to the Prodromus, thus :—

Filix aculeata.

I. Filix aculeata major.

II. Filix aculeata minor : utraque in Prodromo descripta est.

C. Bauhin's 'ΠΡΟΔΡΟΜΟS Theatri Botanici,' p. 151 (1620), has a more extended description, as follows :—

II. FILIX mas aculeata maior : radicem habet nigram, fibrosam, pediculos pedales, foliosos, in multas alas pinnatas, modo maiores, modo minores, modo minores profundis diuisos pallide virentis, primis in ambitu dentatis, & in breuem spinulam desinentibus. Hanc in monte Wasserfall legimus.

Now Royen's description could not have been taken from Bauhin's, because there is no mention of " stipite strigoso." A. P. de Candolle, in his account of Bauhin's Herbarium [Bull. Herb. Boiss. sér. 2, iv. 200–216 (1904)], states that he did not examine the cryptogams. The Herbarium was then at Basle. Hagenbach's 'Tentamentum Florae Basilensis' (1821), which includes an interpretation of Bauhin's names based on his herbarium, does not include cryptogams. However, a letter to the Botanische Anstalt der Universität Basel produced the following reply from Dr. G. Senn :—

" Bauhin's Herbarium is still in Basel. As the Keeper of our Herbaria writes me, two quite good specimens of the species in question are there. They are labelled as follows : ' Filix mas aculeata maior.' They are identical with *Polystichum lobatum* (Huds.) Pr. Tent.=*Aspidium lobatum* Sw.=*Asp. aculeatum* (Sw.) Asch. ssp. *lobatum* (Sw.) Asch., but not with *Polyst. angulare*. There is also a specimen of *F. Pluckenetii* (Loisel.) which is labelled as : ' Filix mas aculeata minor '."

The reference to Bauhin was also cited by Linnaeus, and Linnaeus sometimes interpreted Bauhin's species by means of Burser's Herbarium [as noted by Jackson, *op. cit.* p. 21]. Juel, in his account of Burser's Herbarium ['Symbolae Botanicae Upsalienses,' ii. p. 134 (1936)] mentions a specimen representing Bauhin's name in vol. xx. no. 40 of the Herbarium, and states that it is *Polystichum aculeatum* (L.) Schott, i. e. *P. lobatum* Huds. as opposed to *P. angulare* Presl.

Royen's remaining reference was to Boerhaave's 'Index alter Plantarum quae in Horto Academico Lugduno-Batavo aluntur, p. 25 (1720).' Here, again, there is no real description : only :—

" 1. Lonchitis ; aculeata ; major. T. 538. *Filix aculeata, major. C.B.P.* 358. *Filix mas, aculeata, major. C.B. Prodr.* 151.+." [The + is explained as " Significat indigenam Bataviae stirpem."]

As Royen's description could not have been taken from any of his references he must have had a specimen which was his type, and the ultimate basis of Linnaeus's species also. It was presumably a plant growing in the Botanical Garden at Leiden, and no doubt the specimen H.L.B. 908, 311.72, the statement that it was a native of Holland being an error. *P. lobatum* is not a native of Holland, where only *P. angulare* is found.

Linnaeus's reference to Dalibard ['Florae Parisiensis Prodromus, ou catalogue des Plantes qui naissent dans les environs de Paris,' etc., p. 314, no. 9 (1749)] is unimportant. He merely copies Royen's diagnosis and cites the Tournefort synonym.

In conclusion, the results may be summarized as follows :—

1. The type-specimen of *Polypodium aculeatum* R. is at Leiden, and is the species later named *P. lobatum* Huds.
2. All Linnaeus's and Royen's references refer to this same species.
3. The authority for the combination *Polystichum aculeatum* (L.) should be Roth, and not Schott.
4. The name *Polystichum aculeatum* (L.) Roth should be used for *P. lobatum* Huds.
5. *P. angulare* (Kit. ex Willd.) Presl should be called *P. setiferum* (Forsk.) Woynar.

THREE EAST CORNWALL BRAMBLES.

By F. Rilstone, A.L.S.

Rubus tumulorum, sp. nov.

Turio angulatus striatus parce pilosus vel subglaber, parce glandulosus, copiose aculeolatus. Aculei majores inæquales ad angulos dispositi recti vel reclinati. Petiolus sat pilosus aculeis falcatis setis glandulisque obsitus. Folia 3-nata utrinque subglabra subtus viridia. Foliolum terminale obovatum acuminatum vel cuspidato-acuminatum emarginatum subcuneatum. Inflorescentia lata laxa pyramidalis vel oblonga, inferne foliosa, rachis flexuosa patenter pilosa aculeis falcatis vel reclinatis munita, dense glandulosa. Rami longi, apicem versus patuli, inferiores adscendentes. Sepala pilosa tomentosa glandulosa post anthesin plerumque reflexa. Petala angusta oblanceolata alba vel rosea. Stamina alba stylos superantia.

Stem yellowish brown or purplish, fairly sharply angled, striate, with very little hair ; main prickles chiefly on angles, rather small, usually purplish with pale points, patent or declining straight or somewhat curved, not crowded ; pricklets and setæ numerous, stalked glands few. Leaves mostly 3-nate ; petiole fairly or thinly hairy, with 6–10 falcate prickles and numerous acicles and stalked glands. Leaflets rather thin, green (not yellowish green), thinly strigose above, thinly hairy beneath, with fairly long white hairs, not soft to the touch, with rather coarse but shallow compound toothing, the teeth apiculate, veins prominent beneath. Terminal leaflet obovate-acuminate or cuspidate-acuminate, with subcuneate emarginate base and stalk about $\frac{1}{4}$ of its length. Lateral leaflets shortly stalked, mostly at right angles to the petiole. Panicle lax, broad, pyramidal or cylindrical, with top often truncate and primordial flower shortly stalked ; the lower part with simple and 3-nate leaves, all very sparingly hairy like those of the stem, and the latter much like those of the stem in shape. Rachis somewhat flexuous, considerably but not densely hairy, with little or no felt, fairly numerous unevenly spaced falcate or declining prickles and a dense clothing of acicles and stalked glands, mostly shorter than the patent hair. Panicle branches long and generally slender, mostly 1–3-flowered and patent to patent-ascending above, lower branches distant and strongly ascending, rather like secondary panicles. Sepals grey-felted and hairy, plentifully glandular and aciculate, moderately long-pointed, mostly reflexed in fruit. Petals narrow to very narrow, oblanceolate, white or pink. Stamens white, longer than styles.

Herb. Rilstone, Ref. nos. 275 (a coarse form from Looe, with Rev. H. J. Riddelsdell), 285 (type gathering, near Bury Down camp, Lanreath), 288,289.

Recorded in 'Journal of Royal Institution of Cornwall,' 1926, p. 277, as doubtfully a form of *R. Borreri* var. *dentatifolius* Briggs. Distributed over a considerable area from the coast by Looe and Polperro to a good many miles inland, a district with many tumuli and other remains of prehistoric man.

Rubus cinerosiformis, sp. nov.

Turio purpureus sulcatus, pilosus præsertim ad angulos, glandulis sparsis subnullis munitus. Aculei subæquales basi brevibus longi recti vel reclinati, ad angulos dispositi. Folia

parva 3-nata supra glabriuscula subtus viridia parce pilosa minute vel mediocriter serrata. Foliolum terminale late ellipticum vel obovatum cuspidatum subcordatum. Inflorescentia plerumque parva laxa interrupta pilosa glandulosa aculeis tenuibus reclinatis instructa. Sepala post anthesin reflexa cinereo-tomentosa anguste albo-marginata parce glandulosa. Petala alba anguste obovata, stamina alba stylos virescentes superantia.

Stem dark purple, sometimes blackish purple, brown underneath, somewhat furrowed, with a considerable amount of white patent hair, especially on the angles. Prickles from a short base, long and slender, patent or declining, chiefly on the angles, somewhat unequal; an occasional pricklet or stalked gland on the faces. Leaves rather small and neat, mostly 3-nate. Petiole moderately long, with rather slender, curved or declining prickles, considerable patent hair, and a few acicles and stalked glands. Leaflets green and almost glabrous above, green and rather thinly hairy beneath, with rather fine toothing, simple shallow serration in the lower half of the leaf, above irregular and somewhat compound, with some teeth patent. Terminal leaflet broadly oval or oval-oblong or slightly obovate, with subcordate base and cuspidate point and stalk about $\frac{1}{3}$ its length. Panicle usually small, lax, with distant lower branches and with simple and 3-nate leaves. Rachis with slender declining prickles, considerable white patent hair, and fairly many stalked glands and acicles. Sepals reflexed in fruit, grey-felted, with narrow whitish edges and occasional stalked glands. Petals white, rather narrowly obovate, stamens white, outer stamens longer than green styles.

Herb. Rilstone, Ref. nos. 160, 291, 380 (type gathering, Langreek, Polperro).

A neat low-growing plant with pretty white star-like flowers. Frequent in the neighbourhood of Polperro and for at least ten miles inland.

Rubus fuscoviridis, sp. nov.

Turio validus purpureus angulatus, faciebus planis vel convexis, dense pilosus, glandulis setisque crebris subæqualibus obsitus, parce aculeolatus. Aculei majores subæquales ad angulos dispositi. Folia ampla 5-nata digitata supra fuscoviridia subtus viridia utrinque parce pilosa, grosse apiculato-serrata; foliolum terminale late obovatum cuspidato-acuminatum emarginatum vel cordatum. Inflorescentia cylindrica inferne foliosa interrupta, rachis sat dense aculeata, aculeis curvatis vel rectis reclinatisve, dense pilosa, tomentosa, glandulosa. Sepala dense pilosa tomentosa post anthesin reflexa vel patula. Petala rosea, obovata, stamina stylos superantia.

Stem strong purplish, moderately angled, with flat or somewhat convex faces and a dense clothing of yellowish-white hair, subequal stalked glands and acicles and a few minute pricklets; main prickles mostly on the angles, fairly equal, of moderate length, declining, often slender and needle-like above the base, purple or purple-based, with lighter tip; intermediate pricklets very few. Leaves large, 5-nate digitate, with large, mostly simple, apiculate toothing and some teeth patent, dusky green and thinly strigose above, paler green with scattered white hair beneath. Terminal leaflet broadly obovate cuspidate-acuminate, with emarginate to cordate base and stalk more than $\frac{1}{3}$ its length. Panicle cylindrical, interrupted below, with simple and 3-nate leaves, rachis with numerous prickles, curved or straight and declining below, slender and still more numerous in the ultra-axillary part, shaggy, with dense yellowish hair and felt, and with abundant stalked glands and acicles sunk in the hair; upper panicle branches 1–3-flowered. Sepals moderately long-pointed, densely clothed with yellowish hair and felt acicles and stalked glands, reflexed or partly patent in fruit in well-grown plants, sometimes erect in dwarf growth on exposed cliff slopes. Flowers showy, cup-shaped, with roundish or obovate pink petals. Stamens longer than styles.

Herb. Rilstone, Ref. nos. 10 (type gathering, Polperro, July, 1919), 25, 496, 733, 784, 794. No. 25 was distributed through the Botanical Exchange Club (B.E.C.) in 1920 as *R. oigoclados* M. & L. Recorded as a form of *R. fuscus* Wh. & N. in 'Journal of the Royal Institution of Cornwall,' 1926, p. 279.

A frequent bramble in the part of S.E. Cornwall between the Great Western Railway and the coast eastward from Fowey. In many respects remarkably like Col. Wolley-Dod's Edge Green plant issued as *R. Newbouldii* in the 'Set of British Rubi,' no. 66 (*R. rubristylus* W. Watson), but the stem is not furrowed, and the shaggy hair clothing of stem and rachis is far more like that of *R. fuscus*. It also recalls *R. obscurus* Kalt. Altogether it seems better to treat it as a distinct species.

RESULTS OF TWO BOTANICAL EXPEDITIONS TO SOUTH ALBANIA.

By A. H. G. Alston, B.A., F.L.S., and N. Y. Sandwith, M.A., F.L.S.

(Continued from p. 151.)

*Silene fabarioides Hausskn.; Turrill in Hook. Ic. Pl. t. 3353 (1938).

Near Ersekë, stony ground in river-bed, c. 3300 ft., 29. vi. 33, no. 1992. Inflorescence remarkably divaricate-dichotomous. Petals deeply bifid, very narrow. Corona large. Gjergjevicë, bare places on serpentine in deep gorge, 4000 ft., 21. viii. 35,

no. 2589. Leaves glaucous, rather fleshy. Veins on calyx pale grey. Petals greenish-white. Corona half as long as petals.

*SILENE GIGANTEA L. var. VIRIDESCENS Boiss. *S. rhodopaea* Jka. *S. pseudo-nutans* Panč.

Above Leskovik, limestone rocks of Melesin, with *Crepis turcica*, c. 3300 ft., 19. vi. 33, no. 1786. Very tall and erect, with huge thyrse ; extraordinarily viscid. Petals green.

SILENE GRAECA Boiss. et Sprun.

Sarandë, bare limestone coast slopes, 2. vi. 33, no. 1337. Flowers pink.

Silene italica (L.) Pers. var. ***angustifolia** Turrill, var. nov.; foliis inferioribus angustioribus, calycis dentibus latioribus obtusioribusque, tubo pubescente haud glanduloso distinguitur.

ALBANIA : Nemerçka Range, above Biovishd, among juniper bushes on broken limestone slopes, 5000 ft., 22. vi. 33, *Alston* and *Sandwith* no. 1837 (typus in Herb. Kew. ; dupl. in Herb. Mus. Brit.). Flowers brownish-white.

S. italica is very widely spread in the Balkan Peninsula, and shows a fair range of variation in a number of characters, *e. g.*, length of calyx and density of calyx indumentum. The lower leaves have usually a long and rather slender petiole broadening into a broadly elliptic to obovate blade, and the calyx is usually strongly glandular with short-stalked glands. The present material has narrowly oblanceolate lower leaves, and a finely and shortly pubescent calyx without glands. Probably to be associated with the type are : South (Greek) Macedonia, rocky slopes above Pisoderion, W. of Florina, 4600 ft., 6. vi. 32, *Alston* and *Sandwith* 184 (Herb. Kew., Herb. Mus. Brit.) ; and North (Yugoslav) Macedonia, above Sv. Petka, c. 5000 ft., 22. vi. 35, *Rev.* and *Mrs. H. P. Thompson* 769 (Herb. Kew.).—W. B. TURRILL.

*SILENE LONGIFLORA Ehrh. subsp. STATICIFOLIA (S. et S.) Hayek.

Voskopoj, rocky serpentine slopes, 4500 ft., 20. viii. 35, no. 2565. Very glutinous. Corolla-tube pale green ; petals purple.

*SILENE REMOTIFLORA Vis.

Sarandë, bare limestone coast hills near sea-level, 3. vi. 33, no. 1362. Flowers bright rose.

SILENE SCHWARZENBERGERI Hal. ; Turrill in Hook. Ic. Pl. t. 3354 (1938).

Near Gjergjvicë, on serpentine rocks in deep gorge, c. 4000 ft., 6. vii. 33, no. 2134. Petals reddish and green.

*SILENE UNGERI Fenzl.

Sarandë, bare limestone coast slopes near sea-level, local, 30. v. 33, no. 1207. Stems very viscid. Flowers crimson.

*SILENE VENTRICOSA Adam. ; Turrill in Hook. Ic. Pl. t. 3227 (1934).

Gramos Range above Ersekë, bushy slopes on sandstone, 4500 ft., 27. vi. 33, no. 1937. Ostrovicë Range, grassy slopes on sandstone, 6500 ft., 4. vii. 33, no. 2079.

*TUNICA RIGIDA (L.) Boiss. sens. Hal. et Hayek.

Durrës (Durazzo), sand-dunes, 30. viii. 35, no. 2740. Flowers pink, tending to be clustered.

HYPERICACEAE.

HYPERICUM HIRSUTUM L.

Above Dardhë, S.W. of Korçë, local on shady bank of streamlet in beech woods, 4000 ft., 24. viii. 35, no. 2624.

MALVACEAE.

HIBISCUS TRIONUM L.

Rogojina, between Berat and Durrës, a weed in maize-field, 70 ft., 17. viii. 35, no. 2520.

Not recorded by Hayek from either Albania or Epirus, but noted by Baldacci between Berat and Vlorë ; see It. Alb. 113 (1917).

LINACEAE.

*LINUM ELEGANS Spr. var. ELATIUS Hal.

District of Voskopoj, bare stony slopes in deep serpentine gorge near Gjergjevicë, 4000 ft., 3. vii. 33, no. 2060. Flowers bright yellow.

*LINUM EXTRAAXILLARE Kit., det. W. B. Turrill. *L. perenne* subsp. *extraaxillare* (Kit.) Graebn.

Çajup, Mali Lunxheriës, 12. vi. 33, c. 4000 ft., bare ground near the great meadow, no. 1634. Flowers rather large, a lovely azure-blue.

GERANIACEAE.

*ERODIUM MALACOIDES (L.) Willd.

Sarandë, bare limestone slopes near sea-level, 2. vi. 33, no. 1335. Flowers dark magenta.

GERANIUM ARISTATUM Freyn et Sinten. ; Turrill in Hook. Ic. Pl. t. 3276 (1934).

Tomor Range, rubbly limestone slopes of Abbas Ali, among juniper and pine, 5800 ft., 13. viii. 35, no. 2455. Ostrovicë Range, bare broken limestone slopes, 6200 ft., 4. vii. 33, no. 2083.

Flowers pale mauve with darker veins, the colour of a pale washed-out *Malva sylvestris*.

SAPINDACEAE.

AESCULUS HIPPOCASTANUM L.

Lunxheriës Range, very local in sandstone ravine on slopes between Çajup and Zhej, c. 3200 ft., 8. viii. 35, no. 2365. Tree c. 40–70 ft. high, several seen, native, fruiting. Κάστανο (Greek); " Kështenje " (Albanian).

LEGUMINOSAE.

ASTRAGALUS ANGUSTIFOLIUS Lam., det. W. B. Turrill.

Melesin, above Leskovik, 19. vi. 33, 4000 ft., limestone rocks near summit, no. 1755. Flowers white.

This plant seems distinct from those here named *A. sirinicus* Ten. It has not the long shaggy hairs on the calyces, but there are no fruits.—W. B. TURRILL.

ASTRAGALUS ATTICUS Nyman.

District of Sarandë, sandstone slopes by road between Nivicë e Bubarit and Lukovë, 1500 ft., fr. 4. vi. 33, no. 1409. Near Leskovik, dry bushy sandstone slopes, 3000 ft., 17. vi. 33, no. 1712; prostrate, flowers pinkish lilac to nearly white.

ASTRAGALUS BALDACCII Degen.

Nemerçka Range, rocky limestone slopes of Kuruna above Biovishd (loc. class.), c. 5000–5500 ft., 22. vi. 33, no. 1826. Flowers in dense masses, pale pinkish lilac to nearly white. Seen only in one spot, in good quantity.

*ASTRAGALUS EXSCAPUS L.

District of Voskopoj; near Gjonbabas, below Ostrovicë Range, on grassy slopes, 4000 ft., 3. vii. 33, no. 2053. Flowers bright yellow.

Collected in the same neighbourhood by Dr. P. L. Giuseppi (no. 21) in June 1937. The specimens appear to represent the typical form of the species, which is not recorded from the Balkan Peninsula by Hayek.

*ASTRAGALUS SIRINICUS Ten., det. W. B. Turrill.

Lunxheriës Range, stony limestone slopes of Strakavec, 5500 ft., fl. 13. vi. 33, no. 1649, and fr. 12. vii. 33, no. 2207. Gramos Range, above Ersekë, rocky (sandstone) ground near summit, 6000 ft., 27. vi. 33, no. 1947. Flowers greenish white.

These specimens probably represent one species which seems to be distinct from *A. angustifolius* Lam. in the more shaggily hairy calyces and the long hairs of the legumes. Rohlena (Fünfter Beitr. Fl. Montenegro) doubts the specific distinctness of the two species, but from the material available at Kew one

concludes that it is possible to separate them clearly. Baldacci's no. 168 of his *Iter Albanicum* (*Epiroticum*) *Quartum*—collected in Greek Epirus—at Kew is also *A. sirinicus* Ten. (see Nuov. Giorn. Bot. Ital. vi. 160, under the name *A. angustifolius* Lam., with a note). The type of *A. tymphresteus* Boiss. et Sprun. in Boiss. Diagn. I, ii. 63 (1843) has not been seen, but the specimen so named—and so quoted by Halácsy, Consp. Fl. Gr. i. 435 (1900)—collected by Haussknecht at Agrapha, in reg. super. Pindi summi montis Karáva, alt. 5500–6500′, 1–3 July, 1885, at Kew, matches very well the Albanian and Italian material of *A. sirinicus*.

Fiori, Nuova Flor. Anal. d'Ital. i. 893 (1925), gives the distribution of *A. sirinicus*—under the name *A. Tragacantha* L. var. *sirinicus* (Ten.)—as Mts. Lesina, Alburno, Sirino, Mula, Sardinia, Corsica, Dalmatia, Montenegro. There appears no reason to doubt that this gives approximately the known distribution.—W. B. TURRILL.

Our plant is the subsp. *eu-sirinicus* Briq. Prodr. Fl. Corse, 2, i. 352, which occurs in Italy and the Balkan Peninsula. The Corsican and Sardinian material, with pods glabrous at maturity and a few other minor distinctions, is referred by Briquet to subsp. *genargenteus* (Moris) Briq. Bunge, in his Monograph of the genus *Astragalus*, in Mém. Acad. Imp. Sc. Pétersb. xi. pp. 131–2 (1868), distinguished *A. sirinicus* from *A. angustifolius* by the glabrous stems and pods. The explanation may be that he examined only Corsican material of *A. sirinicus*. A Sardinian sheet at Kew, incidentally, has hairs on the mature pods.—A. H. G. ALSTON and N. Y. SANDWITH.

*BISERRULA PELECINUS L.

Sarandë, broken limestone coast hills, near sea-level, 3. vi. 33, no. 1374.

*CALYCOTOME VILLOSA (Poir.) Lk.

Sarandë, bare rocky limestone slopes near sea-level, 1. vi. 33, no. 1293. Shrub 6 ft. high.

*CICER MONTBRETII Jaub. et Spach.

Near Zhej, in valley between Lunxheriës and Nemerçka Ranges, in oak-woods on sandstone slopes, c. 2000 ft., 12. vi. 33, no. 1642. Very local and seen only sparingly in one spot. Erect. Flowers large, white, but standard with a dark violet blotch.

A great extension westward of the known distribution of this species, which Hayek recorded only from Thrace.

CYTISUS PINDICOLUS Hal. *C. austriacus* L. var. *pindicolus* Degen.

Nemerçka Range above Biovishd, broken limestone slopes, 5000 ft., 22. vi. 33, no. 1795. Flowers bright yellow.

ERVUM ERVOIDES (Brign.) Hayek.

Sarandë, stony limestone coast hills near sea-level, 1. vi. 33, no. 1276. Flowers mauve. Pods hairy.

GENISTA DEPRESSA M. Bieb. subsp. CSIKII (Kümm. et Jav.) Hayek.

Gramos Range above Ersekë, grassy slopes, 5500 ft., 27. vi. 33, no. 1953.

*LOTUS EDULIS L.

Sarandë, rocky limestone coast slopes, sea-level, 3. vi. 33, no. 1378.

*LOTUS PRESLII Ten. f. SIBTHORPII (Rouy) Hayek.

Berat, ditches in cultivated fields by river, 200 ft., 16. viii. 35, no. 2500. Flowers few, rather pale. Calyx teeth rather longer than tube. Perhaps var. *pedunculatus* (Cav.) Rouy, *vide* Hayek, Prodr. i. p. 881.

LUPINUS GRAECUS Boiss., det. W. B. Turrill.

Above Gjinokastrë, c. 1500 ft., open oak scrub on sandstone slopes, 8. vi. 33, no. 1504.

Not recorded by Hayek from either Albania or Epirus, but mentioned in Chodzes' list of Gjinokastrë plants identified by Heldreich (see Verh. Bot. Brandenb. xxi. 62 (1880)).

*MEDICAGO CORONATA (L.) Desr.

Sarandë, rocky limestone slope above the town, near sea-level, 30. v. 33, no. 1234.

*MELILOTUS ITALICUS (L.) Lam.

Sarandë, bare rocky limestone slopes near sea-level, 1. vi. 33, no. 1275.

*ONOBRYCHIS ALBA (W. & K.) Desv. var. DALMATICA Sirj.

Gjinokastrë, gravelly ground by river, 8. vi. 33, no, 1455. Flowers white with pink veins.

ONOBRYCHIS LACONICA Orph.

Biovishd, at foot of Nemerçka Range, sandstone slopes, 2000 ft., 21. vi. 33, no. 1791. Flowers pink.

*ONONIS ORNITHOPODIOIDES L.

District of Sarandë; near Borsh, broken limestone slopes near sea-level, 4. vi. 33, no. 1397.

*PHYSANTHYLLIS TETRAPHYLLA (L.) Boiss.

District of Sarandë; Borsh, roadside, 4. vi. 33, no. 1423.

TRIFOLIUM SPECIOSUM Willd.

Above Gjinokastrë, rocky limestone slopes, 1500 ft., 7. vi. 33, no. 1444. Flowers mauve, turning brown.

Recorded from the Gjinokastrë district in Chodzes's list of plants named by Heldreich in 1879 (see Verh. Bot. Brandenb. xxi. 63 (1880)).

*TRIFOLIUM XANTHINUM Freyn.

Sarandë, rocky limestone coast slopes above the town, near sea-level, 30. v. 33, no. 1232. Flowers sulphur-yellow. A very handsome species.

*VICIA PEREGRINA L.

Near Leskovik, cultivated ground on slopes, 3500 ft., 18. vi. 33, no. 1742. Flowers dull mauve.

ROSACEAE.

*CRATAEGUS HELDREICHII Boiss.

Between Barmash and Borovë, near Ersekë, grassy place, 3500 ft., 25. vi. 33, no. 1895. Flowers greenish white.

FILIPENDULA ULMARIA (L.) Maxim. subsp. *DENUDATA (Presl) Hayek.

Lunxheriës Range, in the great meadow at Çajup, 4000 ft., 9. viii. 35, no. 2418. Leaflets green beneath, *pilose*, not tomentellous on nerves as in most sheets labelled *denudata*.

Agrees with *Baldacci* 264, from Montenegro, and appears to be the f. *denudata* (Presl) Beck of Hayek, Prodr. Fr. Balcan. i. 658. It is a very distinct plant, which probably deserves the rank of subspecies.

*GEUM HETEROCARPUM Boiss.

Lunxheriës Range; above Çajup, Strakavec, under a juniper-bush on limestone summit ridge, 5500 ft., 13. vi. 33, no. 1663; and from the same spot, in fruit, 12. vii. 33, no. 2209. Petals pale yellow.

First record for the Balkan Peninsula (see Turrill in Kew Bull. 1935, pp. 54–55). Recently recorded from under junipers in a similar habitat in Cyprus (see Kew Bull. 1938, p. 465).

*POTENTILLA PINDICOLA Hausskn., det. A. K. Jackson.

Near Ersekë, in plain below Gramos Range, 26. vi. 33, c. 3400 ft., dry sandy fields and banks, no. 1922. Flower medium size. Leaves not silvery beneath.

*RUBUS HIRTUS W. et K., det. W. B. Turrill.

Distr. of Korçë, Dardhë, 26. viii. 35, c. 5500 ft., beech woods on sandstone, no. 2679. Styles exceeding stamens; leaves green beneath; stem green; petals white; sepals erect in fruit.

SAXIFRAGACEAE.

PARNASSIA PALUSTRIS L.

Voskopoj, marshy spots in pine wood below Hagios Prodromos Monastery, 3700 ft., 19. viii. 35, no. 2523.

SAXIFRAGA CHRYSOSPLENIIFOLIA Boiss.

Gjinokastrë, limestone cliff on Mali Gjer, 4000 ft., 9. vi. 33, no. 1521. Flowers white with crimson spots.

SAXIFRAGA GRISEBACHII Degen & Dörfl.

Lunxheriës Range, limestone rocks of summit ridge above Çajup, 6000 ft., 12. vi. 33, no. 1621. Flowers dark purple.

SAXIFRAGA OPPOSITIFOLIA L. subsp. MERIDIONALIS Terrac.

Ostrovicë Range, limestone rocks at summit, c. 7400 ft., 4. vii. 33, no. 2069. This appears to be the most southern locality at present recorded for this plant in the Balkan Peninsula.

CRASSULACEAE.

*SEDUM STELLATUM L., det. A. K. Jackson.

Sarandë, bare rocky limestone slopes, near sea-level, 1. vi. 33, no. 1283.

*SEDUM STRIBRNYI Vel.

Near Shipska, N. of Voskopoj, one patch on serpentine rock, 4000 ft., 22. viii. 35, no. 2600. Petals withered.

*UMBILICUS HORIZONTALIS DC.

Sarandë, limestone coast slopes, 300 ft., 30. v. 33, no. 1239. Flowers greenish white.

Recorded by Hayek from neither Albania nor Epirus, although mentioned by Baldacci as growing on the Nemerçka Range above Prëmeti (see It. Alb. 142 (1917)). However, the plant distributed by him from this locality was later named *Cotyledon erectus* (see Bull. Herb. Boiss. iv. 626 (1896)).

CUCURBITACEAE.

*BRYONIA ALBA L.

Dardhë, S.W. of Korçë, a weed in the garden of a hotel, also seen in the village, 4000 ft., 26. viii. 35, no. 2661. Berries black.

UMBELLIFERAE.

ANTHRISCUS SYLVESTRIS (L.) Hoffm.

Voskopoj, grassy meadow, 3800 ft., 1. vii. 33, no. 2021.

Recorded by Hayek from neither Albania nor Epirus, but noted by Baldacci near Trebesin (see It. Alb. 134 (1917)).

(To be continued.)

SHORT NOTES.

COTONEASTER INTEGERRIMUS Med. IN BRITAIN.—Dr. Lloyd Praeger has recently drawn my attention to a second British station for this species, printed in the second issue of the seventh edition of Bentham & Hooker's ' Handbook of the British Flora,' by the late Dr. A. B. Rendle (1930). This station is " On the Benderloch, crags by the sea." Benderloch, north-east of Oban, in Argyll, is presumably the place intended.

The discovery of a second British locality for *C. integerrimus*, so long known only on the Great Orme's Head, would seem of sufficient interest to warrant a short notice in this Journal, but no record of it can be traced, nor is it referred to in the publications of the two British Botanical Exchange Clubs. There is no specimen and no information respecting the record in Herb. Mus. Brit., at Kew, or at Edinburgh. Peter Ewing, in his ' Glasgow Catalogue of Native and Established Plants,' ed. 2 (1889), recorded the species for Argyll and Cantyre, but Sir William Wright Smith has ascertained that there are no specimens from these counties in his herbarium, and that the only example there under this name is really *C. microphyllus* Wallich.

The record in the Handbook evidently came to Rendle's knowledge between 1924 (the date of the first issue of ed. 7) and 1930, and it is strange that it should have been accepted without comment in view of Britten's caustic papers in this Journal in 1924 (pp. 62 and 244), where a similar record from the Isle of Wight in the ' Wild Flower Magazine '—a misidentification of *C. microphyllus*—was corrected.

It curiously happens that in ' Country Life ' for 23 March, 1940, there is an article by Winifred M. Letts on " Flower Hunting in the Western Hebrides," in which the finding of *C. integerrimus* at Benderloch is narrated. The writer, who appears to be connected with the Wild Flower Society or a similar institution, says that she saw the Cotoneaster tumbling over the severe frontage of the cliff, and that its starry faces peeped from the shrubby, tough branches on every side, where it had seeded freely. From this description the plant would seem to be the Himalayan *C. microphyllus*, which has become naturalised in so many places and has often been mistaken for our native species. The latest issue of the ' Wild Flower Magazine ' (April to May, 1940, p. 50) repeats this Benderloch record from ' Country Life ' in spite of Britten's correction and rebuke. Until an authentic specimen can be produced it is obviously desirable to ignore the record in the Handbook.—H. W. PUGSLEY.

EMPIS PENNIPES Linn. ON THE FLOWERS OF GERANIUM ROBERTIANUM Linn.—On 28 May, 1940, I noticed in the herbage of a lane-side bank near Goodrington, South Devon, on the flowers of *Geranium Robertianum*, a great abundance of an insect

strange to me. Mr. N. D. Riley has kindly identified it as *Empis pennipes*, and tells me that it is rather rare in Britain. The flies showed little activity: they rested on the petals with their tongues thrust to the base of the flower where the honey glands are. Sometimes there would be more than one of them on a flower, even up to five, all stationary, with their red heads close together.

Their efficiency as pollinators seemed small, as they were not moving from flower to flower. But that they should have been so abundant and all feeding on the same plant interested me. The insect's tongue is 5–6 mm. long, and therefore long enough to drain the honey; but they appeared to be sucking the tissues of the nectaries, for it was difficult for them to free themselves.

Empids have tongues by which many prey on other insects, sucking their juices: and similarly they suck plant juices. Charles Darwin recorded this species as feeding in the flowers of *Orchis maculata*, which has no free honey (Ann. Mag. Nat. Hist. ser. 4, iv, 142 (1869)), and in his 'Fertilisation of Orchids' (ed. 2, p. 41 (1888)) he mentions an *Empis*, without giving its specific name, as seen penetrating the tissues of the nectary of that plant. Hermann Müller ('Fertilisation of Flowers,' English trans. (1883), p. 387) recorded *Empis pennipes* on *Hottonia palustris* in Germany, and on *Valerianella olitoria* (Verhandl. naturhist. Ver. Preuss. Rheinland u. Westfalen, xxxix, 99 (1882)); he says that the insects were sucking honey and abundant—exceedingly abundant on the *Valerianella*,—just as I found them on the Geranium.—I. H. Burkill.

Rumex crispus × Hydrolapathum.—In the extensive marshes around Downpatrick, in County Down, in spite of recent drainage operations, *Rumex Hydrolapathum* occurs in remarkable quantity. Mixed with it, mostly in small proportion, is *R. crispus*, the only other species of dock present, and also a large admixture of another plant which is clearly a hybrid between the two. In stature it frequently overtops both parents, attaining under present conditions a height of four feet or more. It is perennial, with the knotted branching rootstock and tuft of stems of *Hydrolapathum*, contrasting with the tap-root and solitary stems of *crispus*. The leaves are rather narrower and smaller than those of the Great Water Dock, slightly wavy on the margin, and without the dark, almost blue-green tint of that species. *R. crispus* flowers a fortnight or so before *R. Hydrolapathum*, and the hybrid is intermediate in this respect. The floral parts are intermediate in character, but recall *crispus* rather than *Hydrolapathum*. The abundance in which the plant occurs suggests that it is fully fertile. This hybrid is known on the Continent (*zerstreut* according to Hegi), where Haussknecht has called it *R. Schreberi*, but I do not find it in any British list to which I have access.—R. Lloyd Praeger.

ORCHIS MACULATA L. VAR. *CORNUBIENSIS* PUGSL.

FURTHER NOTES ON BRITISH DACTYLORCHIDS.

BY H. W. PUGSLEY.

(PLATE 624.)

WHEN I described *Orchis pardalina* (Journ. Linn. Soc. Bot. xlix. 581–3 (1935)) I pointed out that a difference of opinion had existed among British botanists respecting its status, Messrs. Godfery, Stephenson and Butcher having treated it as a natural species, *O. latifolia* L., while the late G. C. Druce doubted this and finally regarded it as a hybrid, *O. maculata* L. × *praetermissa* Dr. On the balance of evidence, and with my own experience in the field, I admitted it as a good taxonomic species. Since that date other botanists have suggested that it is a hybrid, *O. maculata* (*Fuchsii* Dr.) × *praetermissa*.

In 1938 Mr. F. Rilstone, writing in this Journal on some Cornish plants (p. 136), stated that *O. praetermissa* and *O. pardalina* were not uncommon in Cornwall, while *O. maculata* (*Fuchsii*) was a rarity, only certainly known from the extreme west of the county. Mr. Rilstone informs me that its station is near St. Ives, and that it is not the usual form of *O. Fuchsii*. I also learned that *O. pardalina* had been discovered in some quantity near Axmouth, in South Devon.

As it seemed desirable to obtain more information of the conditions under which *O. pardalina* grows in the west, I visited Cornwall and South Devon during the first half of last June, and saw the plant *in situ* in five distinct stations.

Mr. Rilstone first took me to the Lambriggan valley, near Perranzabuloe, a rather narrow depression with marshy fields along the bottom, overgrown with *Iris*, *Lychnis Flos-cuculi*, *Juncus* and *Equisetum*. Here *O. praetermissa* was common, with *O. pardalina* much less so, perhaps in a proportion 1–3. A few individual plants examined were intermediate in characters and were presumably hybrids. No *O. maculata* form was seen, and, according to Mr. Rilstone, none is known in the valley.

I was next taken to Ventongimps Moor, a few miles away. This is a damp, marly expanse, supporting much *Schoenus* and sedges. The prevalent orchid there is *O. ericetorum* (Lint.), and on the moor itself only two dwarf individuals of a Marsh Orchis (*O. praetermissa*) were observed. Along one side of the moor, however, in a wet strip of ground similar to what we had seen at Lambriggan, we found plenty of *O. praetermissa* and several hybrid plants, *O. ericetorum* × *praetermissa*. Some of these latter were very luxuriant and handsome. On another side of the moor also there was much *O. praetermissa*, and with it a few plants of *O. pardalina*. No *O. maculata* (*Fuchsii*) was observed.

On the following day I was botanising among the dunes at the north end of Penhale Sands, about three miles north of Perranporth, and in one of the wet slacks, green with much *Equisetum palustre*, I found a large colony of *O. pardalina* mingled with a still greater abundance of *O. praetermissa*. No apparent hybrids were noticed here, and no other species of *Orchis* was visible.

A few days later I visited a similar wet field near Kingskerswell, in South Devon, with Rev. T. Stephenson and Mr. G. T. Fraser, where the same plants occur, *O. praetermissa*, *O. pardalina* in less quantity, and a certain number of presumable hybrids between them. There is no *O. maculata* form in the immediate vicinity, so far as is known, and Dr. Stephenson has been familiar with the locality for several years.

Finally, I explored the marsh near Axmouth where *O. pardalina* has been much collected in recent years. It is of small extent but very wet, without *Iris* but with much *Schoenus*, *Carex* and *Equisetum maximum*. *O. pardalina* is clearly the dominant *Orchis* here, being abundant, while *O. praetermissa* is relatively scarce. A very few intermediates, apparently hybrids, were noticed, but no form of *O. maculata*.

The *O. pardalina* of all these stations is obviously one well-marked form, and identical with plants that I have previously seen near Lewes and elsewhere, on which the original description is founded. In Cornwall a few individuals produced leaves with solid dark spots, but ringed spots are much more general, and have rightly been taken as a taxonomic character. The flowers were very uniform in colour and in the shape and markings of the lip, except at Axmouth, where in a few individuals the ground-colour was unusually pale, and in some others the double loop of the lip was less distinct. It is probable that in young plants, both of *O. pardalina* and *O. praetermissa*, as well as, indeed, of *O. majalis* Rchb., the labellum often tends to be narrow, with a long, projecting central lobe.

After seeing *O. pardalina* growing in these five stations I think that no ground exists for supposing it to be a hybrid, *O. maculata* (*Fuchsii*) × *praetermissa*, and it is obviously not *O. ericetorum* × *praetermissa*. There is no doubt but that plants may sometimes be found growing with *O. maculata* (*Fuchsii*) and *O. praetermissa*, which may not be readily separable from *O. pardalina*, but I believe that when once the characters of the last-named are appreciated the hybrid may generally be distinguished. Since my return from Cornwall I have seen fresh specimens of what I think to be this hybrid from a locality in Shropshire where one of the parents, *O. praetermissa*, has lately become extinct.

On one or two occasions I have seen solitary specimens, which I consider to be true *O. pardalina* and not hybrids, growing among other species of Marsh Orchids occurring in more or less abundance. I have similarly noticed single individuals of *O. latifolia* L. (*O. incarnata* auct.) or *O. maculata* in company with some quantity of *O. praetermissa* or other cognate forms, and this is probably a frequent experience. The presence of a solitary dactylorchid among numerous individuals of allied species does not necessarily indicate hybridity.

The question remains of the relationship of *O. pardalina* and *O. praetermissa*. *O. pardalina* is not certainly known at present in any British station from which *O. praetermissa* is absent, and it seems likely that the two plants similarly grow in company in Holland. I suspect that the same association may also be found in northern France, where *O. praetermissa* has only been recognised in recent years, and where *O. pardalina* may still be confused with *O. majalis*. The Dutch form that appears identical with *O. pardalina* was first described by Vermeulen as a variety *junialis* of *O. latifolia* (*O. majalis* Rchb.) (Ned. Kruidk. Archief. 397 (1933)), but subsequently he transferred it as a variety to *O. praetermissa*. This transfer seems to accord with its natural affinities. It is clear that the two plants require the same conditions of growth, but whether *O. pardalina* has arisen from *O. praetermissa*, or the converse, is a matter of mere speculation in our present knowledge. They seem to hybridise occasionally, as do other dactylorchids, but there is no appearance of any intergradation of forms. As the chromosome numbers are alike in all the plants of this group, $2n=80$, cytology affords little help beyond indicating that *O. pardalina* is not *O. Fuchsii* × *praetermissa*, in which $2n=60$ would be expected. As *O. pardalina* is not a hybrid, and its points of distinction are clear and constant, and as well marked as those of other recently described Marsh Orchids, it may reasonably be regarded as specifically distinct.

Mr. Wilmott has lately (B.E.C. Report, xi. v. 551 (1938)) raised to specific rank the Irish orchid which I originally described as *O. majalis* Rchb. var. *occidentalis*, and afterwards changed, at his suggestion, to the rank of a subspecies. I am reluctant to treat this plant as a species separate from the Continental *O. majalis*, but if this view is taken, then it is illogical to let the Wicklow orchid remain as a subspecies under *O. majalis*, and this too should become a full species, **O. Traunsteinerioides** Pugsl. It is not unlikely that this plant will be discovered in further stations in Great Britain.

I must now revert to the Cornish *O. Fuchsii*. In Davey's 'Flora of Cornwall' (1909) *O. maculata* is said to be "very common in all the districts" and *O. ericetorum* "perhaps not infrequent," but in Thurston's 'Notes on the Cornish Flora' (1936) the latter is stated by Stephenson to be common on the moors, while *O. Fuchsii* is recorded from two places only near St. Ives.

Rilstone (*l. c.*) confirms that *O. Fuchsii* is a Cornish rarity, and, as remarked above, has noticed that the St. Ives form is peculiar. It is thus clear that these plants were not accurately known to Davey.

On 15th May, 1921, I met with a colony of an orchid, on the cliffs near St. Ives, which seemed unfamiliar and made me doubt momentarily whether I was looking at a Spotted or a Marsh Orchid. I gathered a good series of specimens and sent some to Mr. E. J. Bedford, who kindly made a water-colour drawing of the plant and also took a photograph. Recently I find that Dr. Stephenson has collected the plant in the same neighbourhood, and there is little doubt but that it is the rare form of *O. Fuchsii* that Mr. Rilstone thought peculiar.

As compared with average British *O. Fuchsii* the Cornish plant is relatively dwarf and compact, 10–18 cm. in height, and less slender. The leaves are arcuate-recurved, keeled beneath, and in colour light green, conspicuously marked with large, somewhat transverse, dark purple spots, which give the plant something of the aspect of *O. mascula* L. The spike is short, less dense but with rather larger flowers than in typical *O. Fuchsii*, and with rather broad bracts generally exceeding the buds and equalling the flowers. The colour of the flowers is pale pink—seemingly less lilac than is usual in *O. Fuchsii*—with light rosy crimson, varying lined and dotted markings on the labellum. The labellum is deeply trilobate, with the middle lobe normally oblong, quite obtuse, and about as long as the rounded and somewhat broader lateral ones. The spur is cylindrical, almost as long as the ovary, and nearly as thick as in *O. praetermissa*.

The plant appears to be a local form connected with *O. Fuchsii* which merits distinction as a variety. Its habit is no doubt the result of environment, but the short, rather lax spike of largish, thick-spurred flowers seems an essentially distinct feature. It is proposed to distinguish it as a variety under *O. maculata* L., using this name in a general sense that would cover *O. Fuchsii* Dr. but not *O. ericetorum* (Lint.). The strict application of the Linnaean name has yet to be satisfactorily fixed, but it seems to be ultimately based on the *Satyrium-basilicum foemina* of Fuchs (Hist. cclxx. 712 (1542)), which is a plant related to *O. Fuchsii* rather than to *O. ericetorum*.

ORCHIS MACULATA L.

v. **cornubiensis** Pugsl. var. nov. (Pl. 624.)

Exsicc. Pugsley, no. 592, in Hb. Pugsley.

Herba vix gracilis, satis compacta, 10–18 cm. alta. Folia (summis exceptis) arcuato-recurvata, inferne carinata, dilute viridia, maculis ± magnis, subtransversis, atropurpureis conspicue notata. Spica sæpissime brevis, quam in *O. Fuchsii* minus densa, floribus paulo majoribus bracteisque latiusculis gemmas vulgo superantibus floresque æquantibus prædita. Flores pallide carnei, verisimiliter quam in *O. Fuchsii* minus lilacini, in labello lineis punctisque roseis varie notati; labellum lobo medio sæpius oblongo obtuso laterales rotundatos paulo latiores subæquante (raro superante) alte trilobatum; calcar cylindricum, ovario subæquilongum, ut in *O. praetermissâ* fere crassum.

Hab. in declivis maritimis prope St. Ives comitatûs Cornubiæ in Angliâ.

EXPLANATION OF PLATE 624.

Orchis maculata L. var. **cornubiensis** Pugsl.

Two specimens of the original gathering, the left-hand plant the more typical. (About $\frac{4}{5}$ths natural size; from a photo by Mr. E. J. Bedford.)

Dissections: 1, 3 and 4, detached flowers, × 1·5, the last an unusual form; 2, side view of detached flower, to show spur.

CONTRIBUTIONS TO THE STUDY OF BRITISH ELMS.—III. THE PLOT ELM, *ULMUS PLOTII* DRUCE.

BY R. MELVILLE, PH.D., F.L.S.

THE Plot Elm has been the subject of more confusion than any other British Elm, due in part to the haphazard way in which it was described. The idea that it constituted a distinct species appears to have developed gradually in Druce's mind. The first reference in print appears in the 'Report of the Botanical Exchange Club,' 1907, 258 (1908) as *Ulmus sativa* Mill. var. *Lockii* Druce, with the following most inadequate description:—

> "A graceful tree with small, rather narrow leaves and very distinct habit. Is frequent about Fineshade and other parts of Northamptonshire and is known there as Lock's Elm."

In his 'List of British Plants' (1908), Druce included it as "*U. sativa* e *Lockii*," but soon afterwards seems to have changed his mind as to its relationships, for in the 'Journal of the Northampton Natural History Society, xv. 291 (Dec. 1910) it is recorded as *U. glabra* Mill. var. *Lockii* Druce, though without any reason being given for the transfer.

The earliest account of the Plot Elm as a species, that I have traced, appeared in J. Northampt. Nat. Hist. Soc. xvi. 88 (Sept. 1911) under the heading "*Ulmus Plotii* Druce, sp. nov." Here it states that "A preliminary notice with a photograph of this graceful elm has recently appeared and the species is now for the first time published; a fuller description with plate will be given later." It is not clear where the preliminary notice appeared, though the statement quoted suggests that the binomial "*U.*

Plotii" had not been published before. A list of localities followed, with a statement claiming that his new species was identical with the elm figured in Plot's 'Natural History of Oxfordshire' (1677). The promised "fuller description" appeared in the December number of the same journal (xvi. 107–8, 1911), and was illustrated by two photographs. Substantially the same account was published also in Proc. & Rep. Ashmolean Nat. Hist. Soc. 33–5, 1911 (1912), 'Gardeners' Chronicle,' Dec. 9, 1911, and somewhat later in Rep. Bot. Exch. Club, 31, 1911 (1912).

These later accounts began with the following words and quotation :—

"This tree was first distinguished by Dr. Robert Plot in his classic *Natural History of Oxfordshire*, published in 1677, where he writes of it as hitherto not described, proceeding to give an account of it as 'a narrow-leaved Elm, which also being smooth, justly deserves the name *Ulmus folio angusto glabro*, wherein it differs not only from the *Ulmus minor* of Parkinson and Gerarde, but also from their *Ulmus folio glabro*, whose leaves they say are nothing so large as the Wych Hazel, but nearest in bigness, and exactly the figure of the Common Elm ; whereas ours are much less and of quite a different figure, being narrow and having a peculiar kind of pointed ending as exactly expressed in table 10, fig. 1. Of those there are plenty in the avenue to the house of the Honourable the Lady Cope, the relict of the most ingenious Sir Anthony Cope, of Hanwell, where there is a whole walk of them planted in order, besides others that grow wild in the coppices of the park.'"

Druce then advanced an argument for considering his elm distinct from *U. minor* Mill. and *U. sativa* Mill. In this he misidentified *U. minor* with the Cornish Elm (*U. stricta* Lindl.), so that, apart from other considerations, his arguments fall to the ground. Both of Miller's binomials have since been proposed as *nomina ambigua* (Melville, Journ. Bot. lxxvii, 244–248, 265–270 (1939)). Having disposed of these names, Druce then gave the following brief Latin diagnosis :—

"*Ulmus Plotii, Arbor elevata* (50–80 feet), *cortice glabro, ramis attenuatis, foliis parvis, angustis, acuminatis, glabris.*"

A longer description in English followed, which failed to mention several critical features of the foliage, but recorded certain "whitish lichenous markings" on the leaves of the sucker shoots. Such markings are not a normal character, and it appears from an examination of the material in Herb. Druce that they were caused either by thrips or leaf-hoppers, many of which infest the leaves of elms.

In his final paragraph Druce stated that "the avenue of this tree at Hanwell, mentioned by Plot in 1677, no longer exists, the trees having been replaced by the English Elm." I visited Hanwell (a few miles from Banbury, Oxon.) in 1936, and saw no signs of *U. Plotii*, nor of anything recalling the figure given by Plot in the 'Natural History of Oxfordshire.' The account continued: "the trees represented on the photographs grow in the Banbury municipality, but they are also common in the neighbourhood of Fineshade, whence I first recorded them as *U. sativa* var. *Lockii*, since in that area they are called Lock's Elm, a name I am told which refers to the timber, not to a man's name connected with them," and concluded with an outline of the distribution.

Two important points are left obscure by Druce's account : first, was he justified in identifying the Banbury elm with that described by Plot ; second, what is the type of *U. Plotii* Druce ?

The essential parts of the description given by Dr. Robert Plot (*loc. cit.* p. 158) were quoted by Druce and are reproduced above. Emphasis was placed on the narrow leaves and their pointed tips, which Plot said were exactly represented in his figure (*loc. cit.* tab. 10, fig. 1, opposite p. 212). The leaves illustrated in the slightly conventionalized figure are narrow, with rather slender tips, deep acute serrations and narrow cuneate base. They differ markedly from typical leaves of normal short shoots of Druce's tree (fig. 1), in which the tip is much blunter, the serrations broader and blunter and the base subcordate. It is difficult to see why Druce should have assumed that Plot's tree was identical with his own in the face of such a description and figure. Criticism was soon directed against Druce's meagre description, Prof. G. S. Boulger stigmatising it as "no worse than some of Linné's or many of Ehrhart's, though hardly equal to most of Phillip Miller's" (Gard. Chron. ser. 3, li. 35 (1912)). Moss disputed the identity of material distributed by Druce with the elm figured by Plot, which he maintained was *U. viminalis* Lodd. (*loc. cit.* 234). The latter is of uncertain origin, but has been in cultivation for at least 150 years, long enough to give rise to several variegated sports. Its leaves have deep acute serrations, but the shape differs somewhat from those illustrated by Plot. In his reply, Druce stated that his identification was not based entirely on Plot's description and figure, but was supported by specimens collected by Plot himself (Rep. B. E. C. 1913, 399 (1914)). One of these was in the Herb. Dubois at Oxford and the other in the British Museum (Natural History). The second specimen, of which there is a pencil rubbing in Herb. Druce, is in the Sloane Collection, vol. 113, which contains plants gathered by Plot and Lloyd and named by Bobart. It consists of a small spray of adult foliage on fol. 185 labelled "Ulmus folio angusto glabro." In Druce's handwriting appear the words "It is my *Plotii* Druce," and at a later date A. B. Jackson and A. J. Wilmott added a further note : "This is ordinary

narrow-leaved *U. nitens* Moench." The specimen does not represent, in my view, typical *U. carpinifolia* Gleditsch (*U. nitens* Moench), and is probably a hybrid. It does, however, exhibit a leaf-shape somewhat like that figured by Plot, and has sharp serrations. I can see no reason to doubt that this is Plot's plant,

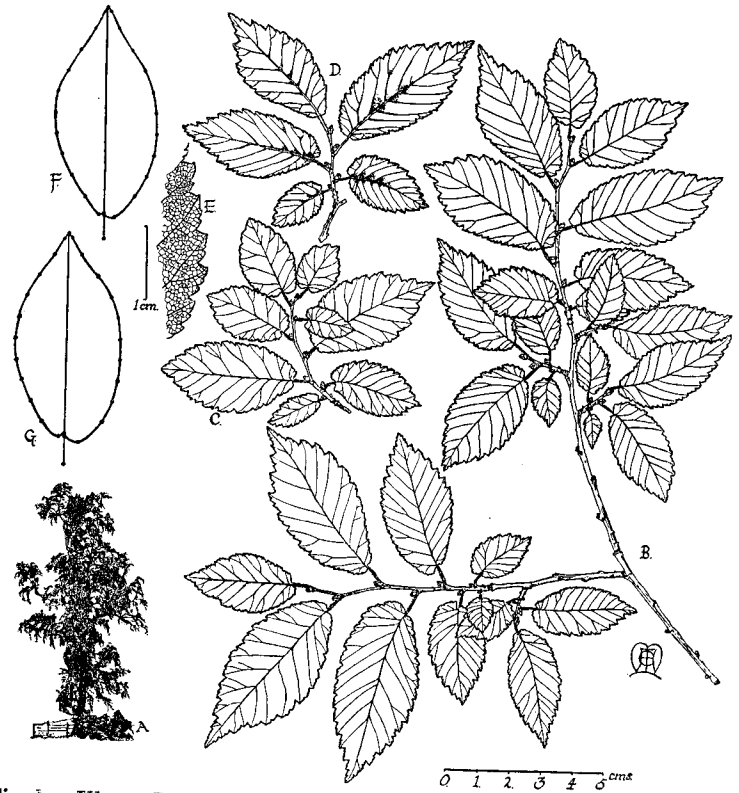


Fig. 1.—*Ulmus Plotii* Druce. A. Habit sketch of Druce's type tree at Banbury (Melville No. 37.64). B. Branch with short shoots and semi-long shoots. C. Proliferating short shoot. D. Typical short shoot, lower surface. E. Serrature, from long side of subdistal leaf of D, upper surface. F & G. Mean leaf outlines for leaves of the short shoots: F. Distal leaf; G. Subdistal leaf. B to G from the second large tree at Banbury, No. 37.63.

but it is certainly not like Druce's Banbury tree, nor is it *U. viminalis* Lodd. Evidently Moss was misled by a superficial resemblance of *U. viminalis* to Plot's figure which is not borne out by the Herb. Sloane specimen. Furthermore, it is unlikely that Plot, who knew the local flora thoroughly, would mistake a tree known only in cultivation for a wild form.

Though Druce was wrong in his identification of Plot's tree, he had recognized as a species one of our most distinctive native elms. During his lifetime he often emphasized the unusual habit, which is quite well shown by his two published photographs. The unbranched trunk, rather short, almost horizontal branches and pendulous branchlets can be seen in both photographs, but the arching leading shoot, which adds so much to the plume-like appearance of the tree, is best depicted in that of the younger tree at Fineshade. If Druce had applied the habit characters stringently, he would not have gone far wrong. Failure to do so, and a lack of appreciation of important leaf and branchlet characters, led him to include various other elms under *U. Plotii*. The elm figured with the original description is represented in Herb. Druce by material from the Banbury and Fineshade trees, from the Bedford Road, three miles from Cambridge, and a specimen from Launde, Leicestershire, collected by A. R. Horwood. Among other forms included by Druce are:— *U. diversifolia* Melville, Swaffham, Norfolk; *U. glabra* Huds. × *Plotii*, Wigginton, Staffs., a segregate approaching *U. Plotii* in leaf characters; *U. Plotii* × (?) *diversifolia*, Wadenhoe, Northants., coll. A. Ley. In general, all forms coming from Norfolk, Suffolk, Essex, and probably Hertfordshire, differ from the Banbury tree. This statement applies to the fruiting material from Sawbridgeworth, Essex, distributed as *U. Plotii* by Druce through the B.E.C. (Ref. No. 6608).

From the evidence given above it is clear that Druce was confused in his conception of *U. Plotii*, both by the reference to Dr. Robert Plot's elm and by the inclusion of a variety of forms under the name in his herbarium. Fortunately it has been possible to trace the tree illustrated in the Banbury photograph, which is still growing in the garden of 17 West Barr Street, Banbury, Oxon. In the photograph a second tree can be seen behind and a little to the left; this tree has also survived, and differs in no material respect from the first. Probably Druce collected his material from the first tree, which appears to have had a branch at the right with twigs low enough to be reached. About fifteen feet from the ground there is now a scar where a fairly large branch has been sawn off, and it is now difficult to collect from the tree even with a long pole-pruner. Consequently, the description given below is based mainly upon material from the second tree. Another change since the photograph was taken is the replacement of the wooden fence by an iron one, which now encloses the tree just within the boundary of the garden. There is no possibility of doubt in the identification, since Druce mentions the address in notes in his herbarium, and the adjacent houses are easily recognizable. It therefore seems reasonable to consider the tree in the foreground of the picture, with a seated figure at its foot, as the type-tree of *U. Plotii* Druce and the specimen

from the Banbury locality in Herb. Druce as the type-specimen. My field-collection number for the type tree is 37.64 and for the second tree behind 37.63. Material from both trees is deposited in the Kew Herbarium.

In thus settling the question of the type of *U. Plotii* it is necessary to exclude Druce's reference to Plot's ' Flora of Oxfordshire ' and references to specimens collected in the East Anglian counties mentioned above. One must regard the tree as being named in honour of Plot, but as to the common name, since it is not Plot's elm, it should be called the Plot Elm. To obviate further confusion, a critical description, with drawings to illustrate the essential features, are given here. The description is drawn up mainly from the Banbury tree, No. 37.63, but the fruits illustrated came from a large tree (No. 38.7) near the bridge over the Avon at Warwick, since cut down.

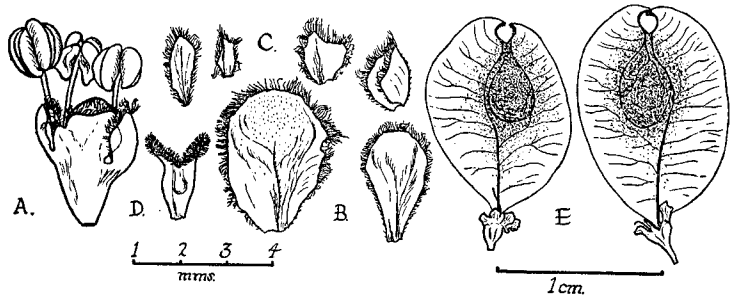


Fig. 2.—*Ulmus Plotii* Druce. A. Flower showing three of the four stamens. B. Bracts. C. Bracteoles. D. Ovary. E. Fruits. A to D from the Banbury tree, No. 37.63; E from a tree at Warwick, No. 38.7.

Ulmus Plotii Druce. Arbor erecta gracillima usque 30 m. alta, apice arcuato, ramis horizontalibus paucis irregulariter dispositis, ramulis gracilibus pendulis. Ramuli capitis normales quadruplicis generis: (i) ramuli breves typici, 1–1·5 mm. crassi, foliis 4–5, internodiis 3–7 mm. longis; (ii) ramuli breves proliferi, folia 5–8 gerentes; (iii) ramuli longi, incremento incerto; (iv) ramuli intermedii, inter (ii) et (iii) medii. Folia distalia et subdistalia ramulorum brevium typicorum elliptica acuta, distalia 3–7 cm. longa, basi cuneata oblique truncata vel subcordata, subdistalia 2–5·5 cm. longa, oblique cordata; laminæ supra minute scabridæ sæpe oculo nudo glabræ, infra glandulis numerosis pilis paucis et villis axillaribus prominentibus; nervi laterales 8–10; margines biserrati; petioli 4–7 mm. longi, supra dense pubescentes infra glabri. Folia 1–3 distalia ramulorum brevium proliferorum minora et late ovata vel suborbiculata, basibus cordatis, marginibus crenato-serratis. Ramuli longi usque 2 mm. crassi, foliis numerosis ut in foliis subdistalibus ramulorum brevium typicorum. Ramuli intermedii graciles 1–1·5 mm. crassi, internodiis usque 2 cm. longis, foliis circiter 9, 2–3 distalibus ut in ramulis brevibus proliferis. Gemmæ foliiferæ ovatæ acutæ 3–4 mm. longæ, squamis 5–6 imbricatis breviter ciliatis; gemmæ floriferæ late ovatæ, 15–35-floræ. Perianthium infundibuliforme viride pallidum usque ad 1/3–1/2 longitudinis in lobos 4 albos vel roseos ciliatos fissum; stamina 2–4, antheris rubidis; ovarium inclusum, stigmatibus albis vel roseis. Samara 11–14 mm. longa, 8–9 mm. lata, late elliptica, apice rotundata, basi late cuneata, semine uno triente longitudinis ab apice distante. (Lectotypus in Herb. Druce, Oxon., specimen arboris Banburyensis. Hypotypi in Herb. Kew., Melville Nos. 37.63 et 37.64, folia et ramuli; 38.7 fructus.)

A graceful erect tree up to 30 m. in height, usually with arching leading shoot and at irregular intervals a few relatively short, almost horizontal branches from which slender pendulous wiry branchlets descend, sometimes for many feet. First-year branchlets of the short shoots 1–1·5 mm. diameter, at first with scattered short hairs and numerous glands; second-year branchlets smooth, shining chestnut-brown, with occasional pustular lenticels. Normal shoots of four kinds: (i) typical short shoots with 4–5 leaves, (ii) proliferating short shoots continuing growth without cessation to 5–8 leaves, (iii) long shoots with indefinite growth, (iv) intermediate shoots, intermediate between types ii and iii. Typical short shoots with internodes mostly 3–7 mm. long and 4–5 leaves, the distal and subdistal leaves elliptic-acute, the distal with base often somewhat wedge-shaped and obliquely truncate to subcordate, the subdistal with base broadly oblique cordate. Lamina length of distal leaves 3–7 cm., of subdistal leaves 2–5·5 cm., appearing smooth but minutely scabrid above, with numerous glands below and a few scattered hairs, rather prominent axillary tufts along the midrib and small tufts at the bases of the sinuses of the margin; number of main lateral nerves on the long side 8–10; margin biserrate, serrations at 1/3 lamina length from the apex usually rather broad and blunt, with one or two subsidiary teeth; petiole 4–7 mm. long, densely pubescent above, glabrous below; stipules caducous, lanceolate to linear, 6–10 mm. long, 1–2·5 mm. broad, glandular and shortly scabrid pubescent. For coordinates of mean leaf-shapes see below. Proliferating short shoots few to many, similar to typical short shoots, but producing without cessation of growth 1 to 3 extra leaves of decreasing size, with transition in shape to broadly ovate or suborbicular, the base cordate and serrature crenate-serrate. Long shoots up to 2 mm. diameter, with majority of leaves approximating in shape to that of subdistal leaves of short shoots, but up to 7·5 cm. long. Intermediate shoots slender, about 1–1·5 mm. diameter, internodes up to 2 cm. long, with

about 9 leaves, 2 or 3 distal leaves transitional in shape as on proliferating short shoots. Vegetative buds ovate acute, 3–4 mm. long, bud-scales 5-6, imbricate, shortly ciliate and minutely scabrid. Flower-buds broadly ovate, bracts obovate-cuneate, fringed with simple colourless hairs and occasionally a few glands, bracteoles ciliate, obovate to oblanceolate or ± irregularly folded. Flowers 15–35 together, perianth funnel-shaped, pale green, cut 1/3 to 1/2 of its length into 4 white- or pink-tinged ciliate lobes, stamens 2–4, anthers deep red, filaments flushed pale to deep red, ovary included in the perianth, the two stigmatic lobes extending nearly half its length, stigmas white or flushed pink. Fruit 11–14 mm. long, 8–9 mm. broad, elliptic, apex rounded, base broad cuneate, centre of seed about 1/3 of the fruit-length from its apex. Stigmatic notch open or closed, forming an angle of 60–90°.

The mean shapes for distal and subdistal leaves are shown in fig. 1. These were obtained by the method previously described (Ann. Bot. n.s. i. 4 (1937), and the mean co-ordinates derived in each case from ten leaves of the tree at Banbury, No. 37.63, are given below. The measurements, including the petiolar ratio, are given in percentages of the length of the lamina, which is stated in centimetres.

Typical short shoots, distal leaves :—

ıort side.—1·8/0, 1·1/2·3, 10/9, 20/15, 30/20, 40/23, 50/24, 60/22, 70/18, 80/12, 90/6, 98/1·5, 1

ɔng side.—1·3/0, 0/4·5, 10/15, 20/20, 30/23, 40/24, 50/24, 60/22, 70/19, 80/12, 90/5, 98/1·5, 10

Petiolar ratio : 12.
Mean length of lamina : 4·8 cm.
Mean no. of lateral nerves, long side : 9.

Typical short shoots, subdistal leaves :—

ıort side.—3·9/0, 2·5/2·9, 10/11, 20/16, 30/21, 40/23, 50/24, 60/22, 70/19, 80/13, 90/6, 98/1·8, 1

ɔng side.—3·7/0, 0/6·6, 10/18, 20/22, 30/25, 40/26, 50/26, 60/24, 70/21, 80/15, 90/7, 98/1·7, 1

Petiolar ratio : 15.
Mean length of lamina : 4·2 cm.
Mean no. of lateral nerves, long side : 8.

A remarkable feature of the Plot Elm is the variety of types of shoot normally produced on the adult branches. The four types here distinguished intergrade to some extent, and in addition proleptic shoots are sometimes formed after damage to the normal foliage, while suckers and epicormic shoots are generally to be seen. Variation of the kind described is not confined to *U. Plotii*, but is found in certain allied trees in East Anglia and to some extent in the hybrids of this group. Confusion is liable to arise if the nature and extent of this variability is not appreciated, and in studying different forms it is essential to compare with one another only similar types of shoot. For the purpose of diagnosis the " typical short shoots " that are found on all elms are of most value ; sometimes on the Plot

Elm these are to a large extent replaced by proliferating short shoots and intermediate shoots, at others they may preponderate.

The lack of precision with which Druce characterized *U. Plotii*, and his failure to distinguish it from related forms and hybrids, has made suspect the accuracy of published records of the tree. It was necessary therefore to disregard all earlier records and to work out anew the distribution, accepting only records for which a voucher specimen could be examined and verified. By far the greater part of the distribution here mapped was ascertained by recent field work with the help of colleagues and friends mentioned below.

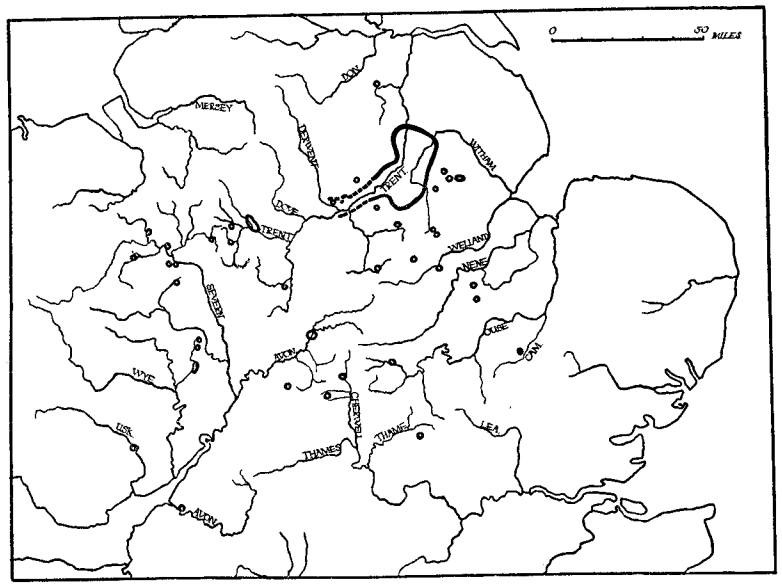


Fig. 3.—Map showing the known distribution of *Ulmus Plotii* Druce.

The main centre of distribution lies in the Trent valley around Newark-on-Trent, together with the neighbouring part of the Witham valley. In this area the plume-like form of *U. Plotii* is a common feature of the landscape. As the higher lands around the valley are ascended the Plot Elm is no longer seen, and very seldom is it found above the 400-ft. contour. It is definitely a tree of the lowlands, preferring a deep soil with ample moisture, and often being found along the river banks. Perhaps for this reason its distribution is related to the valley systems. Farther up the Trent valley it occurs near Papplewick to the north of Nottingham, though beyond this point I have no records for the middle reaches of the river, and the next known station

extends from Weston-on-Trent to Sandon in Staffordshire. Along the tributaries of the Trent it occurs in the Sow valley around Eccleshall; in the Tame valley near Coleshill; in the Wreak valley about Melton Mowbray, though I did not see it on the higher land to the north; and at Great Glen in the Sence valley S.E. of Leicester.

In the Witham valley *U. Plotii* is common from Great Gonerby, about two miles N.W. of Grantham, northwards to Stapleford and Brant Broughton and possibly further towards Lincoln. This district forms part of the main centre of distribution first mentioned. It is bounded on the east by slightly higher land on which the tree is less frequent, and along which the old Ermine Street runs. To the east *U. Plotii* is again fairly common from Sleaford to Heckington in part of the Witham drainage system, but in this direction it appears to stop short at the fens. Southward it occurs in the drainage areas of the Welland, Nene, and Ouze, notably at Towcester on the Tove, a tributary of the Ouze, and near Cambridge. The fens in this region appear to form the eastern limit of distribution, as no trees have been seen further east, and all old records have proved false.

To the south and west, the numerous tributaries of the Trent are separated by only short distances from the drainage systems of the Thames and Severn. *U. Plotii* has been found so far only in the northern and western parts of the Thames area, at Banbury in the Cherwell valley and at Aylesbury in the Tame valley, and has recently been discovered in the upper Thames valley. The Chiltern Hills form a natural boundary to the south-east, cutting off Essex and the lower Thames. A number of stations are known for the Severn drainage area. Warwick, where a number of trees occur, lies on the Avon between the Cherwell and the Trent, and to the north-west others are known in the upper reaches of the Severn itself in the neighbourhood of Shrewsbury, where the Trent system is not far distant and separated by no natural barrier. Finally, in the Wye drainage area *U. Plotii* occurs along the banks of the Frome for a stretch of about three miles to the south of Bromyard. It has not been seen in the Wye valley below its junction with the Frome. The outlying stations at Llanvair Kilgedin on the Usk (one tree) and at Clifton, Bristol (two trees), can be accounted for by planting.

To summarise the distribution, the main centre lies in the Trent valley edged around by more scattered stations. The whole area is bounded on the east by the fens, the south-east by the Chilterns, south by the Marlborough Downs, and on the west by the mountains of Wales. Climatic factors probably limit an extension of the range to the north.

The vice-comital distribution is given below. The list of localities is not claimed to be exhaustive. Obvious gaps are the

absence of records from Worcester (v.c. 37) and Bedford (v.c. 30) in both of which counties *U. Plotii* may be expected to occur. Druce did record it from Bedfordshire, but I have seen no specimen from the county. Hybrids with *U. glabra* Huds. have been found at Bewdley and near Pershore in Worcestershire, and also in north Gloucestershire. The scattered distribution of the Plot Elm over much of its range is a matter for speculation. Was it formerly more abundant? This may well be so, for the timber is of good quality and the trunk usually straight and clean. Probably it was selectively felled by timber merchants to the point of extermination, in preference to its numerous though less valuable hybrids or other species. Within the limits of its distribution hybrids with *U. glabra* Huds. are often far more common than *U. Plotii* itself, and extend over the higher ground, where the species rarely occurs. The presence of hybrids in an area from which one or both of the parent species is absent does not necessarily indicate a former wider range for the parents. Fertile hybrids may extend their range independently of the parents, and even invade territories unsuitable to either, as has been demonstrated for *Crepis* by Babcock and Stebbins (Carnegie Inst. Washington, Pub. 504, 1938).

V.C. 7 North Wilts.: *1 mile S. of Ashton Keynes, A.S.; *Latton parish, 4½ miles S.E. of Cirencester, A.S.
V.C. 22 Berks.: * 1 mile N.W. of South Moreton, A.S.
V.C. 23 Oxford: Banbury, C.; Swerford, S.
V.C. 24 Bucks.: Aylesbury, S.
V.C. 29 Cambs.: Bedford Road, near Cambridge, D.
V.C. 31 Hunts.: Norman Cross; Sawtry.
V.C. 32 Northampton.: Fineshade, D.; Towcester.
V.C. 33 E. Glos.: Kingscombe Lane, Chipping Campden, P.; *Down Ampney, A.S.; *1 mile E. of Ewen, A.S.; *Cirencester, A.S.; *Baunton parish, 2 miles N.E. of Cirencester, A.S.
V.C. 34 W. Glos.: Clifton (Bristol), B.
V.C. 35 Monmouth.: Llanvair Kilgedin, A.S.
V.C. 36 Hereford.: 3–6 miles S. of Bromyard, Frome valley; Upper Sapey.
V.C. 38 Warwick.: Warwick, C.; Bacon's End.
V.C. 39 Stafford.: Islington; Sandon to Weston-upon-Trent, A.S.; Eccleshall; N. of Newport (Salop.).
V.C. 40 Salop.: Port Hill, M.B.; Shipton; Cound Park; Exfords Green; Westbury; Prescott; Baschurch.
V.C. 53 S. Lincs.: Long Bennington, M.B.; Woolsthorpe, N.; Rauceby, N.; Westborough, N.; London-

* These records were received too late to insert on the map.

thorpe, N. ; Gt. Gonerby, frequent along road to Newark-on-Trent ; Stapleford ; Brant Broughton ; Heckington, S.

V.C. 54 N. Lincs. : S. of Torksey.

V.C. 55 Leicester and Rutland. : Launde, D. ; Harston Hill, N. ; Scalford Beck, N. ; Great Glen, A.S. ; Greetham Wood, Stretton ; Branston, W. ; Cottesmore ; Chipsham ; Melton Mowbray.

V.C. 56 Nottingham. : Hopewell, M.B. ; Elton, N. ; Burnt Stump Hill, A.S. ; Weston ; Carlton-on-Trent ; East Stoke, occasional to Newton.

V.C. 63 S.W. Yorks. : Near Bawtrey, W.

Sources of records : A.S., Mr. H. K. A. Shaw ; B., Mr. J. P. M. Brennan ; B.M., Herb. British Museum (Natural History) ; C., Mr. J. F. G. Chapple ; D., Herb. Druce, Oxford ; N., Herb. Natural History Museum, Nottingham ; P., Mr. W. R. Price ; S., Mr. N. Y. Sandwith ; W., Herb. National Museum, Wales ; Records without initials are my own, alone or with collaborators.

It is with great pleasure that I acknowledge the invaluable help of my wife, who is responsible for the plate (fig. 1), and gave assistance with the statistical measurements. I am indebted to Mr. J. F. G. Chapple for tracing the exact situation of Druce's Banbury trees, and for collecting material and help in other ways. My thanks are due to Mr. H. C. S. Halton, Curator, Nottingham Natural History Museum, Mr. H. A. Hyde, Keeper of Botany, National Museum of Wales, and Mr. W. R. Price for the loan of herbarium specimens on which a number of records are based.

A NEW FUNGUS FROM DEVON.

By F. Rilstone, A.L.S.

A *Gloniopsis* collected by Dr. W. Watson from the bark of an oak in Lydford Gorge, Devon, appears to be distinct from any described species, and is here named and described.

Gloniopsis Watsonii, sp. nov.

Apothecia gregaria, linearia, sæpe curvata, striata, 0·5–2×0·3 mm. Asci clavati vel fusoidei plerumque 0·12–0·13 mm. longi. Sporæ imperfecte distichæ, hyalinæ, ellipsoideæ, 7–9-septatæ, plerumque 7-septatæ, septis longitudinis 2–3 præditæ, usque ad 0·051×0·021 mm.

Apothecia gregarious, from 0·5 to 2 mm. long, about 0·3 mm. wide, longitudinally striate, obtuse at the ends, the longer ones mostly bent, margins of slit usually well apart. Asci clavate or somewhat fusoid, about 0·12 or 0·13 mm. long. Spores elliptical (with no trace of a constriction), hyaline, 7–9-septate, oftenest 7-septate, with 1–3 longitudinal divisions, occasionally even 4

in the widest part of the spore, up to 51×21 microns (mature spores seem mostly to be about 50 microns long), irregularly biseriate.

Type-specimen in Herb. W. Watson, Taunton.

The species resembles *G. decipiens* De Not. in the non-constricted spores, but the asci and spores are far larger and the apothecia are striate. The fungus, which was collected at the end of the foray of the British Mycological Society at Totnes in 1935, is associated with the indeterminate white thallus of a lichen.

RESULTS OF TWO BOTANICAL EXPEDITIONS TO SOUTH ALBANIA.

By A. H. G. Alston, B.A., F.L.S., and N. Y. Sandwith, M.A., F.L.S.

(Continued from p. 174.)

*Anthriscus trichospermus R. & S.

Voskopoj, near Hagios Prodromos Monastery, shady bank, 4000 ft., 2. vii. 35, no. 2045.

***Athamanta albanica** Alston et Sandwith, sp. nov. ; *A. macedonicae* (L.) Spr. affinis, foliorum basalium segmentis ultimis multo minoribus carnosulis lucidis glabrescentibus, inflorescentiis amplioribus atque laxioribus, scilicet ramis primariis longioribus necnon internodiis longioribus præditis, secundariis paucioribus atque plerumque longioribus differt.

Herba perennis, circiter ad 50 cm. alta, radice longa crassaque circiter 1·5 cm. lata ; caules erecti vel ascendentes, e basi ramosi, basi minute crispule puberuli, apicem versus glabrescentes, regulariter sulcati. *Folia* basalia rosulata, ambitu deltoidea, ad 13 cm. longa, ad 5 cm. lata, in cultura sæpe ampliora, tripinnata, petiolo rhachidibusque puberulis ; segmenta ultima plus minusve ovata, inciso-lobata, 2–5 mm. tantum longa, rigida, carnosula, lucida, glabrescentia vel glabra, nervis principalibus impresso-canaliculatis, venulis nullis distinguendis ; folia caulina valde reducta, nonnunquam simplicia. *Inflorescentia* tota crispule puberula ; rami primarii inferiores axem principalem sæpe æquantes ac iteratim ramosi. *Umbellæ* terminales plerumque 10-radiatæ, femineæ, laterales 6- vel 4-radiatæ, minores nonnunquam masculæ ; bracteæ involucri lineares, circiter 3 mm. longæ ; bracteæ involucellorum subsimiles. *Flores* albi, petalis subæqualibus. *Styli* stylopodio duplo longiores, juventute erecti, demum deflexi. *Fructus* ellipsoideo-ovoideus, 4–5 mm. longus, 2·5 mm. diametro, crebre praesertim secus juga cano-puberulus.

Albania : district of Gjinokastrë : Lunxheriës Range, on bare sandstone rocks at Çajup, fairly plentiful in one spot at

about 4000 ft., fl. 10. vii. 33, *Alston* and *Sandwith* 2183 (Herb. Mus. Brit., Herb. Kew.) ; *ibid.*, fr. 6. viii. 35, *Alston* and *Sandwith* 2325 (typus in Herb. Mus. Brit. ; dupl. in Herb. Kew.).

This plant has flowered and fruited in cultivation since 1937 in the Herbarium ground at Kew, under the no. K. 1711, and retains its distinctive characters, although larger basal and cauline leaves are developed. Apart from the character of the very small, rigid, shining and glabrescent leaflets of the basal rosette the inflorescence presents a facies very different from that of *A. macedonica*, in which the numerous primary branches are relatively short and subequal in length, with short internodes and many short secondary branches.

*Bupleurum tenuissimum L.

Vlorë (Valona), salt-marshes, 5. ix. 35, no. 2809. Plant somewhat glaucous. Cf. *Fiori* et *Béguinot* 1709.

Var. *Columnae (Guss.) Godr.

Durrës (Durazzo), salt-marshes, 2. ix. 35, no. 2792. Plant erect, glaucous. Cf. *Fiori* et *Béguinot* 1710.

Apparently the first record of this variety for the Balkan Peninsula.

*Caucalis leptophylla L.

Leskovik, border of corn-field, 3000 ft., 24. vi. 33, no. 1874.

Chaerophyllum temulum L., f. *eriocarpum Guss.

Ersekë, in ditch, 3500 ft., 26. vi. 33, no. 1911. Voskopoj, by stream in pine wood, growing with the typical form, 4000 ft., 19. viii. 35, no. 2530.

This hairy-fruited form has not been previously recorded for the Balkan Peninsula and was unrepresented at Kew. It is probably not uncommon, if looked for, at this latitude, having been gathered in South (Greek) Macedonia at Armensko, W. of Florina, in June 1932 (*Alston* and *Sandwith* 201). Fiori and Paoletti record it only from Ischia, while Rouy and Camus (Fl. France, vii. 305) wrote " fruit lisse, glabre, très rarement vélu."

*Conium divaricatum Boiss. et Orph.

Gjinokastrë, edge of limestone gorge, 1000 ft., 8. vi. 33, no. 1469. Stems glaucous, not spotted.

Eryngium palmatum Vis. et Panč.

District of Korçë, dry bushy sandstone slopes above Dardhë, 5000–5500 ft., 25. viii. 35, no. 2648. Very local in this locality. Heads pale blue.

Ferulago nodosa (L.) Boiss.

Above Gjinokastrë, open oak-bush association on sandstone slopes, 1500 ft., 8. vi. 33, no. 1486.

Freyera parnassica Boiss. et Heldr.

Gjinokastrë, open limestone slopes of Mali Gjer, 5000 ft., 9. vi. 33, no. 1527. Nemerçka Range, broken limestone slopes above Biovishd, 5000 ft., 22. vi. 33, no. 1799. Ostrovicë Range, limestone cliff, 6500 ft., 5. vii. 33, no. 2117. Flowers white.

We do not regard the var. *pindicola* (Hausskn.) Hayek as worthy of distinction.

*Hellenocarum multiflorum (S. et S.) Wolff.

Above Leskovik, limestone rocks of Melesin, 3300 ft., 17. vi. 33, no. 1694.

*Heracleum sibiricum L.

Dardhë, S.W. of Korçë, in beech woods near a spring, 5500 ft., 26. viii. 35, no. 2675.

*Hydrocotyle vulgaris L.

District of Sarandë, near Çukë, swampy alluvial flats on north side of Lake Butrinto, sea-level, 2. vi. 33, no. 1332.

Laserpitium Siler L. subsp. garganicum (Ten.) Hayek.

Dardhë, S.W. of Korçë, rocks at summit of Mali Bigla, 5500 ft., 25. viii. 35, no. 2659. Ostrovicë Range, limestone cliff, 5500 ft., 5. vii. 33, no. 2255. Tomor Range, limestone cliffs of Abbas Ali peak, 6000 ft., 13. viii. 35, no. 2433. Leaves slightly glaucous and leathery. This last collection indicates a passage towards *L. Zernyi* Hayek, which is perhaps not truly distinct.

*Levisticum paludapifolium (Lamk.) Aschers.

Voskopoj, stony waste ground in the village, 3700 ft., 19. viii. 35, no. 2519. Plant up to about 8 ft. high, strongly aromatic when cut.

Malabaila aurea (S. et S.) Boiss. var. leiocarpa Stoj.

Sarandë, rocky limestone coast slopes, sea-level, 30. v. 33, no. 1216.

*Malabaila involucrata Boiss. et Sprun. var. parnassica (Heldr.) Hal.

Lunxheriës Range, bare rocky limestone slopes above Çajup, 4000 ft., 11. vi. 33, no. 1579 ; and on slopes of Strakavec, 4800 ft., 12. vii. 33, no. 2213.

*Oenanthe tenuifolia Boiss. et Orph., det. W. B. Turrill.

Distr. of Sarandë ; Nivicë e Bubarit, 500–1000 ft., bushy slopes with bracken, 6. vi. 33, no. 1433. Flowers white.

Recorded by Hayek from neither Albania nor Epirus. Noted by Baldacci at Klyssyra (see It. Alb. 139 (1917)), but the material was apparently not distributed and was perhaps referable to *Œ. pimpinelloides*.

*Peucedanum longifolium W. et K.

Lunxheriës Range, limestone rocks of summit ridge above Çajup, 5500 ft., 11. vii. 33, no. 2253, and 7. viii. 35, no. 2355. About 4 ft. high. Flowers bright yellow.

We have discovered no good characters for separating this species from *P. officinale* L., and suggest that the allies of this group are in need of a special investigation.

*Peucedanum vittijugum Boiss.

Prëmeti, grassy sandstone slopes, 800 ft., 8. vii. 33, no. 2163. Flowers orange-yellow.

*Physocaulis nodosus (L.) Tausch.

Alluvial flats on N. side of Lake Butrinto, near Çukë, seeds collected July 1933, sine no.; cult. at Kew, July 1934, as no. K. 1345.

Not recorded by Hayek from either Albania or Epirus, but collected in Greek Epirus in 1896 by Baldacci (see Nuov. Giorn. Bot. Ital. 1899, p. 170).

*Scandix grandiflora L.

District of Sarandë; mountains above Borsh, broken limestone slopes, 3000 ft., 5. vi. 33, no. 1365.

*Smyrnium Olusatrum L.

Sarandë, waste place, 300 ft., 30. v. 33, no. 1237.

*Torilis Anthriscus (L.) Gmel.

Between Çajup and Zhej, dry bushy sandstone slopes, 2000 ft., 8. viii. 35, no. 2387.

ADOXACEAE.

Adoxa Moschatellina L.

Ostrovicë Range, local in beech woods on high slopes, 5500 ft., 5. vii. 33, no. 2120.

This locality appears to show a southward extension of the range of this species, to judge from the account of the distribution given by Sprague in Journ. Linn. Soc. Bot. xlvii. 484 (1927). At a similar latitude is another recently discovered locality in South (Greek) Macedonia, at 4700 ft. in beech woods at Pisoderion, on mountains W. of Florina, coll. June 1932, *Alston* and *Sandwith* 353. It has also been recorded by K. H. Rechinger from the Bertiscus region of North Albania.

CAPRIFOLIACEAE.

Lonicera Formanekiana Hal. var. adenophora Hal.

Strakavec, Lunxheriës Range, limestone slopes, 4700 ft., 13. vi. 33, no. 1667. Flowers greenish white, turning purple.

RUBIACEAE.

*Galium constrictum Chaub.

Near Ersekë, marshy meadows at foot of Gramos Range, c. 3400 ft., 26. vi. 33, no. 1930. Erect. Flowers congested; buds pink; flowers white.

Galium rotundifolium L.

Voskopoj, in pine wood, 4000 ft., 7. vii. 33, no. 2157.

*Galium tricorne L.

Near Leskovik, in corn-fields, c. 3000 ft., 17. vi. 33, no. 1704.

*Galium verticillatum Danth.

Near Leskovik, on limestone outcrops in Conifer forests on mountains, c. 3800 ft., 18. vi. 33, no. 1746.

*Galium zacynthium Marg. et Reut.

Sarandë, bare limestone slopes near sea-level, 30. v. 33, no. 1209; 31. v. 33, no. 1251. Flowers pale red, petals apiculate (1209); greenish yellow, petals mucronate (1251).

Var. *intricatum (Marg. & Reut.) Hal.

Sarandë, with the typical plant, 30. v. 33, no. 1211. Flowers maroon, petals apiculate.

Vaillantia aprica (S. et S.) Boiss. et Heldr.

Summit of Gramos Range above Ersekë, bare stony ground, c. 6000 ft., 27. vi. 33, no. 1944. Lunxheriës Range, bare rocky limestone slopes of Strakavec, c. 5000 ft., 12. vii. 33, no. 2215. Flowers yellow.

VALERIANACEAE.

*Valerianella eriocarpa Desv.

Above Gjinokastrë, bushy limestone slopes, c. 1500 ft., 7. vi. 33, no. 1456.

COMPOSITAE.

*Achillea setacea W. et K.

Ersekë, grassy bank, 3300 ft., 26. vi. 33, no. 1919. Flowers pure white.

Not recorded by Hayek from either Albania or Epirus, but Baldacci's no. 124 of his 1896 expedition, collected in Greek Epirus between Leskovik and Jiannina, is listed as *A. millefolium* var. *setacea* (W. et K.) Koch, see Nuov. Giorn. Bot. Ital. 1899, p. 177.

Ambrosia maritima L.

Durrës (Durazzo) sand-dunes, 30. vii. 35, no. 2723. Collected by Baldacci at Vlorë, and cited by Hayek from "Epirus."

*Arctium Lappa L. sensu stricto. *A. majus* Bernh.

Voskopoj, waste ground by Hagios Prodromos Monastery, 3700 ft., 19. viii. 35, no. 2545. Petioles solid.

Aster albanicus Degen.

Durrës (Durazzo), dry bushy ground behind sand-dunes, among *Erica verticillata* and *Myrtus communis*, sea-level, 30. viii. 35, no. 2734. Disk golden yellow. Rays mauve.

Certainly this species, in a habitat and locality very different from that of the type.

*Carduus marmoratus Boiss. et Heldr.

Sarandë, low limestone coast rocks, common, 1. vi. 33, no. 1300. Leaves splashed with white.

*Carduus pycnocephalus L.

Leskovik, roadside, 3000 ft., 24. vi. 33, no. 1869.

*Centaurea ptarmicifolia Hal. ex Hayek, Prodr. Flor. Penins. Balc. ii. 781 (1931), det. W. B. Turrill.

Above Voskopoj, 3800–4500 ft., semi-prostrate on rocky serpentine slopes, 1. vii. 33, no. 2022. Dardhë, open grassy slopes of Mali Bigla, 5500 ft., 25. viii. 35, no. 2657.

*Cephalorrhynchus glandulosus Boiss. ; Turrill in Hook. Ic. Pl. t. 3277 (1935).

Melesin, above Leskovik, in shady ravine at top of limestone cliffs, in humus with *Clematis* and *Fraxinus Ornus*, 3600 ft., 19. vi. 33, no. 1784. Root tuberous. Stems tall, erect. Leaves glaucous beneath. Flowers creamy white. Cypselas brownish chocolate-colour.

*Chondrilla juncea L.

Gjinokastrë, limestone slopes, 800 ft., 5. viii. 35, no. 2303.

*Cichorium Intybus L.

Sarandë, corn-field near sea-level, 3. vi. 33, nos. 1368, 1366.

*Cichorium pumilum Jacq.

Sarandë, corn-fields and waysides, sea-level, 3. vi. 33, no. 1366*a*. Small-flowered and nearly glabrous.

Cirsium intraspinulosum Jáv., det. W. B. Turrill.

Lunxheriës Range, dry bushy ground bordering the meadow of Çajup, 4000 ft., 9. viii. 35, no. 2419. Like *C. eriophorum* in size and colour of heads.

The material has been determined from Hayek's key and the original description. Type or authenticated specimens have not been seen. The material examined is limited to leaves and one capitulum. It agrees well with Jávorka's original description, so far as it is possible to compare the organs with the details given, except that the terminal spines of the phyllaries may, on an average, be a little shorter. *C. intraspinulosum* was described from Mt. Hekurave in the "North Albanian Alps" and grew at an altitude of 1000–1300 metres not far from the town of Djakova. It is placed in the section *Epitrachys* DC. subsect. *Ciliata* Petrak.—W. B. Turrill.

*Cirsium stellatum (L.) All.

District of Sarandë ; near Borsh, roadsides and rocky slopes by road to Vlorë, near sea-level, 4. vi. 33, no. 1400. Erect, often very dwarf, occasionally up to 1 ft. high. Leaves entire. Heads small, rose.

*Cirsium tymphaeum Hausskn., ex descr., det. W. B. Turrill.

Lunxheriës Range, abundant in the great meadow at Çajup, 4000 ft., 9. viii. 35, no. 2412. Voskopoj, marshy spots in pine wood, 3700 ft., 19. viii. 35, no. 2533. Flowers bright magenta.

Conspecific with *Baldacci* 206 (ann. 1892) from the Abbas Ali peak of Mt. Tomor, and very distinct in appearance from *C. appendiculatum* Griseb., under which name this collection was published (see Malpighia, viii. 187). Recently collected also at Metsovo, Greek Epirus, at 5000 ft., July 1937, by *E. K. Balls* and *W. B. Gourlay*, no. B. 3783.

(To be continued.)

SHORT NOTE.

Cotoneaster at Benderloch (see p. 175).—The article by Winifred M. Letts in 'Country Life'—"Flower Hunting in the Western Highlands" [not "Hebrides"]—was shown me by Mr. Francis Druce, and I got in touch with the author with a view to obtaining specimens which would settle the identity of the plant. The first result obtained was a specimen of *C. microphyllus* Wallich, collected by friends of the author from her directions. In her accompanying letter, however, she stated that she had also seen a plant which at the time she took to be *C. Simonsii* Baker, but her friends had not been able to refind it. I expressed the hope that she would be able to revisit the locality herself and thus clear up the whole matter. Her friends returned to Benderloch and on July 6th a specimen of *C. Simonsii* was received at the Museum. Both species are therefore escaped at Benderloch.—A. J. Wilmott.

BOOK-NOTES, NEWS, etc.

Linnean Society of London.—At the General Meeting on April 11th, the President in the Chair, Dr. V. J. Chapman gave an account of the functions of the pneumatophores of

Avicennia nitida. These act in essentially the same way as those of *Sonneratia alba*, with certain minor differences. They are (1) organs of gaseous exchange, (2) respiratory organs, (3) organs for bearing lateral rootlets and maintaining them at what appears to be the most suitable level.

The remainder of the meeting was occupied by a discussion on Phylogeny and Taxonomy, arranged jointly with the Association for the Study of Systematics in relation to General Biology. The discussion covered too wide a field to be summarized here. The principal speakers were Mr. J. S. L. Gilmour, Drs. O. W. Richards, T. A. Sprague, and E. I. White. One gained the impression, after their remarks had been discussed, that phylogeny and taxonomy were generally regarded as being distinct and not necessarily interrelated. Without fossil evidence phylogeny is nothing more than scientific guess-work, and many of the recently popular phylogenetic trees are essentially two dimensional arrangements of existing organisms.

Department of Botany, British Museum.—Messrs. A. H. G. Alston and W. R. Philipson have been seconded to the Home Office; Mr. I. M. Lamb to the Children's Overseas Reception Board; and Mr. R. Ross to the Ministry of Aircraft Production. The majority of the non-scientific staff have joined H.M. Forces or been seconded to other Departments. The work of the skeleton staff now remaining is mainly that of care and maintenance of the collections. These may still be consulted by botanists.

Chronica Botanica.—Dr. F. Verdoorn writes from Box 151, Waltham, Mass., U.S.A., that the publication of a weekly edition will begin on September 7th. As stated in this Journal last November (p. 324), the intention was to begin publication in the new form in January "in spite of the international situation." The conditions on the continent have so altered since then that at the present time we are more anxious to hear about the welfare of botanical friends there than even about their scientific activities.

La Mortola.—Doubtless many botanists will be interested to learn that the estate at Ventimiglia, Italy, with its hill-side garden made famous by the Hanbury family, has been seized by the Italian prefect. In times of peace there would be a reasonable hope that the local people would see that no great harm came to La Mortola if only to ensure the continuance of the benefits they have derived from it. The fact that the report has been published in Switzerland suggests that the Italian authorities attach some importance to the sequestration, and may take the necessary steps to prevent the garden from becoming derelict.

SOME BRITISH SPECIES OF *RHINANTHUS*

By A. J. Wilmott.

In revising the British material of *Rhinanthus* in the British Museum herbarium, it has become evident that the account of the genus given by J. von Sterneck ("Monographie der Gattung *Alectorolophus*," in Abh. Zool.-bot. Ges. Wien I, ii. 1–150 (1900)) is inadequate for dealing with the British species. Although between *R. minor* Ehrh. and "*R. stenophyllus* (Schur) Druce" a large number of puzzling intermediate variations remain to be elucidated, other forms appear to be sufficiently distinct to be described. The name *Rhinanthus* is retained instead of *Alectorolophus*, as F. W. Pennell (Proc. Acad. Sci. Philadelphia, lxxxii. 16 (1931)) has shown that the genotype of *Rhinanthus* is *R. Crista-galli* L.

Rhinanthus stenophyllus (Schur) Druce was originally described by Schur (Enum. Pl. Trans. 511 (1866)) as one of several varieties of *R. minor* Ehrh., and was raised to the rank of species by Sterneck (Öst. bot. Zeit. xlv. 301 (1895); li. 110 (1901)) as *Alectorolophus stenophyllus*. Sterneck distinguishes it from *A. minor* chiefly by the presence of two to three pairs of "intercalary leaves," the term intercalary (first used in this genus by him) signifying those between the topmost branch and the lowest bracts, their presence being said to be characteristic of "autumnal" as opposed to "æstival" forms. One will therefore not expect to find any mention of intercalary leaves in Schur's description, which (translated) runs: "d. *stenophyllus*. Stem tall, weak, 1½ ft., virgate-branched, leaves narrow, linear lanceolate, softer. Transitional to *R. alpinus* Bmg. A distinct species ?—(*Rhinanthus* [*Alectorolophus*] *stenophyllus* Schur; ? *R. minor* var. *γ angustifolius* Koch, syn. ed. 2, 626, and consequently=*R. minor β* Rchb. pl. crit. viii. f. 973=*R. minor β alpinus* Gaud. helv. 4, 197.)—In meadows and pastures in the alpine and subalpine region: Preschbe, Arpás, Bulla. Jun. Jul."

Sterneck (1901), in his account of the distribution of his *A. stenophyllus*, mentioned only specimens which he had seen, but Transylvania is outside the area of those cited, and even Hungary is not mentioned. He evidently bases his use of Schur's epithet on the Reichenbach figure cited by Schur with some doubt. Schur's own account would obviously include narrow-leaved forms of *R. minor* without intercalary leaves, and until his original material has been examined, and a lectotype chosen therefrom, the validity of Sterneck's application of the name *R. stenophyllus* must remain doubtful. For the time being I retain it in the sense in which it was applied by Sterneck in his determinations of British specimens (see Druce in Ann. Scott. Nat. Hist. 178 (1901), and E. S. Marshall in Journ. Bot. xli.

295 (1903)). It occurs in many parts of Britain, being more common in western and north-western parts.

Quite distinct from the British plants referred to above as *R. stenophyllus* is a form which from the available material seems confined to the chalk and limestone downs of southern England, from Dorset and Wiltshire to Kent. It is a tall, slender (? stiff), branched plant with extremely narrow leaves, the *many* pairs of intercalary leaves being shorter, and the upper broader based (subbracteiform). It is narrower leaved than *R. stenophyllus*, but it seems less likely that this plant, with a more restricted distribution, could be Schur's "*stenophyllus*" than the one for which that name is being retained, and I therefore describe it as a new species :—

R. calcareus, sp. nov.

Caulis gracilis (35–) 40–50 (–65) cm. altus, e medio ramosus ; ramis plerumque pluribus, supremis plerumque caule non-nihil brevioribus, internodiis inferioribus c. 8 mm. longis, eis inter folia intercalaria valde elongatis c. 5 cm. longis. Folia inferiora caduca (non vidi) ; media patentia vel arrecta linearia c. 20–22 mm. longa et solum (cum dentibus haud prominentibus apicibus vix divergentibus) 2–3 mm. lata ; intercalaria (2–) 4–5 (–6) paribus, patentia arrecta vel recurva, 16–10 mm. longa superiora breviora subbracteiformia (*i. e.*, e basi dilatata ubi cum dentibus longioribus arrectisque ad apicem subacutam attenuata). Inflorescentia secunda laxa 4–7-flora. Bracteæ breves, calyce subæqantes vel paululum breviores, ovato-triangulares vix in apicem angustatam productæ, dentibus inferioribus anguste triangularibus. Calyx juvenilis ovali-ellipticus aliquantum, maturus (parvus —c. 12×9–11 mm.) paululum longior quam latus ; margine tenuiter puberulo excepto glaber. Corolla (colore ?) parva 14 mm. longa, angusta, dentibus labii superioris modice prominentibus deorsum sensim vel magis subitiore decurrentibus. Capsula subrotunda (8–9½ mm. longa, 9–9½ mm. lata) vix emarginata, apiculo 1 mm. longo suffulto. Fl. viii–ix. In collibus calcareis Angliæ australis : holotypus in Herb. Mus. Brit. coll. E. S. Marshall (no. 2584).

Stem tall, slender (35–) 40–50 (–65) cm. high, usually with numerous very slender branches from the middle, the uppermost of which is generally not much shorter than the main stem ; lower *internodes* about 8 mm. long, those *between the intercalary leaves greatly elongated averaging 5 cm. long.* Lower leaves already fallen from all specimens so far seen, middle *leaves* spreading to arrect (*linear*, c. 20–22 mm. long and including the shallow teeth *only* 2–3 *mm. broad, intercalary leaves* (2–) 4–5 (–6) *pairs*, the lowest c. 15 mm. long, the upper shorter (to 10 mm. long) and subbractiform (*i. e.*, attenuate to a subacute apex from a broadened base where the teeth are closer, longer and arrect),

spreading, arrect or recurved. Inflorescence secund, lax, 4–7-flowered. Bracts short about equalling or a little shorter than the calyx, ovate-triangular, scarcely produced into a narrower apex, lower teeth narrowly triangular. *Calyx small*, oval-elliptic when young, slightly longer than broad when mature (c. 12× 9–11 mm.), glabrous except for the finely puberulous margin. Corolla (colour ?) small, 14 mm. long, narrow, teeth of upper lip moderately projecting at top gradually or more suddenly decurrent downwards. Capsule nearly round (8–9½ mm. long and 9–9½ mm. broad), only very slightly emarginate, with terminal apiculis 1 mm. long. Flowers end of July to September.

Specimens which I place to *R. calcareus* are from :—

V.-c. 8. Wilts. S. Chalk down, Ham Hill, *E. C. Wallace* (no. 3062) 25. vii. 1927, as *R. stenophyllus* Schur, less extreme (? in less dry soil) than the type-series, but apparently agreeing quite well with the description.

V.-c. 9. Dorset. Melbury Hill (on chalk), *E. F. Linton*, 15. ix. 1891, as *R. Cr.-Galli* L. ; chalk bank, Bere Regis, *R. P. Murray*, 10. viii. 1897, as var. *vittulatus*.

V.-c. 13. Sussex W. Downs above (S. of) Sutton, *E. F. Linton*, 3. viii. 1901 ; also *E. S. Marshall*, no. 2584 (including holotype), 3. viii. 1901 ; Littleton Farm, near Duncton, by lane side towards Downs, *E. F. Linton*, 5. viii. 1901 (see B. E. C. 1901, Rep. 22 (1902), as *R. Crista-galli* var. *stenophyllus* Schur ?). Linton has overwritten his labels "*R. angustifolius* Sterneck, *fide* Sterneck," but they are certainly not *R. angustifolius* Gmel., and in Watson's Bot. Exch. Club 1901–2 Rep. 18 (1902), it is stated that "Herr Sterneck has confirmed it as his *Alectorolophus stenophyllus* ; Pangdean, chalk mound, *T. Hilton*, Sept. 1910.

The following gatherings are probably also *R. calcareus* :

V.-c. 14. Sussex E. Lewes Downs, *A. H. Wolley-Dod*, 11. viii. 1923, as *R. stenophyllus* Schur—small drought forms determined by Soó in 1928 as "subsp. *monticola* Chab."

V.-c. 15. Kent E. Dover, *R. Pryor*, 1839, some of the specimens, as *R. Crista-galli*. Small plants, probably desiccated.

V.-c. 23. Oxford Wytham, *H. J. Riddelsdell*, 13. vi. 1907. (There is possibility of interchange of labels with specimens from v.-c. 33, Sapperton : the plant should be resought in both localities.)

The British plant which has so far been called *R. monticola* is not the plant which Lamotte intended by *R. minor* var. *monticola*, and I therefore redescribe it as :

R. spadiceus, sp. nov.

Caulis plerumque humilis (10–15 cm.) rarius altior (—30 cm.) plerumque ramosus rarius subsimplex, ramis plerumque brevibus abortivis interdum nonnullis aliquantum elongatis 1 (—2)-floris ; internodiis infra mediam vel versus basin valde contractis,

internodiis 3–4 infra inflorescentiam valde elongatis, foliis intercalaribus (1–3 (–4–5)-jugis, quamobrem plantæ habitus variabilis videtur propter ramos supremos interdum infra interdum supra internodium infimum elongatum sitos et propter ramos supremos interdum breves interdum magis elongatos. Folia plerumque lineari-lanceolata (inferiora lineari-oblonga), rarius latiora intercalaria internodiis elongatis multo breviora, suprema interdum subbracteiformia, plerumque ascendentia interdum suberecta, inferiora præcipue superficie inferiore ibi præcipue ad costam marginemque pubescentia, superiora minus pubescentia et bracteæ margine excepto subglabra. Inflorescentia secunda, pauciflora, floribus 3–5 (–6). Bracteæ calyce longioræ, inferiores sæpe in formam foliorum transeuntes, in prolongatione foliaceo productæ, superiores ovato-triangulares subito in prolongationem brevem contractæ. Calyx maturus longior quam latus (juvenilis ovali-ellipticus), plerumque parvus (*e. g.* $11\times8\frac{1}{2}$, 12×9, 11×10 mm. long. et lat.), rarius amplior (*e. g.*, $14\times9\frac{1}{2}$ mm.), margine tenuiter pubescente excepto glaber, plerumque cum bracteis colore atroviolaceo suffusus, ejus dentes triangulares æquilongi ac lati. Corolla parva, 13–14 mm. longa, labio superiore denique spadiceo, dentibus violaceis aliquantum projectis deorsum longe sensim decurrentibus. Capsula parva, paululum latior quam longa (c. $8\frac{1}{2}\times9\frac{1}{2}$ mm. long. et lat.), apice vix emarginato, apiculo 1 mm. longo prædita. Semina ala membranacea $\frac{1}{2}$–$\frac{3}{4}$ mm. lata prædita. Fl. vii.–viii.

Holotypus in Herb. Mus. Brit. (coll. *E. S. Marshall*, no. 2947, "Glen Dee near Braemar," 30. vii. 1906).

Usually small (10–20 cm. high), more rarely taller (—30 cm.), usually branched, more rarely subsimple, *branches mostly* usually *short* and abortive, sometimes some somewhat elongated and 1(—2)-flowered; *internodes* below the middle or *towards the base much contracted, the* 3–4 *internodes below the inflorescence much elongated, intercalary leaves* 1–3 (–4–5) *pairs*, wherefore the habit of the plant appears variable, depending on whether the upper branches are situated above or below the lowest elongated internode, and whether they are short or more elongated. Leaves usually linear-lanceolate (the lower ones linear-oblong), more rarely broader, intercalary ones much shorter than the elongated internodes, the *uppermost* sometimes subbractiform, usually ascending sometimes suberect, the lower pubescent, especially beneath and especially on the midrib and margin, the upper less pubescent and the bracts subglabrous except on the margin. *Inflorescence secund with few* 3–5 (–6) *flowers*. Bracts longer than the calyx, the lower often transitional in form to the leaves, produced into a long leaf-like point, the upper ovate-triangular suddenly contracted into a short prolongation. *Calyx*, when young, considerably longer than broad, oval-elliptic, when

mature remaining longer than broad, *usually small* (*e. g.*, $11\times8\frac{1}{2}$, 12×9, 11×10 mm. long and broad), sometimes larger (*e. g.*, $14\times9\frac{1}{2}$ mm.), glabrous except for the finely pubescent margin, *usually* (together with the bracts) *much suffused with dark violet*, teeth triangular, as broad as long. *Corolla small*, 13–14 mm. long, upper lip *ultimately dark* ("*treacle*") *brown*, teeth violet, rather projecting above thence gradually decurrent downwards to the corolla. *Capsule small*, a little broader than long (c. $8\frac{1}{2}\times9\frac{1}{2}$ mm. long and broad), scarcely emarginate above, and with an apiculus about 1 mm. long. Seeds with a membranous margin about $\frac{1}{2}$–$\frac{3}{4}$ mm. broad. Flowers July to Aug.

This description is from a considerable series of specimens collected by E. S. Marshall (no. 2947) in Glen Dee, near Braemar, 30. vii. 1906.

I am not completely satisfied as to the status of this plant. In some localities it is found comparatively uniform and unmistakable, and seems to deserve the rank of species which it has been given. But *R. stenophyllus* can be found with a certain aggregation of leaves and branches below the middle, due to contracted internodes; it can have dark flowers (among plants with yellow ones), and can also be suffused about the calyx with deep violet; it might be suspected that if it grew in dryish upland peat instead of in lowland meadows it would sometimes take on a form very like that of *R. spadiceus*. Some intermediate taller plants have been identified by Soó as "*R. monticola*," and among the mass of material in Herb. Mus. Brit. there are many plants which in various ways seem to be intermediate between the two species. It is possible that hybridity cannot be excluded, since hybrids between *R. major* and *R. minor* are recognized, but so far as I am aware these parasitic plants have not been cultivated, and data are completely lacking. The numerous forms now referred to *R. minor* or to *R. stenophyllus* still remain to be disentangled, and until that has been done it is impossible to be more definite concerning the status of *R. spadiceus*. Further field observations are needed to clear up the relationships between the various forms of the series *Minores* which have the surface of the calyx glabrous.

Lamotte's original account of his var. *monticola* in Mém. Acad. Clermont, xxii. 880, 166 (1881) (Prodr. Fl. Nat. Centr. France, ii. 566) is (translated) :—

"*R. minor* . . . var. *β monticola* Lamotte.—*R. minor β. angustifolius* G. & G. ii. p. 613, non *R. angustifolius* Gmel.—*R. minor* Cus. 17, *Scroph.* t. 121; Rchb. fil. *Ic. scroph.* t. 117, f. I. Very common—dry pastures, mountain heaths. Annual. June to July. This form is perhaps a species; this one may ascertain when one knows better on what plant it is parasitic."

This name is illegitimate, Lamotte rejecting the earlier var. *angustifolius* because of the existence of the distinct species

bearing the same epithet. The description given by Grenier & Godron (*l. c.* 1850) was "*β. angustifolius* Feuilles de moitié plus étroites que dans le type, et donnant à cette forme l'aspect du *R. angustifolius Gmel.—Fries h. n. fasc.* 7, *n°.* 12′ ! " Chabert (in Bull. Herb. Boiss. ser. 2, vii. 513 (1899)) cites the Lamotte reference as a synonym of *R. minor* var. *stenophyllus* Schur, saying (p. 514) (translated): "Lamotte gave no description of the plant so far as I am aware; he was content with citing in his Prodromus the figures of Cusin 17, Scroph. t. CXXI, Reichenbach fil. Ic. Scroph. t. CXVII. f. 1 [*i. e.*, Icon. Fl. Germ. XX. t. 117=MDCCXXXVIII, f. 1], adding 'Pastures . . . June, July . . .'" As I have indicated, this is not quite accurate, for Lamotte cites the description of Grenier and Godron, who naturally at that period make no mention of the presence or absence of intercalary leaves, and therefore would include narrow-leaved forms of *R. minor* as well as *R. stenophyllus* (Schur) Druce, under which Sterneck cites it (1901 : 110). Indeed the figure of Cusin & Ausberque cited shows three specimens, none of which appears to be *R. stenophyllus*: one plant is small and simple-stemmed, a second slightly larger subsimple, the third a branched narrow-leaved *R. minor* without intercalary leaves and without any trace of any congestion of branches at the base of the stem. The Reichenbach figure cited is reprinted from the Icones .... Criticæ Cent. viii. t. DCCXXXI. fig. 973, which is that cited (with some doubt) by Schur (Enum. Pl. Trans. 512 (1866)) under his *R. minor* d. *stenophyllus*. Of the specimens in Lamotte's herbarium Chabert says: "Lamotte's herbarium contains three sheets of plants labelled *Rh. minor monticola*. Those from the Puy-de-Dôme and from the Lake of Guéry are indeed *R. stenophyllus* Schur. The third sheet bears plants collected, 1. vii. 1838, in the meadows ('prairies') of Channat (P.-de.-D.), much branched with ascending branches, lanceolate leaves, with only one pair of intercalary leaves and looking intermediate between typical *minor* and the var. *stenophyllus*. The plants collected by Heribaud on the Puy-de-Dôme and Mts.-Dores all belong to this variety, all Auvergne specimens of which were collected by him and by Lamotte in August, although Lamotte in his Prodromus indicates June to July as the flowering time." In raising the epithet *monticola* to the rank of species (as *Alectorolophus monticola*) Sterneck (1901) cites the Lamotte reference as "sine descriptione (sec. Chabert)" and the locality "Auvergne: Pentes de Puy de Dôme (Lam.)." The footnote adds: "the second and third of Lamotte's original specimens cited by Chabert, from the Lac de Guéry and from Charnat, which I likewise have seen, are typical *A. stenophyllus*." It will be noted that the gathering cited as *A. monticola* by Sterneck was one of the two said by Chabert to be *R. stenophyllus*. It is clear that by var. *monticola* Lamotte meant just what Koch and Grenier and Godron meant by var. *angustifolius*, and what Chabert and Sterneck mean by "*stenophyllus*." If one or other of his gatherings were incorrectly identified by him with the Reichenbach figure (evidently by him—as by Sterneck—used as a type), that fact does not affect the typification of the name. Sterneck's excuse for his misuse of the epithet reads thus (translated): "As regards the name of the plant I have retained the name of Lamotte "in Schedis," which is said to have been published without description (*cf.* Chabert . . . 514, 1899), but which so far as I know has no other synonym, and so can be used. That I use it in a sense restricted to the single monticole specimen may be considered justified, since the name *A. stenophyllus* remains, as before, valid for the race inhabiting the valleys." This treatment is completely contrary to the type method of obtaining precision in nomenclature. So although for the time being I accept the doubtfully applicable *R. stenophyllus* (Schur) Druce, Sterneck's misuse of the epithet *monticola* is clear and cannot be accepted.

Plants distributed from Orkney by Col. H. H. Johnson—Mainland, Point of Onston, Stenness, no. 1879, 21. vii. 1922, Mainland, Stromness, Mui Fea, no. 2714, 11. viii. 1924—differ, in facies, from any series of *R. spadiceus* which I have seen, although occasional specimens from the north coast of Scotland approach them and may prove to be identical. I therefore describe them as:

R. SPADICEUS subsp. **orcadensis,** subsp. nov. Ab *R. spadiceo* notis sequentibus differt. Caulis humilis 7–12 (–14) cm. altus simplex vel ramosus, ob defectionem internodiarum elongatorum folia intercalaria plura gerentium plerumque quasi fruticulosus foliis intercalàriis 0–2 paribus instructus; ramis superioribus sæpe florentibus caulem subæquantibus. Folia arrecta, vel superiora cum bracteis inferioribus et nonnumquam foliis inferioribus recurva, plerumque latiora dentibus minus prominentibus (vix apice divergentibus). Corolla lata ut videtur crassa (13 mm. longa) labio inferiore magno. Fl. vii.–viii.

In insulis Orcadibus. (Holotypus in Herb. Mus. Brit.: H. H. Johnston, no. 1879, Point of Onston, 21. vii. 1922.)

Differing from *R. spadiceus* as follows: Stem dwarf 7–12 (–14) cm. high, simple or generally branched, and owing to the absence of elongated internodes bearing intercalary leaves, looking like a little bush, with 0–2 intercalary leaves, upper branches usually flowering. Leaves arrect, the upper ones and lower bracts and sometimes even the lower leaves may be recurved, usually broader and with shallower teeth, which are scarcely turned out at their tips. Corolla broad, the upper lip much broadened distally, lower lip very large.

In his monograph Sterneck recognised two British species of *Rhinanthus* with the surface of the calyx hairy (puberulous)

all over, instead of glabrous as in the remaining British members of the series *Minores*, viz., *A. borealis* (Sterneck) Sterneck and *A. Drummond-Hayi* (Buch.-White) Sterneck. As synonym of the latter, whence he adopted his specific epithet, he cites "*Rhin. Crista Galli* var. *Drummond-Hayi* Withe [sic], in 'The Scottish Naturalist,' p. 324 (1886). Unfortunately, as appeared to be his wont, he was content not to see any type material, which shows that the original specimens, which came from Ben Lawers, were *R. borealis* (Sterneck) E. S. Marshall, and *not A. Drummond-Hayi* Sterneck. Buchanan White's original description (in Scott. Naturalist, viii. n.s. 324 (1886)—*cf.* also his remarks in letters to Arthur Bennett) supports this view. He says: "Ben Lawers, alt. 3350 ft., very rare . . . I have seen specimens on several occasions, but only in one spot. " — " " Plant dwarf, 2–5 inches high in our specimens, not branched . . . In the dried specimens I cannot find any constant character by which this can be distinguished from the ordinary form of *R. Crista-galli*, except the pubescent calyx."

As I find that the material supposed to be *A. Drummond-Hayi* is not uniform, I propose to describe two series of specimens as two new species, but before doing so I will deal with forms of *R. borealis* in which the calyx is not hairy all over.

In Herb. C. E. Salmon, some specimens collected by him in Angus (rocks, foot of Craig Maid, Clova, at about 2000 ft.: flowers bright yellow, 16. vii. 1912) were annotated by Soó as "*R. borealis* f. ad *R. minor* typ. vergens, calyce non solum ad margines, sed etiam superficie puberulo: R. Salmoni Soó n. f." Salmon had put the following note with them: "I have never seen *minor* proper as high as 2000 ft. I feel sure it is one of the named alpine forms.—Calyx ciliate, otherwise apparently glabrous." I am unable to explain Soó's remarks, for there does not appear to be a single hair on the visible part of any calyx. Whether there were any on parts now hidden (in mounting) cannot be ascertained. Soó's publication of the name (in Fedde Report, xxvi. 182 (1929) runs thus (translated): " . . . some species with hairy calyx also have glabrescent forms (. . . ssp. *Salmonii* Soó of the group ["Formenkreise"] of *Rh. Drummond-Hayi* [Withe] Druce emend. Soó, Scotland)." Soó's repetition of Sterneck's misprint of "Withe" instead of "White" suggests ignorance of the originals. Apparently his emendation was intended to indicate that he united *R. borealis* (Sterneck) E. S. Marshall and *A. Drummond-Hayi* Sterneck, preferring to use the older varietal epithet. According to the International Rules, "*borealis*" has preference as a specific epithet, and Soó's specific name is illegitimate. It has been argued that epithets published under illegitimate names of higher rank are automatically illegitimate, but although the matter is not specifically dealt with in the International Rules, such an attitude would be difficult

to apply in practice, for if at any time the name of a large genus were found to be illegitimate a large number of long known specific names might be *liable* to become superseded by others. It seems better, therefore, to accept subsp. *Salmonii* (Soó) as valid for the Craig Maid plant. What it is I am not prepared to say: certainly *R. minor* at that altitude would be very unusual, and *R. borealis* is plentiful on the Clova rocks, but Salmon's specimens do not appear to belong to *R. borealis*. It requires further collection and field study.

Specimens of what appear to be *R. borealis* with glabrescent calyx have, however, been collected in Scotland. One series collected by Symers MacVicar in Moidart (Inverness) shows some specimens of typical *R. borealis* with large fruiting calyx puberulous all over, others with more sparse hairs and some glabrous areas, and one completely glabrous on the surface. All, however, seem to belong to a single form, although not exactly like typical *R. borealis*. A second gathering, however, appears to be normal *R. borealis*, but for the partly glabrous or more sparsely puberulous calyx, except near the margins toward the base, where the hairs are denser. This I therefore name:—

R. BOREALIS var. **calvescens,** var. nov.; superficie calycis glabrescente, partim sparsius puberulo vel omnino glabro, marginem versus ad basim plerumque normaliter puberulo. Holotypus (coll. *H. J. Riddelsdell*: "Ben Nevis July 1903" ut *R. minor* Ehrh.) in Herb. Mus. Brit.

I have not yet seen the two gatherings cited by Sterneck under *A. Drummond-Hayi*, but that from Clova is probably the species I now describe:

R. Lintoni, sp. nov.

Caulis 10–20 (–27) cm. altus, tenuis et gracilis, simplex vel ramis (debilibus) instructus; internodiis inferioribus brevibus contractis, superioribus valde elongatis foliis longioribus. Folia ascendentia vel suberecta, inferiora (caduca) anguste oblonga, media (c. 30×3 mm.) superioraque angusta lineari-lanceolata basi vix dilatata interdum leviter angustata, dentibus patentibus inferioribus brevioribus etiam arrectis; omnia (cum bracteis) præsertim subtus ad venis pubescentia; folia intercalaria carent vel unum jugum exstat. Inflorescentia gracilis secunda floribus paucis (2–) 3–4 (–5). Bracteæ infimæ foliis superioribus similes vel in formam bracteorum superiorum transeuntes, superiores ovatæ supra in prolationem angustam foliaceam acute contractæ, calyce longiores. Calyx juvenilis aliquantum, maturus paululum vel vix longior quam latus, parvus (*e. g.*, 12×9½, 9½×10, 13×11 mm.), undique pilis brevibus puberulus, dentibus subæquilongis ac latis, subtriangularibus acutis (glanduliferis!). Corolla 13–14 mm. longa, dentibus labii superioris angustis

vix projectis, deorsum sensim anguste decurrentibus. Capsula paululum latiora quam longa (*e. g.*, $9\frac{1}{2}\times10\frac{1}{2}$ mm.), apice leviter emarginata cum apiculo c. 1 mm. longo prædita. Semina obreniformia, ala membranacea c. $1\frac{1}{4}$ mm. lata prædita. Fl. vii.

Holotypus in Herb. Mus. Brit., coll. *E. F. Linton*, " Forfar, Glen Fiagh, 13. vii. 1889," ut " *R. Crista-Galli* var. *Drummond Hayi* F. B. W."

Stem 10–20 (–27) cm. high, slender, simple or branched, but branches weak and only rarely with one or two flowers ; *lower internodes short* so that the leaves (and branches if any) are congested near the base of the stem, *upper* internodes *much elongated* and *longer than the leaves*. *Leaves ascending generally suberect, narrow, linear lanceolate* gradually tapering to a more or less acute apex, those of mid stem on a well-developed plant c. 30×3 mm., the lowest (falling early) rather broader —4·5 (5) mm. oblong not tapering and with rounded terminal lobe, *leaf base scarcely broadened and often slightly narrowed*, surface finely pubescent all over but longer pubescent on midrib (and sometimes veins) beneath, teeth markedly spreading at the (itself rounded) tip, which turns outwards more obviously owing to the (generally) concave outer edge of the tooth, the teeth shorter and closer together at the base of the leaf, and if that is broadened slightly more projecting and sometimes more acute ; *intercalary leaves none or one pair*. Inflorescence few (2–) 3–4 (–5)-flowered, secund. Lowest *bracts* either like the upper leaves (or with slightly broader base) or transitional to the fully developed bracts, which are ovate in the lower half and contracted into a narrow leaf-like upper part *exceeding the calyx*, finely pubescent especially on the veins beneath, the lower teeth subtriangular, broader or narrower (length 2–3 times the breadth), reaching about $\frac{1}{3}$–$\frac{1}{4}$ to the midrib, the lowest occasionally aristate. *Calyx* at first definitely longer than broad, *ultimately nearly as broad as long*, the teeth about as long as broad, subtriangular acute, the surface finely pubescent all over, the margin rather more densely pubescent with similar hairs and the teeth with glands also. *Corolla* c. 13–14 mm. long, tube narrowish ($2\frac{1}{2}$–3 mm. broad), upper lip c. 5×3 mm., lower lip about half the length of the upper, *teeth* of upper lip (apparently violet) *narrow*, either truncate or rounded above, thence tapering gradually downwards for a considerable distance. Capsule subrotund (rather broader than long) with a sharp apiculus about 1 mm. long projecting from the otherwise slightly emarginate upper edge. *Seed* obreniform, lower edge unwinged, sides and top *broadly* (c. $1\frac{1}{4}$ mm.) *winged*.

V.-c. 88. Perth mid. N. side of Creag Mhor, Lawers, *C. E. Salmon*, 18. vii. 1913 (as *R. Drummond-Hayi* Druce, " ! Soó ").

V.-c. 90. Forfar (Angus). Clova, Glen Fiadh, *E. F. Linton*, 13. vii. 1889 (as *R. Crista-Galli* var. *Drummond-Hayi* F. B. W.), includes holotype in Herb. Mus. Brit. ; also " Glen Doll " and

" Glen Fiagh," *E. F. & W. R. Linton*, 15. vii. 1889 (see B. E. C. 1889, Rep. 266 (1890), where the gathering is passed as *R. Crista-Galli* var. *Drummond-Hayi* by Buchanan White). In the earlier gathering E. F. Linton mixed *R. Lintoni* and *R. borealis* in his herbarium, but subsequently differentiated the two.

A series of fourteen specimens in Herb. Mus. Brit. collected in Glen Nevis (Lochaber) by C. E. Salmon appear to be uniformly different from both *R. borealis* and *R. Lintoni*. I therefore describe them as :

R. lochabrensis, sp. nov.

Caulis 10–15 (–25) cm. altus ut videtur rigidus, simplex vel ramis paucis abbreviatis plerumque sterilibus instructus, internodius etiam infra ramos superiores longis sed inter folia intercalaria longioribus. Folia patentia arrecta vel recurva inferiora anguste oblonga (c. 18×3 mm.), media paululum majora ; intercalaria (internodiis bene evolutis paululum breviora sed interdum —internodiis omnibus minus longis—paululum longiora), (1–2–) 3 (–4) juga, superiora breviora subbracteiformia ; folia inferiora pubescentia sed versus plantæ apicem minus breviusque. Calyx juvenilis aliquantum maturus clare longior quam latus (*e. g.*, $13\times11\frac{1}{2}$, $15\times10\frac{1}{2}$, $17\times13\frac{1}{2}$ mm.), undique pilis brevibus puberulus dentibus etiam parce glandulosis. Corolla dentibus superioris exceptis secundum verba collectoris " wholly yellow," dentibus violaceis perspicue projectis rotundata vel truncata deorsum sensim decurrentibus. Capsula parva ($8\times8\frac{1}{2}$ mm.), subrotunda paululum latiora quam longa, apice leviter emarginata, cum apiculo c. 1 mm. longo prædita. Semina ala membranacea c. 1 mm. lata prædita. Fl. (vii.–viii.).

Holotypus in Herb. Mus. Brit. (coll. *C. E. Salmon*, " Inverness, near Meall Cumhaun, Glen Nevis, 19. viii. 1902 ").

Stem stouter than in *R. Lintoni*, 10–15 (–25) cm. tall, simple or with one, rarely two pairs of weak branches, which are rarely slightly elongated with one or two flowers, with more and longer pubescence in the lower part, but more glabrescent above ; internodes elongated even below the topmost branches, longest between the middle intercalary leaves. *Leaves patent, arrect* (" horizontal ") *or recurved*, rather shorter than in *R. Lintoni*, the lower c. 20 (25)$\times$4 ($4\frac{1}{2}$) mm. long and broad, those in mid stem as long as the lower leaves, but in their base transitional to the intercalary leaves ; *intercalary leaves* (*rarely* 1, 2) 3 (4) *pairs*, usually rather shorter than the internodes, but sometimes all the internodes are shorter, and then the intercalary leaves slightly exceed them, *shorter and broader than the lower stem leaves, all or the upper subbractiform ovate with elongated spreading lower teeth*, less pubescent than the lower leaves. Bracts (except sometimes the lowest pair) shorter than the fruiting calyx, ovate triangular, apex (except sometimes in lowest pair), scarcely at all produced,

even less pubescent than the intercalary leaves, the surface finely pubescent but the veins not more so, lowest teeth only very rarely narrow and subaristate. *Calyx at first considerably longer than broad,* and remaining so *in ripe fruit* (*e. g.*, $13\times11\frac{1}{2}$, $17\times13\frac{1}{2}$ mm., sometimes smaller). Corolla "wholly yellow," *teeth* distally *more projecting* than in *R Lintoni*, then outwardly truncate or rounded, thence gradually tapering downwards into the margin of the corolla. Capsule small ($8\times8\frac{1}{2}$ mm.) shallowly emarginate with apiculus c. 1 mm. long above. Seeds with membranous wing c. 1 mm. wide above and at the sides. Fl. (July)–Aug.

V.-c. 97. Westerness.—Inverness. Near Meall Cumhaun, Glen Nevis, *C. E. Salmon*, 19. viii. 1902 (as *R. Crista-galli* and *Drummond-Hayi* F. B. White) includes holotype in Herb. Mus. Brit. Rather poorly developed specimens which I collected in Glen Nevis (by the road up the Ben, A. J. W. Ref. and date 35704 A *a, i. e.*, 4. vii. 1935) are apparently *R. lochabrensis.*

It may be useful to add determinations of, or remarks on, the remaining gatherings in Herb. Mus. Brit. which have been identified as "*Drummond-Hayi*," in one or other nomenclatural combination. Some of them do not agree with *R. borealis*, *R. Lintoni*, and *R. lochabrensis*, and whether the descriptions of these require modification or whether there remain still further forms to be described, must await further investigation.

V.-c. 87. Perth. W. Glen Falloch, cliffs of Ben-a-Chroin, *E. S. Marshall*, 31. vii. 1889, =*R. borealis.*

V.-c. 92. Aberdeen S. Corrie of Loch Ceann-more [=Corrie Kander], 2300 ft. *Buchanan White*, 5. viii. 1886, =*R. borealis*—near Dhuloch, *E. F. Linton*, 24. vii. 1889, =*R. borealis*—Craigindal, *E. F. Linton*, 27. vii. 1889, fits neither *R. Lintoni* nor *R. lochabrensis*, but seems too much branched for *R. borealis*, and the leaves are scarcely oblong enough ; intercalary leaves 0–1 pair, except one specimen with 3 ! ; ? nearest *R. borealis.*

V.-c. 97. Westerness.—Inverness. Coire-an-Easain More, Glen Spean, *E. S. Marshall*, 29. vii. 1896, =*R. borealis.* Aonach Beg, *E. S. Marshall*, no. 1641, 1. viii. 1896, is "*R. borealis* f. *gracilis* m. det. Soó," and is probably *R. borealis* (some fruiting calyces are large), but two plants have 1–2 pairs of intercalary leaves, the upper of which are subbractiform. Moidart, Roshven range, N. side, 2100 ft. and 2200 ft, *Symers Macvicar*, 17 & 18 vii. 1895, =*R. borealis.* Moidart, Ben Gaire, 1900 ft, *Symers Macvicar*, 15. viii. 1892, =*R. borealis.*—Argyll. Coire a' Chearcaill, near Conaglen, *C. E. Salmon*, 23. viii. 1902 : E. S. Marshall thought it better under *R. borealis*, and Soó its f. *gracilis* ; it is peculiar, as most specimens have short internodes, and one plant has the upper leaves subbractiform.

V.-c. 98. Main-Argyll. Ben Chaisteil, *E. S. Marshall*, 3. viii. 1891 ; poor material, possibly *R. borealis*, but one specimen with one pair of intercalary leaves and another with slightly subbractiform upper leaves. Meall nan Tigearn, *E. S. Marshall*, no. 3466, 20. vii. 1910 ; branches sometimes developed as in *R. Lintoni*, but intercalary leaves 0–3, usually narrower but shorter than the lower leaves, only the top ones occasionally slightly subbractiform, corolla with large lower lip, corolla tooth variable, =?.

V.c. 99. Dumbarton. Ben Vorlich, *E. S. Marshall*, no. 3938, 10. vii. 1914, is apparently *R. Lintoni.*

V.-c. 107. Sutherland E. Near the W. end of Loch Lannsaidh, *A. J. Wilmott*, no. 1058, 12. viii. 1919 ; small specimens growing in poor soil during a dry season ; intercalary leaves (1–) 3, fruiting calyx small (? starved, $10\times8\frac{1}{2}$, $10\frac{1}{2}\times8$) ; needs further collection.

V.-c. 108. Sutherland W. Canisp, 2000 ft., *C. E. Salmom*, 26. vii. 1899, =*R. borealis* ("f. *gracilis*" det. Soó).

V.-c. H. 2. Kerry N. Mangerton, *H. N. Ridley*, 27. viii. 1883, det. Ostenfeld, 1906, =*R. borealis.*

It is clear that the elucidation of the British representatives of *Rhinanthus* series *Minores* is far from complete, and I would welcome for the Museum series of specimens carefully collected with field notes to illustrate the variation in any area. Notes specially required are of the colours of stem, leaves, bracts, corolla, and corolla teeth : characters of leaf variation, presence or absence of intercalary leaves, etc., can be demonstrated by the specimens themselves, if carefully collected. The characters given for the new forms here described, being based on a limited number of specimens, also require testing in the field, and any observations thereon supported by specimens will be specially welcome.

STUDIES IN THE GENUS *EUPHRASIA* L.—I.

By E. O. Callen, B.Sc., Ph.D.

During the course of the last seven years I have been paying particular attention to the collection and identification of species of the genus *Euphrasia*, at first in Scotland only (see Journ. Bot. lxxiii. 53 (1935)), but later on the Continent as well. I should like here to record my indebtedness to Mr. H. W. Pugsley for his encouragement throughout.

When on a visit to the United States in September last, I took the opportunity of examining American material in the Herbaria of the New York Botanical Garden, of the Smithsonian Institution in Washington, and particularly the very large collection of the Academy of Natural Sciences of Philadelphia. As a sequel to this visit, Dr. Francis W. Pennell of Philadelphia sent me some duplicate material for study. The following note incorporates the results of this study, and includes the

descriptions of two new species, one American, the other Bavarian, of a new variety to the American species, of four hybrids, and a discussion on a Russian species.

The American material had been entirely collected in the Gaspé Peninsula of Quebec, and consisted largely of *Euphrasia americana* Wettst. and *E. canadensis* Towns. There was one gathering, however, which by reason of its glandular foliage stood out as distinct. I describe this plant as

Euphrasia Pennellii, sp. nov.

Inter species americanas foliis glandulosis distinctissima; ex affinitate *E. kashmirianae* Pugsl. esse videtur sed foliis angustioribus minoribusque, floribus parvis albis inter alia differt.

Planta habitu æstivali. Caulis erectus, robustus, 10–20 cm. altus, rubescens, pilis longis deflexis crispulis albidis eglandulosis immixtis pilis magis patentibus glanduliferis vestitus, foliis caulinis quam internodiis brevioribus, e foliorum pare octima ad decimum florens, simplex vel sæpius e nodis caulinis inferioribus ramos paucos robustos emittens, iterum ramosus. Folia læte viridia, erecto-patentia, ad 8 mm. longa, breviter petiolata, inferiora caduca; floralia oblonga vel obovata, utrinque dentibus 3–5 obtusis vel subacutis; nonnunquam ramorum folia acuta dentata; omnia pilis brevibus glanduliferis setis brevibus immixtis plus minusve dense vestita. Calyx ut folia vestitus, dentibus acuminatis, fructifer accretus. Corolla parva, dorso 4·5–5·5 mm. longa, præter labium superius saturate lilacinum albida lilacino-tincta, striis purpureis valde picta et in labio inferiore luteo-maculata, labio superiore bilobo porrecto, labio inferiore superius superante, lobis emarginatis trilobis, lobo medio quam lateralibus longiore. Capsula 4–6·5 mm. longa, oblonga, rotundato-truncata vel retusa, ciliata et superne subpilosa, vulgo calycis dentibus folioque subtendente longior.

Exsicc. Francis W. Pennell 24926, grassy bluff, above shore, west of Caps de Maria, on Baie des Challeurs, Bonaventure County, Quebec, 23rd August, 1939 (type in Acad. Nat. Sc. Philadelphia).

Var **naicna,** var. nov.

Planta habitu gracili, caule ad 35 cm. alto, internodiis (summis floralibus exceptis) folia valde superantibus. Folia eis typi minora, ad 5 mm. longa, pilis longis glanduliferis crispulis setis longis immixtis dense vestita. Capsula forma typica minor, ad 5 mm. longa.

Exsicc. Ynes Mexia 2297, trail, Fairbanks to College of Agriculture, Alaska, 30th August, 1928 (type in Herb. Edinburgh).

The glandular character of the foliage of this Eyebright marks it as distinct from any other species known from North America. The size of the capsule, exceeding both the calyx teeth and the subtending leaf, a character common to only a few species, when allied to the glandular foliage, forms a further diagnostic feature.

The variety *incana* is readily recognizable on account of the very long waved glandular hairs and the longer bristles on the edges of the leaves. I have seen several Eyebrights from North America with a very few glandular hairs on a plant otherwise densely covered with a great number of long, waved bristles. The variety *incana* can readily be separated from them, however, as the glandular covering is dense, and the capsules exceed the calyx teeth and the subtending leaves, and the few erect branches are produced from the lowest flowerless nodes. The material on which this variety is based is almost entirely in fruit, but there were still a few flowers and floral leaves on the material in Edinburgh and in the Herbarium of the British Museum (Nat. Hist.), London. It has been suggested that this material resembles some form of *E. hirtella* Jord., but the small size of the flowers amongst other things, excludes this possibility.

The foliar glands of this species place it at once into the Series *Brevipilae*. It is, perhaps, most closely allied to *E. kashmiriana* Pugsl., from which it differs in being very much taller and having much narrower foliar leaves, as well as having a much smaller white corolla. From *E. brevipila* B. & G., *E. Pennellii* differs in branching much lower down, and in having smaller erect and not spreading leaves.

The material from the Gaspé Peninsula contained several gatherings, which upon examination proved to be of hybrid origin. None of them appear to have been described.

×**Euphrasia vestita** Callen (E. AMERICANA × PENNELLII).

Differt ab *E. americana* Wettst. ramis robustis e nodis caulinis inferioribus orientibus, foliis et calycibus pilis glanduliferis brevibus obsitis, capsula rotundato-truncata angustiore; ab *E. Pennellii* Callen foliis patentibus, corollis majoribus, capsula calycis dentibus folioque subtendente breviore.

Exsicc. Pennell 24915, sandy soil, back of low dune on beach, Douglastown, Gaspé County, Quebec, 20th August 1939 (type in Herb. Callen); 24921 (in part), field in clearing, Riviere Malbaie, west of Barachois, Gaspé County, Quebec, 21st August, 1939.

No. 24921 was labelled *E. americana* Wettst., and of the two plants examined, one was undoubtedly this species, but the other, with its glandular foliage and narrower truncated capsules, exceeding the subtending leaves, was different. A closer study convinced me that it was a hybrid of *E. americana* with *E. Pennellii*. All the specimens seen of no. 24915 were this hybrid.

×**Euphrasia villosa** Callen (E. AMERICANA × ARCTICA).

Differt ab *E. americana* Wettst. ramis e nodis caulinis inferioribus orientibus, foliis et calycibus pilis longis vestitis,

capsula angustiore ; ab *E. arctica* Lange foliis minoribus angustioribus sæpe purpureo-tinctis haud imbricatis (summis exceptis), corollis minoribus, capsula calycis dentibus breviore.

Exsicc. Pennell 24906 (in part), grassy field above sea-cliff, Cloridorme, Gaspé County, Quebec, 19th August, 1939 (type in Herb. Callen).

Under *E. arctica* Lange I understand the large-flowered, large-leaved pubescent plant, which according to Prof. Fernald is so common around the coast of the Lower St. Lawrence, Quebec. The material under the no. 24906 was mixed, half the specimens were referable to this hybrid, and the rest to *E. arctica*×*canadensis*.

×**Euphrasia aequalis** Callen (E. AMERICANA × CANADENSIS).

Differt ab *E. americana* Wettst. ramis e nodis caulinis inferioribus orientibus suberectis vel erectis, foliis minoribus dentibus acuminatis in pagina inferiore pilis paucis glanduliferis brevioribus obsitis ; ab *E. canadense* Towns. foliis caulinis superioribus majoribus latioribus sæpe purpureo-tinctis, corollis majoribus, capsula latiore.

Exsicc. Pennell 24912, grassy flat above beach, south of Cap des Rosiers, Gaspé County, Quebec, 19th–20th August, 1939 (type in Herb. Callen) ; 24907, grassy field above sea-cliff, Cloridorme, Gaspé County, Quebec, 19th August, 1939.

The gathering no. 24907 contained a transition series, from plants inseparable from the one parent, through intermediates to others very like the other parent.

×**Euphrasia aspera** Callen (E. ARCTICA × CANADENSIS).

Differt ab *E. arctica* Lange ramis e nodis caulinis superioribus orientibus suberectis vel erectis, foliis minoribus dentibus acuminatis, corollis minoribus ; ab *E. canadense* Towns. foliis setis longis vestitis.

Exsicc. Pennell 24901, above beach, west of Riviere Marsoui, Gaspé County, Quebec, 18th August, 1939 (type in Herb. Callen) ; 24903, slaty talus, above beach, Cap de Gros Morue, Gaspé County, Quebec, 18th August, 1939 ; 24906 (in part), grassy field above sea-cliff, Cloridorme, Gaspé County, Quebec, 19th August, 1939 ; 24895, crevices of calcareous rocks, shore west of Cap au Renard, Gaspé County, Quebec, 18th August, 1939 ; 24899, grassy summit of cliff, 500–600 ft. alt., Petit Cap Perce, west of Riviere Marsoui, Gaspé County, Quebec, 18th August, 1939.

The plants here generally greatly resemble *E. canadensis* Towns., and I have found great difficulty in detecting characters of the other parent, though the long waved hairs on the leaves are an infallible guide. Of the gatherings cited above the first two are the most typical.

Euphrasia bavarica, sp. nov.

Species affinis *E. tirolensi* Pugsl. a qua foliis pilis glandulosis longis sparsim vestitis, capsulis emarginatis e calyce haud exsertis ; ab *E. Willkommii* Freyn foliis dentibus brevibus utrinque 3–4 præditis nec profunde serratis nec subpinnatifidis inter alia differt.

Planta habitu subæstivali. Caulis erectus, gracilis, 5–11 cm. altus, plus minusve purpurascens, basin versus viridescens, pilis longis crispulis deflexis albidis eglandulosis dense vestitus, foliis caulinis quam internodiis brevioribus, e foliorum pare tertio ad quintum (vulgo quarto) florens, simplex vel e nodis caulinis superioribus ramos 1–2 graciles emittens. Folia majuscula, 8–10(12) mm. longa, ad 10 mm. lata, grisco-viridia, erecto-patentia, inferiora caduca ; caulina ovalia, inferne plus minusve cuneata, utrinque dentibus 1–3 obtusis ; floralia vulgo subopposita, late ovata, basi cuneata, dentibus utrinque 3–4 infimis obtusis supremis acutis aristatis ; omnia pilis albidis (in pagina superiore sæpius brevioribus) unà cum marginibus utrinque parce vestita, in pagina inferiore pilis glandulosis longis parce immixtis. Pedicelli ad 1·3 mm. longi. Calyx dentibus longiusculis acutis munitus, setis brevibus pilisque glandulosis longis immixtis vestitus, fructifer vix accretus. Corolla parva, dorso 4–5 mm. longa, præter labium superius lilacinum albida, striis purpureis picta et in labio inferiore luteo-maculata, labio superiore lobis parvis emarginatis porrectis, labio inferiore trilobo, quam superiore vix longiore, lobis subæqualibus emarginatis. Capsula 3·5–5·5 mm. longa, plus minusve fusco-tincta, oblongo-elliptica, emarginata, ciliata et superne subpilosa, calycis dentes non superans.

Exsicc. Callen 270, between Kreuzeck and Hochalm (1700 m. alt.), Garmisch-Partenkirchen, Bavaria, 30th July, 1938 (type in Herb. Callen) ; 269, beside Kreuzeck-Haus (1600 m. alt.), Garmisch-Partenkirchen, Bavaria, 30th July, 1938.

This Eyebright bears a great resemblance to *E. tirolensis* Pugsl. It differs from it in being a more slender plant, often unbranched, or if branched, then from the uppermost flowerless node only, in the partly glandular foliage, but most important of all in the short emarginate capsule subequalling the calyx teeth. From *E. frigida* Pugsl. it differs in possessing long stalked glands and in not having the dense terminal spike and the broad emarginate capsules of that species. The only other species with which it might be confused is *E. Willkommii* Freyn of southern Europe, in which the foliage, though glandular, is much more deeply cut, and only has two or at the most three teeth on each side of the leaf.

Taking the characters of this species as a whole, it seems best to place it in the Series *Latifoliae* with *E. Willkommii* Freyn and *E. frigida* Pugsl. (*E. latifolia* Pursh ex Wettst.).

I found this Eyebright in 1938 when revisiting the Alpine Club hut at Kreuzeck. The most striking feature of the rich flora of this district was the almost complete absence of Eyebrights, the only ones collected being *E. Rostkoviana* Hayne around the Talstation of the Kreuzeck aerial ropeway, *E. salisburgensis* Wettst. between Kreuzeck-Haus and the Hochalm, and *E. montana* Jord. in a neighbouring valley (Reintal), though none of these was plentiful. Although *E. bavarica* was collected from two different stations I was unable to obtain more than thirty-five plants in all. Some material has been placed in the Kew Herbarium.

Amongst other material that I have recently examined is *E. praebrevipila* Chitrowo from Russia. Pugsley does not mention this species in his "Enumeration of the Species of *Euphrasia* L.," Journ. Bot. lxxiv. 273 (1936). Chitrowo, in Trav. Mus. Bot. Acad. S. Pétersb. iii. 27 (1907), described three species—*E. praecurta*, *E. praerostkoviana*, and *E. praebrevipila*—in Russian. The Latin diagnosis of the first (at least) has been given on the labels of the Exsicc. Herb. Fl. Russica.

Chitrowo explained that Wettstein had described "spring" and "autumn" flowering forms, but that in his opinion there appeared to be a certain amount of lumping under the term "autumn forms." He felt that in Russia he had a plant which closely resembled *E. brevipila* B. & G., but flowered earlier. He designated it as a "summer form" of that species, with the name *E. praebrevipila*.

The material was collected in Province Pskov, District Velikolutzka, 29th June, 1921. On some of the plants there are from 6–8 pairs of well-developed capsules, so that I should definitely term this a "spring" flowering form, as it must have come into flower at the end of May at the latest.

Wettstein actually gave *E. tenuis* (Brenn.) Wettst. as the "spring" flowering form of *E. brevipila*. The Pskov material differs from *E. tenuis* in a number of points, however: firstly in the complete absence of glands, secondly in the corolla being much smaller, with the lower lip scarcely projecting beyond the upper, and finally in having an emarginate capsule. It is therefore clear that *E. praebrevipila* does not belong to the Series *Brevipilae* as was to be surmised from Chitrowo's remarks, but to the Series *Latifoliae* near *E. minima* Jacq. and *E. pulchella* Kern. From the former it differs in flowering from a lower node, in having smaller leaves, and in the capsule, shorter than the calyx teeth but exceeding the subtending leaf; from the latter it differs in having much smaller leaves and flowers, and in the capsules, shorter than the calyx teeth but exceeding the subtending leaf.

RESULTS OF TWO BOTANICAL EXPEDITIONS TO SOUTH ALBANIA.

By A. H. G. Alston, B.A., F.L.S., and N. Y. Sandwith, M.A., F.L.S.

(Continued from p. 199.)

*Crepis Dioscoridis L.

Sarandë, rocky limestone coast slopes, 30. v. 33, no. 1238.

*Crepis Reuteriana Boiss.

Leskovik, pine woods, 3500 ft., 18. vi. 33, no. 1739. Flowers orange-yellow.

Very rare in Europe, and recorded only from Thrace and Corfu.

Crepis rubra L.

Sarandë, abundant on limestone slopes at sea-level, 31. v. 33, no. 1267. Cultivated at Kew from seed collected in this locality, and flowering in July 1934, no. K. 1331. Previously collected in Albania in 1878 near Gjinokastrë by N. K. Chodzes (see Verh. Bot. Brandenb. xxi. 63 (1880)).

The rose-pink flower-heads of *C. rubra* make a beautiful show at Sarandë in May and early June.

*Crepis rutilans Lacaita.

District of Sarandë; broken limestone slopes of mountains above Borsh, 1500 ft., 5. vi. 33, no. 1383. Flowers bright yellow.

A form (so placed by E. B. Babcock in sched.) or subspecies of *C. vesicaria*, described from two collections made on Corfu. Apparently the first record from the mainland.

Crepis turcica Degen et Baldacci.

Melesin, above Leskovik, limestone cliffs at about 3500 ft., 19. vi. 33, no. 1777. Flowers bright yellow.

Doubtless the same locality as Mt. Prophet Elias of Melesin, where Baldacci's assistant Micio Panajotis Xenos collected it for him on July 4th, 1896.

*Echinops viscosus DC.

Gjinokastrë, bare slopes and rocky ground, 800 ft., 5. viii. 35, no. 2319. Flowers bluish white.

Recorded by Hayek from neither Albania nor Epirus.

Erigeron crispus Pourr.

Durrës (Durazzo), waste ground, 2. ix. 35, no. 2759.

Not recorded by Hayek from either Albania or Epirus, but collected by Baldacci at Vlorë (Valona) and distributed (no. 21 of 1892 coll.) as *E. linifolius* Willd. (see Malpighia, viii. 184).

*Hypochoeris aetnensis (L.) Ball.

Sarandë, bare limestone slopes near sea-level, 30. v. 33, no. 1217. Flowers orange-yellow, reddish outside.

*Inula bifrons (Gouan) L.

District of Korçë, dry bushy sandstone slopes above Dardhë, 5000–5500 ft., 25. viii. 35, no. 2644.

This locality marks a very considerable southward extension of the range of the species.

Kremeria Myconia (L.) Maire. *Chrysanthemum Myconis* L. *Myconella Myconis* (L.) Sprague.

District of Sarandë; Borsh, gravelly roadside by road to Vlorë, near sea-level, 4. vi. 33, no. 1396. Flowers yellow.

Lactuca contracta Vel.

Above Gjinokastrë, rocky limestone slopes, 1500 ft., 10. viii. 35, no. 2417.

*Lactuca cretica Desf.

Sarandë, limestone coast hills near sea-level, 3. vi. 33, no. 1382.

Lactuca graeca Boiss.

Lunxheriës Range, sandstone rocks at Çajup, 4000 ft., 10. vii. 33, no. 2179. Gramos Range near Ersekë, on bare shale rocks in deep ravine, c. 3800 ft., 28. vi. 33, no. 1952.

Lactuca Serriola L.

Voskopoj, waste stony ground near village, 28. viii. 35, no. 2701. Achenes grey.

Recorded by Hayek from Epirus, and collected by Baldacci near Vlorë in S. Albania.

*Leontodon tuberosus L.

District of Sarandë; broken limestone slopes of Borsh, 3000 ft., 5. vi. 33, no. 1379. Flowers bright yellow.

*Mycelis sonchifolia (Panč.) Hayek.

District of Korçë, dry beech woods on sandstone slopes above Dardhë, 5000–5500 ft., 25. viii. 35, no. 2650. Tall, erect. Heads rather large, bright yellow.

Onopordon illyricum L.

Bare ground in valley between Gjinokastrë and Erindi, 800 ft., 13. vii. 33, no. 2222. Very strictly erect. Whole plant grey-hoary. Flowers purple. Abundant on the Lunxheriës Range up to at least 4000 ft.

Recorded by Hayek from Epirus, and frequently noted by Baldacci as occurring within the present limits of S. Albania.

*Picris pauciflora Willd.

Sarandë, limestone coast slopes, 31. v. 33, no. 1265. Flowers orange-yellow.

Prenanthes purpurea L.

Above Dardhë, S.W. of Korçë, beech woods on sandstone slopes, 5500 ft., 25. viii. 35, no. 2656. Heads mauve.

*Pulicaria odora (L.) Rchb.

Sarandë, limestone coast slopes, 31. v. 33, no. 1257.

*Rhagadiolus stellatus (L.) Willd., var. edulis (Gaertn.) DC.

District of Sarandë; stony sandstone slopes above Borsh, 2000 ft., 5. vi. 33, no. 1428.

Scorzonera rhodantha Hausskn. *S. purpurea* L. var. *peristerica* Form.

Ostrovicë Range, highest grassy sandstone slopes, 7000 ft., 4. vii. 33, no. 2091. Flowers pale pinkish mauve.

*Scorzonera rumelica Vel.

Above Gjinokastrë, stony limestone slopes of Mali Gjer, 4500 ft., 9. vi. 33, no. 1522. Flowers yellow. Leaves strongly veined with white.

Senecio viscosus L.

Lunxheriës Range, among boulders on limestone slopes at Çajup, 4000 ft., 10. vii. 33, no. 2174.

Sonchus asper (L.) Hill. subsp. *eu-asper Hayek.

Voskopoj, by stream in wood, 3700 ft., 19. viii. 35, no. 2543.

*Sonchus maritimus L.

Durrës (Durazzo), marshy spots in sand-dunes, 30. viii. 35, no. 2711. Vlorë (Valona), marshes behind sand-dunes, 4. ix. 35, no. 2794. Leaves fleshy, glaucous. Involucre pale. Flowers orange-yellow.

The auricles at the base of the upper leaves of these specimens are sometimes distinctly sagittate.

*Tragopogon orientalis L.

Ersekë, damp hay-field, 3300 ft., 26. vi. 33, no. 1921. Flowers yellow, as long as phyllaries.

*Tragopogon Samaritani Boiss. et Heldr.

Gjinokastrë, grassy slopes, 1500 ft., 8. vi. 33, no. 1477. Flowers yellow.

XERANTHEMUM INAPERTUM (L.) Willd.

Below Ostrovicë Range, dry sandstone slopes near Marjan, 4000 ft., 5. vii. 33, no. 2099. Flowers pale mauve.

Not recorded by Hayek from Albania. Collected by Baldacci in Greek Epirus, but also noted by him as seen in S. Albania near Klyssyra (see It. Alb. 139 (1917)).

*ZACYNTHA VERRUCOSA Gærtn.

Sarandë, stony limestone coast slopes, 31. v. 33, no. 1244.

CAMPANULACEAE.

CAMPANULA ATHOA Boiss. et Heldr.

Lunxheriës Range, rubbly slopes of deep ravine between Çajup and Zhej, 3500 ft., 8. viii. 35, no. 2402. Flowers pale blue.

*LEGOUZIA HYBRIDA (L.) Gérard.

District of Sarandë; grassy places on lower slopes of Mali Lucës above Borsh, c. 3000 ft., 5. vi. 33, no. 1422.

MONOTROPACEAE.

*MONOTROPA HYPOPITYS L.

Dardhë, beech woods on sandstone, 5500 ft., 25. viii. 35, no. 2641. Plant almost white. Petals hairy within. To be referred either to var. *glabra* Roth f. *hypophagos* Andres or to var. *hirsuta* Roth.

PLUMBAGINACEAE.

ACANTHOLIMON ECHINUS (L.) Boiss.

Mali Lunxheriës Range, rocky limestone slopes of Strakavec, plentiful at c. 5000 ft., occasionally found dropped down to a lower level, 11. vii. 33, no. 2182. Spiny cushion plant with pink flowers.

The first collection certainly made in Albania (see Kew Bull. 1939, p. 191). Baldacci's locality on the Nemerçka Range above Biovishd was on the present boundary of Albania and Greece.

*GONIOLIMON DALMATICUM (Presl) Rchb.

Lunxheriës Range, limestone rocks above Çajup, 5500 ft., rather scarce, 11. vii. 33, no. 2191, and 7. viii. 35, no. 2349. Flowers pinkish mauve; petals slightly emarginate.

*LIMONIUM ANFRACTUM (C. E. Salmon) C. E. Salmon.

Sarandë, low limestone coast rocks by the sea, 14. vii. 33, no. 2229. Flowers pale mauve.

*LIMONIUM SINUATUM (L.) Mill.

Sarandë, limestone rocks by sea, sea-level, 14. vii. 33, no. 2225.

ASCLEPIADACEAE.

*GOMPHOCARPUS FRUTICOSUS (L.) R. Br.

District of Sarandë; Borsh, dry bushy slopes by road to Vlorë, c. 600 ft., 4. vi. 33, no. 1394. Tall erect shrub, said to be "wild" by the inhabitants. Corolla white.

BORAGINACEAE.

*ALKANNA PULMONARIA Griseb. var. PINDICOLA (Hausskn.) Hayek.

Zhej, on slopes of valley between Lunxheriës and Nemerçka Ranges, in oak-hornbeam scrub on sandstone, 2500 ft., 12. vi. 33, no. 1595; this agrees excellently with the type collection, *Sintenis* 1494. Leskovik, sandstone slopes, 3000 ft., 17. vi. 33, no. 1697. Ostrovicë Range, bare broken limestone slopes, 6200 ft., 4. vii. 33, no. 2087. Corollas of 1595, 1697 noted as creamy yellow with purple veins; those of 2087 (this material is much nearer typical *A. Pulmonaria*) noted as yellow.

*ANCHUSA HYBRIDA Ten., det. W. B. Turrill.

Distr. of Gjinokastrë; Gjinokastrë, c. 1000–1200 ft., limestone slopes, frequent, 7. vi. 33, no. 1438. Gjinokastrë, April 1936, *Mrs. R. V. Pennington* 116. Flowers violet-black.

*CERINTHE PURPUREA Vis., vide Turrill in Kew Bull. 1939, pp. 191–3.

Sarandë; rocky limestone slopes near sea-level, 30. v. 33, no. 1228. Leaves white-spotted. Bracts blue-violet. Corolla blue-violet, but with a narrow yellow band towards apex.

The distribution of this plant and its relationship with *C. retorta* S. et S. is discussed by Dr. Turrill in the note cited above.

CYNOGLOSSUM MONTANUM Höjer apud L., sens. Hayek, Brand et Markgraf.

Leskovik, limestone rocks near summit of Melesin, 4000 ft., 19. vi. 33, no. 1757. Flowers dark red. Nemerçka Range above Biovishd, stony bushy limestone slopes, c. 4000 ft., 22. vi. 33, no. 2251. Growing with no. 1824 (*C. pustulatum*), but indumentum quite different.

*CYNOGLOSSUM PUSTULATUM Boiss. Elench. 66 (1838); Willk. in Willk. et Lge. Prodr. Fl. Hisp. ii. 508 (1870), in syn. sub *C. nebrodensi* Guss.—*C. nebrodense* Guss. var. *pustulatum* (Boiss.) Boiss. Voy. Bot. Esp. ii. 434 (1845); Brand in Engl. Pflanzenreich, iv. 252, p. 128 (1921); Cuatrecasas in Trab. Mus. Cienc. Nat. Barcelona, xii. 386 (1929). *C. valentinum* Lag. forma *castrilense* Degen et Herv. in Bull. Acad. Géogr. Bot. xvii. 60 (1907). *C. castrilense* (Degen et Herv.) Pau, Cart. Bot. 3 a (1907 ?). *C. Dioscoridis* Vill. var. *castrilense* (Degen et Herv.) Brand. in Engl. Pflanzenreich, *l. c.* p. 119.

S. SPAIN. Sierras of the provinces of Jaén, Granada, Málaga, Almeria.

S. ALBANIA. Lunxheriës Range, bare stony slopes near Çajup, c. 3700 ft., 12. vi. 33, no. 1638. Nemerçka Range, above Biovishd, stony and bushy limestone slopes, c. 4000 ft., 22. vi. 33, no. 1824. Ostrovicë Range, near Marjan, in short turf and stony ground, c. 4000 ft., 5. vii. 33, no. 2106. Leaves shiny and glossy, greyish green, hispid with tuberculate-based hairs, not downy. Inflorescence weak and nodding. Flowers small, rich deep red.

The distinguishing characters and synonymy of this plant were discussed at length by Cuatrecasas in his account of the vegetation of the Sierra Mágina, cited above; but Cuatrecasas retained it as a variety of *C. nebrodense*. We ourselves are unable to do this, and prefer to regard the plant as a full, distinct species. The Albanian plant, which agrees well with the Spanish material, was sometimes found growing with the Italian and Balkan *C. montanum* Höjer apud L., which is perhaps conspecific with the Sicilian *C. nebrodense* Guss., and was distinguished from it at a glance by the stems being shining and glabrous, or glabrescent with adpressed hairs; by the glossy grey-green (often almost glabrous) leaves which are ciliate on the margin and clothed on the surface with scattered stiff hairs resting on a very conspicuous tuberculate base; by the shape of the upper stem leaves, which widen to an auriculate-amplexicaul base; by the weak and flexuous branches of the fully developed inflorescence; and by the much smaller corollas. *C. Dioscoridis* Vill., which is perhaps a closer ally, differs from *C. pustulatum* in the shape and indumentum of the leaves, the larger corollas, and the distinctly raised margins of the nutlets; while *C. germanicum* Jacq. (*C. montanum* Lam., non Höjer apud L.) is distinguished at once, *inter alia*, by the shape and colour of the large leaves which are glabrous above, and the large oblong sepals.

We have seen no Italian specimens of *C. pustulatum*, which appears to be a member of the interesting group of species confined to the Balkan and Iberian Peninsulas. The leaves of Italian specimens of *C. montanum* are sometimes scabrous with tuberculate-based hairs, possibly, as was pointed out by Lacaita in Bull. Ort. Bot. Nap. iii. 291, owing to a dry habitat, but such specimens, *e. g.* those of Herb. Gay at Kew, maintain the characters of indumentum, leaf-shape, and inflorescence which distinguish the species from *C. pustulatum*. Similarly, we have seen no Spanish specimens of *C. montanum* (or *C. nebrodense*, sens. strict.), but *C. Dioscoridis* is well known in Spain and accompanies *C. pustulatum* on the Sierra Mágina, where Cuatrecasas saw specimens of *C. pustulatum* presenting characters "tan intermediarios con el *C. Dioscoridis* que no extraña se hayan tomado ejemplares parecidos por formas de éste."

(To be continued.)

UNDESCRIBED FERNS FROM NEW GUINEA.

BY A. H. G. ALSTON.

IN recent years I have had the privilege of working out a number of collections from New Guinea. Some of these contain many new records, and it is hoped eventually to publish fuller enumerations of them. The following are the collections referred to:—

1. C. E. Carr. 500 numbers, the first set at the British Museum (Natural History), with duplicate sets at the Rijks Herbarium, Leiden, and the Botanisches Museum, Berlin-Dahlem. This collection was from the Owen Stanley Range. There are only two new species, but the collector performed a valuable service by re-collecting many of the old species described from this area by Baker and based on fragmentary material.

2. Miss L. E. Cheesman. About 500 numbers, British Museum, from a number of localities, Mt. Tafa, Owen Stanley Range, Waigeu, Japen, Cyclops Mts., and Torricelli Range.

3. Mrs. M. S. Clemens. About 1500 numbers. The first set is at the Botanisches Museum, Berlin-Dahlem: there are duplicates at the British Museum (Natural History). Collected on the Sattelberg and vicinity, a locality well worked by some of the old German collectors, but nevertheless the collection contains a few novelties.

4. Prof. Pulle's collection. About 250 numbers, first set at the Rijks Universiteit, Utrecht, with duplicates at the British Museum. At the time when it was made this collection must have abounded with undescribed species, but in the long interval that has elapsed most have been described from the collections of Kloss on the Carstensz Mts. and H. J. Lam on Doormantop. Some of the specimens were collected by G. M. Versteeg.

The comparatively small number of new species in these collections shows that the fern flora of New Guinea is now fairly well known.

Blechnum (EuBlechnum) nigropaleaceum Alston, sp. nov.

Frondes c. 75 cm. longi, pinnati, stipitibus c. 45 cm. longis, pallide brunneis, minute asperulis, basi squamatis; squamæ nigri, lineares, c. 12 mm. longi, 0·75 mm. lati; pinnae 7–4 utroque latere, c. 4·5 cm. inter se distantes, anguste oblongae, c. 16 cm. longi, 1·25 cm. lati, margine serrata, basi oblique truncatæ, superioribus decurrentis, infiniis brevissime stipitatis; textura subcoriacea; costæ utrinque prominentes supra leviter sulcatæ; nervi laterales simplices paralleli, supra inconspicui; pinnulæ fertiles steriles-que similes; sori costales continuæ; indusium subintegrum.

PAPUA : Boridi, forest, on tree-trunks, 4700 ft., *Carr* 14363 (type BM) ; 5000 ft., *Carr* 13336 (BM).

Allied to *B. Whelani* Bailey, but pinnæ more truncate at the base, and to *B. laevigatum* Cav., but with broader fertile pinnæ.

Cyathea longipaleata Alston, sp. nov.

Truncus ex schedula 3 m. altus ; frondes c. 80 cm. longi, 15 cm. lati, tripinnati, c. 14 pinnæ utroque latere, ambitu oblongi, vix stipitati, rachis apicem versus glabra, parte inferiore leviter nodulosa, basi dense paleacea, paleis linearibus, brunneis, integris, c. 4 cm. longis, 1 mm. latis, pinnis ad basin paullo decrescente ; pinnuli sessiles adnati, glabri, venulis inconspicuis furcatis, oblongi, leviter crenati, c. 8 mm. longi, 3 mm. lati ; sori submediali, indusiis cupularibus, persistentibus, fissis.

NETHERLANDS NEW GUINEA : near Meerbivak, 3600 m., *Versteeg* 2498 (type U ; dupl. BM). The notes, which I translate, read "Tree up to 3 metres, often lower, thickness to 20–25 cm. Only a few to 10 apical leaves, few withered leaves. Frequent on sandstone ridges."

Cyclophorus foveolatus Alston, sp. nov.

Rhizoma late repens, 1·5 mm. crassum, paleis primo pallide fuscescentibus, demum nigrescentibus, lineari-lanceolatis, palearum marginibus fere eciliatis ; stipites c. 4 cm. longi, superne sulcati ; frondes plus minusve uniformes, c. 20 cm. longæ, c. 1 cm. latæ, anguste oblongo-lanceolatæ, supra glabrescentes, subtus dense stellato-paleaceæ, rigide coriaceæ ; costa inferne conspicua, apicem versus occulta, venulis omnino immersis ; sori magni, subdistantes, in foveolæ insertæ.

PAPUA : Boridi, in forest on trees, 4700 ft., *Carr* 13039 (type BM), 13020 (BM).

MANDATED AREA : Morobe Distr., Ogeramnang, forest tree, 6000 ft., *Clemens* 5416 (BD), s.n. (BD), 5900 ft., *Clemens* 4972 (BD) ; Yunzaing, forest tree, 4500 ft., *Clemens* 4116 (BD), 4–5000 ft., *Clemens* 2929 (BD) ; Sambanga, 5–6000 ft., *Clemens* 7679 (BD).

Allied to C. LANCEOLATUS (L.) Alston, but distinguished by the scattered sori, sunk in pits.

Diplazium flavoviride Alston, sp. nov.

Rhizoma suberecta, squamulis brunneis, oblongo-ovatis, obtusis, induta ; frondes pinnatæ, ambitu anguste oblongæ, c. 45 cm. longæ ; stipes stramineus, dorso plus minusve bisulcatus, subtus leviter rotundatus ; pinnæ inferiores ovato-oblongæ, basi oblique truncatis, pinna ultima lobata ; pinnæ medianæ c. 5·5 cm. longæ, 1 cm. latæ, oblongæ, apice attenuatæ, basi oblique truncatæ, membranaceæ, glabræ, margine crenato-sinuata, costis prominentibus, venulis, conspicuis, unifurcatis vel simplicibus ; sori singuli venarum dorso inserti, acroscopici, sorium una linea costæ utroque latere disposita ; indusium integrum.

NEW GUINEA : rocky ravine by village, 5–6000 ft., Sambanga, Morobe District, *Clemens* 7037 (type BD ; dupl. BM).

Apparently allied to the North American *Diplazium pycnocarpon* (Spreng.) M. Broun.

Dryopteris marattioides Alston, sp. nov.

Frondes 12–14 pedes altæ, bipinnatæ ; stipes basin versus dense spinosus, spinis nigrescentibus, usque ad 7 mm. longis, basi squamosus, squamis fusco-brunneis, falcatis, linearibus, apice filiformis ; rachis in parte superiore glabra, fusco-straminea aculeis brevibus sparse induta ; pinnæ usque ad 35 cm. longæ, pinnatis, inferiores pinnatifidæ exceptæ ; pinnulæ alternæ vel subopppositæ, usque ad 5·5 cm. longæ, 9 mm. latæ, plerumque reflexæ, glabræ, anguste oblongo-lanceolatæ, basi latere basiscopica rotundato-cuneata, latere acroscopica rotundata, leviter adnata, margine integra ; costa conspicua ; venulæ parallelæ, prominentes, sori subconfluentes utroque latere juxta costam dispositi.

NEW GUINEA : on bank of trail in forest, Ogeramnang to Bulung R., 5800 ft., Morobe District, *Clemens* 4809 (type BD ; dupl. BM) ; Sambanga, 6000 ft., Morobe District, *Clemens* 6808 (BD, BM).

Seems allied to *Dryopteris imponens* (Ces.) C. Chr., but this belongs to the section *Lastrea*.

Dryopteris perpubescens Alston, sp. nov.

Lastrea, rhizomate breviter repente, c. 5 mm. crassa, paleacea ; paleis atrobrunneis, lanceolatis, puberulis ; stipitibus c. 3 cm. longis, stramineis, dense puberulis ; frondes bipinnatifidæ, c. 22 cm. longæ, 3·5 cm. latæ ; pinnulæ c. 27 utroque latere inferiores decrescentes, infimæ auriculiformæ, profunde pinnatifidæ, nonnumquam segmentis basalibus liberis, textura laminæ herbacea ; lamina utrinsecus dense breviterque pubescens, costis plus minusve sparse hirsutis ; lobis oblongis, obtusis, penninerviis cum c. 4 venulæ utroque latere ; venulæ basales liberæ, sinum supra basin attingentes. Sori mediales, indusiis hirsutis indutis. Sporangia glabra.

MOROBE DISTRICT : Kalasa, rock crevices, on grassland in Mission grounds, 1600 ft., *Clemens* 7902 c (type BD ; photo and fragment BM).

Dryopteris (Lastrea) septempedalis Alston, sp. nov.

Frondes ex schedula, usque ad 7 pedes altæ, bipinnatifidæ ; stipes basin versus sparse spinulosi, spinulis nigrescentibus, c. 2 mm. longis, glabris ; rachis glabra, pallide brunnea, supra sulcata, subtus nonnumquam spinulosa ; lamina ambitu lanceolata, pinnis

infimiis deflexis, paullo minoribus ; pinnis maximis c. 40 cm. longis, 12 cm. latis, pinnatifidis, sinubis, profundis, obtusis, fere ad costam attingentibus, segmentis cuneatis, apicem versus attenuatis, basi latioribus, subcoriaceis, costis prominentes, venulis obscuris, glabris ; sori costulares, fere confluentes.

JAPEN ISLAND : River Menai-Wendé, 500 ft., below Mt. Eiori, *Cheesman* 1383 (type BM) ; Mt. Eiori, 2000 ft., *Cheesman* 1326 (BM) ; Mt. Oudia, 3500 ft., *Cheesman* 1435 (BM).

Allied to *D. marattioides* Alston, but bipinnatifid only. *D. notabilis* Brause is probably near, but Brause describes the nerves as prominent.

Marattia costulisora Alston, sp. nov.

Frondes 6–8 pedes longæ, probabiliter bipinnatæ, pinnarum rhachitibus, leviter squamulosis, mox glabrescentibus, pallide badeis, punctatis, supra bisulcatis, subtus rotundatis vel trigonis ; pinnulæ oblongo-lineares, c. 10 cm. longæ, 1 cm. latæ, acute serratæ, basi truncatæ, apice valde attenuato-acuminatæ, subtus pallidiores sparse squamosæ, supra glabræ ; costæ subtus prominentes, plus minusve squamosis, supra minus prominentes ; venulæ simplices apicem dentarum attingentes, fere 1 mm. inter utramque distantes, utroque latere conspicuæ ; sori prope costam inserti ; sporangia circa 18–24.

NEW GUINEA : mossy bush between ponds, 8–9000 ft., Mt. Sarawaket, Morobe District, *Clemens* 6157 (type BD ; dupl. BM).

Polypodium flavovirens Alston, sp. nov.

Rhizoma breviter repens, c. 4 mm. crassa, dense squamosa, squamis pallide brunneis, integris, lanceolatis ; frondes usque ad 28 cm. longæ, 8 cm. latæ, longe stipitatæ, stipitibus c. 9 cm. longis, vel parte superiore pilis longis atropurpureis, indutis, nigro-fuscis ; lamina ambitu oblonga, profunde pinnatifida, segmentis usque ad 4·5 cm. longis, 5·5 mm. latis, costis venulisque immersis ; siccitate flavo-viridis, margine integris, superficie sparse pilosa, pilis longis atropurpureis ; venulæ liberæ, furcatæ vel pinnatæ, uno ramo, utroque latere, anadromæ, soris supra ramis anadromis dispositis ; sori in duas lineas uno utroque latere costæ dispositi, proxima costam quam marginem.

NEW GUINEA : Morobe District, forest, 5–6000 ft., Sambanga, *Clemens* 6764 (type BD ; photo and fragment BM) ; on forest tree, 4500 ft., Yunzaing, *Clemens* s.n. (BD) ; Ogeramnang, 5500 ft., *Clemens* 4767 A (BD) ; Ogeramnang, below water supply, epiphyte in forest, 5800 ft., *Clemens* 5136 (BD) ; Abe, Sarawaket, epiphyte, 6000 ft., *Clemens* s.n. (BD).

Allied to *P. Shawii* Copel., but frond pilose, less decurrent and with broader segments. Scales light brown.

Polypodium (EuPolypodium) Pullei Alston, sp. nov.

Rhizoma breviter repens, paleis lanceolatis, brunneis, integris, vestita. Frondes subcæspitosæ, c. 35 cm. longi, 8 mm. lati, pensiles ; stipites graciles, 0·5–3·5 cm. longi, pilis atro-rufis, vestiti ; lamina pinnata, subcoriacea, pilosa, pilis illæ stipitis conformibus, lobis breviter oblongis, 3 mm. longis, 2 mm. latis, adnatis, basi breviter decurrentibus, venulis unifurcatis, ramo breviore acroscopico ; sori solitarii mediales.

NETHERLANDS NEW GUINEA : Bijenhorfbivak, 1800 m. *Pulle* 765 (type U ; photo and fragment BM).

Allied to *P. pulogense* Copel., but widely differs in its rounded segments and central sori.

Pteris (Eupteris) montis-wilhelminæ Alston, sp. nov.

Rhizoma ignota ; stipes c. 1 cm. crassa, stramineus, glaber ; lamina e basi trifurcata, palmato-pedata, parte centrale bipinnata, apice pinnata excepta, c. 58 cm. longa, partibus lateralis furcatis demum bipinnatis c. 48 cm. longis ; pinnæ partis centralis c. 14 utroque latere c. 14 cm. longæ, pinnatæ vel apicem versus pinnatifidæ ; pinnulis ultimis c. 3 cm. longis, 5 mm. latis, stipitatis vel breviter adnatis, glabris, anguste oblongis, latere basiscopica basi subcordata, latere acroscopica basi cuneata, marginibus plus minusve revolutis, venulis indistinctis, furcatis ; indusium fere apicem attingens, integrum.

NETHERLANDS NEW GUINEA : in monte Wilhelmina, 3800–4000 m., *Versteeg* 2532 (type U ; dupl. BM).

Probably allied to *P. Brassii* C. Chr., which I have not seen.

NOTES ON SINO-HIMALAYAN UMBELLIFERAE.

BY C. NORMAN, F.L.S.

VICATIA DC.

Vicatia Wolffiana (Wolff ex Fedde) Norman, comb. nov.

Tongoloa Wolffiana Wolff ex Fedde in Fedde, Rep. xxvii. 181 (1929).

Pimpinella saxifraga var. *dissectifolia* C. B. Clarke (non Boiss.) in Flor. Brit. Ind. ii. 685 (1879).

I think there is no doubt that this plant should be removed from *Tongoloa*. I believe it to be a true *Vicatia* with the somewhat elongated *Chaerophyllum*-like fruit and very unequal rays. From *Vicatia coniifolia* DC. it can readily be distinguished by the narrowly-oblong *pinnatisect* leaves and the short obtuse deeply-lobed segments much like certain forms of *Pimpinella saxifraga* L. In *V. coniifolia* the leaves are *bi-pinnatisect* narrowly-triangular-acuminate, and the pinnae lanceolate-acuminate. *V. Wolffiana* is known only from the N.W. Himalayas and Karakoram Range.

Specimens seen. N.W. Himalaya : Tihri-Garhwal ; Ourie Gadh, in Nila Valley, *Duthie* 1134 (type of *Tongoloa Wolffiana*).

Kashmir : Alampi La, *Duthie* 12176.

Karakoram Range (without locality) : *Clarke* 30257.

(All specimens both at British Museum and Kew.)

A plant from Nanga Parbat sent to me from Berlin (*Troll* 7485) is very similar but not certainly identical. It is much more robust in all its parts. More material of this plant is required before definitely deciding on its status.

VICATIA MILLEFOLIA (Kl.) C. B. Clarke in Flor. Brit. Ind. ii. 671 (1879).

I cannot distinguish this species from *V. coniifolia* DC., and if Clarke was right in identifying *Chareophyllum gracillimum* Klotzsch with *Vicatia coniifolia*, my view is confirmed, for I fail to see (judging from Klotzsch's plates in Reis. Pr. Waldem. Bot.) how *Chaerophyllum gracillimum* Klotzsch (tab. 46), differs from *C. millefolium* Klotzsch (tab. 45), upon which *Vicatia millefolia* is based.

VICATIA ? STEWARTII C. B. Clarke, *loc. cit.* (based on *Stewart* 888 from Garhwal, or *Stewart* 891 from Kumaon (both at Kew)), is also indistinguishable from *Vicatia coniifolia* DC.

I was fortunate in seeing De Candolle's type some years ago, and cite the following specimens as good *Vicatia coniifolia* DC.

Kumaon : near Ralam Glacier, *Duthie* 2939 (K). Naini Tal, *Thomson* 657 (BM).

Garhwal : *Duthie* 1138 *a* (BM).

Kashmir : Aphawat, *Mrs. Prescott Decie* 4 (BM) ; Alibad, *Clarke* 28932 (K). Tragbol, *Clarke* 29253 (K : cited as *V. millefolia*). Pir Pimjal, *Clarke* 28874 (K).

N.W. Province : Deoban, *Gamble* 24400. Mundali, *Gamble* 23771 (K).

VICATIA THIBETICA de Boiss. in Bull. Soc. Bot. France, liii. 423 (1906), is unknown to me, but from de Boissieu's remarks I suspect it may be a species of *Tongoloa*.

PTERNOPETALUM Franch.

In Journ. Linn. Soc. xxxv. 495 (1903) Dunn published his description of *Cryptotaeniopsis leptophylla* (i. e. *Pternopetalum leptophyllum* (Dunn) Hand. Mzzt.) based on *Faber* 628, a plant from Mt. Omei in Western Szechuan.

Unfortunately de Boissieu in Bull. Soc. Bot. France, liii. 427 (1906), identified *Wilson* 3669 as being *C. leptophylla* Dunn, and this specimen was so written up in the Kew Herbarium. Realizing that there were two distinct plants under the name *Cryptotaeniopsis leptophylla* Dunn, I described (Journ. Bot. lxvii. 146 (1929)) *C. viridis* (i. e. *Pternopetalum viride* (Norm.) Hand. Mzzt.), based on *Wilson* 4931, also from Mt. Omei assuming, quite unpardonably, that the true *C. leptophylla* Dunn was the plant represented by *Wilson* 3669 whereas, in fact, it is the Mt. Omei plant *Faber* 628, and this is identical with *Wilson* 4931.

Consequently *Pternopetalum viride* (Norm.) Hand. Mzzt. is a synonym of *Pternopetalum leptophyllum* (Dunn) Hand. Mzzt., and a new name must be found for *Wilson* 3669.

I propose the following :—

Pternopetalum confusum Norman, sp. nov. *Cryptotaeniopsis leptophylla* auct. non Dunn.

Herba glaberrima, ±45 cm. alta caule simplice, ab uno nudo nisi versus summum. Folia homomorpha longe petiolata lamina ambitu lanceolata acuta vel acuminata ±5–7 cm. longa et medio ±3·5 cm. lata, 4-jugata bi-pinnatisecta, pinnis lanceolatis segmentis ultimis lanceolatis ±profunde lobatis.

Umbellæ multiradiatæ radiis æquilongis, umb. juniorum ±1 cm. longis, post anthesin multo longioribus : umbellulæ 3-pedicellatæ. Involucri phylla 0, involucell. 1 minuta linearis acuta. Petala alba, fructus omnino generis.

Western China : *Wilson* (Veitch Expedition) 3669 (type BM).

W. Szechuan : Tahsiangling, *Harry Smith* 10367, Upsala : BM. No doubt allied to *P. leptophyllum*, but with much less finely divided leaves and lacking the vivid green colour (in dried specimens) of that species.

ACRONEMA Edgw.

The following I believe to be hitherto undescribed species.

Acronema pilosum Norman, sp. nov.

Herba humilis ±15 cm. alta, caule piloso ramoso. Folia glabra longe vel breviter petiolata ; lamina ambitu triangularis 1–2 cm. longa, ternato- vel 2-jugata pinnatisecta, segmenta triangularia ·5–1 cm. longa profunde lobata margine incisa, breviter petiolulata vel sessilia. Umbellæ ±6 radiatæ, radiis pubescentibus ±1–2 cm. longis. Involucri phylla 1 ±1 cm. longa pinnatifida basi expanso, involucellorum 5 vel auguste linearia integra, vel pinnatifida. Petala caudata purpurea. Fructus *A. tenero* Edgw. consimilis.

Upper Burma : Nam Tamai Valley, 28° N. 97° 45″ E., 10,000–11,000 ft. " Among rubble and earth slides amongst exposed cliffs." *Kingdon-Ward* 13227 (type) BM.

Apparently allied to *A. Handelii* Wolff, a completely glabrous species without involucral bracts of either kind.

Acronema rivale Norman, sp. nov.

Herba erecta ±30 cm. alta, caule foliosa ramoso inferne glabro. Folia homomorpha, sat longe petiolata, lamina, ambitu late triangularis 8–10 cm. longa, 3-jugata (bi-) pinnatisecta

segmenta 2–2·5 cm. longa profunde trisecta, ambitu ovato-lanceolata margine supra medium crenata apice acuta vel subobtusa. Umbellæ 8–12 radiatæ pedunculo radiisque dense pubescentibus; radii ±1 cm. longi cum pedunculo post anthesin incrassati. Involucri phylla 0 vel 1 (decidua ?), involucellorum 5 linearia acuta. Petala delapsa. Fructus *A. tenero* Edgw. consimilis.

Burma-Tibet Frontier: "Hills E. of Fort Hertz, 3000 ft., on moss-clad boulders in the bed of the torrent." *Kingdon-Ward*, 9082 (type). Upper Burma: Naur Tisang Valley, 4000 ft., 27° 30′ N., 97° 35′ E. "On mossy rocks in the shady bed of a torrent." *Kingdon-Ward* 13554 (both BM).

Nearly allied to *A. evolutum* (C. B. Clarke) Wolff, but is readily distinguished by the pubescent umbels and the strong bracts of the involucels.

RESULTS OF TWO BOTANICAL EXPEDITIONS TO SOUTH ALBANIA.

By A. H. G. Alston, B.A., F.L.S., and N. Y. Sandwith, M.A., F.L.S.

(Concluded from p. 224.)

*Echium vulgare L.

Near Leskovik, sandstone slopes, 2800 ft., 18. vi. 33, no. 1762.

*Heliotropium dolosum Notar.

Durrës (Durazzo), waste place near sea, 1. ix. 35, no. 2753. Flowers white.

*Lappula barbata (M. Bieb.) Gürke.

Leskovik, 3000 ft., 17. vi. 33, no. 1703. Flowers sky-blue.

*Myosotis caespitosa Schultz.

District of Sarandë; near Çukë, marshy alluvial flats on N. side of Lake Butrinto, sea-level, 2. vi. 33, no. 1331.

*Myosotis refracta Boiss.

District of Sarandë; mountains above Borsh, on broken limestone slopes, 3000 ft., 5. vi. 33, no. 1367. Flowers pale blue.

*Myosotis versicolor (Pers.) Sm.

Çajup, Lunxheriës Range, in wet meadow, 4000 ft., 11. vi. 33, no. 1559. Flowers yellow, turning blue.

*Nonnea pallens Petr.

Leskovik, roadside, 3000 ft., 17. vi. 33, no. 1701. Flowers small, yellow.

Solenanthus scardicus Bornm.; Turrill in Hook. Ic. Pl. t. 3278 (1935).

Ostrovicë Range, upper slopes, on stony ground and in open beech-woods, 5500–6000 ft., 4. vii. 33, no. 2072. Erect. Corolla a curious pale, dingy pinkish mauve. Markgraf's description of the flower-colour as "Röhre am Grunde scharlach-rot, Saum gelb" is to be contrasted with our notes, and with the "schmutzigviolett" of Hayek and the "schmutziggelb" of Bornmüller.

CONVOLVULACEAE.

Convolvulus hirsutus M. Bieb.

Near Leskovik, prostrate on bare banks on sandstone slopes, 3000 ft., 17. vi. 33, no. 1730. Flowers large, white, faintly pink in throat.

*Convolvulus nitidus Boiss. var. acutifolius Koš., det. W. B. Turrill.

Near Floq, between Korçë and Ersekë, locally abundant on bare serpentine slopes over a large area, c. 3500 ft., 8. vii. 33, no. 2154. Growing in dense tufts. Leaves silvery grey, strongly veined. Flowers white.

*Cuscuta campestris Yuncker in Mem. Torrey Bot. Cl. xviii. 138 (1932).

Gjinokastrë, rocky ground below town, 800 ft., 5. viii. 35, no. 2310. Parasitic on *Xanthium spinosum*. Stems yellow. Flowers white.

The material agrees well with Yuncker's conception of this species, to which several European gatherings formerly identified with *C. Cesatiana* or *C. pentagona* should evidently be referred.

SOLANACEAE.

*Solanum suffruticosum Schousb.

Sarandë, bare rocky limestone coast slopes, near sea-level, 1. vi. 33, no. 1289. Flowers white. Fruits black.

SCROPHULARIACEAE.

*Odontites glutinosa (M. Bieb.) Benth.

District of Korçë, mountains above Dardhë, locally abundant on bare sandy ground, c. 5500–5800 ft., 25. viii. 35, no. 2674. Flowers pale yellow; back of upper lip brownish purple; throat with a few purplish spots.

The first collection made in Albania, and recorded by Turrill in Kew Bull. 1939, p. 193. The specimens are far less glandular than those from other localities.

Rhinanthus Hayekii (Degen) Alston et Sandwith, comb. nov.—*Alectorolophus Hayekii* Degen in Magyar Bot. Lap. 1922, 64 (1923). *R. mediterraneus* (Bég.) Sóo, grex *melampyroides* (Borb. et Degen) Sóo, subsp. *Hayekii* (Degen) Sóo in Fedde Rep. Sp. Nov. xxvi. 204 (1929).

Mali Lunxheriës Range, limestone rocks near summit ridge above Çajup, 5500 ft., 11. vii. 33, no. 2186. Erect, short. Leaves and bracts broad. Fruiting calyx very swollen and broad. Corolla rather short, deep yellow, tip of upper lip white.

Agreeing well with the type collection from Mt. Pastrik, and—in our opinion—better treated as an independent species than as a subspecies of *R. melampyroides* (Borb. et Degen) Sóo.

*Rhinanthus Sintenisii (Sterneck) Sóo.

Near Ersekë, in meadows, c. 3400 ft., 25 & 26. vi. 33, nos. 1880, 1920. Bracts green. Rostrum of upper lip white in 1880, violet in 1920.

*Verbascum mallophorum Boiss. et Heldr. f. italo-thessalum Murb., det. Sv. Murbeck.

District of Voskopoj, W. of Korçë ; Ostrovicë Range, 4. vii. 33, c. 5500 ft., stony limestone slopes above Marjan, no. 2096. Flowers bright yellow, sweetly scented of lilac ; filaments with mauve hairs.

Verbascum niveum Ten. subsp. pannosiforme (Stoj.) Murbeck, forma filamentis anticis quam anthera e 2-plo longioribus ad subsp. *Visianianum* (Rchb.) Murbeck accedens. Det. Sv. Murbeck.

Near Leskovik, 24. vi. 33, c. 3000 ft., broken limestone slopes, no. 1854. Flowers yellow ; leaves very strongly decurrent.

Verbascum speciosum Schrad., det. Sv. Murbeck.

Voskopoj, abundant in bare sandy ground, c. 3700 ft., 23. viii. 35, no. 2614.

Used locally as a fish-stupefier in preference to other species, as witnessed by the collectors.

*Veronica cymbalaria Bodard.

Sarandë, rocky limestone coast-hills, near sea-level, 31. v. 33, no. 1252. Flowers white.

*Veronica peloponnesiaca Boiss. et Orph.

District of Sarandë ; above Borsh, stony (sandstone) mountain slopes, c. 2000–3000 ft., 5. vi. 33, no. 1416. Leaves often purplish beneath. Flowers a bright deep blue, very beautiful.

*Veronica praecox All.

Above Leskovik, limestone slope of Melesin, c. 4000 ft., 19. vi. 33, no. 1772. Leaves purple beneath. Flowers bright blue.

Veronica rigida Turrill in Kew Bull. 1922, p. 186, et in Hook. Ic. Pl. t. 3118 (1927).

District of Gjinokastrë ; open limestone slopes of Mali Gjer, 4000 ft., 9. vi. 33, no. 1509.

In the absence of ripe fruits and mature infructescences the determination is not absolutely certain. The inflorescence is somewhat more prominently glandular-hirsute than in the type material at Kew, and the leaves are slightly more deeply and irregularly incised as in the Baldacci material quoted in Kew Bull. 1922, p. 186.—W. B. Turrill.

Veronica scardica Griseb.

Gjergjevicë, boggy spot by stream in deep gorge on serpentine, c. 4000 ft., 21. viii. 35, no. 2580. Leaves wavy, strongly serrate. Flowers bluish mauve as in *V. Anagallis-aquatica*.

*Veronica triphyllos L.

Near Ersekë, on wall by sandy fields between the village and the foot of the Gramos Range, c. 3400 ft., 26. vi. 33, no. 1886.

OROBANCHACEAE.

*Orobanche lutea Baumg.

Lunxheriës Range, on *Medicago* sp. on grassy border of meadow at Çajup, 4000 ft., 12. vi. 33, no. 1596. Corolla dingy mauve. Stigma yellow.

*Orobanche Muteli F. Schultz.

Mali Gjer, above Gjinokastrë, on *Euphorbia Myrsinites*, 3000 ft., 9. vi. 33, no. 1511. Flowers pale blue.

This was a simple stemmed form apparently confined to this host.

LABIATAE.

Ajuga chia (Poir.) Schreb., det. W. B. Turrill.

Sarandë, near sea-level, rocky limestone slopes, 30. v. 33, no. 1240.

Not recorded by Hayek from either Albania or Epirus, but noted by Baldacci in the Vlorë (Valona) district (see It. Alb. 70 (1917)).

AJUGA ORIENTALIS L.

District of Sarandë; above Borsh, sandstone mountain slopes below Mali Lucës, c. 3000 ft., 5. vi. 33, no. 1410. Corolla violet; segments of lower lip acute.

BALLOTA ACUTA (Mch.) Briq. subsp. MACEDONICA (Vandas) Hayek.

Gjinokastrë, bare rocky limestone slopes, 1000 ft., 9. vii. 33, no. 2175. Flowers purple.

Baldacci's plant from the Acroceraunian Mts., no. 276 of 1894, published as *B. rupestris* Vis., is to be referred here.

*CALAMINTHA EXIGUA (S. et S.) Briq.

Near Leskovik, cultivated fields, 3000 ft., 24. vi. 33, no. 1864. Flowers mauve.

GALEOPSIS LADANUM L. subsp. *LATIFOLIA (Hoffm.) Gaud. *G. intermedia* Vill.

Voskopoj, corn-field, 3800 ft., 6. vii. 33, no. 2127. Flowers purple, with white throat.

MARRUBIUM CYLLENEUM Boiss. et Heldr., det. W. B. Turrill.

Near Çajup, Lunxheriës Range, rocky limestone slopes, 4000 ft., 13. vi. 33, no. 1673; this agrees with and is almost a topotype of var. *albanicum* Rech. fil. in Fedde Rep. Sp. Nov. xlvii. 173 (1939). Voskopoj, limestone rocks near Hagios Prodromos Monastery, 4500 ft., 30. vi. 33, no. 2003. Flowers white.

*MICROMERIA CREMNOPHILA Boiss. et Heldr.

A few miles from Perati, in Vojusa Valley towards Prëmeti, on low sandstone cliff by the river, 800 ft., 23. vi. 33, no. 1847. Flowers pinkish mauve.

*PRASIUM MAJUS L.

Sarandë, limestone rocks near the sea, 31. v. 33, no. 1260. Flowers white with mauve-purple blotches.

SALVIA ARGENTEA L. var. *ALPINA Heldr.

Lunxheriës Range, limestone ridge of Strakavec, 5000 ft., 13. vi. 33, no. 1668. Flowers white.

SALVIA CANDIDISSIMA Vahl.

District of Korçë, Dardhë, abundant over a small area on rocky sandstone slopes, 5000–5500 ft., 25. viii. 35, no. 2637. Leaves intensely white-woolly. Corolla white, with a few purple spots on the lower palate. Cultivated at Kew (16. vi. 37, no. K. 1749), and producing plants with much larger and greener leaves. Also on slopes between Perati and Prëmeti, June 1937, *Giuseppi* 41.

Not recorded by Hayek from either Albania or Epirus, but collected on the border of Albania and Greece near Leskovik in 1896 by Baldacci, no. 138, and recorded in Nuov. Giorn. Bot. Ital. 1899, p. 343.

*SALVIA TRILOBA L. fil.

Sarandë, a characteristic plant of the broken limestone coast hills, with *Phlomis fruticosa*, sea-level to 500 ft., 1. vi. 33, no. 1288. Shrubby and bushy. Flowers a disappointing bluish white.

SCUTELLARIA PEREGRINA L.

District of Sarandë; Borsh, limestone cliff above Vlorë road, c. 300 ft., 4. vi. 33, no. 1427. Flowers violet.

SIDERITIS PURPUREA Talbot ex Benth.

Sarandë, abundant on bare and rocky limestone ground at sea-level, 30. v. 33, no. 1202. Flowers reddish mauve, sometimes very pale and nearly white.

STACHYS ANNUA L. subvar. *ADENOCALYX (C. Koch) Hausskn.; det. W. B. Turrill.

Leskovik, 17. iv. 33, 3000 ft., sandstone and limestone slopes, no. 1681. Upper corolla lip white, lower yellow.

The specimens are interesting. They appear to have been eaten down by grazing animals and may have over-wintered, thus attaining the appearance of biennial or short-lived perennial plants. The lowest leaves are slightly bullate with subcordate bases.—W. B. TURRILL.

*STACHYS DECUMBENS Pers., det. W. B. Turrill.

Sarandë, broken limestone coast hills, near sea-level, 3. vi. 33, no. 1358. Flowers white with mauve streaks.

Hitherto regarded as one of the few endemics of the Ionian Islands.

*STACHYS SERBICA Panč.; Turrill in Hook. Ic. Pl. t. 3229 (1934).

Five S. Albanian localities are given in Dr. Turrill's article, viz.: Mali Gjer above Gjinokastrë, June 1933, no. 1544; Çajup, Mali Lunxheriës, June 1933, no. 1576; Nemerçka Range, above Biovishd, June 1933, no. 1849; Melesin, above Leskovik, June 1933, no. 2250; and near Voskopoj, June 1933, no. 2007.

*STACHYS SPINULOSA S. et S., det. W. B. Turrill.

Sarandë, bare limestone slopes, c. 300 ft., 30. v. 33, no. 1231. Flowers white with purple marks.

TEUCRIUM FLAVUM L.

Between Leskovik and Perati, on limestone rocks in one spot, 1000 ft., 23. vi. 33, no. 1843. Flowers cream.

Collected very near here, possibly in the same spot, by Baldacci, no. 436 of 1896 coll.

TEUCRIUM POLIUM L. var. PURPURASCENS Benth.

Gjinokastrë, bare limestone ground by the town, c. 1000 ft., 9. vii. 33, no. 2164. Flowers pinkish purple, yellow at throat. All the plants of *T. Polium* seen in S. Albania bore flowers of this colour.

*THYMUS HETEROTRICHUS Griseb., det. W. B. Turrill.

Leskovik, 17. vi. 33, 3000 ft., sandstone slopes, no. 1705.

Type material has not been seen. The stem hairs are rather coarser than in Thessalian material so determined by K. Ronniger. —W. B. TURRILL.

*THYMUS TEUCRIOIDES Boiss. et Sprun., det. W. B. Turrill.

Voskopoj, 4500 ft., rocky slopes on serpentine, 1. vii. 33, no. 2011. Flowers pink. Very local and confined to serpentine.

CHENOPODIACEAE.

*KOCHIA SCOPARIA (L.) Schrad.

Durrës (Durazzo), clayey banks by sea, 1. ix. 35, no. 2784. Recorded with a query for Albania by Hayek.

POLYGONACEAE.

POLYGONUM ALBANICUM Jávorka, ex descr.

Near Gjergjevicë, W. of Korçë, in bare serpentine gorge among box and juniper, c. 4000 ft., 6. vii. 33, no. 2128; and from the same locality, in fruit, 21. viii. 35, no. 2576. Plants more or less erect. Fruits blackish, not shining, far exceeding the perianth.

Not quite agreeing with the description, but apparently this species—if it is really distinguishable from *P. Bellardi*.

*RUMEX GRAECUS Boiss. et Heldr.

Tomor Range, precincts of the dervish Tekke on S.E. slopes of Abbas Ali, 5500 ft., 14. viii. 35, no. 2496. Leaves somewhat curly. Perianth with one small tubercle.

RUMEX THYRSIFLORUS Fingerh.

Lunxheriës Range, abundant in the great meadow at Çajup, 4000 ft., 9. viii. 35, no. 2414. Tall, often 3 ft. high. Lobes of leaves spreading horizontally. Cultivated at Kew, 29. viii. 36, as no. K. 1663.

EUPHORBIACEAE.

*EUPHORBIA HELDREICHII Orph.

District of Korçë, beech-woods above Dardhë, c. 5500 ft., 25. viii. 35, no. 2670.

*EUPHORBIA TERRACINA L., det. W. B. Turrill.

Vlorë (Valona), 4. ix. 35, sea-level, sand-dunes, local, no. 2795.

IRIDACEAE.

*CROCUS ALBIFLORUS Kit., det. B. L. Burtt.

Nemerçka Range, above Biovishd, 22. vi. 33, c. 6500 ft., summit ridge, by large snow patches, no. 1852. Flower pure white, faintly purple at bottom, drying a darker purple at bottom; stigmas overtopping anthers.

CROCUS SCARDICUS Koš., det. B. L. Burtt.

Gramos Mts., above Ersekë, 6000 ft., near summit ridge, around patches of snow, 27. vi. 33, no. 1943. Flowers pale yellow; stigmas overtopping anthers.

*GLADIOLUS SEGETUM Ker-Gawl.

Corn-field, Leskovik, 3000 ft., 18. vi. 33, no. 1743.

LILIACEAE.

*ALLIUM ARVENSE Guss., sens. Hayek et Halácsy.

Tomor Range, limestone rocks of Abbas Ali, c. 6000 ft., 13. viii. 35, no. 2439. Petals white with green stripe.

*ALLIUM CHAMAESPATHUM Boiss.

Sarandë, limestone slopes near sea, 7. ix. 35, no. 2819. Flowers dull green.

ALLIUM CUPANI Raf.

Gjergjevicë, W. of Korçë, bare stony ground in gorge on serpentine, 4500 ft., 21. viii. 35, no. 2583. Flowers pale mauve with darker midribs.

*ALLIUM FUSCUM W. et K., sens. Hayek.

Durrës (Durazzo), margin of salt-marsh, 2. ix. 35, no. 2763. Petals greenish white with brownish markings outside on margins, and median line greenish brown; stamens included.

*ALLIUM NIGRUM L.

Leskovik, grassy bank, 3500 ft., 18. vi. 33, no. 1731. Petals pale green. Ovary black.

ALLIUM SUAVEOLENS Jacq.

Gjergjevicë, distr. Korçë, boggy spot in deep gorge on serpentine, c. 4200 ft., 21. viii. 35, no. 2582. Perianth segments dirty white within, pinkish purple outside in upper half.

ALLIUM SUBHIRSUTUM L.

Sarandë, bare limestone coast slopes, sea-level, 30. v. 33, no. 1233. Flowers white.

Recorded by Hayek from neither Albania nor Epirus, but noted by Baldacci near Vlorë (Valona) (see It. Alb. 127 (1917)).

*ASPHODELINE LUTEA (L.) Rchb.

District of Sarandë ; Borsh, near road from Sarandë to Vlorë, on mountain slopes, c. 3000 ft., 5. vi. 33, no. 1426. Flowers golden yellow.

*ASPHODELINE TAURICA (Pall.) Kth.

Nemerçka Range, above Biovishd, high broken limestone slopes, very local, 5000 ft., 22. vi. 33, no. 1835. Flowers white with slate-coloured stripes.

A westward extension of the range of this species, which is recorded by Hayek only from Bulgaria, Macedonia and Thrace.

*FRITILLARIA PONTICA Wahlenb., det. W. B. Turrill.

District of Gjinokastrë ; Lunxheriës Mts., 12. vi. 33, 6000 ft., rocky limestone slopes, flowers purplish green, somewhat tessellated, no. 1599. Strakavec, Lunxheriës Range, 13. vi. 33, 5500 ft., stony limestone slopes, no. 1651.

GAGEA PUSILLA (Schmidt) R. et S.

Nemerçka Range, above Biovishd, near snow-patches of the summit ridge, 6500 ft., 22. vi. 33, no. 1827.

Recorded by Hayek from Albania, but not from Epirus.

*LILIUM HELDREICHII Freyn.

District of Korçë, bushy sandstone slopes above Dardhë, c. 5000 ft., 25. viii. 35, no. 2646. In fruit only, but a native informed the collector that the flowers were red.

JUNCACEAE.

JUNCUS ALPINO-ARTICULATUS Vill.

Voskopoj, by stream in ravine on serpentine slopes, c. 4000 ft., 20. viii. 35, no. 2554. Fruits blackish.

JUNCUS ANCEPS Laharpe subsp. HERZEGOVINUS Sag.

Durrës (Durazzo), marshy spot in dunes near sea, 30. viii. 35, no. 2728.

*JUNCUS LONGICORNIS Bast. *J. paniculatus* Hoppe.

Lunxheriës Range, by stream on bare sandstone slopes at Çajup, c. 3800 ft., 6. viii. 35, no. 2344. Sheaths dark, blackish, shining. Stem less striate than in *J. glaucus*. Fruits *brown*, oblong, blunt.

Baldacci no. 95 of 1892, from Logara, Acroceraunian Mts., distributed as *J. glaucus* (see Malpighia, viii. 297), although very immature, is probably to be referred here.

JUNCUS MARITIMUS L.

Durrës (Durazzo), marshy spot in sand-dunes, 30. viii. 35, no. 2716. Vlorë (Valona), marshes among dunes, 4. ix. 35, no. 2799 ; this collection is a state approaching " var." *congestus* L. B. Hall in Journ. Bot. 1928, p. 361.

Recorded by Hayek from neither Albania nor Epirus, but noted by Baldacci at Vlorë (see It. Alb. 77 (1917)), and distributed as no. 41 of 1892 coll. (see Malpighia, viii. 298).

JUNCUS TOMMASINII Parl.

Durrës (Durazzo), marshy spot in sand-dunes, 30. viii. 35, no. 2714. Vlorë (Valona), abundant in large tufts in marshes behind sand-dunes, with *Nerium*, *Schoenus*, *Erica verticillata*, 4. ix. 35, no. 2793. Top of stems very pungent. Panicles lax. Fruits quite different from those of *J. acutus*. This is a very good species.

ALISMACEAE.

*ALISMA LANCEOLATUM With.

District of Sarandë ; near Çukë, N. end of Lake Butrinto, in marshes in alluvial flats at sea-level, 2. vi. 33, no. 1329. Flowers pale mauve.

Not recorded from the Balkan Peninsula in Hayek, Prodr. iii. 4–5 (1932), but localities from Greece, Thessaly, the Ionian Islands, Thrace and Bulgaria are given by Samuelsson in his revision of the genus in Arkiv. Bot. xxiv. A, no. 7 (1932).

TYPHACEAE.

*TYPHA ANGUSTATA Bory et Chaub.

Vlorë, abundant in marshes behind sand-dunes, 4. ix. 35, no. 2781. Plants 8 ft. tall.

*TYPHA SHUTTLEWORTHII Koch. et Sond.

Voskopoj, scattered along small running stream, 3800 ft., 23. viii. 35, no. 2609. Spikes contiguous. Plants all small.

NAIADACEAE.

*POTAMOGETON PECTINATUS L.

Floating in Lake Butrinto, S. of Sarandë, sea-level, 7. ix. 35, no. 2816. Plants very flabellate.

CYPERACEAE.

ACORELLUS PANNONICUS (Jacq.) Palla.

Vlorë (Valona), wet sandy ground near sea, 4. ix. 35, no. 2775. Spikelets silvery green with brown markings. Leaves terete, stiff.

Recorded with a query for Albania by Hayek, and not recorded for Epirus. Collected, however, by Baldacci at Arta, near Vlorë, no. 212 of 1894 (see Bull. Hb. Boiss. iv. 651.)

*CAREX GRACILIS Curt.

Mali Lunxheriës; Çajup, edge of small pond in the great meadow, c. 4000 ft., 11. vi. 33, no. 1560; *ibid.*, in fruit, 12. vii. 33, no. 2249.

*CAREX OEDERI Retz., auct., sens. lat.

Durrës (Durazzo), marshy spots in sand-dunes, 30. viii. 35, no. 2736.

This material, not exactly matched in the Kew Herbarium, has the habitat, habit, crowded spikes, small spikes and utricles of *C. Oederi* var. *cyperoides* Marss., but the utricles are more divaricate and the beaks deflexed. The latter, moreover, are longer than is usual in *C. Oederi*. The taxonomy and nomenclature of this group of *Carex* (*C. flava* and its allies) are now under investigation.—E. NELMES.

*CAREX OTRUBAE Podp. *C. vulpina* "L." auct. occid., non L.

Between Prëmeti and Perati, wet place on bushy sandstone slopes, 700 ft., 16. vi. 33, no. 1717.

A small form with very short and narrow leaves, short culms, and small spikes, perhaps to be referred to *C. vulpina* var. *compacta* Velen. of which no material has been seen.—E. NELMES.

*CAREX PANICEA L.

Gramos Range near Ersekë, swampy rill on lower slopes, 4000–4500 ft., 28. vi. 33, no. 1960.

*CAREX PSEUDOCYPERUS L.

District of Sarandë; near Çukë, bushy ditch in swampy alluvial flats on N. side of Lake Butrinto, sea-level, 2. vi. 33, no. 1324.

*SCIRPUS TABERNAEMONTANI Gmel.

District of Sarandë; swamps on N. side of Lake Butrinto near Çukë, sea-level, 2. vi. 33, no. 1340. Stems glaucescent. Styles 2.

GRAMINEAE.

*AEGILOPS UNIARISTATA Vis.

Above Gjinokastrë, grassy bushy slopes on sandstone, c. 1500 ft., 7. vi. 33, no. 1442.

*AGROPYRON JUNCEUM (L.) Beauv.

Vlorë (Valona), sands of foreshore, 4. ix. 35, no. 2797.

AGROPYRON TRICHOPHORUM Link.

Near Voskopoj, W. of Korçë, dry bushy bank in valley, c. 3800 ft., 7. vii. 33, no. 2144.

Not recorded by Hayek from either Albania or Epirus, but mentioned by Baldacci (as *A. villosum*) as occurring at Klyssyra (see It. Alb. 140 (1917)).

*AGROSTIS SEMIVERTICILLATA (Forssk.) C. Chr.

Biovishd, near S.E. end of Nemerçka Range, damp gully on sandstone slopes, c. 2000 ft., 21. vi. 33, no. 1808.

*ALOPECURUS PRATENSIS L.

Boggy meadows, Voskopoj, W. of Korçë, c. 3700 ft., 1. vii. 33, no. 2024. Whole plant very glaucous.

*ANDROPOGON DISTACHYUS L.

Sarandë, limestone rocks near the sea, sea-level, 31. v. 33, no. 1254.

*ANTHOXANTHUM GRACILE Biv.

Sarandë, broken limestone coast slopes, in bare spots among shrubs, sea-level, 3. vi. 33, no. 1354.

*BRACHYPODIUM SERPENTINI C. E. Hubbard, sp. nov. in Hook. Ic. Pl. t. 3280 (1935).

On serpentine rock in gullies and gorges at Voskopoj, Gjergjevicë and Boboshticë, west and south of Korçë, 2700–5000 ft., July 1933 and August 1935, nos. 2016, 2584, 2704, 2708.

For a full account of the taxonomy and habitat of this remarkable new endemic see Mr. Hubbard's article cited above. The plant is now doing well in cultivation both at Kew and at Aberystwyth.

*BRIZA SPICATA Sibth. et Sm.

District of Gjinokastrë, rocky limestone slopes descending from the Çajup meadow to Zhej, c. 3000 ft., 14. vi. 33, no. 1678.

Very local; also seen on ascent of Mali Lunxheriës above Erindi, at c. 2200 ft. It was collected by Baldacci in Greek Epirus, near Jiannina.

*Bromus cappadocicus Boiss. et Bal., sens. lat., sens. Bornm. in Engl. Bot. Jahrb. lxi. Beibl. n. 140, 172–4 (1928).

Lunxheriës range, rocky limestone slopes of Strakavec, 5000 ft., 12. vii. 33, no. 2198. Tomor Range, rubbly limestone slopes of Abbas Ali peak, c. 6500 ft., 14. viii. 35, no. 2492.

As Bornmüller remarks, the material of this group is badly in need of revision, and at the moment we prefer to follow him in extending the concept of *B. cappadocicus* to cover several groups. Our specimens differ from the type collection of *B. cappadocicus* in the sparsely ciliate leaves, the glabrescent spikelets, the much longer upper and lower glumes, and the shape of the lemmas ; and from *B. fibrosus* Hack. and its forms in the very narrow, filiform, involute leaves, especially those of the culms.—C. E. Hubbard.

*Bromus ramosus Huds. subsp. eu-ramosus (Asch. et Graebn.) Hayek.

Above Dardhë, dry beech-woods, c. 5500 ft., 26. viii. 35, no. 2698.

*Cynodon Dactylon (L.) Pers.

Near Voskopoj, bare sandy field, c. 3700 ft., 23. viii. 35, no. 2618.

*Echinaria capitata (L.) Desf.

Near Leskovik, dry sandstone slopes, c. 3000 ft., 17. vi. 33, no. 1702.

*Festuca affinis Boiss. et Heldr. var. coarctata (Hack.) Richt., det. C. E. Hubbard.

District of Gjinokastrë ; Mali Lunxheriës Range, summit ridge of Strakavec, on broken limestone, c. 6000 ft., 12. vii. 33, no. 2202.

A high mountain species, only once seen.

*Glyceria plicata Fr.

District of Sarandë ; near Çukë, swampy alluvial tract on N. side of Lake Butrinto, sea-level, 2. vi. 33, no. 1338.

*Helictotrichon convolutum (Presl) Henrard in Blumea, iii. 430 (1940), confirmt. C. E. Hubbard. *Axena convoluta* Presl.

District of Sarandë ; mountain slopes above Borsh, c. 2000 ft., 5. vi. 33, no. 1420. Tufted, with erect culms.

Helictotrichon Besser has been treated usually as a *nomen nudum*, but a short generic description was given by Schultes (Syst. Veg. ii. Mant. Addit. I. 526 (1827)). *Helictotrichon* has been taken up by Hubbard (Hill, Fl. Trop. Afr. x. 103 (1937)), Schweickerdt (Bothalia, iii. 185 (1937)), and Pilger (Fedde, Repert. xlv. 6 (1938)).—C. E. Hubbard.

*Hordeum hystrix Roth ; Nevski in Act. Univ. Asiae Mediae, ser. viii. b, Bot. Fasc. 17, 42 (1934). *H. Gussoneanum* (Parl.) Asch. et Græbn. Det. C. E. Hubbard.

Ersekë, wet meadows in plain below Gramos Range, very local, 3400 ft., 26. vi. 33, no. 1892.

The specimens agree with Dörfler's material of var. *simplex* Dörfl. et Degen (sub *H. Gussoniano*), which does not seem worthy of distinction.

*Leersia oryzoides (L.) Sw.

District of Sarandë ; near Çukë, ditch in swampy alluvial flats on N. side of Lake Butrinto, sea-level, 2. vi. 33, no. 1326.

*Melica minuta L. var. vulgaris Coss. ; Papp in Engl. Bot. Jahrb. lxv. 318 (1932) ; det. C. E. Hubbard.

Sarandë, in cracks of limestone coast rocks, sea-level, 1. vi. 33, no. 1274.

The first record of this variety for the Balkan Peninsula.

*Milium effusum L.

District of Korçë, dry beech-woods on slopes above Dardhë, c. 5500 ft., 25. viii. 35, no. 2666.

*Molinia caerulea (L.) Mch.

Voskopoj, by streams in ravines on serpentine slopes, c. 4000 ft., 20. viii. 35, no. 2570.

*Oryzopsis holciformis (M.B.) Richt.

Sarandë, on broken limestone coast hills, near sea-level, 3. vi. 33, no. 1350.

*Oryzopsis miliacea (L.) Asch. et Schweinf. var. Thomasii (Duby) Richt.

District of Sarandë ; near Çukë, on rocky bushy limestone slopes at sea-level, 15. vii. 33, no. 2238.

*Panicum repens L.

Durrës (Durazzo), sands at sea-level, 31. viii. 35, no. 2752. Anthers orange-saffron ; styles violet.

*Phleum phleoides (L.) Simonk.

Near Leskovik, dry sandstone slopes, c. 2800 ft., 24. vi. 33, no. 1862.

*Poa sterilis M. Bieb., confirmt. C. E. Hubbard.

Voskopoj, on serpentine rocks in ravine, with *Brachypodium serpentini*, c. 4000 ft., 28. viii. 35, no. 2706.

Very rarely collected in the Balkan Peninsula, being recorded by Hayek only from Macedonia.

*SERRAFALCUS MOLLIFORMIS (Lloyd) Husnot, det. C. E. Hubbard.

Gjinokastrë, gravelly ground by river, 800 ft., 8. vi. 33, no. 1459. A piece of *S. intermedius* was found mixed with this gathering.

*SERRAFALCUS SCOPARIUS (Jusl.) Parl. var. PSILOSTACHYS Hal.

Leskovik, roadside, 3000 ft., 17. vi. 33, no. 1715.

SESLERIA TENERRIMA (Fritsch ex Baldacci) Hayek.

Nemerçka Range above Biovishd, limestone rocks, 6500 ft., 22. vi. 33, no. 1829. Collected from near the type locality.

*SETARIA GLAUCA (L.) Beauv.

Berat, waste fields on edge of low-lying cultivations by river, 200 ft., 16. viii. 35, no. 2506.

*SIEGLINGIA DECUMBENS (L.) Bernh.

Near Ersekë, marshy meadows in plain at foot of Gramos Range, c. 3400 ft., 26. vi. 33, no. 1902.

*STIPA TORTILIS Desf.

Sarandë, on broken limestone coast hills, near sea-level, 3. vi. 33, no. 1352.

EQUISETACEAE.

EQUISETUM HYEMALE L.

Voskopoj, rubbly sandstone slope near Hagios Prodromos Monastery, very local, 4200 ft., 22. viii. 35, no. 2595. Dark green.

REVIEW.

The New Systematics. (Edited by JULIAN HUXLEY.) viii+ 583 pages. Oxford : Clarendon Press, 1940. 21*s.* net.

THE Committee on Publications of the Association for the Study of Systematics in relation to General Biology is to be congratulated on ' The New Systematics,' which is a most comprehensive statement of the problems which confront systematists, and a welcome summary of much of the newer work in biology, bearing, not only on systematics, but on the biological sciences in general. The book contains so much information and suggests so many ideas, that no one reviewer could deal with it in detail ; it is mainly concerned with the mechanism of evolution, the ways in which species may originate, and with the fundamental importance of taxonomy. Throughout the book, there is rightly an insistence on the need for studying living plants and animals. Difficulties are fairly faced and not glossed over, and there is a refreshing absence of attempts to uphold points of view which

conflict with facts. The twenty-two writers are all well established workers, and this guarantees the quality of the whole ; they include a number of professional taxonomists, together with ecologists, cytologists and geneticists ; palæontologists bring their share to the common fund, but there is a noteworthy absence of physiologists. Is this because physiologists have nothing to offer, or were they not asked to collaborate ?

The twenty-one chapters which follow the editor's stimulating introduction cover a wide field, and naturally, with so much diversity, any one reader finds some chapters of more interest than others. The taxonomists perhaps have the best opportunity of developing their views, and, without waste of time and space, they indicate that taxonomy is much more than " a pleasant occupation demanding relatively little intelligence." They reveal a wide outlook and a lively appreciation of the many problems that have to be met, and their chapters should educate those who regard systematists with " benevolent condescension ", maybe because such critics have no idea of the immense amount of detailed knowledge which may be needed to name an organism accurately. To some minds, detail is insufferable, but the taxonomist must have it ; ' The New Systematics ' suggests how the detail can be used.

Unquestionably, the study of systematics provides a unifying thread running through an enormous body of diverse facts and ideas, and systematics may properly be regarded as one of the most fundamental and important branches of biological work. In the past, species-mongering did much to discredit systematics, but we are nearly freed from that. The current neglect of taxonomy in the training of undergraduates is a well-known defect in our academic system ; it may not be too much to hope that the publication of ' The New Systematics ' may help to remedy the defect.

It is a pity that a title was not chosen which would have attracted the attention of workers other than those interested in taxonomy, for there is much in ' The New Systematics ' worthy of general diffusion. The book proposes no new system, but it contains many suggestions, which, if acted upon, would broaden the whole of biological work and lead to notable progress. Some of the information has appeared elsewhere, and this is duly accounted for in the generous lists of references, but there seem to be new facts and new points of view scattered throughout the book, which should be read by all biologists, whether systematists or not, and by all students working for honours in botany or zoology.

To a botanist, the uniform printing of specific epithets with small initial letters looks odd. The editor has missed an opportunity of increasing the debt of gratitude due to him, by his failure

to exclude that weed-word, " case " ; that word, and the obnoxious " involve " are far too common in biological writings, and both are so completely defaced that they should be withdrawn from circulation. It is inevitable that the book should contain a number of terms not wholly familiar to the general biologist. The index, though very full, does not pick up all the terms, and a glossary would have helped the non-specialist reader.

' The New Systematics ' is not an effort by systematists to magnify their calling, though the opportunity has been rightly and effectively used to show how important their work is. Taxonomy should run through all biological work, and its function is not merely to provide a passive support for the rest of the structure ; systematists do much more than stick labels on organisms. If ' The New Systematics ' receives the success it deserves, we may expect, not only a revitalisation of biological work, but, when economic conditions allow, the realisation of at least some of the practical aims with which the editor closes his introduction.

B. Barnes.

SHORT NOTES.

Linnean Society of London.—It has been decided that it would serve no useful purpose to hold general meetings of the Linnean Society for the time being, but that the Society's Rooms and Library shall remain open. There will be a Special Meeting of the Society, however, on November 7th to elect a Treasurer in place of Mr. Francis Druce. Mr. Druce has served the Society well since he took office in 1931, on the death of Mr. H. W. Monckton. His quiet self-effacing demeanour, his business capacity, and his wise counsel have been great assets to the Society throughout years which have had more than the average of problems and worries. He has been second to none in upholding the traditions and dignity of the Society and the interests of Fellows, and, moreover, has been generous in every sense of the word. Most of what he has done is known only to those who have served on the Council, but all will regret that he is no longer able to continue in office. His many friends, however, will wish to congratulate him on his election as Master of the Worshipful Company of Innholders, a City Guild with which his family have been connected for well over a century—a high honour, well and truly deserved.

British Mycological Society.—Owing to billeting and travel difficulties, arrangements for the Annual Autumn Foray had first to be altered and finally cancelled. The Annual Meeting will be held before the end of the year.

Correction.—On p. 214, for " var. **naiena** " read " var. **incana**."

NEW SPECIES FROM BRITISH GUIANA.

By T. G. Tutin, M.A.

All but one of the species described here were collected by the Cambridge Expedition to British Guiana in 1933 (see Journ. Bot. 1934, 306 and 333). Four of the species are from the low-lying rain-forest area relatively near the coast and fairly well known, while the remainder, all species of *Begonia*, are from the peculiar habitat formed by the gorge of the Potaro River, with the exception of one plant found by E. F. im Thurn on Roraima. The Potaro gorge, just below Kaietuk Fall, is narrow and steep-sided, the slopes consisting chiefly of large boulders continually wet with spray and thickly covered with bryophytes, Selaginellas and ferns. Between the boulders there is a dense growth of small trees, apparently mostly different from the common species found elsewhere in the colony. At one place there is a small area of flat clay soil which bears Mora forest similar to that found along the banks of the main rivers (see Davis, T. A. W., and Richards, P. W., Journ. Ecol. xxi.–xxii. 1933–4). From the base of the fall for about half a mile no trees occur and the dominant plant is the Bromeliad *Brocchinia micrantha* which grows to a height of fifteen feet and also occurs abundantly on the savanna above. The gorge is most difficult to penetrate and has been little explored, but would repay further investigation.

My thanks are due to Messrs. N. Y. Sandwith and E. F. Warburg for much help, and to the Keeper of Botany, British Museum, and the Director of the Royal Botanic Gardens, Kew, for facilities for working out the collection.

Sparattanthelium aruakorum Tutin, sp. nov. (Hernandiaceae). *S. Botocudorum* Mart. var. *uncigero* Meissn. ramis uncinatis brevibus aphyllis similis sed ab illo foliis glaberrimis, habitu alto scandente discedit.

Frutex scandens c. 24 m. altus ; ramuli striati glabri, aliqui aphylli compressi recurvi uncos scandentes formantes. *Folia* oblongo-lanceolata ad ovata, acuminata, 6–12 cm. longa, 2·5–4·0 cm. lata, basi plus minusve rotundata et plerumque aliquanto obliqua, chartacea vel coriacea, supra satis nitentia, glaberrima, basi trinervia, nervis lateralibus primariis e costa subtus medio exeuntes, secundariis cum costa angulum rectum facientibus et reticulum pulchrum formantibus, omnibus in foliis adultis utrinque prominentibus in junioribus supra inconspicuis ; petioli glabri 1·5–2·0 cm. longi. *Inflorescentiæ* numerosæ illis aliarum specierum generis similes, usque ad 13 cm. longæ, axillares vel pseudo-terminales, laxe et late divaricatæ, pedunculis glabris subtus pedicellis minute puberulis, floribus pedicellisque minute appresse canescenti-tomentosis, pedicellis tenuissimis 2–3 mm.

longis. *Perianthium masculum* 5-partitum, lobis anguste obovatis plus minusve cucullatis vel ligulatis, 1·0–1·5 mm. longis, usque ad 0·75 mm. latis, lobo uno quam aliis sæpissime minore ; stamina 4, filamentis 1 mm. longis, crassissimis basi angustatis, antheris c. 0·5 mm. longis, stylo piloso c. 0·5 mm. longo, stigmate capitato. *Perianthium femineum* 5-partitum tubo et ovario 1·0 mm. longo, urceolato, lobis 1·0–1·5 mm. longis, ovatis ad ligulatis, usque ad 1 mm. latis, staminodiis 4, stylo 0·5 mm. longo piloso. [*Fructus* mihi ignotus.]

Hab. Bartica–Portaro Road, 82 miles from Bartica. Typus in Herb. Mus. Brit., *Tutin* 252. In Wallaba (*Eperua*) forest, June 24, 1933. Altitude c. 400 ft. Bush-rope climbing about 75 ft. on a Marishiballi (*Licania*). Pedicels red-brown. Flowers yellow.

Begonia (**Doratometra**) **kaietukensis** Tutin, sp. nov. (Begoniaceae). *B. guianensi* A. DC. affinis a qua caulibus ligneis pubescentibus, stipulis parvis pectinato-subulatis, pedunculis florum femineorum longis gracilibus, bracteis bracteolisque pectinatis, alis fructuum inæqualibus asymmetricis discedit.

Herba erecta annua 15–24 cm. alta basin versus paulum ramosa caule aliquanto ligneo costato, plus minusve crispe pubescente. *Folia* 1·5–3·0 cm. longa, basi usque ad 1·5 cm. lata, lanceolata, basi cordata, apice acuminata, serrata vel biserrata serraturis aristatis mucronatisque, utrinque rare pubescentia præcipue subtus in nervis, palmate 4-nervia, nervis supra impressis, subtus prominentibus ; petioli 0·5–2·0 cm. longi rare pubescentes ; stipulæ 2–3 mm. longæ pectinato-subulatæ, persistentes. *Inflorescentia* thyrsoidea ; cymulæ femineæ ex axillis foliorum exorientes semel dichotomæ, ramulo uno furcæ abortivo ; pedunculi graciles rare pubescentes sub anthesi 0·5, sub fructu 1–2 cm. longi, pedicelli glabri sub anthesi 0·2, sub fructu 0·5–1·0 cm. longi, basi bibracteati, bracteis 1·5–3·0 mm. longis lanceolatis pectinatis vel laciniatis, persistentibus. *Flores feminei* 4 mm. longi ; tepala 3, 1 mm. longa, ovata concava dilute viridia ; styli 1 mm. longi bifurcati ; ovarium inæqualiter trialatum, basi bibracteolatum bracteolis persistentibus ovatis pectinatis. *Flores masculi* pseudoterminales ; pedunculi c. 0·4 cm. longi rare pubescentes, dichotomi, furcæ ramulo uno abortivo, bibracteati, bracteis ut in flore femineo ; pedicelli c. 0·3 cm. longi rare pubescentes ; tepala 2, c. 3 mm. longa, ovata vel oblonga, dilute viridia ; stamina c. 15 antheris filamentis subæquilongis. *Fructus* 1 cm. longus, 1·5 cm. latus, ovoideus trialatus, alis duabus angustis, ala tertia 0·5 cm. lata plus minusve orbiculari, bracteolis 0·5–0·7 cm. longis plerumque paulum inæqualibus.

Hab. Gorge below Kaietuk Fall. Typus in Herb. Mus. Brit., *Tutin* 531 in part. 21 August, 1933. Altitude c. 300 ft. On wet boulders. Stems purple, flowers pale green.

Begonia (**Doratometra**) **charadrophila** Tutin, sp. nov. Affinis *B. guianensi* A. DC. a qua florum femineorum pedunculis longissimis gracilibus, fructuum alis valde inæqualibus, et *B. kaietukensi* Tutin a qua caulibus glabris minus ligneis, stipulis majoribus, foliis tenuioribus majoribus, cymularum feminearum furcis magis numerosis et fructuum alis magis inæqualibus discedit.

Herba erecta annua c. 25 cm. alta paulum ramosa caule herbaceo vix costato glabro. *Folia* 2·5–7·0 cm. longa basi usque ad 4 cm. lata, lanceolata vel triangularia basi rotundata apice longe acuminata, biserrata serraturis aristatis, tenuissima glabra vel paulum pubescentia, palmate 7-nervia, nervis utrinque plus minusve conspicuis ; petioli 0·5–2·0 cm. longi glabri vel parce pilosi ; stipulæ 4–6 mm. longæ oblongæ mucronatæ integræ vel basi parce fimbriatæ caducæ. *Inflorescentia* thyrsoidea. Cymulæ femineæ ex axillis foliorum exorientes ter dichotomæ furcarum secundarum et tertiarum ramulo uno abortivo ; pedunculi primarii sub fructu usque ad 2·5 cm. longi graciles glabri, secundi 4–7 mm. longi, tertii 1–2 mm. longi, pedicelli 4–6 mm. longi ; furcis omnibus bibracteatis bracteis 1–1·5 mm. longis laciniatis persistentibus vel pari imo caduco. *Flores feminei* 2–3 mm. longi ; tepala 3, 1·5 mm. longa, elliptica ; styli c. 0·5 mm. longi ; ovarium trialatum alis subæqualibus, basi bracteolis duabus persistentibus altera 3 mm. longa, altera 2 mm. longa præditum. *Flores masculi* pseudo-terminales, cymulis femineis similibus sed ramulis omnibus perfectis ; tepala 2, c. 3 mm. longa, ovata ; stamina c. 20 antheris quam filamentis brevioribus.

Hab. Wet boulders in the gorge below Kaietuk Fall, 21 August, 1933. Typus in Herb. Mus. Brit., *Tutin* 531 in part.

Begonia (**Begoniastrum** subsect. **Eubegonia**) **roraimensis** Tutin, sp. nov. *B. tovariensi* Klotzsch affinis a qua alis fructus minoribus minus inæqualibus, antheris brevioribus, filamentis longioribus, tepalis floris feminei brevioribus latioribus, petiolis stipulisque brevioribus differt.

Herba erecta c. 50 cm. alta verisimiliter perennis ; caulis basi paulum ligneus, 3 mm. diametro nodis inflatus, statu juniore aliquanto pubescens demum glaber, haud ramosus. *Folia* 1·0–2·5 cm. longa, 1–2 cm. lata, ovata cordata ad fere orbicularia crenulato-biserrata serraturis aristatis, apice obtuse acuminata, utrinque pilis brunneis brevibus appressis rare vestita, palmate 4-nervia nervis supra inconspicuis subtus conspicuis ; petioli 0·5–1·5 cm. longi ferrugineo-tomentosi ; stipulæ 3–4 mm. longæ oblongo-lanceolatæ ciliatæ, sæpe post lapsum foliorum persistentes. *Inflorescentia* thyrsoidea ; cymulæ femineæ ex axillis foliorum orientes bis dichotomæ, ramulorum ultimorum uno paris cujusque suppresso ; pedunculus communis 2–3 cm. longus aliquanto pubescens sub fructu glaber ; pedunculi 0·3–0·6 cm. longi ; pedicelli sub anthesi 0·8–1·0 cm. longi, sub fructu ad 2 cm.

longi ; bracteæ furcis omnibus duæ 2–4 mm. longæ lanceolatæ usque ovatæ fimbriatæ mox caducæ. *Flores feminei* 1 cm. longi, parum omnium unus post anthesin caducus ; tepala 5 fere orbicularia c. 2 mm. diametro et ut videtur rosea ; ovarium inæqualiter tri-alatum basi cum bracteis duabus parvis illis pedunculorum similibus mox caducis ; styli tres c. 1 mm. longi bifurcati. *Fructus* capsula trilocularis 1·2 cm. longa, 1·7 cm. lata, cuneiformis trialata ; alæ duæ angustæ, ala tertia 0·5 cm. lata sursum directa. *Flos masculus* pseudo-terminalis pedunculo brevi ; tepala 4, duo orbicularia 0·5 cm. longa, 0·7 cm. lata, duo anguste obovata 0·6 cm. longa, 0·2 cm. lata ; stamina numerosa antheris quam filamentis brevioribus.

Typus in Herb. Kew., " Roraima, our house," *E. F. im Thurn*, without number.

Begonia (**Magnusia** subsect. **Gireoudia**) **Jenmani**, Tutin, sp. nov. Species valde distincta, caule brevi basi repente foliis paucis integris fructuum alis valde inæqualibus.

Herba erecta c. 30 cm. alta verisimiliter perennis ; caulis plus minusve repens 5–10 cm. longus nodis radicans quadratus papillosus pilis brevibus albis vel rubiginosis rare vestitus. *Folia* pauca plerumque 3 vel 4, 7–10 cm. longa, 5–9 cm. lata, plus minusve orbicularia cordata valde asymmetrica integra vel parum biserrulata ciliata apice acuminata, acumine brevi satis lato, viridia per longitudinem nervorum late purpureo-fasciata palmate 6–7-nervia, nervis utrinque æqualiter prominentibus, nervis et venulis pilis albis brevibus appressis rubiginosis rare vestitis ; petioli 2–6 cm. longi rubiginoso-hirsuti ; stipulæ 5–8 mm. longæ ovato-lanceolatæ acutæ mucronatæ (mucrone 2 mm. longo) glabræ persistentes. *Inflorescentia* thyrsoidea pedunculo terminali glabro plus minusve erecto usque ad 10 cm. longo dilute roseo nodis viridi ; cymulæ femineæ in parte inferiore inflorescentiæ axillares bis usque sexagies dichotomæ, furcæ primæ ramulis ambobus plerumque persistentibus, furcarum aliarum ramo uno abortivo vel caduco, pedunculis sub fructu 0·6–2·0 cm. longis glabris, satis crassis, ramulis usque ad 2·5 cm. longis glabris gracilibus, nodis 2–5 bibracteatis, bracteis ad costas deminutis. *Cymulæ masculæ* in parte superiore inflorescentiæ, femineis similes sed ramulos plures perfectos exhibentes, bracteis 1 mm. longis ovatis acutis. *Florum masculorum* tepala 4, duo 3 mm. longa, ovata vel orbicularia, acuta, statu vivo rosea, duo 2 mm. longa, lanceolata acuta, statu vivo alba ; stamina c. 15 antheris quam filamentis paulum brevioribus. *Flores feminei* c. 7 mm. longi, tepala 5 inæqualia c. 4 mm. longa, ovato-lanceolata usque ad fere linearia, alba ; styli ad 2 mm. longi stigmatibus spiralibus ; ovarium ebracteatum c. 3 mm. longum, trialatum, alis valde inæqualibus duabus angustis, ala tertia c. 7 mm. lata triangulari. *Fructus* 7–10 mm. longus, 5 mm. latus, ovoideus, alis duabus 5 mm. latis altera late triangulari altera aliquanto

angustiore, ala tertia usque ad 2 cm. lata ovata vel fere orbiculari acuminata, acumine longo obtuso curvato.

Hab. Potaro River near Kaietuk Fall. Typus in Herb. Mus. Brit., *Tutin* 529, wet boulders in the spray of the fall in the gorge, August 21, 1933. Leaves and petioles hairy, broad purple bands along the veins. Stems glabrous, pale pink with green nodes. Sepals pink, petals white. *Tutin* 530, same date and locality. *Jenman* 891, " Sept.–Oct. 1881. On rocks under the fall, Kaieteur, Potaro River." *E. F. im Thurn*, without number, " 23 Feb. 1879 above Tukine (Tukeit), Potaro River.' *E. F. im Thurn*, " Nov. 1878, under rocks in Kaietuk ravine." The Jenman and im Thurn specimens are in the Kew Herbarium.

Comparatively few specimens of *Begonia* have been collected in British Guiana, and some of those were unidentified till recently, so it may be convenient to enumerate them here.

B. (DORATOMETRA) GUIANENSIS A. DC. *Schomburgk* 334, " Low, herbaceous." Flower yellow-white. Rich soil along the rivers.

B. (BEGONIASTRUM) VELLEREA Klotzsch. Demerara, *Mr. Parker.* A. De Candolle has the note " Dubia propter defectum bracteolarum floris fem. . . Petala fl. masc. paulo minora." Apart from this the plant agrees perfectly with *B. vellerea*, which is a Brazilian species. It has not been re-collected in British Guiana, and may possibly have been cultivated.

B. (BEGONIASTRUM) HUMILIS Ait. *C. F. Appun* 227, " Cuyounie Creek." *Jenman* 3989, " On rocks by the Great Falls, Upper Demerara River, Sept. 1887." *Altson* 476, " Anandabaru, Kopinang River, 1,800 ft., April 1926." " In forest by creek side. Prostrate succulent herb, stem and petioles reddish. Flowers, female tepals 5, male tepals 2."

This species is rather similar to *B. guianensis* in general appearance, but is rather larger and has a more branched inflorescence, while the placentas are divided, not simple.

Couratari calycina Sandwith, sp. nov. (Lecythidaceae) ; foliis pagina glabris, pedicellis longis robustis, sepalis magnis, galeæ androecii parte apicali reflexa haud echinata valde distincta ; facie, venatione, glabritie foliorum ad *C. multifloram* (Sm.) Eyma approximans.

Arbor magna, ramulis summis sulcatis minute puberulis crebre lenticellatis. *Folia* obovato-oblonga, apice late obtuse breviter cuspidata, basi obtusa sæpe plus minusve obliqua, 10·5–16·5 cm. longa, 4·8–8·5 cm. lata, coriacea, marginibus integris revolutis, supra nitida, costa utrinque pubescente supra prominula subtus prominente, paginis omnino glabris, nervis lateralibus primariis utroque costæ latere circiter 12–14 a sese 0·8–1·8 cm. distantibus ascendentibus satis longe a margine conspicue anastomosantibus, supra cum reticulatione fere planis

subimpressis sed manifestis, subtus prominentibus reticulatione intricata; petiolus exalatus minute puberulus, 1·3–1·8 cm. longus. *Inflorescentia* rhachi ad 10 cm. longa, 2–4 mm. lata, sulcato-angulata, dense breviter subvelutino-pubescente vel subtomentella, colore sordide brunneo; pedicelli robusti, 3·5–4 cm. longi, 1·5–2 mm. crassi, indumento atque colore simili; [bracteolæ non visæ]. *Hypanthium* sub flore turbinatum, circiter 7 mm. diametro, indumento atque colore simili. *Sepala* late ovata vel ovato-semiorbicularia, 5–7·5 mm. longa, 6–8 mm. lata, conspicue ciliata, præterea extra minute puberula, colore siccitate plus minusve vinaceo vel saltem nigro-purpurascente. *Petala* oblonga, 2·7–3 cm. longa, 1·2–1·8 cm. lata, plus minusve leviter neque regulariter ciliata, extra præsertim inferne minute furfuraceo-puberula. *Andrœcii galea* supra ovarium spiraliter incurva, facie interiore secus spiram staminodiis dense echinata, tum parte superiore apicali more generis abrupte retrorsum extra recurvata intricate rugulosa sed ob staminodia multo inferius posita haud echinata sed sublævi. *Stamina* circa annulum valde numerosa pluriseriata, filamentis 1–1·3 mm. longis, antheris circiter 0·75 mm. longis atque latis. *Ovarium* triloculare, ovulis in quoque loculo 10–15. [*Fructus* adhuc ignotus.]

Hab. Bartica–Potaro road, 84 miles, in Clump Wallaba bush, c. 400 ft., June 20, 1933. Typus in Herb. Mus. Brit. *Tutin* 200: Tree 95 ft. high, 10 in. diam.; bark smooth, red-brown; crown small; petals red beneath, pink and white above.

Vernacular name (Arawak): Wadara (*cf.* other species of the genus).

This is the fifth species of this genus to be discovered in British Guiana, the others being *C. pulchra* Sandwith, *C. multiflora* (Smith) Eyma, *C reticulata* A. C. Smith, and *C. coriacea* Mart. Material of the latter (*Forest Dept.* No. 2242) was at first identified as *C. fagifolia* (Miq.) Eyma and the record was published in Kew Bull. 1935, 129. Further investigation proves that this identification was incorrect. The British Guiana material differs widely from Surinam specimens of *C. fagifolia* which have been named by Eyma, whereas it agrees remarkably well with Amazonian examples of *C. coriacea* which are considered by A. C. Smith to represent Martius' species (see Bull. Torrey Club, lxi. 195–196 (1934)). *C. calycina* is not the only *Couratari* with large sepals; those of *C. macrosperma* A. C. Smith are equally large (see 'Phytologia,' i. no. 3, 125), but that species has short petioles and very different leaves with more numerous and more closely-set lateral nerves. It is somewhat strange that none of the five species known from the colony resembles very closely any of the other four, and the inference is that other species await discovery and collection. The following factors make the study of *Couratari* both slow and difficult. The Wadaras are large trees, frequently with high buttresses; some of them shed their leaves before flowering; while the fruits, which are of taxonomic importance, are rarely associated with inflorescences and leaves collected from the same tree. For a full explanation of the nomenclatural and taxonomic problems connected with the genera *Couratari* and *Allantoma* see Eyma, 'Polygonaceae, Lecythidaceae, and Guttiferae of Surinam, pp. 54–65 (1932); and Sprague in Journ. Bot. lxx, 231–233 (1932).—N. Y. Sandwith.

Licania Boyanii Tutin, sp. nov. (Rosaceae). *L. buxifoliae* Sandwith affinis a qua ramulis novellis dense et minute tomentosis, foliis latioribus, stipulis majoribus, inflorescentiæ ramis brevioribus, crassioribus, magis numerosis, sæpissime recurvatis, calyce ore minus contracto lobis magis acutis discedit.

Arbor c. 24 m. alta, cortice brunneo crassissimo ramulis cinereis glabris lenticellis inconspicuis novellis tomentosis, lenticellis elongatis albidis exceptis, tomento brunneo furfuraceo. *Folia* ovata vel fere orbicularia, basi plus minusve cuneata, 2–6 (sæpissime 5) cm. longa, 1·5–4·5 cm. lata, chartacea, dilute viridia, statu vivo vix bullata, supra glabra subtus tomento brunneo furfuraceo minute vestita, margine integra plus minusve recurvata, tomento costæ illo laminæ simili sed cum pilis albis satis longioribus intermixtis, nervis lateralibus utrinque 5–7 nervis et reticulo venularum supra impressis inconspicuis subtus prominentibus; petioli 2–3 mm. longi supra plani subtus teretes rugosi, indumento costæ; stipulæ 3–5 mm. longæ subulatæ statu juniore tomentosæ petiolum amplexæ demum glabræ et sæpe ramulum amplexæ, sæpissime persistentes. *Inflorescentiæ* numerosæ 3–6 cm. longæ, ramulis superioribus bracteis triangularibus acutis concavis inferioribus sæpe bracteis foliaceis præditis, omnibus tomento denso brunneo furfuraceo cum pilis albis longioribus intermixtis; bracteolæ tres dimidio inferiore conjunctæ, lobis acutis 0·5 mm. longis; cymæ 5–20-floræ, 1·0–2·5 cm. longæ, plus minusve recurvatæ pedunculis 2–5 mm. longis. *Flores* parvi antheris exceptis brevissime tomentosi; calyx basi angustatus ore paulum contractus, tubo 2·0 mm. longo, lobis fere 0·5 mm. longis triangularibus acutis, paulum patentibus; petala nulla; staminum filamenta applanata tubo calycis adnata, antheræ ovoideæ; ovarium sphericum stigmate globoso subsessili. [*Fructus* non visi.]

Hab. Bartica–Potaro Road, 88 miles from Bartica, in Wallaba (*Eperua*) forest growing in a small group of Marishiballi (*L. buxifolia*). Altitude c. 130 m., June 27, 1933. Typus in Herb. Mus. Brit., *Tutin* 293. Tree c. 70 ft. high, bark brown, very thick; leaves pale green, scarcely bullate. Calyx lobes more acute and bark thicker than in *L. buxifolia*.

Vernacular name (Arawak): Thick-skinned Marishiballi.

Named after Jonah Boyan, an Indian plant-collector who distinguished it from the other species of *Licania*, and without whose skilful help little collecting would have been possible.

Talisia elephantipes Sandwith, sp. nov. (Sapindaceae); *T. guianensi* Aubl. affinis, foliis giganteis petiolo basi multo insignius incrassato, rhachi folii superne valde acutangulo-tricarinata nec subtereti, foliolis brevius acuminatis, inflorescentia longissima, pedicellis brevioribus, staminibus 5, differt.

Arbor satis excelsa, ramulis summis percrassis subteretibus glabris siccitate nigrescentibus nitidulis crebre verruculosis 2–2·5 cm. diametro. *Folia* gigantea, 0·5 (summa)–1·5 m. longa, ubique glabra; petiolus foliorum maximorum 27–37 cm. longus, 7–9 mm. crassus, subteres, brunneo-pullus vel nigrescens, nitidulus, crebre leviter striatus atque sulcatus, basi insigniter bulboso-incrassata 2·5–3 cm. lata inferne irregulariter plus minusve excavato-lobata; rhachis inferne petiolo similis, superne cinerea supra atque lateraliter valde acutangula vel potius tricarinata; internodia inferiora 8–10 cm., superiora 3–5 cm. longa; petioluli 1–3 cm. longi (vel foliolorum summorum paulo breviores) supra levissime alati sed subplani basi conspicue bulboso-incrassati; foliola multijuga, ut videtur 8–15-juga, alterna vel raro opposita, oblonga, apice acuminata vel subcuspidata, acumine 0·5–1·5 cm. longo, basi valde obliqua attenuata cuneata ac in petiolum decurrentia, inferiora 22–36 cm. longa, 5·8–7·5 cm. lata, superiora 15–30 cm. longa, 3·4–7 cm. lata, glabra, subcoriacea, utrinque satis nitida, nervis lateralibus primariis utrinsecus costæ circiter 16–20 arcuato-patulis marginem versus læte anastomosantibus, supra cum costa leviter prominulis subtus prominentibus, rete venularum subtilissimo intricatissimo utrinque præsertim subtus prominulo. *Inflorescentia* maxima, longissima, teste lectore circiter 1 m. longa, pyramidalis, ramis infimis usque 40 cm. longis, ubique pallide haud dense flavo-pubescens vel rhachis ipsa subglabrescens; rhachis ramique valde angulati atque sulcati; cymæ secus ramos ramulosque subsessiles, congestifloræ; pedicelli brevissimi, 0·5–0·75 mm. longi. *Flores* albi, masculi tantum visi. *Calyx* ultra medium partitus; lobi ovato-elliptici, obtusi, circiter 2–2·5 mm. longi, 1·4 mm. lati, ciliati, extra satis sparse pubescentes, intus glabri. *Petala* ungue brevi glabro superne sensim dilatato 0·3–0·7 mm. longo; lamina oblonga vel elliptico-oblonga, apice obtusa atque plus minusve cucullata, 4 mm. longa, 2–2·2 mm. lata, basi in unguem rotundata nec auriculata, utrinque glabra; squama laminam æquans sed paullo angustior, integra, extra secus margines dense villosa ceterum glabra, intus dense villosa nisi triente inferiore marginibus exceptis glabra. *Discus* glaber, fere 1 mm. altus, circiter 1·3 mm. diametro, cupularis, conspicue 5-angulatus, lateribus concavis, angulis crassis obtusis rotundatis. *Stamina* 5, fundo disci inserta, ubique glabra; filamenta 1–2·3 mm. longa; antheræ lineares vel lineari-oblongæ, apiculatæ, 1·3–1·75 mm. longæ. *Ovarii rudimentum* minutum, pilosum.

Hab. Arawak Matope, Cuyuni River, July 20th, 1933, *Tutin* 405 (typus in Herb. Mus. Brit.): tree 85 feet high, 7 in. diam., in mixed forest on top of a small stony ridge between two creeks; branches very few and short; young stems and petioles dark brown; inflorescence about 1 m. long; flowers white.

There is an authentic Aublet specimen in the British Museum Herbarium which agrees relatively well with his figure and description of *Talisia guianensis*. On this specimen the leaflets are only up to 17 cm. long and 4·2 cm. wide, while the acumen is at least 2 cm. long. The rhachis of the leaf is subterete and the petiole is only slightly thickened at the base, the width at this point being up to about 7 mm. The sepals are, as would be expected in a *Talisia*, obtuse, not acute as described and figured by Aublet. Radlkofer (Sapindaceae in Engler, 'Pflanzenreich,' 845, 1932) cites several other specimens from French Guiana and brings the measurements of the leaflets up to 20 cm. long and 7·5 cm. wide, and the flowers up to 7 mm. long. The unexpanded flowers of Aublet's specimen are very much shorter than this. The characters of the immense leaf and the presence of five instead of eight stamens amply distinguish *T. elephantipes* from *T. guianensis*, to which it is certainly related on account of the numerous leaflets and the glabrous disk and stamens. It may be added, for what it is worth, that Aublet described *T. guianensis* as a shrub with the trunk only 3–4 feet high and with inflorescence and flowers of a beautiful rose-colour; it was this mention of rose-colour which induced Vahl to change the name of the species to *T. rosea* when he re-described it, without further reference to such colour, from a specimen collected by van Rohr. Another species with five stamens, *T. longifolia* (Benth.) Radlk., differs widely from *T. elephantipes* in its smaller flowers with the disk densely pubescent at the apex.—N. Y. Sandwith.

THE HEPATICS OF SURREY.

By E. C. Wallace.

The following notes and records are the results of several years study in the field, library, and herbarium. Being resident in the county I have had the time to visit all places likely to be worth searching for liverworts, and to confirm many old records made during the last century. Most of the species now on record for Surrey have been recorded during the last forty years by the following bryologists:—L. J. Cocks, W. R. Sherrin, H. H. Knight, Dr. Parsons, A. M. Saunders, P. W. Richards, and myself. About eighty species are now known to occur in the county as compared with one hundred and nineteen in Sussex, seventy-four in Kent, and fifty-six in Hampshire. The difference in the numbers of Surrey and Sussex is explained by the presence of extensive outcrops of sandstone rock in east Sussex and areas of clayey soil

in the Ashdown Forest region, which seem to be specially favourable for the growth of some tender species. Mr. W. E. Nicholson, who has added so many species to the British Hepatic list, has extensively explored Sussex in search of hepatics. I do not expect many more species to be found in Surrey, but there is scope for much field-work in Hampshire, especially the northern half of the county.

In Surrey the richest areas for hepatics are to be found on the higher ground in the western parts, such as the downs westward from Boxhill and the greensand heights from Leith Hill to Hindhead. Some woods on the weald clay towards the Sussex border are also fairly rich in species. Some species (in common with a few mosses) have been found as yet only on the chalk downs, and three only on the northern slopes of Boxhill. These three, *Scapania aspera* Bernet, *Madotheca laevigata* (Schrad.) Dum. var. *Thuja* Nees, *Frullania Tamarisci* (L.) Dum., are widespread on the South Downs—northern escarpment only—from Petersfield to Lewes.

The species now enumerated are arranged as in the 'Census Catalogue of British Hepatics,' third edition (British Bryological Society). Almost all localities are given except for species fairly common in the county, when a general statement is made. All records are my own except where initials of the aforementioned bryologists are given.

Sphaerocarpos texanus Aust. Recorded only from Woking, Journ. Bot. 306 (1909), the first British record.

Riccia Warnstorfii Limpr. in Warnst. Margin of pond on Reigate Heath.

R. commutata Jack. Sandy field, South Park, Reigate (*A. M. S.*).

R. glauca L. Scattered over the county, but scarce.

R. sorocarpa Bisch. Sandy fallow near Wotton Church.

R. crystallina L. Hedge Court Millpond (*W. E. N.*).

R. Huebeneriana Lindenb. With the last, on exposed mud. The only other British station for this is a pond at Horsted Keynes in Sussex.

R. fluitans L. Not uncommon in ponds, often mixed with *Lemna* spp. and amongst *Typha* and *Sparganium*. Occurs in the canal at Frimley.

Targionia hypophylla L. On several sandy hedgebanks between Thursley and Churt.

Reboulia hemisphaerica (L.) Raddi. Sandy hedgebanks, mostly on lower greensand about Shere and Thursley.

Conocephalum conicum (L.) Dum. Streamsides and ditches mostly, and the greensand from Nutfield to Farnham.

Lunularia cruciata (L.) Dum. Common in gardens, orchards, and some woods on the chalk. Also streamsides in the Weald, as at Nutfield and Alfold.

Marchantia polymorpha L. Scattered over the county but not common.

f. *aquatica* Nees. By pond near Wotton.

Aneura pinguis (L.) Dum. Ditch near Westcott, bogs on Bisley Common, Thursley Common.

f. *angustior* Hook. Thursley Common.

A. multifida (L.) Dum. Local, Dry Hill, Reigate Hill, Tillingbourne cascade, Thursley Common, Hindhead.

A. sinuata (Dicks.) Dum. Coldharbour, Tillingbourne cascade.

var. *major* (Lindb.). Earlswood (*A. M. S.*), Thursley Common (*L. J. C.*).

Metzgeria furcata (L.) Dum. Common on beeches right across the county and in the weald, on a flint wall at Thursley.

Pellia epiphylla (L.) Corda. Common in suitable habitats throughout the county.

P. Fabbroniana Raddi. Local, sides of paths in woods on Boxhill and Netley Heath; by canal near Wisley; in spring on the Hog's Back near Puttenham; heathy ground. Ockham Common.

Blasia pusilla L. Rare. Leith Hill (*H. H. K.*), near Godalming (1855).

Fossombronia pusilla (L.) Dum. Ditch near Dormans, fallow by Old Surrey Hall.

F. Wondraczeki (Corda) Dum. Reigate Heath, Abrook Common, Pray Heath (*L. J. C.*).

F. Dumortieri (Hüb. & Genth.) Lindb. Reigate Heath (*A. M. S.*), Ockham Common (*H. H. K.*), Chobham Common (*H. H. K.*).

Alicularia scalaris (Schrad.) Corda. Common on heathy ground throughout the county and in woods on clay, especially in the weald.

A. Geoscyphus De Not. Rare. Westend Common, Esher (*L. J. C.*), Chobham Common (*P. W. R.*).

Aplozia crenulata (Sm.) Dum. Few records, but doubtless not uncommon. Wimbledon Common with var. *gracillima* (Sm.) Heeg.; Worplesdon (*L. J. C.*), the variety also at Newlands Corner and Pitch Hill (*L. J. C.*).

A. caespiticia (Lindenb.) Dum. A rare plant in Britain, recorded by *H. H. K.* from sandstone near top of Leith Hill.

Gymnocolea inflata (Huds.) Dum. Found on all the boggy heaths throughout the county, also on Sheen Common (1909, *W. R. S.*) and Walton Heath.

Lophozia turbinata (Raddi) Steph. Common all along the chalk downs and confined to the chalk.

L. badensis (Gottsche) Schiffn. Apparently rare. Reigate Hill (*A. M. S.*).

var. *obtusiloba* (Bern.) Schiffn. On Boxhill.

L. ventricosa (Dicks.) Dum. Not uncommon on the greensand westwards from Leith Hill to Hindhead, unrecorded elsewhere.

L. bicrenata (Schmid.) Dum. Rare., Oxshott Heath (*L. J. C.*), Merrow Downs, on gravelly soil.

L. excisa (Dicks.) Dum. and *L. incisa* (Schrad.) Dum. are both recorded for the county, but I have been unable to trace the records or as yet find the plants myself.

Sphenolobus exsectiformis (Breidl.) Steph. Rare. Oxshott Heath (*L. J. C.*), Tilford (*L. J. C.*), hedgebank in lane near Kettlebury Hill.

Plagiochila asplenioides (L.) Dum. Not uncommon, scattered over the county in most large woods, especially in the weald.

var. *minor* Lindbenb. Near Effingham (*L. J. C.*).

Leptoscyphus anomalus (Hook.) Mitt. Local, but abundant on a few boggy heaths, such as at Bagshot, Bisley, and Thursley.

Lophocolea bidentata (L.) Dum. Frequent throughout the county.

L. cuspidata Limpr. Scarce, but may occur more frequently than the only three records indicate. Farthing Downs (*W. R. S.*), Betchworth, lane near Shere.

L. alata Mitt. Local, but scattered over the county from Caterham to Clandon, occasionally on clay by streams.

L. heterophylla (Schrad.) Dum. Scattered along the downs in beechwoods, tree on Holmbury Hill, hedgebank near Churt.

Chiloscyphus polyanthus (L.) Corda. Scarce, by streams in woods and in alder swamps ; Dry Hill ; Mag's Well, Westcott ; Hindhead ; Middle Old Park, Farnham.

Cephalozia bicuspidata (L.) Dum. Common in the county, in a variety of situations and on all soils.

f. *conferta* Hüben. Wood near Clandon Downs, Ockley Common.

var. *Lammersiana* (Hüb.) Breidl. Oxshott Heath (*L. J. C.*).

C. connivens (Dicks.) Lindb. On most of the more extensive boggy heaths in the west of the county, from Esher to Thursley.

C. media Lindb. Bisley Common and near Horsell, on peat.

C. macrostachya Kaal. In *Sphagnum* on Ockley and Thursley Commons.

C. leucantha Spruce. A surprising plant for Surrey, found on peaty soil on Kettlebury Hill (4. iv. 1937), the only English record. (Identification confirmed by Mr. W. E. Nicholson.)

C. Francisci (Hook.) Dum. Rare. Westend Common, Esher (*L. J. C.*), Oxshott (*L. J. C.*), and Witley Common.

C. fluitans (Nees) Spruce. Apparently rare ; only two records. Reigate Heath (*A. M. S.*) and Thursley Common (*L. J. C.*). It is sometimes confused with *Gymnocolea inflata,* which occurs in the same habitat.

Cephaloziella Starkei (Funck) Schiffn. Reigate district (*A. M. S.*), Witley Common.

var. *asperifolia* (Jens.) Macv. Near Thursley (*L. J. C.*).

C. myriantha (Lindb.) Schiffn. Pine stump with moss, Esher Common.

Odontoschisma Sphagni (Dicks.) Dum. Local, but occurs on most of the boggy heaths in the western part of the county; very fine in the Punch Bowl, Hindhead.

O. denudatum (Nees) Dum. Oxshott, Esher Common, and near Tilford (*L. J. C.*).

Calypogeia Trichomanis (L.) Corda. Common throughout the county in woods, on heaths, and occasionally in *Sphagnum* bogs.

C. Neesiana (Carest. & Massal.) K. M. Oxshott Heath (*W. R. S.*), more common on the sandrocks of east Sussex than anywhere else in Britain.

C. fissa (L.) Raddi. Hedgebanks on sandy soil, Wimbledon Common (*W. R. S.*), Shirley Hills, Churt.

C. sphagnicola (Arnell & Perss.) Warnst. & Loeske. *Sphagnum* bogs, rare, Oxshott (*L. J. C.*), Thursley.

C. arguta Nees & Mont. Rather scarce, Shirley Hills, Westend, Esher (*L. J. C.*), Middle Old Park, Farnham.

Lepidozia reptans (L.) Dum. On heathy banks in woods and on commons throughout the county, but scarce on the clayey soils.

var. *julacea* Nees. Hindhead (*E. Armitage*, 1932).

L. setacea (Web.) Mitt. On all the boggy heaths in the western part of the county ; unrecorded east of Oxshott.

Ptilidium ciliare (L.) Hampe. Oxshott Heath (*L. J. C.*), under heather, Ockley Common, rare in south-eastern England.

P. pulcherrimum (Web.) Hampe. Beech-tree in Deerleap Wood, Wotton, and on elders in copse near Farnham. Epping Forest is the only other station recorded in south-eastern England.

Trichocolea tomentella (Ehrh.) Dum. Alder swamps, Squires Great Wood, Westcott ; Punchbowl, Hindhead.

Diplophyllum albicans (L.) Dum. Heaths and woods in all parts of the southern and western areas of the county.

D. obtusifolium (Hook.) Dum. Esher Common (*L. J. C.*), disused gravel workings, Newlands Corner (*L. J. C.*).

Scapania compacta (Roth.) Dum. Oxshott Heath (*L. J. C.*).

S. aspera Bernet. Recorded only from two areas on Boxhill—the northern slopes.

S. nemorosa (L.) Dum. Leith Hill (*L. J. C.*), Dormans, Frensham Common, Durfold Wood near Alfold.

S. undulata (L.) Dum. Streams, Dryhill ; various streams about Leith Hill; not recorded yet from the Hindhead area, where it is likely to occur.

S. irrigua (Nees) Dum. Sandy heaths in south and western areas, also in woods on the weald clay as about Alfold.

S. curta (Mart.) Dum. Newlands Corner (*L. J. C.*).

Radula complanata (L.) Dum. Not uncommon on a variety of trees in most parts of Surrey.

Madotheca laevigata (Schrad.) Dum. var. *Thuja* Nees. Recorded from only two areas on Boxhill. The species has been recorded for the county, but I believe that the variety only occurs.

M. platyphylla (L.) Dum. All along the chalk downs from Caterham to Farnham Castle; the only record I have off the chalk is from a sandy lane at Churt.

Cololejeunea minutissima (Sm.) Schiffn. Recorded only from Shere, by the late E. M. Holmes. So far I have been unable to refind.

Lejeunea cavifolia (Ehrh.) Lindb. On soil, Boxhill, trees in wood on Dryhill, Dormans.

Microlejeunea ulicina (Tayl.) Evans. Common in most beechwoods on the chalk and lower greensand; on juniper near Hascombe.

Frullania Tamarisci (L.) Dum. Two areas on Boxhill with *Scapania aspera* Bernet.

F. dilatata (L.) Dum. Scattered over the county on a variety of trees, quite common south of the chalk downs.

Anthoceros punctatus L. Near Waverley Abbey, Tilford (*J. Denyer*).

A. crispulus (Mont.) Douin. Reigate (*A. M. S.*), Worplesdon (*L. J. C.*), fallow near Old Surrey Hall.

A. laevis L. Cosford near Thursley (*J. Denyer*), ditch on Coldharbour Common.

There are Surrey specimens of hepatics in the Herbaria at the British Museum, Kew, South London Botanical Institute, Haslemere Educational Museum, and I have in my herbarium specimens from all parts of the county.

SOME NEW VARIETIES OF *ENTEROMORPHA* AND A NEW SPECIES OF *MONOSTROMA*.

By V. J. Chapman, M.A., Ph.D., F.L.S.

During the course of a revision of the genus *Enteromorpha* a number of new forms or varieties were encountered. It was hoped that these could be described in the final monograph, but as it seems unlikely that this will be ready for some time it would seen advisable that short descriptions of these new plants should be published now. Some of the plants were collected during a visit to the Pacific Coast of North America and to Jamaica in the summer of 1936. For the other new plants I am much indebted to Miss E. L. Stephens, of Cape Town, and Mr. V. W. Lindauer, of New Zealand, and for the trouble they have taken in providing me with material from those places respectively.

It is not proposed to describe the new plants as new species of *Enteromorpha* but as varieties of existing species. This is because I am convinced that the genus is composed of a few highly polymorphic species (*cf.* Le Jolis, 1886) rather than a collection of numerous species with few or no varieties (*cf.* J. G. Agardh, 1888). An examination of herbarium material has shown that many of the new varieties have been collected before but have subsequently been wrongly named or frequently left unnamed. The genus is notoriously difficult, and it is evident that much material in herbaria has been incorrectly named. Of the new varieties two each are recorded from South Africa, San Diego, U.S.A., and Bay of Islands, New Zealand, whilst one was collected in Jamaica.

Enteromorpha clathrata (Roth.) Ag. var. **angustimembrana,** var. nov.

Thallus nanus, tubulosus, ramis conferveis, contortis, plerumque ramosissimis, usque ad 1044 μ latis, ramis aliis brevibus et acutis aliis obtusis. Rami sæpissime ex paucis seriebus cellularum in partem monosiphoneam terminantibus compositi. Cellulæ ramorum plerumque ordinibus adulti thalli nullo ordine dispositæ. Cellulæ 14–18 μ latæ, 10 μ altæ, 12–22 μ longæ, raro 40 μ in thallo vetere, diametron mediocriter 16–18 μ habentes. Chloroplaston granulatum vel pæne vel omnino cellulam complens. Parietes cellularum incrassati. Membrana 18–24 μ lata, a parte exteriore 4–6 μ crassa, a parte interiore 6–8 μ. Thallus pallide viridis.

Locality: Cogman's Kloof River, Montagu, B.S.A.—a river into which flow warm mineral springs.

When this plant was first examined it appeared to be very little different from *Enteromorpha clathrata*, but on closer examination it became clear that it differed in one or two important details. These are the thinner membrane—*E. clathrata* usually has a membrane more than 30 μ wide, and the spine-like branches with blunt apices—acute in *E. clathrata*. Furthermore, as a freshwater form it is separated ecologically from the marine *E. clathrata*.

Enteromorpha clathrata (Roth.) Ag. var. **angusta,** var. nov.

Thallus tubulosus, a stipite ramosum, ramis tenuioribus, elongatis, paulatim usque ad stipitem attenuatis. Rami 2–3 cm. longi, 1–2 mm. lati. Cellulæ non ordinatæ, 18–22 μ diametron, mediocriter 14 μ habentes, 20 μ altæ. Chloroplaston granulatum, majorem partem cellulæ non complens. Parietes intercellulares incrassati. Membrana 28 μ lata, a parte interiore usque ad 8 μ crassa. Thallus pallidissime viridis, saxis adherens.

Locality: San Diego, California; Bay of Islands, New Zealand.

The granular nature of the chloroplasts has been the deciding factor in placing this variety under *E. clathrata* because the nature of the chloroplast appears to be a constant character of *E. clathrata*. Apart from this feature the variety approaches *E. procera* fairly closely in some details. The walls of the cells are thick and faintly lamellose.

ENTEROMORPHA PROLIFERA (Muell.) J. Ag. var. **inflatissima,** var. nov.

Thallus statu juniore adherens, adultus laxe volitans, tubulosus aut collapsus, usque ad. ·75 cm. latus, planus vel contortus proliferationibus plurimis capillaribus sæpe longissimis præditus. Ramuli ultimi plerumque monosiphonei; rami majores obtusi, ex latis brevibus crescentibus. Cellulæ ramorum in parte infima non elongata. Cellulæ ordinatæ, nonnumquam in ramulis minoribus in modum cochlearum circumpositæ; ordo cellularum incerte in adultioribus thalli partibus redditus. Cellulæ 8–22 μ latæ, 9–28 μ longæ, 20–23 μ altæ, quadratæ, diametron mediocriter 12–14 μ habentes. Chloroplaston homogeneum, totam cellulam complens. Membrana 24–28 μ lata a parte interiore 4–5 μ crassa.

Locality: Oudtshoorn, Malmesbury, Piquetberg Mts., B.S. Africa.

Fresh or brackish water in rivers.

This variety is essentially fresh-water, and it is very closely related to both *E. prolifera* and *E. crinita*. It differs from the latter in the blunt apices of the main branches and from the former in the great length of the proliferations and the large size to which the main thallus may grow. It is possible that the variety is merely a fresh-water modification of *E. prolifera* or *E. crinita*, and has migrated from purely marine conditions up the rivers to beyond the tidal influence. This should be capable of proof by means of transplant experiments.

ENTEROMORPHA PROCERA Ahln. var. **prolifica,** var. nov.

Thallus adultior magnus, usque ad 22·5 cm. longus, 8 mm. latus, ubique ramosissimus, thalli ramique paulatim ad stipitem attenuati. Thallus tubulosus vel collapsus. Cellulæ thalli adultioris 8–26 μ diametron, mediocriter 14–16 μ habentes, 18–22 μ altæ. Chloroplaston homogeneum nisi in cellulis circa stipitem. Membrana 20–36 μ lata ab parte interiore usque ad 8 μ crassata. Thallus viridis vel subviridis.

Locality: Pacific Grove, California; Osund, Norway; Bay of Islands, New Zealand.

Grows epiphytically on other algæ.

This plant has been encountered three times and is described as a variety with some reservation because I suspect that it is simply the form that *E. procera* takes up under unfavourable conditions. If it is encountered again the habitat conditions should be carefully examined with a view to ascertaining how far they may be unfavourable towards the existence of green algæ.

ENTEROMORPHA PROCERA Ahln. var. **minuta,** var. nov.

Thallus tenuis, tubulosus, linearis, ramosus imprimis a stipite, ramis paulatim usque ad stipitem attenuatis. Thallus 1·5–2 cm. altus, 1–2 mm. latus. Cellulæ ad stipitem et in thallis junioribus ordinatæ, in adultioribus non ordinatæ. Cellulæ thalli ad stipitem 12–22 μ longæ, 10–22 μ latæ, diametron mediocriter 15×18 μ habentes, alibi 14–32 μ longæ, 14–22 μ latæ. Cellulæ ramorum a parte infima elongatæ. Chloroplaston homogeneum totam cellulam complens. Membrana 28 μ lata paulum ab interiore parte incrassata. Thallus viridis, saxis adhærens.

Locality: Jamaica; Bay of Islands, New Zealand; Java (Moller in Herb. Ag. as *E. lingulata* !).

The plants from New Zealand and Jamaica were collected from near high-water mark, and the small size may be associated with the exposure the plants undergo.

ENTEROMORPHA PROCERA Ahln. var. **nova-zealandia,** var. nov.

Thallus parvus, usque ad 2 cm. altus, tubulosus, circa stipitem ramosissimus, frondibus supra stipitem minus frequentibus institutus. Rami alterni raro oppositi, paulatim usque ad stipitem attenuati. Cellulæ elongatæ a parte infima nonnullorum ramorum. Ramuli ultimi in partem monosiphoneam terminantes; ramuli secundi in partem brevem monosiphoneam terminantes; rami majores obtusis. In forma juvenile rami plerumque monosiphonei. Cellulæ in toto thallo per series longitudinales dispositæ, 12–22 μ diametron, mediocriter 16–20 μ habentes, 15–17 μ altæ. Chloroplaston homogeneum, totam cellulam complens. Membrana 20–24 μ paulum ab parte utraque crassata. Thallus pallide viridis, epiphyticus in constrictionibus *Hormosirae*.

Locality: Bay of Islands, New Zealand.

The variety appears to be confined to the nodal constrictions of the fucoid *Hormosira*. In many respects it is very like miniature plants of *E. erecta* or *E. Hopkirkii* but it differs in the small size and homogeneity of the chloroplast. The blunt apices of the main branches are a further distinguishing feature.

ENTEROMORPHA PROLIFERA (Muell.) J. Ag. var. **australiensis,** var. nov.

Thallus parvus, usque ad 1 cm. altus, tubulosus, cæspitosus, circa stipitem ramosissimus; rami obtusi plurimis proliferationibus præditus. Proliferationi ad stipitem non attenuati, apicis acutis. Cellulæ ad stipitem et in proliferationibus ordinatæ, in adultioribus thallis non ordinatæ. Cellulæ 10–16 μ diametron,

19 μ altæ, chloroplaston homogeneum. Membrana 20–24 μ lata ab parte interiore usque ad 3 μ crassata.

Locality : Bay of Islands, New Zealand.

Near high-water mark on a sheltered coast.

The characteristic features of this variety are its small size, its tufted character, and the numerous small proliferations which clothe the major branches and give the plant a bristly appearance.

Monostroma Lindaueri, sp. nov.

Thallus parvus, inflatus, saccus, sphæricus aut elongatus, non ruptus. Cellulæ per series horizontales et longitudinales dispositæ, ordo cellularum incerte in adultioribus thallis et ad stipitem. Cellulæ 8–24 μ dia., mediocriter 12–14 μ habentes, elongati usque ad 40 μ ad stipitem. Parietes cellularum adulti thalli incrassata. Chloroplaston homogeneum, elongatum in cellulis ad stipitem. Membrana 28–36 μ lata, a parte exteriore 3 μ crassa, a parte interiore 6–8 μ. Thallus viridis epiphyticus aut saxis adhærens.

Locality : Bay of Islands, New Zealand.

This striking new species differs from nearly all other known species of *Monostroma* in that the thallus appears always to retain the saccate shape since no evidence of splitting was observed. The thallus may be either perfectly spherical or sausage-shaped. Various stages in the embryology were observed, and they are characteristic of a *Monostroma*. Its nearest ally would appear to be *M. Grevillei*, but the new species is much smaller, and, furthermore, *M. Grevillei* ultimately splits. It gives me great pleasure to name the species after Mr. V. W. Lindauer, who has provided me with much of my material.

I would like to acknowledge the assistance of Dr. E. F. Warburg in drawing up the Latin diagnoses.

REVIEWS.

Propagation of Horticultural Plants. By G. W. Adriance and F. R. Brison. 8vo, pp. viii+314, 182 text-figs. McGraw-Hill Book Co., New York. [McGraw-Hill Publishing Co., London.] Price £1.

Although this book is intended primarily for horticulturists it contains much of interest to the ordinary botanist. In these days many are learning from digging for victory that the empirical methods of plant cultivation have a sound scientific basis in the search for which their botanical outlook is widened.

A reasoned account of one of the fundamental practices of horticulture, propagation, giving the results of research work and describing commercial methods is therefore of wider appeal than in more prosaic times. That the account deals mainly with American plants is of little consequence ; that it is written

in simple style with abundant illustrations is all to the good. The book is divided into seventeen chapters, which include Forcing Equipment ; Grafting Waxes, and Tools ; Propagation of Certain Plants ; The Relation of Propagation Practices to Diseases ; Transplanting ; Growing and Handling of Nursery Stock, as well as the production of seeds and the growing and treatment of seedlings, and various methods of asexual reproduction.

Welsh Ferns. A Descriptive Handbook. By H. A. Hyde and A. E. Wade. 8vo, boards, pp. x+131, 11 plates and 67 text-figs. Cardiff : The National Museum of Wales. Price 5*s*.

In recent years students have had to be satisfied with the short accounts of ferns given in our standard floras, whereas formerly there were a number of books published which were usually lavish in detail though much of this was from a point of view now regarded as out of date. This descriptive handbook of Welsh Ferns will doubtless have a ready sale, for it is not confined to forms occurring only in Wales but has notes on other British species.

The main body of the book gives first a key to the genera, and then descriptions of orders, families, genera, species (with keys) and varieties. The classification adopted is the recent one of Christensen (' Verdoorn's ' Manual of Pteridology,' 1938). The authors state that " every Welsh species has been described anew from the specimens themselves." The descriptions are clear, and different founts are used to stress important characters ; they are illustrated by text-figures, and either habit drawings or photographs ; the habitat, Welsh and general distribution are added, and the first Welsh record. Except for the commonest species there is a detailed list of " Specimens in Herbarium " ; this is unnecessary, and occasionally reaches inordinate lengths, even sixteen lines of small type for *Asplenium Trichomanes*. There are two other points which are more general. Under *Dryopteris dilatata* there appear to be four nomenclatural transfers of varieties. Is it advisable to make these in such a handbook, where they are liable to be overlooked and so cause confusion ? The second point concerns the Introduction. This is of thirty-one pages, and lays great stress on F. O. Bower's researches and other points only indirectly, if at all, concerned with the identification of ferns ; much of it is too academic for ordinary readers and is not sufficient for examiners. The short notes here and there (usually at the ends of families) give all the information about affinities that is needed.

The Handbook will serve its purpose admirably, for great pains have been taken with it ; the suggested pruning, however, might have made it possible to publish it more cheaply.

Plant Microtechnique. By D. A. JOHANSEN. 8vo, pp. xi+523, 110 text-figures. London (& New York): McGraw-Hill Publishing Co. Price 30*s*.

Elementary Microtechnique. By H. A. PEACOCK. 2nd Edition. 8vo, pp. viii+330. London: Edward Arnold & Co. Price 9*s*.

THE first of these books is a new work in McGraw-Hill's Publications in the Botanical Sciences, a series which is rapidly expanding into an Encyclopædia of Botany. "The main purpose of the book is to acquaint the user with the principles and procedures of all phases of botanical microtechnique. The specific aim is to enable elementary and advanced students, instructors and research investigators to prepare their own microscope slides of plant materials." There are two sections: 1. General Methods (pp. 1–208). 2. Special Methods for the various Phyla (pp. 211–491). Palæobotany and photomicrography are excluded.

The first section is much the more interesting and useful. The account starts from scratch and follows the customary sequence, giving full details of the standard methods of manipulation. Considerable advance has been made during the past few years in many branches of microscopical technique, and some of these methods are described here for the first time in a text-book. To the non-specialist it is useful to have chapters on smear- and whole-mount methods, which have recently come so much to the fore. The instructions are clear, and the author's comments on various points show a practical knowledge of difficulties and a sane outlook. In writing of the choice of a fixing fluid in a chapter on cytological methods, he says, "Conditions are not the same everywhere at all times. In England, for example, LaCour's fluids are popular and apparently afford excellent results, but on the Pacific Coast the fixation is atrocious, and staining is most difficult. Climatic conditions apparently have a definite bearing on fixation results and certainly have one on the subsequent staining."

The second section of the book is not so successful. It contains a mass of information about the methods most likely to provide satisfactory results in the different groups of plants, but gives unnecessary details about the plants themselves, sometimes of a trivial kind, and is not exact in giving the distinction between "*Oïdium* and *Monilia* [which] are frequently confused." It would have been sufficient to restrict the text to cytological matters, leaving cultural details, general morphology, distribution and such like to those books which treat them adequately; we assume that the "technician" is not merely wishing to try his technique on all kinds of organisms as an end in itself but has in view either the testing of previous accounts or the discovery of new facts.

The book is one which will prove valuable both to those studying academic botany and to those whose knowledge of cytological methods has lagged somewhat. The illustrations include many excellent photomicrographs.

'Elementary Microtechnique' has deservedly reached a second edition. It is a much less ambitious book than Johansen's, though it deals with animals as well as plants. It is essentially one for beginners—sixth form and first year university students are specifically mentioned—and is a laboratory manual of the best type, giving the process to be followed and the reasons therefor. There is some rearrangement from the first edition which makes for ease in consultation, and there is a little amplification of the text. This will probably be the accepted elementary practical work on the subject for many years. [For the next edition some better method of using the page headings might be devised; perhaps a different type could be used where reference is made to contents as against a repetition of the title of the chapter; in the chapter on "Methods for Specific Material" this appears at the head of over sixty pages, *i. e.*, much more than half the chapter, whereas other headings range from one page to ten.]

SHORT NOTES.

GRIM AND GAY.—The 'Daily Sketch' recently reported that "a fire was started, but was quickly subdued, and the only damage to exhibits was in a part of the Museum set aside for members of the staff." 'Punch's' comment was: "And who cares about them?"

NEW USE FOR THE DOG ROSE.—Throughout the ages roses have been put to many uses. The name Dog Rose has a significance, but precisely what is apparently open to question, beyond that it refers in some way to the dog and not to its commonness. Reports have appeared in the press that German chemists have found that the hips of *Rosa canina* are a rich source of the anti-scorbutic vitamin C. The German State Railways are therefore using their tracks for growing this species; half a million plants are to be acquired for this alone, and other waste land is to be utilised. Vitamin C is supplied in normal diets by fruits and vegetables, and Italy should have an abundance of lemons to spare, particularly if she is satisfied with citric acid resulting from the fermentation of carbohydrates by *Aspergillus niger*.

ORCHIS PARDALINA Pugsl. IN NORTH STAFFORDSHIRE.—In June 1938 I found at Stanton in North Staffordshire a solitary specimen of what I took to be *Orchis pardalina* Pugsl. Mr. F. Rilstone, who examined the plant in a fresh condition, agreed that it was certainly *O. pardalina*. The specimen was not preserved, but I have notes and specimens of other orchids which

were growing in the same locality. These included an abundance of *O. Fuchsii* Dr. and *O. ericetorum* (Lint.) E. S. Marsh. and a small patch of *O. latifolia* L. var. *pulchella* (Druce) Pugsl. But I found no trace of *O. praetermissa* Dr. Indeed I have never found *O. praetermissa* in North Staffordshire, although there are two records of it in 'The Flora of North Staffordshire' (issued as Appendices 1–8 to the 'Transactions of the North Staffordshire Field Club,' 1922–1929). Neither locality mentioned in the 'Flora' is within ten miles of Stanton. Accordingly if the orchid from Stanton has been rightly determined as *O. pardalina*, here is one example of its dissociation from *O. praetermissa*. If, on the other hand, the Stanton orchid is not *O. pardalina*, but a hybrid orchid, *O. praetermissa* can hardly have been one of its parents.—E. S. EDEES.

GLOETAENIUM LOITLESBERGERIANUM: NOTE ON AN ALGAL RECORD.—My attention has recently been drawn to a list of the freshwater algæ of Glamorganshire published by Mr. A. E. Harris in 'Glamorganshire County History.—1. Natural History,' 1936. In this paper reference is made to the occurrence in Glamorganshire of a number of algæ for which no British record is given in West and Fritsch, 'British Freshwater Algæ,' 1927. Included among these is *Gloetaenium Loitlesbergerianum*, upon which I published a note in this Journal (lxxvii. 315, (1939)), claiming its discovery near Sheffield as a new British record. It is now clear that the record given by Mr. Harris is an earlier one which had escaped my notice.

It may be interesting to note also that *Uroglenopsis americana*, another of the unrecorded species in 1927, has now been described from several localities (Lund, J. W. G., Journ. Bot. lxxv. 305 (1937); Pearsall, W. H., 'The Naturalist,' 122 (1933); Williams, E. G., 'North-Western Naturalist,' 23 (1936)). There is still a big field open to freshwater algologists to add to the list of British species, and it is desirable that some such medium as the 'Journal of Botany,' with its wide and general circulation, should be used for the publication of new records.—E. M. LIND.

CAREX GRAHAMI BOOTT IN ARGYLLSHIRE.—When botanising on Ben Douran in late June this year I was pleased to find, on a wet grassy slope, a large patch of this alpine sedge. It was a flourishing colony, in dense growth with a little *C. saxatilis* L. present. The plants were well advanced in fruit despite the early date for alpine plants, so that I was able to gather some stems for distribution amongst those known to be interested.

The only other station in Scotland where this sedge can be found now with certainty seems to be the well-known station in Glen Clova, Angus. It does not appear to have been found recently in Perthshire, whence it has been recorded from Ben Lui, Ben nau Eachan (Killin), Meall Ghaordie, and Ben More, where I have vainly sought for it. There are good records, too, from Ben Heasgarnich, a remote hill, parts of which are difficult of access.

Specimens from Ben Douran have been sent to the herbaria at the British Museum, Kew Gardens, and the Royal Botanic Garden, Edinburgh.—E. C. WALLACE.

SIEGESBECKIA ORIENTALIS IN LANCASHIRE.—I have deposited in the British Museum herbarium a specimen of *Siegesbeckia orientalis* from Rufford, politically west Lancashire (botanical vice-county 59 "south Lancashire"), a new locality for this rare British Composite whose only other British stations appear to be an established colony at Freshfield station, ten miles westwards, where two members of the Southport Scientific Society discovered it in 1928 and sent specimens to Kew after the late Dr. Druce had identified it, and a record in Yorks: Frizinghall, 1910: "F. Rhodes ex Lees." B.E.C. 1930 Rep. 356 (1931). The new locality at Rufford is a sandy wild garden where, according to the curator of Rufford village museum, it has been rampant for some years, but no one had identified it. These specimens have five or six spreading bracts (the Freshfield plants have five), and, contrary to the description in Ridley's 'World Distribution of Plants,' adhesive glandular hairs are on the leaves and stem as well as the bracts, and the specimens grow to three, five, or even six feet tall. The plant flourishes abundantly at its Rufford site, and spreads rapidly, especially after a bonfire; despite a local supposition that it originated with poultry food, there is also the possibility of seed distribution on the sticky bracts after they were shed by the plants at Freshfield. There seems no reason why this Composite should not spread further on dry, sandy sites in west Lancashire. I exhibited specimens to a meeting of the Merseyside Naturalists' Association, November 3rd, 1940.—ERIC HARDY.

BOOK-NOTES, NEWS, ETC.

LINNEAN SOCIETY OF LONDON.—At a General Meeting on November 7th, Major Frederick Claude Stern, O.B.E., M.C., was elected Treasurer in succession to Mr. Francis Druce. The present time is not ideal for taking over such an office, and the Society is fortunate in having secured the services of a Fellow experienced in financial matters and knowledgable in botany. We wish him the same success as his predecessor.

CHRONICA BOTANICA.—This periodical, which began as an annual volume, then was published bi-monthly, is now to appear fortnightly as an International Plant Science Magazine. The first number of volume 6 is dated October 7th, 1940, and has 24 pages. It is on much the same pattern as formerly, but obviously it cannot give much information about botanists in enemy-occupied countries, or of work being carried on there.

Naturally, therefore, there will be a tendency for the botanical affairs of America to loom more prominently even than they do in less troubled times, but it is pleasing to read of botanical work and botanical discussions being carried on and to hear of progress in different branches of the science which is most remote from war. Messrs. Dawson and Sons are the London Agents of the Chronica Botanica Co., Waltham, Mass., U.S.A.

INDEX LONDINENSIS.—The Supplement to this containing references to illustrations of plants up to 1935 will shortly be published. The Royal Horticultural Society have decided that it is impossible for them to subsidise any further work on the Index. The Director of the Royal Botanic Gardens has issued a circular letter in which he says, " It would be possible to afford full facilities in the Library to carry on the work of the Index Londinensis if a few botanical institutions . . . would be prepared to purchase a typed copy of the new list of illustrations, which could be issued annually. Judging from past experience such annual supplements might under war conditions contain only four or five thousand references. A complete index of references is not now compiled, but only those dealing with plants not previously illustrated or which have hitherto been only poorly or imperfectly represented. The proposed annual supplements would be typed either on cards, for a card catalogue, or alphabetically on foolscap sheets on one side of the paper. As the cost of preparing the supplement will be about £300 a year, it would be necessary to ask for a contribution of £20 for a copy typed on sheets or £25 for one on cards." If a sufficient number offer to subscribe it may be possible to reduce the price.

OUR SOUTH AFRICAN FLORA.—It has been the custom for over half a century to issue cards with packets of cigarettes. The practice probably began with the object of providing a stiffening to prevent the cigarettes being broken when carried in the pocket. Whether this is so or not, the popularity of cigarette cards has increased, and many firms have issued sets of excellent plant pictures with authoritative letterpress and small albums to contain them. The South African Tobacco Companies have gone much further, for they have produced an excellent series of a hundred cards illustrating South African flowers, with an album that is much more lavish in every way than anything so far produced for the purpose in this country. It is an attractively bound large octavo volume of 113 pages. The letterpress, in English and Africaans, by Professor R. H. Compton, breaks new ground. It is divided into four chapters: Where did the South African Flora come from ? Classification of the South African Flora; Types of South African Vegetation ; and How some of our plants live. Though written in simple language it gives much up-to-date information.

REPORT OF THE PERCY SLADEN EXPEDITION TO LAKE HULEH: A CONTRIBUTION TO THE STUDY OF THE FRESH WATERS OF PALESTINE.—PART II. THE FLORA.

BY R. FORBES JONES, Ph.D., and R. WASHBOURN, B.A.

IN 1935 plans had been prepared for the drainage of Lake Huleh and its adjacent swamp. As this would have resulted in the certain loss of many aquatic species of this interesting district it seemed desirable that a permanent record of the aquatic flora and fauna should be made. It was with the object of providing such a record that the Percy Sladen Expedition visited the Huleh district in the latter six months of 1935.

In a previous paper (Washbourn and Jones, 1938) the fauna of the lake and swamp was described. In addition, a brief summary of the historical, climatic, and topographical features of the district were given. The present paper is concerned with recording the plant species to be found in Lake Huleh and in the Huleh Swamp. The plant ecology of this area has been dealt with elsewhere (Jones, 1940). For the purposes of clarity it may be convenient to describe briefly some of the main features of the Huleh valley.

The Huleh district lies in the most northern area of the Jordan Valley. Lake Huleh and the Swamp are in a shallow basin in the valley and are lateral extensions of the Jordan river. The lake is pear-shaped, the broad end being in the extreme north. This forms the southern boundary of the swamp which is contiguous with the lake.

The heaviest rainfall is during the winter, and especially in the months of December, January, and February, which are also the coldest months of the year. The summer is dry and hot. The sub-aerial flora of Palestine develops in the winter, flowering generally occurring in the winter or spring. In summer, the ground flora, except for some shrubs and some xerophytes, is entirely scorched by the hot sun. On the other hand, the aquatic flora, both submerged and otherwise, does not fully develop until the summer, when the temperature of the water and of the soil is most suitable for growth.

Specimens were collected from the lake bottom by means of a drag. The results of a series of transects have been utilised for making a vegetation map (Jones, 1940). From this it may be seen that the various species in the lake are each confined, more or less, to definite areas in the lake. It was more difficult to collect in the swamp, which, broadly speaking, was a huge jungle of *Cyperus Papyrus* approximately twelve square miles in area. The north-east corner of the swamp was difficult to reach, and in view of this and the fact that there was some local trouble with

the Bedouin, this area was left unexplored. Collections, however, have been made from many other parts of the swamp, the interior of which could be reached only with the aid of narrow reed rafts.

Specimens were preserved and dried in the usual manner. For ease of reference identifications were provisionally made on the fresh material, wherever possible, at the time of collection. The final naming of the specimens, however, has been done by members of the staff of the British Museum (Natural History). The plant collection has been presented to the British Museum. The species mentioned in the paper were found in the lake or in the near vicinity of the water.

PTERIDOPHYTA.

By A. H. G. ALSTON.

Dryopteris Thelypteris (L.) A. Gray.
Adiantum Capillus-Veneris L.
Marsilea diffusa Lepr. ex A. Br.
Cheilanthes pteridiodes (Reich.) C. Chr.
Notholaena lanuginosa (Desf.) Desv.
Ceterach officinarum DC.

SPERMATOPHYTA.

Dicotyledones : Polypetalae.

(Ranunculaceae–Geraniaceae, Rhamnaceae–Anacaridaceae, and Rosaceae–Haloragaceae by A. W. EXELL ; Malvaceae and Leguminosae by E. G. BAKER ; Lythraceae–Molluginaceae by W. R. PHILIPSON ; Umbelliferae by C. NORMAN.)

RANUNCULACEAE.

Ranunculus aquatilis L.
Anemone coronaria L.

NYMPHAEACEAE.

Nymphaea alba L.
Nuphar luteum (L.) Sm.

CRUCIFERAE.

Rapistrum sp.
Nasturtium officinale R. Br.
Thlaspi perfoliatum L.
Sinapis incana L.

CARYOPHYLLACEAE.

Dianthus strictus Banks & Soland.
Silene sp.

GERANIACEAE.

Erodium malacoides (L.) Willd.

MALVACEAE.

Lavatera trimestris L.
Althaea officinalis L.
Hibiscus Trionum L.

RHAMNACEAE.

Ziziphus Spina-Christi (L.) Willd.

ANACARDIACEAE.

Pistacia Lentiscus L.

LEGUMINOSAE.

Calycotome villosa Link.
Melilotus alba Desr.
Trifolium fragiferum L.
Trifolium resupinatum L.
Lotus sp.
Glycyrrhiza echinata L.
Scorpiurus subvillosus L.
Alhagi maurorum Boiss.
Prosopis farcata (Banks & Soland.) Eig.

ROSACEAE.

Rubus ulmifolius Schott.
Poterium spinosum L.

CRASSULACEAE.

Sedum sp.

HALORAGACEAE.

Myriophyllum spicatum L.

LYTHRACEAE.

Lythrum Salicaria var. *tomentosum* DC.
Lythrum Hyssopifolia L.

ONAGRACEAE.

Epilobium hirsutum L.
Jussiaea repens L.

MOLLUGINACEAE.

Glinus lotoides L.

UMBELLIFERAE.

Hydrocotyle vulgaris L.
Hydrocotyle ranunculoides L. f.
Oenanthe media Griseb.
Ammi Visnaga (L.) Lam.
Sium erectum Huds.

Dicotyledones : Gamopetalae.

(Rubiaceae–Asclepiadaceae, by W. R. PHILIPSON; Gentianaceae–Plantaginaceae by G. TAYLOR.)

RUBIACEAE.

Galium elongatum Presl.

COMPOSITAE.

Eupatorium cannabinum L.
Phagnalon rupestre (L.) DC.
Bellis sylvestris Cyr.
Varthemia iphionoides Boiss. & Blanche.
Inula viscosa Ait.
Inula crithmoides L.
Pulicaria vulgaris Gaertn.
Xanthium Strumarium L.
Bidens tripartita L.
Calendula arvensis L.
Centaurea calcitrapoides L.
Centaurea carduiformis DC.
Eclipta prostrata (L.) L.
Hedypnois cretica (L.) Dum.-Cours.
Helminthia echioides (L.) Gaertn.
Lactuca scariola L.
Sonchus oleraceus L.
Artemisia monosperma Del.
Scolymus hispanicus L.

PLUMBAGINACEAE.

Plumbago europaea L.

PRIMULACEAE.

Lysimachia dubia Ait.
Cyclamen persicum L.

STYRACACEAE.

Styrax officinalis L.

APOCYNACEAE.

Nerium Oleander L.

ASCLEPIADACEAE.

Cynanchum acutum L.

GENTIANACEAE.

Erythraea spicata (L.) Pers.

BORAGINACEAE.

Heliotropium villosum Willd.
Heliotropium rotundifolium Sieb.

CONVOLVULACEAE.

Cuscuta pedicellata Ledeb.
Cuscuta monogyna Vahl.

SOLANACEAE.

Solanum nigrum L.
Datura Stramonium L.

SCROPHULARIACEAE.

Verbascum sinuatum L.
Linaria Elatine (L.) Mill.
Veronica Beccabunga L.
Scrophularia alata Gilib.

LENTIBULARIACEAE.

Utricularia sp. (sterile).
Utricularia vulgaris L.

VERBENACEAE.

Vitex Agnus-Castus L.
Lippia nodiflora (L.) Rich.
Verbena officinalis L.

LABIATAE.

Lycopus europaeus L.
Stachys longespicata Boiss. & Kotschy.
**Scutellaria galericulata* var. *pubescens* Benth.
Origanum Maru var. *sinaicum* Boiss.
Ballota rugosa (Russ.) Benth.
Micromeria Juliana (L.) Benth.
Mentha aquatica L.
Mentha longifolia (L.) Huds.
Teucrium scordioides Schreb.

PLANTAGINACEAE.

Plantago Lagopus L.

Dicotyledones : Apetalae.

By G. TAYLOR.

ILLECEBRACEAE.

Paronychia argentea Lam.

* Critical identification by Dr. Eig, Hebrew University, Jerusalem.

AMARANTHACEAE.

Alternanthera sessilis (L.) R. Br. ex Schult.
Amaranthus chlorostachys Willd.
Amaranthus graecizans L.

CHENOPODIACEAE.

Chenopodium album L.
Chenopodium urbicum L.

POLYGONACEAE.

Polygonum aviculare L.
Polygonum lapathifolium L.
Polygonum senegalense Meisn.
Polygonum tomentosum Willd.
Polygonum scabrum Poir.

EUPHORBIACEAE.

Chrozophora obliqua (Vahl) A. Juss.
Euphorbia Chamaesyce L.
Euphorbia petiolata Banks & Soland.
Euphorbia Paralias L.
Euphorbia Gaillardotii Boiss. & Blanche.
Mercurialis annua L.
Ricinus communis L.

URTICACEAE.

Urtica dioica L.
Urtica pilulifera L.
Parietaria officinalis L.

FAGACEAE.

Quercus coccifera var. *calliprinos* (Webb) Boiss.
Quercus Aegilops L.

SALICACEAE.

Salix sp. (sterile).

CERATOPHYLLACEAE.

Ceratophyllum demersum L.

Monocotyledones.

By J. E. Dandy.

HYDROCHARITACEAE.

Hydrocharis Morsus-ranae L.
Vallisneria spiralis L.

ALISMATACEAE.

Alisma Plantago-aquatica L.

BUTOMACEAE.

Butomus umbellatus L.

ZANNICHELLIACEAE.

Zannichellia palustris L.

POTAMOGETONACEAE.

Potamogeton lucens L.
Potamogeton nodosus Poir.
Potamogeton pectinatus L.

NAJADACEAE.

Najas marina L.

LEMNACEAE.

Lemna minor L.
Lemna polyrrhiza L.
Lemna trisulca L.

SPARGANIACEAE.

Sparganium erectum L.

TYPHACEAE.

Typha angustata Bory & Chaub.

IRIDACEAE.

Iris pseudacorus L.

AMARYLLIDACEAE.

Narcissus Tazetta L.

LILIACEAE.

Colchicum Stevenii Kunth.
Asparagus acutifolius L.

JUNCACEAE.

Juncus acutus L.
Juncus Fontanesii Gay ex Laharpe.
Juncus inflexus L.

CYPERACEAE.

Cyperus alopecuroides Rottb.
Cyperus dives Del.
Cyperus flavescens L.

Cyperus fuscus L.
Cyperus glaber L.
Cyperus longus L.
Cyperus Papyrus L.
Cyperus pygmaeus Rottb.
Cyperus serotinus Rottb.
Scirpus lacustris L.
Scirpus litoralis Schrad.
Scirpus maritimus L.
Eleocharis palustris (L.) Roem. & Schult.
Fimbristylis bis-umbellata (Forsk.) Bub.
Fimbristylis ferruginea (L.) Vahl.
Cladium Mariscus (L.) R. Br.

POACEAE.

Panicum repens L.
Digitaria sanguinalis (L.) Scop.
Echinochloa Crusgalli (L.) Beauv.
Sorghum halepense (L.) Pers.
Hemarthria altissima (Poir.) Stapf & Hubbard.
Heleochloa schoenoides (L.) Host.
Phleum subulatum (Savi) Aschers. & Schweinf.
Polypogon monspeliensis (L.) Desf.
Cynodon dactylon (L.) Pers.
Phragmites communis Trin.
Arundo Donax L.
Scleropoa rigida (L.) Griseb.
Hordeum murinum L.

Discussion.

From the foregoing it is apparent that the Huleh basin has floristic affinities with the Temperate Zones, Europe, Siberia, the Caucasus, Asia Minor, Asia, the Mediterranean, the Orient, Africa (tropical and sub-tropical), India, etc. With regard to the species which are not of Indian or African affinity it is understandable that a migration in historical times could have taken place across the watersheds which ultimately connect the Huleh district with the regions outside. In addition, the geographical position of Palestine makes possible the formation of such a mixed flora, as this country is the junction or meeting place of the phyto- and zoo-graphical regions described by Eig (1932) viz., (1) Euro-Siberian, (2) Mediterranean, (3) Saharo-Sindian, (4) Irano-Turanian.

The flora of the Huleh is therefore mainly of Palaearctic origin, although there has been a penetration of species of the Sudano-Deccanian region of the Ethiopian sub-kingdom. The presence of these latter elements, so far from their normal region

of distribution, and in a region which is otherwise of a Palaearctic nature, cannot be understood without reference to the geological history of the country; for even in historical time, a migration of any but desert types has been virtually impossible in view of the fact that great desert tracts intervene between the Sudano-Deccanian regions and Palestine. Unless the species showing this Ethiopian affinity have been brought by artificial means, they must have migrated at a time when conditions were very different from those of the present day.

Tristram, when discussing the subject, comes to the conclusion that such a migration would have been possible during the Miocene and Early Pliocene eras when Palestine was yet separated from Europe, etc. by the Syrio-Persian Sea and its only land connection was with Africa. During that time there was a continuous freshwater system from the Jordan basin in the north to the lakes and rivers of Africa in the regions of the Nile basin, the Nyanza, the Nyassa, and the Tanganyika lakes (and possibly the Red Sea) in the south. The climate over all that area was, at that time, warm and suitable for a migration of species from Africa, northwards into Palestine.

We may assume, therefore, that the hydrophytic flora of the Huleh region was, at first, Palaeotropic in character. Later, migration of Palaearctic species occurred when land connection with Europe and the Orient was made, and, with the final transition to a more or less Mediterranean climate, the flora of the Huleh basin came to assume a predominantly Palaearctic character. When we consider that the area must have been indirectly affected during the glacial period of the northern regions and also (according to the early historians) that the Huleh basin has, at periods, been completely dry, any Ethiopian relicts must have shown extreme tenacity of life to have survived to the present day.

Lake Huleh must also have been an important factor in the preservation of these Palaeotropic hydrophytic elements in the Jordan Valley, as this is the only one of the three Jordan lakes which has remained continuously fresh. A study of the literature shows that during the Middle Diluvial period, volcanic eruptions separated Lake Huleh from Lake Tiberias. Towards the end of this period, a dry period caused an excessive shrinking of the waters of Lake Tiberias, which thus became distinctly saline. During this time, therefore, the aquatic flora of Lake Tiberias and of the Dead Sea (which had already become saline), must have disappeared, or very nearly so. It was not until the Upper Diluvial, when the waters of Lake Huleh broke through the basaltic bar, that Lake Tiberias became fresh once more, and a recolonization by an aquatic flora from the northern lake took place.

Of the species mentioned, most of the tropical or sub-tropical

types as indicated in ' Index Kewensis ' are already known for Palestine (Post, 1933), viz., *Alternanthera sessilis* (L.) R. Br. ex Schult., *Cyperus alopecuroides* Rottb., *Cyperus Papyrus* L., *Cyperus pygmaeus* Rottb., *Fimbristylis bis-umbellata* (Forsk.) Bub., *Fimbristylis ferruginea* (L.) Vahl, *Glinus lotoides* L., *Hibiscus Trionum* L., *Jussiaea repens* L., *Polygonum scabrum* Poir., *Polygonum tomentosum* Willd., *Ricinus communis* L., *Ziziphus Spina-Christi* (L.) Willd.

A most important contribution is the finding of *Marsilea diffusa* Lepr. ex A. Br. This species is of African and Ethiopian distribution. The present record is the first in Asia, and is probably the most northern record of the species. It is noteworthy that the species was found in only one locality of the Huleh swamp, viz., on the west side at Beisamun, and was in the vicinity of a spring where there was no fear of drying. This colony of *Marsilea* is probably a relict of the pre-glacial age when it no doubt had a much wider distribution than at the present day. As such it would be one of the " tropical outliers " referred to by Tristram (1884), a condition made possible by the unique climate of the Jordan Valley.

The following record of species new for Palestine is made on a basis of Post's ' Flora of Syria, Palestine and Sinai,' revised by Dinsmore (1933). The species marked with an asterisk * are recorded in Post for Syria and the Lebanon, etc., but not for Palestine :—**Chenopodium urbicum* L., *Cuscuta pedicellata* Ledeb., *Cyperus dives* Del., *Cyperus serotinus* Rottb., *Dianthus strictus* Banks & Soland., **Eupatorium cannabinum* L., *Euphorbia petiolata* Banks & Soland., *Galium elongatum* Presl, *Hydrocharis Morsus-ranae* L., *Marsilea diffusa* Lepr. ex A. Br., *Polygonum tomentosum* Willd., *Prosopis farcata* (Banks & Soland.) Eig, **Pulicaria vulgaris* Gaertn., *Scutellaria galericulata* L. var. *pubescens* Benth., *Stachys longespicata* Boiss. & Kotschy, *Vallisneria spiralis* L., **Veronica Beccabunga* L.

From the ecological point of view, the distribution of the consocies in the swamp is normal in character and shows a seral succession similar to other reed swamps. In the lake, the distribution of the plant communities seems to obey some governing factors inherent to the lake. Probably the rate of silt deposit and the nature of the silt in the different areas of the lake are in the main responsible. The excessive growth of the plants is no doubt due to the sufficiency of salts and organic material and to the moderate to high temperatures, all of which would induce vegetative growth.

Opportunity may here be taken to express our thanks to those who assisted the Expedition in many valuable ways. We are indebted to the Trustees of the Percy Sladen Memorial Fund for financing the Expedition and to Dr. and Mrs. Mer, of the Malaria Research Station, Rosh Pinna, for the many kindnesses

they showed while the Expedition was in Palestine. Our thanks are also due to Professor Bodenheimer and his staff at the Hebrew University at Jerusalem for the interest shown in the work of the Expedition ; we also express our indebtedness to the late Dr. Eig of that University for permission to use and assistance in the University Herbarium, where many of the specimens were provisionally identified, although the responsibility for the final naming of the specimens rests entirely with the staff in the Botany Department of the British Museum, to whom our appreciation is now shown. Our thanks are also due to Professor W. Stiles, F.R.S., and to Professor H. Munro Fox, F.R.S., for giving us leave of absence from Birmingham University and for much help in other ways. Professor J. Stanley Gardiner, F.R.S., gave much valued advice to the Expedition, as did many others ; in particular we may mention Dr. J. Ramsbottom, O.B.E., Dr. G. S. Carter, Professor P. A. Buxton, and Professor W. H. Pearsall. We further acknowledge the loan of apparatus from the Zoological Department, Cambridge, and the Departments of Botany and Zoology, Birmingham University ; the John Murray Expedition and the Trustees of the British Museum (Natural History). In conclusion we wish to thank all those, in Palestine and at home, who freely assisted us in a variety of ways.

List of References.

Bodenheimer, F. S. 1935. ' Animal Life in Palestine.' Jerusalem.
Eig, A. 1932. ' Les elements et les groupes phytogeographique auxiliares dans la flore palestinienne.' Berlin.
Jones, R. F. 1940. " Report of the Percy Sladen Expedition to Lake Huleh ; The Plant Ecology of the District." Journ. Ecol. xxviii. 357–376.
MacGregor, H. G. 1886. ' The " Rob Roy " on the Jordan.' London.
Post, G. E. 1932–33. ' Flora of Syria, Palestine, and Sinai.' (Revised by Dinsmore, J.) Beirut.
Tristram, H. B. 1884. ' Fauna and Flora of Palestine.' London.
Washbourn, R., & Jones, R. F. 1936. " The Percy Sladen Expedition to Lake Huleh." ' Nature,' London, cxxxvii. 852.
—— ——. 1938. " Report of the Percy Sladen Expedition to Lake Huleh." Ann. & Mag. Nat. Hist. (2) ii. 517.

BIBLIOGRAPHICAL NOTES.

CXI. Franchet and Savatier's ' Enumeratio Plantarum in Japonia Sponte Crescentium.'

By William T. Stearn

(Lindley Library, Royal Horticultural Society, Westimnster).

Sooner or later all students of Japanese plants have to consult the ' Enumeratio Plantarum in Japonia sponte crescentium ' (2 vols., 8vo ; Paris, 1873–79) by Adrien Franchet

(1834–1900) and Paul Amédée Ludovic SAVATIER (1830–91). It enumerates all the plants known from Japan at the time of preparation, determines the scientific names of those plants figured in the three most famous Japanese botanical iconographies —Iwasaki, *Honzô Zufu* [*Phonzo Zoufou*] (1828); Iinuma, *Sômoku Dzusetsu* [*Sô mokou Zoussetz*] (1856); Shimada, alias Yonan Si, *Ka i* [*Kwa-wi*] (1759)—describes many new species and gives keys to the species of many genera. Moreover, the 'Avant-propos' contains a short history of the progress of botany in Japan, and the appendix a bibliography of works and papers on the Japanese flora. It was published in five parts, as follows:—

VOLUME I (Dicotyledones).

Pars 1, pp. i–xv, 1–192, publ. 4 November 1873, noted in Bibl. France, lxii. 601 (15 Nov. 1873), Bull. Soc. Bot. France, xx. Bibl. 187 (Nov.-Dec. 1873), Journ. Bot. xii. 32 (Jan. 1874), Bot. Zeit. xxxii. 112 (Feb. 1874).

Pars 2, pp. 193–486, publ. 1875 (probably October), noted in Journ. Bot. xiii. 351 (Nov. 1875), Bot. Zeit. xxxiii. 815 (Dec. 1875).

VOLUME II (Monocotyledones, etc.).

Pars 1, pp. 1–256, publ. Jan. 1877, noted in Journ. Bot. xv. 63 (Feb. 1877), Bull. Soc. Bot. Belg. xv. 619 (June 1877), Bot. Zeit. xxxv. 568 (Aug. 1877), xxxvi. 443 (July 1878).

Pars 2, pp. 257–624, publ. 1878 (thus dated) or 1879.

Pars 3, pp. 625–789, publ. 26 April 1879, noted in Bibl. France (3) xxiii. 290 (10 May 1879), Journ. Bot. xvii. 159 (May 1879), Friedländer, Nat. Nov. i. 140 (June 1879), Bot. Zeit. xxxvii. 376 (June 1879), Bull. Soc. Bot. France xxvi. Bibl. 1–3 (Jan.–June 1879).

The Botanisches Museum, Berlin-Dahlem, possesses a copy of volume II. with the original wrappers preserved and their contents noted; details of these, courteously supplied by Professor Ludwig Diels, are given above.

Franchet and Savatier's work was by no means the first enumeration of the plants of Japan. For a bibliographical note on F. P. von Siebold and J. G. Zuccarini, 'Flora Japonica' (1835–70) see Tucker in Journ. Arnold Arb. ii. 237–39 (1921), T. Nakai in Bot. Mag. Tokyo, xl. 362 (1926), and for a bibliographical note on F. A. W. Miquel, 'Prolusio Florae Japonicae' (1866–67) and 'Annales Musei Lugduno-Batavorum' (1863–69) see T. Nakai in Journ. Arnold Arb. vi. 211–13 (1925), Bot. Mag. Tokyo, xl. 364–5 (1926).

There is a biography of Franchet in Bull. Soc. Bot. France, xlvii. 158–172 (1900) and of Savatier in Kew Bull. 1909, 148–150.

SHORT NOTE.

JERUSALEM ARTICHOKE.—The common English name for *Helianthus tuberosus* has puzzled many when they realized that the plant, like the potato and maize, came to us from America. "Why 'Jerusalem' Artichoke?" In an article with this title in the 'Journal of the Royal Horticultural Society' (lxv. 338–48, 376–83 (1940)) R. N. Salaman gives a full and interesting account of the introduction of the plant into Europe and of its history. The first notice of *Helianthus tuberosus* in this country was in the 1622 edition of 'Via recta ad vitam longam,' by Dr. Venner of Bath, who calls it "Artichokes of Jerusalem"; J. E. Smith accounted for the name as being a corruption of the Italian *Girasole articiocco*, sun-flower artichoke, and in this was generally followed until 1918, when Vicary Gibbs expressed his profound disbelief in this derivation, in which he was strongly supported by C. C. Lacaita. Dr. Salaman discusses the question thoroughly, and states that "there appears to be no evidence, whether sought among specialist botanical sources or from the common language of the day, that the word Girasole was used . . . in Italy or elsewhere either for our Sunflower, *H. annuus*, or for the Jerusalem Artichoke *H. tuberosus*." Whence does the "Jerusalem" come?

Petrus Hondius, a famous gardener of Ter Neusen, planted a tuber in 1613, and got a good crop, as we learn from the 1618 edition of Dodœns, 'Cruydt Boeck.' It was freely distributed both in the Lowlands and abroad, and Sir David Prain suggests that tubers reached London by the regular service of the Dutch barges, which sailed up to the Custom House Wharf. "Here they would be bought by the hawkers of the town, who, after an initial effort to cry their wares as Artichokes van Ter Neusen, quickly metamorphosed it into Artichokes of Jerusalem—Jerusalem Artichokes"—an interesting suggestion which Dr. Salaman adopts. It is a strange coincidence that the name Topinanbour in common use in France, Germany, and frequently in Italy has an equally misleading geographical association, originating as a name transference.

REVIEW.

A Manual of Aquatic Plants. By NORMAN C. FASSETT. Pp. i–viii+1–382, and numerous black-and-white illustrations. New York & London, 1940. (McGraw-Hill Publishing Company, Ltd., Aldwych House, London, W.C. 2.) Price 26*s*.

This book will be welcomed by all students of aquatic plants. To identify such plants is notoriously difficult; and the attempt usually involves the consulting of literature scattered in various monographs and local floras, often without adequate keys.

Here is a systematic work devoted to aquatics, which, though it deals only with those found in a restricted region of North America (from Minnesota to Missouri and eastwards to the Gulf of St. Lawrence and Virginia), includes so many plants known on this side of the Atlantic that it cannot fail to interest Old World botanists as well as their American colleagues.

The book is more comprehensive than might be expected, for Professor Fassett has not confined its scope to aquatic plants in the strictest sense, but has included any plant "that may, under normal conditions, germinate and grow with at least its base in the water and is large enough to be seen with the naked eye." It is obviously difficult to define exactly what is meant by an aquatic plant, for, as the author points out, under some conditions almost any plant may be found in the water. So he frankly admits that his list of species is highly subjective, the goal being to treat such plants as the aquatic biologist will be likely to find.

The body of the book takes the form of descriptive keys, designed for the identification of the plants, whether flowering or sterile, and very copiously illustrated with black-and-white figures accompanied by a few photographs. In fact the text, as stated by the author, is essentially a set of directions for looking at the pictures. The keys to Algae, Mosses, and Liverworts (contributed by Dr. Pauline Snure) go only as far as genera; but those to the Pteridophytes and Flowering Plants take the student down to species and even to subdivisions of species. A summary of the geographical distribution, often accompanied by notes on the habitat, is given for each plant.

An unusually interesting feature of the book is an appendix dealing with the use of aquatic plants by birds and mammals, and with the relation of plants to fish, compiled from a great variety of publications. These are listed in two numbered bibliographies, and each statement in the appendix is referred to the appropriate publication. A glossary and an index complete the work.

It is difficult to criticize such a novel, and indeed brave, piece of work as Professor Fassett's book. The keys, no doubt, are not perfect (how many keys are ?), and perhaps should not be relied on for the identification of plants growing under unusual water-conditions; but it is certain that they will prove of immense assistance in the working out of aquatic plants. Most of the figures are excellent, and nearly all are adequate. The only exceptions which I feel constrained to point out are the two figures intended to illustrate *Potamogeton zosteriformis*, which quite fail to show the most characteristic feature of this species—the numerous fine sclerenchymatous nerves of the leaves, mentioned in the key but absent from the figures.

Professor Fassett is to be congratulated on the production of this book.

J. E. DANDY.

BOOK-NOTES, NEWS, ETC.

MR. FRANCIS DRUCE.—At the Special General Meeting of the Linnean Society of London, November 7th, 1940, Mr. J. Ramsbottom gave the following appreciation of the services of Mr. Francis Druce, the resigning Treasurer:

As the one who has been longest associated with Mr. Francis Druce on the Council it is perhaps appropriate that I should speak of his great services to our Society.

Every Fellow who attends our Meetings knows our Treasurer for his quiet demeanour, and how he has somehow always contrived to be the least conspicuous amongst those sitting on high. He has certainly hidden his scientific attainments during our Proceedings, but botanists know of his extended journeys in the British Isles in search of rare plants, journeys, I might add, by which the National collections have greatly benefited; and his botanical library was the subject of a special article in the 'Times Literary Supplement' a short time ago.

As Treasurer of the Society since 1931 he has looked after our financial affairs with care and skill, ever ready to explain why he proposed certain steps and always glad to answer questions put to him by members of Council, or at our Annual Meetings. Our balance sheets, year after year, are sufficient testimony to his success in keeping the finances of the Society sound when some of us perhaps were inclined to live dangerously.

But there is something I must add, for it is not commonly known even in Council. It was not long after Mr. Druce's election as Treasurer that his fellow officers began to appreciate the wisdom of their colleague in all matters of procedure, and to discuss points with him before bringing them before Council. Speaking for myself I should have found it far more difficult at times, and particularly during the worries of the last three years, if I had not always had my friend Druce at hand ready with sage advice. No one could have been more zealous of the dignity of The Linnean Society of London. We owe him a deep debt of gratitude not only for so skilfully managing our finances, but also for his wise counsel, and we do not forget his generosity, for he made possible the hospitality which we were able to extend to our guests at our 150th Anniversary celebrations.

A question I have been asked repeatedly during the last few days has been, "What has happened to Druce"? I think what has happened, if he were to admit it, is the fulfilment of a dream of his boyhood. The name of Druce for well over a century has been associated in the City with the Worshipful Company of Innholders, one of the City of London Guilds which are world-famous for their work and for their history. Francis Druce has been elected Master of the Innholders, a high honour indeed, for it is not lightly bestowed. We all heartily congratulate him and wish him success in his new office with the hope that the cares consequent upon the unwelcome attentions that London

is receiving from above will remain merely anxieties. We thank our Treasurer for his services and we wish him well.

Peziza cerea on sand-bags.—In the 'Journal' (p. 152) I recorded the occurrence of quantities of *Peziza repanda* on sand-bags in the London area. Mr. G. J. Cooke later sent me specimens of *Peziza cerea* which he and Mr. A. I. Ellis had found "growing in large masses" on two lots of sand-bags at Norwich—a fungus of somewhat similar appearance to *P. repanda* but much more fragile.

I have also noted *P. cerea* on sand-bags at Turnham Green and Slough. The only other fungus I have seen, so far, is *Hypholoma fasciculare* which was on bags at Richmond, Surrey.

P. cerea was originally figured by Sowerby from specimens growing on tan, but is usually found on the ground amongst leaves in woods. Three years ago a cluster of fruit-bodies of this fungus appeared on the colour-washed damp wall of an outhouse at Richmond.

It is worth recording that in London sand-bags have already become rare, most of the bags having rotted and been replaced by other more permanent protective structures. Even when filled with fresh sea-sand jute bags, if untreated, rot within a year, as may be seen at many of our seaside towns, *e. g.*, Bournemouth.

J. Ramsbottom.

The British Mycological Society has in preparation a series of lists of British fungi. The first of these, "List of Pyrenomycetes recorded for Britain," by G. R. Bisby and E. W. Mason, appears in 'Transactions British Mycological Society,' xxiv. pt. 2. There are 1423 entries. The classification adopted is, on the whole, that of Saccardo, which makes it convenient to consult. References are given to the original British record and to British descriptions and illustrations and any special point of interest. The list, and its successors, should prove most useful.

This part of the 'Transactions' also includes E. W. Mason's Presidential Address "On Specimens, Species and Names." The other papers are:—"The British Species of *Puccinia* included under '*P. Syngenesiarum*,' with Notes upon the British Rust Fungi occurring on Thistles," by M. Wilson, "A *Phytophthora* Blight of Bulbous Iris," by G. W. Gibson and P. H. Gregory, and "Two Diseases of Grasses caused by Species of *Helminthosporium* not previously recorded in Britain," by K. Sampson and J. H. Western.

British Mycological Society.—The postponed Annual Meeting was held in the rooms of the Linnean Society on Saturday, December 14th, when the President, Dr. H. Wormald, gave an Address "On recent research on diseases of fruit-trees and bushes in Britain."

Mr. W. C. Moore was elected President of the Society for the session 1941.

Mr. I. M. Lamb has returned to the Department of Botany after duty with the Children's Overseas Reception Board.

INDEX.

For Classified Articles, see—Obituaries; Reviews. New genera, species, varieties, and names are distinguished by an asterisk.

Unsigned Reviews and Notes are by the Editor.

PRINTED BY TAYLOR AND FRANCIS, RED LION COURT, FLEET STREET, E.C. 4.