THE

JOURNAL OF BOTANY

BRITISH AND FOREIGN.

EDITED BY

JAMES BRITTEN, K.S.G., F.L.S.

VOL. XLII.

ILLUSTRATED WITH PLATES AND CUTS

LONDON:
WEST, NEWMAN & CO., 54, HATTON GARDEN.
1904.

LONDON :

WEST, NEWMAN AND CO., PRINTERS,

HATTON GARDEN, E.C.

CONTRIBUTORS

TO THE PRESENT VOLUME.

J. Adams, M.A.
Eleanora Armitage.
J. E. Bagnall, A.L.S.
E. G. Baker, F.L.S.
J. G. Baker, F.R.S.
Arthur Bennett, F.L.S.
Spencer H. Bickham, F.L.S.
G. S. Boulger, F.L.S.
James Britten, F.L.S.
C. E. Britton.
Ll. J. Cocks.
H. N. Dixon, M.A., F.L.S.
G. C. Druce, M.A., F.L.S.
G. F. Scott Elliot, M.A., F.L.S.
William Fowler, M.A.
F. E. Fritsch, B.Sc.
F. N. A. Garry, M.A.
Antony Gepp, M.A., F.L.S.
Ethel S. Gepp.
E. G. Gilbert, M.D.
E. S. Gregory.
Percy Groom, M.A., F.L.S.
Henry Groves, F.L.S.
James Groves, F.L.S.
W. H. Hammond.
W. P. Hiern, M.A., F.R.S.
E. M. Holmes, F.L.S.
A. R. Horwood.
A. B. Jackson.
B. Daydon Jackson, Sec.L.S.
J. R. Jackson, A.L.S.
D. A. Jones, F.L.S.
Otto Kuntze.
H. W. Lett, M.A.
Augustin Ley, M.A.
E. F. Linton, M.A.
Arthur Lister, F.R.S.
Gulielma Lister.
Symers M. Macvicar.
E. S. Marshall, M.A., F.L.S.
J. Cosmo Melvill, M.A., F.L.S.
Spencer le M. Moore, F.L.S.
G. R. M. Murray, F.R.S.
P. Olsson-Seffer.
W. H. Painter.
W. H. Pearson.
Tom von Post.
R. Ll. Praeger, B.A.
H. W. Pugsley, B.A.
R. F. Rand, M.D., F.L.S.
A. B. Rendle, D.Sc., F.L.S.
H. J. Riddelsdell, M.A.
W. Moyle Rogers, F.L.S.
C. E. Salmon, F.L.S.
E. S. Salmon, F.L.S.
W. A. Shoolbred, F.L.S.
Annie L. Smith.
H. S. Thompson, F.L.S.
F. Townsend, M.A., F.L.S.
G. R. Ward.
G. S. West, M.A., F.L.S.
J. A. Wheldon, F.L.S.
J. W. White, F.L.S.
W. Whitwell, F.L.S.
W. H. Wilkinson, F.L.S.
F. N. Williams, F.L.S.
Albert Wilson, F.L.S.
E. A. Woodruffe-Peacock.

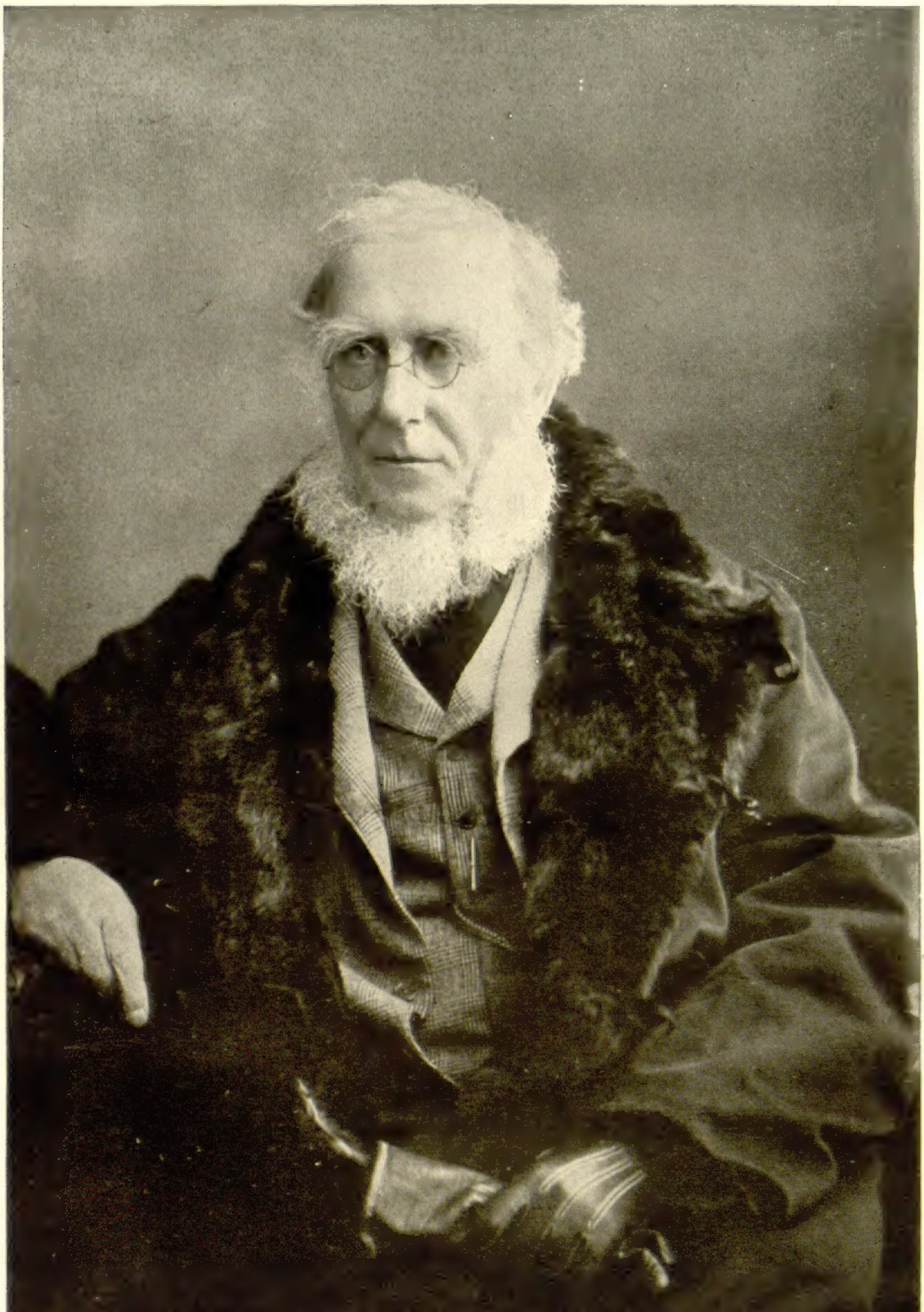
Directions to Binder.

Tab.	456	to face page 33
,,	457	,, 65
,,	458	,, 97
,,	459	,, 129
,,	460	,, 161
,,	461	,, 193
,,	462	,, 217
,,	463	,, 249
,,	464	,, 281
,,	465	,, 321
,,	466	,, 361
,,	467	,, 363
Portrait of Rev. W. H. Purchas		,, 80
,,	Sir Joseph Hooker	*Frontispiece.*

Or all the Plates may be placed together at the end of the volume.

The Supplement ('Notes on the Drawings for *English Botany*') should be placed separately at the end of the volume.

This is bound separately and catalogued under F.N.A. Garry.



Sir Joseph Dalton Hooker.

THE

JOURNAL OF BOTANY

BRITISH AND FOREIGN.

R. BROWN'S LIST OF MADEIRA PLANTS.

By James Britten, F.L.S.

The first published list of Madeira plants appears to be the "Verzeichniss der auf Madeira wildwachsenden Pflanzen" given in Leopold von Buch's *Physicalische Beschreibung der Canarischen Inseln* (1825), pp. 189–199. This is usually quoted as of that author—*e.g.* in De Candolle's *Prodromus*, the *Index Kewensis*, and, which is more remarkable, in Lowe's *Flora of Madeira*, although the last-named author ascribes many of the novelties to Solander. There can, however, be no doubt that the author of the list, and consequently the authority for the names first printed therein, is Robert Brown; von Buch prints at the head of it the following note:—"Dieses Verzeichniss ist schon vor vielen Jahren, von Robert Brown aus Masson's Journal, den Londner Herbarien und aus einige Tage eigener Anzicht, zusammengetragen und mir gütigst mitgetheilt worden." It would seem that von Buch became acquainted with Brown's work after the reading of his paper on Canary Island plants in November, 1817; for when the paper was published in 1819 in *Abhandlungen Akad. Berlin*, 1816–17, he added a "Nachtrag" of eighteen species on the authority of Brown.

The omission of the list from the "Collected Works of Robert Brown" is difficult to understand. Mr. Lowe's acknowledgment of indebtedness both to Brown and Bennett, and the intimate relations existing between the two last-named, as well as Bennett's intimate knowledge of what was contained in the Department of Botany and his well-known carefulness as a bibliographer, all combine to make explanation difficult: the fact, however, remains that no reference to the Madeiran list is to be found in the "Collected Works."

Brown's MS., from which the published list is taken, is in the Department of Botany of the British Museum; it contains an enumeration of "about 600 species," and corresponds in the main with that printed by Buch, which includes 409; the difference in number being largely accounted for by the inclusion in Brown's MS. of cultivated plants.

Banks and Solander were in Madeira Sept. 13–18, 1768; a

transcript of the MS. list of the plants collected by them is appended to the MS. copy of Banks's Journal preserved in the Department of Botany, but was not printed by Sir Joseph Hooker in his edition of the Journal—a wise omission, as it contains a large number of unpublished names. This list contains 329 plants, often with their native names, many of them cultivated; it was probably added to the Journal at a later date. A still earlier list, in Banks's hand, is preserved in the Department; it forms one of the "Catalogues of the plants of Cook's First Voyage in the order in which they were loosely placed in the drying books in which they were brought home." In this is indicated the number of specimens collected of each, the number of species being 255. In it are many MS. names, which were continued through the later list into the MS. lists of Masson and Brown, and in many cases were published by the last-named in the list in Buch's work. Although originated by Banks, in whose first MS. they appear—or perhaps more accurately by Banks and Solander—they must, so far as published in Buch, be quoted as of Brown, who is responsible for their publication and for such descriptions as are given. These lists formed the basis of the folio MS. in Solander's hand, preserved in the Department of Botany, entitled "Primitiæ Floræ Maderensis, sive Catalogus Plantarum in Insula Madera A.C. MDCCLXVIII diebus 13–18 Septembris collectarum." This is an extremely careful piece of work, which it is to be regretted was not published; it contains descriptions of new species, critical notes, native names, &c.

Francis Masson went to Madeira first in 1776, leaving England on the 9th of May. He sent his first instalment of plants to Banks in July, and a list of these—sixty in number—in Solander's hand is in the Department of Botany. Of this a copy was sent to Masson, who acknowledged it in a letter dated Feb. 4, 1777, with comments showing considerable botanical acumen. On May 27 of that year, Masson sent Banks 123 species, and also his "own herbarium," containing "about 444 folios and upwards of 400 different species, which I take the liberty to recommend to your care until I return, with power to open, examine, and describe any plants that may not be in your collection."* He continues: "My friends no doubt will be surprized at my long stay in Madeira; but I hope you will easily conceive the reason. During my stay here I have had two opportunities to the Canaries, but they happening too early I had not half compleated my Madeira collection, which I thought would be a great pity to neglect, as I have great doubts of being able to investigate either the Canaries or Azores with that accuracy as Madeira: owing to the good disposition of the Governour, and the genteel society of English Gentlemen who reside here."

In August of the same year Masson sent "a few plants" to Linnæus, among them the plant described from his specimens (Linn. f. Suppl. 141) as *Campanula aurea*. Masson, in the letter †

---

* I have never been able to discover what became of Masson's herbarium; his plants are of course well represented in the Banksian collection, but he evidently had a herbarium of his own.

† Correspondence of Linnæus, ii. 562.

announcing the sending of the plants, said that he thought this "a new genus, but this matter I must submit to your better judgment"; subsequent authors, however, have confirmed Masson's view, and the plant is now known as *Musschia aurea*. Other plants described by the younger Linnæus in the *Supplementum* from specimens sent by Masson are *Sida carpinifolia*, *Campanula* (*Wahlenbergia*) *lobelioides*, *Sonchus fruticosus*, *Carthamus* (*Carlina*) *salicifolius*, *Echium candicans*, and *Digitalis Sceptrum*; it would appear from a letter of Masson to the younger Linnæus that the latter was at first inclined to refer these to *E. argenteum* and *D. canariense*, but that Masson maintained their distinctness from these species.

Masson left Madeira for the West Indies in October, 1778, returning to England in 1781; in 1783 he went to Portugal, and thence to Madeira, returning home in 1785. We have in the Department of Botany a MS. list in Dryander's hand, with notes by Solander, lettered "Massonii Flora Maderensis"; this is probably a transcript from a MS. by Masson; in it the species supposed to be new are indicated by an asterisk: a number of the plants are localized and have vernacular names. This is the basis of Brown's list in Buch's work, which includes his own gatherings in the island on Aug. 4–7, 1802.

It seems somewhat strange that Lowe, to whose constant consultation of the Banksian collections much of the elucidation of the plants mentioned by Buch is due, should have given no account of them in the introductory portion of his *Flora of Madeira*. The preliminary "notice" of two pages was, however, probably intended to be merely temporary; had the author lived to complete his work, we should doubtless have had a more sufficient introduction. In the preface to his *Primitiæ Floræ Maderæ* (1831), he thus refers to these sources of information: "Cl. Rob. Brown, adjuvante J. I. Bennett armº, summâ humanitate ac benevolentiâ, plantarum Maderensium à Masson aliisque lectarum, in Herbario Banksiano conservatarum, necnon manuscriptorum ipsius Solandri, copiam fecit."

Besides the specimens and lists, we have a volume of twenty-two drawings by Sydney Parkinson, who accompanied Banks and Solander, some of which were engraved although not published. The following is a list of them; those engraved are indicated by an asterisk:—

Ilex Perado Ait.
,, Azevinho Sol. (canariensis Poir.).
*Lotus glaucus Ait.
Eugenia Jambos L.
,, uniflora L.
*Lythrum Græfferi Ten.
*Helichrysum obconicum, DC.
*Clethra arborea Ait.
*Ardisia excelsa Ait.
Diospyros Lotus L.
*Convolvulus althæoides β virescens Lowe.
*Linaria laniflora Desf.
*Sibthorpia peregrina L.
*Globularia salicina Lam.
Lavandula pinnata L. f.
*Ocotea fœtens Nees.
Smilax pendulina Lowe.
Caladium picturatum C. Koch & Bouché.
Briza minor L.
Pteris arguta Ait.
Polypodium Thelypteris.
*Asplenium monanthos.

It may be added that in the Banksian Herbarium we have early Madeiran specimens from an anonymous collector in 1763, from Downe (1776), and Robins (1774)—collectors of whom I know nothing further.

In the course of going through the National Herbarium with the view of identifying the plants collected by Banks and Solander, I observed that a considerable number of the names in Buch's (*i. e.* Brown's) list are therein misapplied, and that others, which have dropped out of notice or have been ranked as synonyms, ought to be retained. It seemed to me that in view of this being the earliest published attempt at a Madeiran Flora, it might be worth while to reprint the list, with modern identifications and such notes as have resulted from my investigation. The names in small capitals and the localities and notes which occasionally follow them are transcribed from Buch's list; my identifications and notes follow them, in square brackets.* I have rearranged the sequence of orders in accordance with Bentham and Hooker's *Genera Plantarum;* but in other respects the list is an exact transcript.

The names to which no synonymy is attached are those which are generally retained: I have not thought it necessary to add the authority for these, and have not corrected the occasional errors in spelling. Many of them represent the types from which the descriptions in Aiton's *Hortus Kewensis* were drawn up.

DELPHINIUM CONSOLIDA.

NIGELLA DAMASCENA.

RANUNCULUS REPENS.

R. ARCTICUS [a misprint for *creticus*. "In sylvis umbrosis Ribeira fria, fol. radical. reniform. crenatis sublobatis, caul. 3 part. lanceol." [Brown's short diagnosis shows that he differentiated this plant from the true *creticus* of Linnæus. Lowe first distinguished it specifically as *R. grandifolius* in his *Primitiæ* (p. 38), but subsequently (*Prim. App.* v.) restored it to *creticus*. In 1857 he published, in *Hook. Journ. Bot.* ix. 65–74, an elaborate paper on the plant and its allies, and restored the name *grandifolius:* this, however, had been published earlier by C. A. Meyer for a Siberian plant, and Steudel had on this account substituted *megaphyllus* for Lowe's *grandifolius*. Lowe (*l. c.* 74) says that the question of priority between the two plants called *grandifolius* "cannot well be settled," as both date from 1830; but this can hardly be the case, as Lowe's paper was not read until Nov. 15 of that year, and was not published until 1831. Lowe prefers to retain his own name, and suggests *R. Meyeri* for Meyer's plant: this is not entered in the Kew Index. The synonymy is :—

R. MEGAPHYLLUS Steud. Nomencl. ii. 434 (1841).

R. creticus (sphalm. *arcticus*) Br. in Buch Canar. Ins. 195 (1825); Lowe, Prim. ed. 2, App. v. (1851), non Linn.

---

* A considerable number of the names are omitted from the *Index Kewensis*, although so far as they are taken up and identified by Lowe in his *Flora* they should appear there. I have not thought it necessary to specify these in each case; they will be readily apparent if the list be compared with the *Index*.

R. grandifolius Lowe, Primit. 38 (1831) & in Hook. Journ. Bot. ix. 70 (1851) ; Fl. Mad.; 3 (1857), non C. A. Meyer.
R. cortusæfolius Hook. Bot. Mag. t. 4625 et descr. partim, non Willd.]

CHELIDONIUM MAIUS.

FUMARIA OFFICINALIS [F. *muralis* Sond. *α vulgaris* Lowe].

MYAGRUM PERENNE [*Rapistrum rugosum* DC. See Lowe, Fl. Mad. i. 38. This name, like many others in the list, is not cited in *Ind. Kew.*]

M. SCABROSUM [*Crambe fruticosa* L. fil. See Lowe, Fl. Mad. i. 39, where *M. scabridum* Sol. in Herb. Banks is rightly cited as a synonym.]

LEPIDIUM VIRGINICUM.

COCHLEARIA CORONOPIFOLIA [a slip for *C. Coronopus* = *Coronopus Ruellii* All. (1785), *C. procumbens* Gilib. (1781).]

IBERIS NUDICAULIS [*Teesdalia nudicaulis* Br.]

SISYMBRIUM NASTURTIUM [*Roripa Nasturtium* Beck. Fl. Nieder-Osterr. 463 (1892).]

ERYSIMUM OFFICINALE [*Sisymbrium officinale* Scop.]

CHEIRANTHUS LITTOREUS [Lowe (Fl. Mad. i. 28) identifies this with his *Mathiola maderensis;* I find no Madeiran plant bearing the name in the Herbarium. *C. littoreus* (*Malcomia littorea* Br.) is not recorded as a Madeiran plant.]

C. ARGUTUS. [This was the name employed by Solander when first describing the plant for the *Hortus Kewensis*, in which, on publication, the name *C. mutabilis* L'Hérit. (Stirp. Nov. p. 92) was adopted.]

C. DENTATUS. [This, as Lowe says (Fl. Mad, i. 28), is merely a more hoary narrower-leaved form of *C. mutabilis*.]

C. TENUIFOLIUS. [This name was adopted by L'Héritier (*l. c.*) from the Banksian Herbarium, where he was working in 1786–7: both this and *C. mutabilis* are established on Masson's specimens.]

HESPERIS DIFFUSA. [This and SINAPIS FRUTESCENS = *Sinapodendron frutescens* Lowe (*Sinapis frutescens* Ait. Hort. Kew. ii. 404); the sheets in Herb. Banks. bear both the names in Brown's list.]

ARABIS ALPINA [*A. albida* Stev.]

BRASSICA MURALIS. [This is in Brown's and Masson's MS. lists, but I find no specimen, nor does Lowe recognize it as a Madeiran plant.]

B. FRUTESCENS [*Sinapodendron salicifolium* Lowe, Prim. 37 (1831) (*S. angustifolium* Lowe, Fl. Mad. 30 (1857); *Sinapis angustifolia* DC. Syst. ii. 624 (1821)). If, as seems probable, Lowe's genus *Sinapodendron* consists of one variable species, the name for the segregate under *Brassica* will be *B. frutescens* Sol. ex DC. Syst. ii. 624.]

SINAPIS FRUTESCENS [see above under *Hesperis*.]

S. INCANA Mass. [This appears in Brown's MS. as "S. incana L. ?" : the name is not in Masson's list. The reference is, I think, to a specimen of *S. frutescens* grown at Kew in 1778 from Madeiran seeds, in which Solander has noted "Sinapis ? incana ? cp. specimen Masson." Lowe (Fl. Mad. 27) considers *Brassica nigra* as "undoubtedly the plant intended by Von Buch and others in their lists of Mad. plants under the name of *S. incana* L." But it will be observed that in Buch's list it stands as "S. incana Mass.," and I find no Madeiran specimen of *B. nigra* collected by him.]

Bunias Cakile. Porto Santo [*Cakile maritima* Scop.]
Isatis tinctoria [*I. præcox* Kit.]
Reseda Luteola.
Cistus monspeliensis. Juxta templum S. Antonio.
Viola odorata.
Frankenia lævis.
Sagina procumbens.
Alsine media [*Stellaria media* With.]
Dianthus prolifer.
Cucubalus Behen [*Silene inflata* Sm.]
Silene gallica.
S. inaperta.
Stellaria graminea. ["A bad but undoubted Madeiran specimen of [*S. uliginosa*] in the B[anksian] H[erbarium], marked '*S. graminea* L.?' has doubtless occasioned the insertion of *S. graminea* as well as of *S. uliginosa* in Von Buch's list of Mad. plants. The true *S. graminea* L. is certainly not found in the Madeiran islands."—Lowe, Fl. Mad. 60.]
Cerastium viscosum [*C. glomeratum* Thuill.]
Portulaca oleracea.
Hypericum erectum [*H. grandifolium* Chois. The name *erectum*—a misprint for "*evectum*," as is clear from Banks's and Brown's MSS.—is taken up by Webb and Berthellot (Phyt. Can. i. 51), where it is erroneously cited as of "Masson in Herb. Banks, 1768." The 1768 specimens were collected by Banks and Solander, the former of whom has written "Hypericum evectum" on the sheet; Masson's specimens, on the same sheet, are dated 1777.]
H. floribundum.
H. perforatum.
H. humifusum.
H. angustifolium [*H. linarifolium* Vahl. The name *angustifolium* was published by Lowe (Prim. 35), who subsequently (Fl. Mad. i. 78) reduced it to *linarifolium*. In the *Index Kewensis* it is erroneously referred to *perforatum*.]
H. montanum. [A correlation of the MS. lists of Brown and Masson shows that "*H. ovatum*" of the latter (which Lowe thought might be *quadrangulum*) = *montanum* Br. = *perfoliatum* L.]
H. glandulosum.
Sida rhombifolia.
S. carpinifolia (canariensis). [This species (published in Linn. f. Suppl. 307 (1781)) was established on a plant collected by Masson "in Madera in Horto Monasterii Sti Francisci."]
Malva rotundifolia; M. mauritanica. [Both are *M. mauritanica* L.; see note on the specimens in Lowe, Fl. Mad. 67.]
Linum perenne [*L. angustifolium* Huds.]
L. gallicum.
Impatiens Balsamina.
Erodium cicutarium.
E. malacoides. ["Of two specimens in the Banksian Herbarium on the same sheet, marked '*Erodium malacoides—Ger. malacoides* L.—Madeira, Fr. Masson,' the smaller may possibly be rightly so called, but the larger is certainly *E. chium* L." Lowe, Fl. Mad. 93.]

GERANIUM STRIGOSUM [*Erodium Botrys* L.]

G. LÆVIGATUM [*G. anemonæfolium* L'Hér. Geran. t. 36. I think the "*G. lævigatum* Burm. ex L'Hér. MSS." of DC. Prodr. i. 640, refers to Masson's specimens named *lævigatum* in Herb. Banks, and that "Burm." is wrongly transcribed for "Banks." I can find no reference to the name in Burman, but L'Héritier went through Banks's *Geraniaceæ*, many of which are types of his species, and have his names attached in his handwriting.]

G. ROBERTIANUM.

G. DISSECTUM.

G. ROTUNDIFOLIUM "var. fol. profundius incisis, laciniis angustioribus." [Lowe retains this under *G. rotundifolium*, but the specimen seems to be a young plant of *G. dissectum*.]

OXALIS CORNICULATA.

RUTA GRAVEOLENS [*R. glandulosa* DC.]

ILEX PERADO Ait.

I. ÆSTIVALIS Lam. "an eadem?" [*I. canariensis* Poir, *I. Azevinho* Sol. ! MSS. and in Lowe, Fl. Mad. ii. 12—a name not taken up in the *Index Kewensis*, which does not seem to include the second volume (of which only one part was published) of Lowe's work.]

CELASTRUS UMBELLATUS. "Inermis. Foliis elypticis, serrato denticulatis laevibus, pedunculis subumbellatis unifloris." [*Gymnosporia Dryandri* Masferrer in Anal. Soc. Esp. Hist. Nat. x. 176 (*Catha Dryandri* Lowe ! cfr. Fl. Mad. i. 109).]

RHAMNUS GLANDULOSUS. [The description in Ait. Hort. Kew. i. 265, was drawn up from Masson's specimens.]

RHUS CORIARIA.

SPARTIUM VIRGATUM [*Genista virgata* DC.]

S. SCOPARIUM [*Cytisus scoparius* Link.]

GENISTA CANARIENSIS. "In sylvis 20 pedalis" [*G. maderensis* Webb.]

LATHYRUS APHACA. "In sylvis prope villam."

L. SATIVUS.

L. ANNUUS.

L. CLYMENUM.

VICIA GRACILIS [*Ervum pubescens* DC. *β glabrescens* Lowe (as to Banks and Solander's specimen), and *V. albicans* Lowe, Prim. 33 (as to Masson's specimen); see Lowe, Fl. Mad. pp. 196, 200–1. Masson's plant is the type of *V. micrantha* Lowe, Prim. 33, and was subsequently united by him with *V. albicans* (see Prim. App. iv. v.): it is the *V. Loweana* Steud. Nomencl., a name retained by error in *Index Kewensis*, where *V. albicans* is given as = *atropurpurea* Desf.]

V. LUTEA.

ERVUM TETRASPERMUM [*Vicia gemella* Crantz.]

E. HIRSUTUM [*V. hirsuta* S. F. Gray.]

CICER ARIETINUM.

CYTISUS GLUTINOSUS [*Adenocarpus intermedius* DC.; see Fl. Mad. i. 128.]

ORNITHOPUS PERPUSILLUS.

O. COMPRESSUS.

SCORPIURUS SULCATA.

ASTRAGALUS CANESCENS. [This name should be retained for the plant which Lowe called later *A. Solandri*. The synonymy is:

A. CANESCENS Br. in Buch, Canar. Ins. 197, n. 399 (nomen) (1825); Sol. MSS. et Herb. Banks! ex Lowe, Prim. 34 (1831); non DC. Astrag. 142 (1802) nec Bunge, Gen. Astragal. ii. 174 (1869) nec Kit. in Linnæa, xxxii. 625 (1863).

A. Solandri Lowe in Hook. Kew Journ. viii. 294 (1856); Fl. Mad. i. 188 (1862).

"Although in strictness Dr. Solander's MS. designation of this plant is not superseded by *A. canescens* of De Candolle, that species having merged into a synonym of *A. onobrychoides* Bieb., it would be now undesirable to adopt a name having no real claim to preference, and liable to cause confusion" (Lowe in Kew Journ. *l. c.*). Solander's name, however, must be adopted by those followers of the law of priority who do not accept the formula "once a synonym always a synonym"; it dates from Lowe's *Primitiæ* (1831)—Brown's publication is only a *nomen nudum*—where it is fully described. Solander's own description in our interleaved and consecutively paged copy of Willdenow, p. 4156, runs: "*A. canescens* caulescens diffusus. foliolis ovalibus retusis pilosis, spicis paucifloris, siliquis falcatis compressis pilosis. Hab. in Insula Porto Santo prope Madeirum locis arenosis. Fr. Masson."]

PSORALEA BITUMINOSA. "In sepibus."

P. AMERICANA. "In agris."

MELILOTUS INDICA [*M. elegans* Salzm.]

M. ITALICA [(*M. Lippoldiana* Lowe!)]

TRIFOLIUM REPENS.

T. CHERLERI.

T. ANGUSTIFOLIUM.

T. STELLATUM.

T. GLOMERATUM.

T. STRIATUM.

T. AGRARIUM [*T. procumbens* L.]

T. PROCUMBENS [*T. minus* Relh.]

[The confusion in these species is not quite satisfactorily cleared up by Lowe, whose note (under *T. minus*) runs as follows: "Three good spec. of this pl. on one sheet marked '*Tr. agrarium* Linn. Sp. Pl. 1087—Madera' in BH. sufficiently attest the syn. *T. agrarium* of Buch. On the other hand, his *T. procumbens* was doubtless founded on the '*T. agrarium* var. foliis non retusis Madera 1776 Downe' of the same Herb. marked also '*T. procumbens*,' and which is unquestionably true *T. procumbens* L.!" The latter plant, it is clear from Brown's MS. list (in which the phrase "var. foliis non retusis" follows the name), is the *T. agrarium* of the list published by Buch; the "three specimens," and three others which Lowe apparently did not see, were collected by Banks and Solander, and are the *procumbens* of Brown's list—the name *procumbens* is attached to them in the herbarium, as well as to Downe's plant. The synonymy is therefore as given above.]

(To be continued.

SOUTH DEVONSHIRE PLANTS.

By G. Claridge Druce, M.A., F.L.S.

I spent a few days in July, 1899, at Plymouth and at Torr Cross, when I noticed, among others, the following plants. I have to thank the Rev. W. Moyle Rogers for naming the brambles, Mr. F. Townsend for examining the Euphrasiæ, and Mr. E. G. Baker for critical assistance. My late friend Herr Freyn suggested the names for the varieties of *Urtica* and *Arenaria*, and Prof. Hackel named the new variety of *Agropyron*.

Arenaria leptoclados Guss. var. *scabra* Rouy & Fouc. Fl. Fr. iii. p. 242. "Plantes pubescente-scabres, non glanduleuses, panicule presque lâche, fleurs petites." At Slapton, South Devon. I think the first record for Britain.—*A. serpyllifolia* L. var. *scabra* Fenzl. Slapton.

Budâ rupestris Druce in Trans. Bot. Soc. Edinb. xx. 134 (1894); F. J. Hanb. in Lond. Cat. ed. ix. 1895. Torr Cross.

Malva rotundifolia L. (*M. vulgaris* Fries = *M. neglecta* Wallr. in Syll. Pl. Ratisb. i. (1824), p. 140), var. *elachista* (Beck in Fl. Nieder. Oester. ii. p. 539). "Blätter klein 8–15 mm. breit, oft nierenförmig und querbreiter, die Blattstiele höchstens 35 mm. lang. Fruchtscheiben 5–6 breit. Blumenblätter 8–11 mm. lang." A very dwarf form from the Slapton Sands is very near to, if not identical with, this.

Erodium cicutarium L'Hérit. var. *micranthum* Beck *l. c.* p. 563. On the Slapton Sands.

Ononis repens L. var. *inermis* Lange. Slapton Sands.

Medicago lupulina L. var. *Willdenowiana* Koch. Plymouth.

Rubus erythrinus Génev. Tamerton Foliot. — *R. dumnoniensis* Bab. Tamerton Foliot.—*R. mucronatus* Blox. Torr Cross.—*R. calvatus* Blox. Tamerton Foliot, *teste* Focke. — *R. Schlechtendalii* Weihe. Torr Cross.—*R. Borreri* Bell-Salt. var. *dentatifolius* Briggs. Near Torr Cross.

Sedum rupestre L. Dawlish.

Epilobium Lamyi Schultz. Near Tamerton Foliot. — *E. roseum* Schreb. Exeter.

Galium erectum Huds. Near Torr Cross.

Arctium minus Bernh. A neat small tomentose form occurs at Torr Cross, which is worth further study.

Erythræa pulchella Fries = *E. ramosissima* Pers. Plentiful near Torr Cross, by the side of Slapton Ley.—*E. capitata* Willd. Near Torr Cross.

Statice linearifolia Laterr. = *S. pubescens* Sm. Torr Cross. The holotrichous *S. maritima* not seen there.

Verbascum Thapsus L. With deeper yellow flowers than usual near Torr Cross.

Melampyrum pratense L. var. *hians* Druce. Plentiful by the Tamar near Weir Head.

Euphrasia nemorosa H. Mart. Slapton Ley.—*E. occidentalis* Wetts. Coast near Torquay.

Mentha verticillata L. Syst. Nat. ed. x. 1099, n. 4 A (1759) (*M. arvensis* × *aquatica*). On Slapton Ley as a form with oblong leaves. —*M. verticillata* L. var. *paludosa* (Sole). By Slapton Ley.—Var. *subspicata* (Weihe in Beck. Fl. Frankf. p. 222) as a variety of *M. hirsuta*, teste Freyn. Near Tamerton Foliot.

Plantago Coronopus L. var. *pumila* Lange. Near Torr Cross.

Atriplex Babingtonii Woods. A form with very small leaves at Torr Cross.

Urtica dioica L. var. *hispida* Gren. & Godr. Fl. Fr. iii. p. 108. "Feuilles ovales et même suborbiculaires inférieurement, à dents très profondes, à pétiole court comme dans le type ; à poils extrêmement nombreux sur les feuilles et sur la tige ; stipules plus larges." This very bristly and powerfully stinging nettle grew on the shingle near Slapton Ley.

Typha angustifolia L. Extremely abundant and luxuriant at Slapton Ley.

Scirpus Tabernæmontani Gmel. Slapton Ley.

Agropyron repens Beauv. var. *lasiorachis* Hackel, *in litt.* Differs from the type in having the rachis covered with hairs. By the tidal river near Tamerton Foliot. A new variety.

Chara connivens Brann. In great abundance in Slapton Ley.

INULA GRANDIFLORA Willd.

By A. B. Rendle, D.Sc.

In looking up some garden specimens of *Inula* with Mr. Britten, reference to the types of *Inula grandiflora* Willd. and *I. barbata* Wallich, in the National Herbarium, suggested the following observations :—

I. grandiflora Willd. Sp. Pl. iii. p. 2096 (1800) is based on Tournefort's *Aster Orientalis, Conyzæ folio, flore luteo, maximo*, of which we have an original specimen. As Lamarck founded his *I. orientalis* (Encyc. iii. p. 255) eleven years before (1789), on a similar specimen which he saw in Jussieu's herbarium, his name takes precedence. Willdenow described at the same time with *I. grandiflora* (the description follows that of *I. grandiflora*) *I. glandulosa*, also an Eastern species, differing from *I. grandiflora* in the shape of the involucral bracts (lanceolate as compared with linear-subulate in *grandiflora*), and the smaller flower-head (one and a half inch as against nearly three inches in diameter). We have no type of *I. glandulosa*, but there has existed from the first considerable doubt as to the specific distinction of the two species. The early garden works cite and figure *I. glandulosa*, which agrees well with Tournefort's plant. Thus Sims, in Bot. Mag. 1907 (1817), figures and describes *I. glandulosa*, citing *I. orientalis* Lam. as a synonym, and, as a variety β, *I. grandiflora* Willd., and the

original reference from Tournefort, whose plant he had seen in Herb. Banks. He distinguishes the variety from the species by the presence of the glands on the serratures of the former, a character which he has previously noted as being very variable. Bot. Reg. 334 (1818) represents, under *I. glandulosa*, what is probably the same species, though the ray-florets are depicted with curiously laciniate tips. The writer quotes Marschall von Bieberstein, who found the plant on Mount Caucasus, growing along with *I. grandiflora*, from which, he observes, "it differs only by having the glands of the leaves produced on a completely entire border, instead of at the points of the teeth of a serrated border; it seems to be a mere variety." Tournefort's original specimen (*i. e.* Willdenow's *I. grandiflora*), however, has leaves with an almost entire margin, on which the small black glands occur at irregular intervals.

The suggestion therefore is that Willdenow's two species are varieties, or perhaps merely forms, of the same plant, and are thus both represented by the earlier name, *I. orientalis* Lamarck.

I. BARBATA Wallich, herb. and list (no. 2961, Srinaghur, Blinkworth), described by A. P. De Candolle (Prodr. v. p. 470) is a Western Himalayan plant. We have an original specimen from Kumaon, collected by Robert Blinkworth. Other specimens from Kumaon (Strachey & Winterbottom, no. 5), Garhwal (Schlagintweit, Duthie), Kashmir, &c., agree with the type. *I. barbata* is not included in the *Flora of British India*, where, however, we find *I. grandiflora* (vii. p. 294) cited as Western Himalayan; but the specimens are noted as differing in the involucre from the Caucasian species. As one of the chief distinctions between the species lies in the shape and indumentum of the involucral leaves (larger, narrower, and more hairy, with darker reddish brown hairs in *I. grandiflora*), it is suggested that the *I. grandiflora* of Flor. Brit. Ind. is not *I. grandiflora* Willd., but represents *I. barbata* Wall. This view is supported by the fact that Mr. C. B. Clarke (*Compositæ Indicæ*, p. 122) says, under *I. barbata*, that it has been distributed as *I. grandiflora*, and herbarium specimens bear this out. Mr. Clarke, however, includes *I. grandiflora* as a native of high altitudes on the North-west Himalayas, basing his statement on a specimen collected at 14,000 to 17,000 ft. by Dr. Stoliczka. His description of the involucral scales as "angustissime oblonga" does not quite suggest those of *I. grandiflora*, and Dr. Stoliczka's plant may perhaps not represent this species, which on this view has only an "oriental" distribution (Caucasus, &c.).

The following is the synonymy of the two plants:—

I. ORIENTALIS Lam. Encyc. iii. p. 255 (1789).

Aster Orientalis, Conyzæ folio, flore luteo, maximo Tourn. Coroll. Instit. p. 36 (1703).

I. grandiflora Willd. Sp. Pl. iii. p. 2096 (1800); Boiss. Fl. Orient. iii. p. 186; ? C. B. Clarke, Compositæ Indicæ, p. 123.

I. glandulosa Willd. *op. cit.* p. 2097; Ait. Hort. Kew. ed. ii. v.

p. 78 (1813); Sims in Bot. Mag. t. 1907 (1817); Bot. Reg. 334 (1818); Boiss. Fl. Orient. iii. p. 187.
I. alpina Web. & Mohr. Beitr. z. Naturkunde, i. p. 68 (1805).
An Oriental species (Caucasus, &c.).

I. BARBATA Wall. list and herb. 2961 (1828); De Cand. Prodr. v. p. 470; C. B. Clarke, *Compositæ Indicæ*, p. 122.
I. grandiflora Hook. f. Fl. Brit. Ind. vii. p. 294, non Willd.
A Western Himalayan plant.

NORTH-EAST HIGHLAND PLANTS (1903).

By the Rev. W. Moyle Rogers, F.L.S.

These notes refer only to plants seen last summer in the Watsonian counties of Banff (94), Elgin (95), and Easterness (96), which together constitute the Sub-Province of "N.E. Highlands" of *Cybele Britannica*. "Strathspey plants" would have been almost as accurate a heading, very nearly all the localities visited being in the immediate neighbourhood of the Spey, or of one of its affluents, R. Dulnan or R. Nethy, at no great distance from its junction with the Spey.

My first week (June 19–26) was spent at Carrbridge, where I had considerable help in my botanizing from my son, Rev. F. A. Rogers. After three nights at Aberlour (Banff), the rest of my time was divided between Nethybridge (June 30–July 15) and Kingussie (July 15–27). I thus stayed for five weeks in Easterness, and with the help of the two railway lines (the Highland R. and the N.S.R.), which have their junction at Aviemore, I explored a fair amount of ground in that vice-county, and also made a few incursions into the counties of Elgin and Banff.

The backwardness of the season, and the height above sea-level at which I was staying all my time in Easterness, probably go far to account for the comparatively small number (about 363) of the species seen. While Carrbridge stands at over 900 ft., Nethybridge and Kingussie are both over 700, as are all my other Easterness localities except Culloden Moor, which is only 440. Hence the number of plants common in England for which I searched in vain was greater than I had expected; and Culloden Moor was the only Easterness station where I succeeded in finding brambles, with the one further remarkable exception of Kincraig, where, by Loch Insh, at about 800 ft., my son pointed out to me some vigorous and characteristic bushes of *Rubus Rogersii*. From Nethy, however, I was able to visit some Elgin and Banff localities at a lower level (the highest being Advie, at about 650 ft.), and these yielded in all seven bramble species.

The two highest points (both in Easterness) reached by me were by the railway stations at Tomatin (1029 ft.) and Dalwhinnie (1174 ft.). At each of these, within about a mile of the station,

I had nearly two hours' work noting all the species I could find, lists of which I here subjoin. But, I should explain, my visit to Tomatin was three and a half weeks the earlier of the two, a circumstance which, in a summer such as the last, probably accounts in great measure for the larger number of species found at Dalwhinnie :—

TOMATIN (1029 ft.), JUNE 24TH, 1903.

(*81 Species.*)

Anemone nemorosa.
Ranunculus acris.
R. repens.
Cardamine pratensis.
Bursa pastoris.
Polygala serpyllacea.
Silene Cucubalus.
Cerastium glomeratum.
C. triviale.
Stellaria media.
S. uliginosa.
Sagina procumbens.
Genista anglica.
Trifolium pratense.
T. repens.
T. dubium.
Lotus corniculatus.
Lathyrus montanus.
Potentilla silvestris.
Pyrus Aucuparia.
Conopodium denudatum.
Galium verum.
G. saxatile.
Scabiosa succisa.
Bellis perennis.
Antennaria dioica.
Chrysanthemum Leucanthemum.
Tussilago Farfara.
Senecio Jacobæa.
Cnicus lanceolatus.
C. arvensis.
Crepis virens.
Leontodon autumnalis.
Taraxacum officinale.
Vaccinium Vitis-Idæa.
V. Myrtillus.
Arctostaphylos Uva-Ursi.
Calluna Erica.
Trientalis europæus.
Myosotis arvensis.
M. versicolor.
Veronica Chamædrys.
Euphrasia officinalis.
Pedicularis sylvatica.
Plantago major.
P. lanceolata.
Rumex crispus.
R. sanguineus.
R. obtusifolius.
R. Acetosa.
R. Acetosella.
Urtica dioica.
Betula verrucosa.
Salix aurita.
Juniperus communis.
Pinus sylvestris.
Juncus bufonius.
J. squarrosus.
J. effusus.
Luzula campestris.
L. erecta.
Scirpus cæspitosus.
Eriophorum vaginatum.
E. angustifolium.
Carex Goodenowii.
C. flacca.
C. pilulifera.
C. panicea.
Anthoxanthum odoratum.
Agrostis palustris.
Deschampsia flexuosa.
Holcus lanatus.
Dactylis glomerata.
Poa annua.
P. pratensis.
Festuca sciuroides.
F. ovina.
F. rubra.
Nardus stricta.
Equisetum sylvaticum.
Lycopodium clavatum.

Dalwhinnie (1174 ft.), July 18th, 1903.
(107 Species.)

Anemone nemorosa.
Ranunculus Flammula.
R. acris.
R. repens.
Caltha palustris.
Viola palustris.
V. Riviniana.
V. lutea.
Lychnis alba.
Cerastium triviale.
Stellaria media.
S. graminea.
S. uliginosa.
Sagina procumbens.
S. subulata.
Montia fontana.
Hypericum pulchrum.
Linum catharticum.
Genista anglica.
Ulex europæus.
Cytisus scoparius.
Trifolium pratense.
T. repens.
Anthyllis Vulneraria.
Lotus corniculatus.
Lathyrus montanus.
Spiræa Ulmaria.
Rubus idæus.
Alchemilla vulgaris.
Pyrus Aucuparia.
Epilobium palustre.
Conopodium denudatum.
Galium verum.
G. saxatile.
G. Witheringii.
Scabiosa succisa.
Bellis perennis.
Antennaria dioica.
Achillea Millefolium.
A. Ptarmica.
Matricaria inodora.
Tussilago Farfara.
Senecio vulgaris.
S. Jacobæa.
Cnicus lanceolatus.
C. palustris.
C. arvensis.
Centaurea nigra.
Crepis virens.
Hieracium Pilosella.
Hypochœris radicata.
Taraxacum officinale.
Campanula rotundifolia.
Arctostaphylos Uva-Ursi.
Calluna Erica.
Erica Tetralix.
E. cinerea.
Veronica arvensis.
V. serpyllifolia.
V. officinalis,
V. Chamædrys.
V. scutellata.
Euphrasia brevipila.
E. gracilis.
Pedicularis sylvatica.
Rhinanthus Crista-Galli.
Pinguicula vulgaris.
Thymus Serpyllum.
Prunella vulgaris.
Plantago major.
P. lanceolata.
Polygonum viviparum.
Rumex Acetosa.
R. Acetosella.
Urtica dioica.
Myrica Gale.
Salix aurita.
Orchis ericetorum.
Juncus squarrosus.
J. effusus.
Luzula campestris.
L. erecta.
Scirpus cæspitosus.
Carex echinata.
C. Goodenowii.
C. pilulifera.
C. panicea.
C. binervis.
C. flava, minor.
Anthoxanthum odoratum.
Phleum pratense.
Agrostis palustris.
A. vulgaris.
Deschampsia cæspitosa.
D. flexuosa.
Holcus mollis.
H. lanatus.
Sieglingia decumbens.

Cynosurus cristatus.
Dactylis glomerata.
Poa annua.
P. trivialis.
Festuca ovina.
F. rubra.
Nardus stricta.
Pteris aquilina.
Lomaria Spicant.

For help in dealing with several of the more critical genera, I am indebted to Mr. Arthur Bennett (Carices), Rev. E. F. Linton (Hieracia and Salices), and Mr. F. Townsend (Euphrasiæ). Mr. Bennett has also kindly revised my lists of "County Records." These will be found "starred," while the sign † is used for plants which were either certainly or very probably "introduced" in the localities given. Plants which I found generally distributed in suitable ground in the Spey basin are given without localities. "Grantown" will be found included in v.-c. 96, because all the ground examined by me in that neighbourhood is in Easterness, though the town of Grantown is within the Elgin border.

Anemone nemorosa L. — *Ranunculus hederaceus* L. Apparently uncommon. 95. Advie. 96. Grantown. — *R. Flammula* L. — *R. acris* L.—*R. repens* L.—*R. bulbosus* L.—*Caltha palustris* L.—*Trollius europæus* L. 96. By R. Nairn at Culloden Moor. By Loch Insh. By R. Spey near Grantown. — *Papaver dubium* L. 96. About Nethybridge, rather frequent. Grantown.—*Neckeria claviculata* N. E. Br. 95. Advie; locally abundant.—*Fumaria officinalis* L.

Cardamine pratensis L. — *C. hirsuta* L. — *C. flexuosa* With.—*Erophila verna* DC. 96. Carrbridge; in great quantity.—*Sisymbrium Thalianum* J. Gay. 96. From Carrbridge to Kingussie, frequent.—*S. officinale* Scop.—†*Erysimum cheiranthoides* L. 95. Cornfield by R. Spey at Advie, in considerable quantity (fifty to sixty plants seen from the road). 96. Waste ground at Aviemore and at Kingussie.—*Brassica Sinapistrum* Boiss.—*Bursa pastoris* Weber.—*Raphanus Raphanistrum* L. 95. Waste ground at Elgin. Abundant by R. Spey at Advie (95), and at Kingussie (96).

Reseda lutea L. 96. Boat of Garten; on moor near railway station. — *Helianthemum Chamæcistus* Mill. 96. Culloden Moor. Frequent and locally abundant from Carrbridge to Kingussie.

Viola palustris L.—*V. Riviniana* Reich.—*V. ericetorum* Schrader. 94. By R. Spey at Aberlour. 96. Apparently rather frequent at Carrbridge, Nethy, by L. Insh and Aviemore.—*V. tricolor* L.—*V. arvensis* Murr.—*V. lutea* Huds. Locally abundant. 95. Blacksboat; Advie. 96. Culloden. Carrbridge. Nethy. Kingussie. Dalwhinnie. Usually in great quantity, and chiefly f. *amæna* (Symons).

Polygala vulgaris L. By R. Spey and its affluents. Aberlour (*94), Advie (95), Carrbridge and Nethy (96). Also by R. Nairn at Culloden (96).—*P. oxyptera* Reichb. *94. Aberlour. *95. Advie. 96. Carrbridge. Grantown. Nethy. Characteristic in all three counties. Mostly in short grass on hilly slopes; not unfrequently side by side with the next.—*P. serpyllacea* Weihe.

Silene Cucubalus Wibel. Decidedly uncommon. 94. Ballindalloch. 96. Tomatin; several plants together by roadside.—

S. maritima With. By R. Spey, in great quantity, at Aberlour (94 and 95), Advie (95), and Kingussie (96); in the last locality, I suppose, fully sixty or seventy miles from the coast.—*Lychnis alba* Mill.—*L. dioica* L. Much rarer than *L. alba*. 94. Aberlour. 95. Blacksboat.—*L. Flos-cuculi* L. Seen only at Advie (95) and by L. Insh (96). Perhaps common enough later in the summer.—*Cerastium semidecandrum* L. 96. Carrbridge. Nethy.—*C. glomeratum* Thuill.—*C. triviale* Link.—*C. arvense* L. 96. Nethybridge to Broomhill; in considerable quantity. Grantown.—*Stellaria media* Cyr.—*S. Holostea* L.—*S. graminea* L.—*S. uliginosa* Murr.—*Arenaria serpyllifolia* L. Frequent.—Var. *leptoclados* (Guss.). 94. Ballindalloch. 96. Grantown.—*Sagina procumbens* L.—*S. subulata* Presl. 96. Dalwhinnie.—*Spergula arvensis* L.—*Buda rubra* Dum. 96. Carrbridge.

Montia fontana L. Both forms abundant.—*Hypericum pulchrum* L. Very common. The only species seen.—†*Tilia vulgaris* Hayne. 96. Kingussie.—*Linum catharticum* L.—*Geranium sylvaticum* L. Frequent. 94. By R. Spey at Ballindalloch, in plenty. 96. By R. Nairn at Culloden. Carrbridge. By L. Insh. Kingussie.—*G. pratense* L. Seen only by R. Dulnan at Carrbridge, where it looks as if it might be a "garden escape."—*G. moll* L.—*G. dissectum* L.—*G. Robertianum* L. 94. Aberlour. 95. In plenty near R. Spey at Advie, at about 650 ft., the highest ground on which I saw it, except as a garden weed in one spot at Carrbridge.—*Erodium cicutarium* L'Hérit. 96. Aviemore.—*Oxalis Acetosella* L.

Genista anglica L.—*Ulex europæus* L.—*Cytisus scoparius* Link. In wonderful abundance and beauty.—*Ononis repens* L. Only at Culloden Moor (96).—*Medicago lupulina* L. 96. Kingussie. Local or late in coming into flower. Looked for in vain until July 22nd, and then seen only in two spots.—*Trifolium pratense* L.—*T. medium* L. 95. Ballindalloch. 96. Kincraig. Kingussie.—†*T. hybridum* L.—*T. repens* L.—†*T. agrarium* L. 96. Nethy.—*T. procumbens* L.—*T. dubium* Sibth.—*Anthyllis Vulneraria* L. Remarkably common.—*Lotus corniculatus* L.—*Vicia Cracca* L.—*V. sepium* L.—†*V. sativa* L. 96. Nethy.—*Lathyrus pratensis* L.—*L. montanus* Bernh. Frequent. Forms passing from type to extremest var. *tenuifolius* Reich.; as at Tomatin, where, on the turfy slopes overlooking R. Findhorn, this species occurs with leaflets no wider than in *L. Nissolia* L.

Prunus spinosa L. Seen only at Advie (95).—*P. Avium* L.—*P. Padus* L.—*Spiræa Ulmaria* L.—*Rubus idæus* L. Abundant everywhere except the most exposed localities.—*R. fissus* Lindl. *94. Aberlour. Ballindalloch. *95. Aberlour (west of R. Spey). Blacksboat. 96. Culloden Moor.—*R. Rogersii* Linton. So far as I saw, more abundant than all the other fruticose brambles put together. 94. Aberlour. Ballindalloch. 95. Aberlour. Blacksboat. Advie. 96. Culloden Moor. By L. Insh.—*R. plicatus* Wh. & N. Apparently rare. *95. Advie.—*R. villicaulis* Koehl. 95. Blacksboat. 96. Culloden Moor. Apparently this, but the plants were too young for certain determination.—*R. danicus* Focke. 94. Ballindalloch (probably this).—*R. melanoxylon* Muell. & Wirtg. Probably common; but seen with certainty only at Elgin (95),

where it is abundant, *F. A. Rogers*!, and Blacksboat.—*R. coryli-folius* Sm. *95. Elgin, *F. A. R.*! 96. Culloden Moor; var. *cyclophyllus* (Lindeb.), or form near it.

Geum urbanum L. Uncommon, or very exceptionally late in coming into flower. 94. Aberlour. Ballindalloch (just under 500 ft.).—*G. rivale* L. 96. By R. Nairn, at Culloden.—*Fragaria vesca* L.—*Potentilla sylvestris* Neck.—*P. Anserina* L.—*P. palustris* Scop. 96. Common. I searched in vain for other species.—*Alchemilla arvensis* Scop.—*A. vulgaris* L. b. *alpestris* (Schmidt). Common. The only form seen. Not unfrequently wholly glabrous but for the ciliation of the leaf-serrations. 94. Ballindalloch. *95. Cromdale. Advie. Blacksboat. 96. By R. Nairn at Culloden. Carrbridge, &c.

Rosa pimpinellifolia L. Apparently rare inland. 96. Near Inverness, *F. A. R.*! Nethy, in one spot only, where it looked like a "garden escape."—*R. mollis* Sm. Very abundant and variable. On the higher ground prevailing almost to the exclusion of other species; but in exposed places coming late into flower, and rather frequently failing to produce flowers altogether. A small white-flowered form occurs in several places; and another form with striped and mottled flowers is locally abundant at Advie (95) and Nethy (96).—*R. tomentosa* Sm. Frequent, but less so than *R. mollis*. As variable as usual.—*R. rubiginosa* L. 95. Blacksboat. 96. Near Inverness, *F. A. R.*—*R. obtusifolia* Desv. 95. Advie.—c. *tomentella* (Leman). 95. Advie (f. *decipiens*). 96. Grantown. Nethy.—*R. canina* L. and *R. glauca* Vill. These seemed only moderately frequent, and were mostly too immature for positive determination. But I saw varities *lutetiana* (Leman) and *dumalis* (Bechst.) in all three counties, and bushes which I believed to be *vinacea* Baker near L. Insh (96) and *dumetorum* (Thuill.) by the Spey at Aberlour (94); also *R. glauca* Vill. at Ballindalloch (94) and Kingussie, and by L. Insh (96), and *coriifolia* (Fr.) at Ballindalloch (94) and Nethy (96).—*R. arvensis* Huds. 96. Carrbridge; field hedge near cottage on Inverness Road (two or three bushes). No doubt planted.

Pyrus Aucuparia Ehrh.—*Cratægus Oxyacantha* L. Possibly native at Aberlour and Ballindalloch (94). In 96 seen only (in situations over 500 ft. above the sea) where it has obviously been planted.—**Ribes Grossularia* L. Fairly frequent.—*R. rubrum* L. b. *petræum* (Sm.). 95. Blacksboat. 96. Nethy. By L. Insh.—†*R. nigrum* L. 94. By R. Spey near Aberlour.—*Sedum villosum* L. *96. Grantown, a few plants only, in the sheltered banks of a perennial beck.—*S. acre* L. Uncommon. 96. Nethy. Grantown. Kingussie.—*Drosera rotundifolia* L. Rather local. 95. Cromdale. 96. Carrbridge. Grantown. Kingussie.—*Callitriche stagnalis* Scop.—*Epilobium montanum* L.—*E. adnatum* Griseb. *95. Advie.—*E. obscurum* Schreb.—*E. palustre* L.

Hydrocotyle vulgaris L. Seen only by L. Insh (96).—†*Carum Carvi* L. 94. Ballindalloch. 95. Cromdale. In both places several large patches of plants by roadside near railway station.—*Ægopodium Podagraria* L.—*Pimpinella Saxifraga* L. 95. Advie. 96.

Kincraig. Kingussie. First open flowers seen on July 20th.—*Conopodium denudatum* Koch. — *Myrrhis odorata* Scop. 94. By R. Spey near Aberlour. 96. By R. Nairn at Culloden Moor. Carrbridge. —*Anthriscus sylvestris* Hoffm. — *Angelica sylvestris* L. — *Heracleum Spondylium* L. Umbelliferæ were exceptionally late in coming into flower, and (perhaps partly on that account) seemed few in number.

†*Sambucus nigra* L. — *Galium boreale* L. Frequent by the Spey. By R. Dulnan at Carrbridge.—*G. verum* L.—*G. saxatile* L.—*G. palustre* L. Common and variable. — b. *elongatum* (Presl). In fairly sheltered ditches at Advie (95), and at Kingussie (96).—c. *Witheringii* (Sm.). Frequent.—*G. uliginosum* L. 94. Near Aberlour. — *G. Aparine* L. — *Sherardia arvensis* L. Seen only at Aviemore (96), on July 25th.—*Valeriana sambucifolia* Willd. — *Scabiosa succisa* L.

Solidago Virgaurea L. — *Bellis perennis* L. — *Filago minima* Fr. 95. Advie. 96. Aviemore.—*Antennaria dioica* R. Br.—*Gnaphalium uliginosum* L. Just showing first flower on July 26th at Kingussie (96).—*G. sylvaticum* L. Frequent in 96. — *Achillea Millefolium* L. —*A. Ptarmica* L. — *Chrysanthemum Leucanthemum* L. — *Matricaria inodora* L.—†*Tanacetum vulgare* L. 96. Nethy ; a clump of plants in one spot near a saw-mill.—*Artemisia vulgaris* L. Fairly frequent. —b. *coarctata* Forcell. In several spots near Kingussie (96).—*Tussilago Farfara* L.—*Senecio vulgaris* L.—*S. Jacobæa* L. — *Arctium minus* Bernh. 96. Kingussie.—*Cnicus lanceolatus* Willd.—*C. palustris* Willd. — *C. heterophyllus* Willd. 96. Fairly frequent. Carrbridge. By L. Insh. Kingussie.—*C. arvensis* Hoffm. — *Centaurea nigra* L. — *Lapsana communis* L. — *Crepis virens* L. — *C. paludosa* Moench. 94. Aberlour. 95. Blacksboat. 96. By R. Nairn at Culloden Moor. Carrbridge. By L. Insh. Kingussie.—*Hieracium Pilosella* L.—*H. Sommerfeltii* Lindeb. *94. Aberlour.—*H. murorum* L. pt. agg. 96. Carrbridge.—*H. vulgatum* Fr. agg. 94. Aberlour. 96. Common. Nethy. L. Insh. Kingussie. Dalwhinnie. — *H. umbellatum* L. 96. By R. Nairn, Culloden Moor. Nethy. Kingussie.—*Hypochæris radicata* L.—*Leontodon autumnalis* L.—*Taraxacum officinalis* L., type and c. *palustre* (DC.). — *Sonchus arvensis* L. 94. Ballindalloch.

Campanula rotundifolia L.—*Vaccinium Vitis-idæa* L. 96. Nearly or quite as common as the next. — *V. Myrtillus* L. — *Arctostaphylos Uva-ursi* Spreng. 96. Very abundant on most of the hillsides and open slopes. Near Carrbridge. Tomatin. Kingussie. Dalwhinnie. —*Calluna Erica* DC.—*Erica Tetralix* L.—*E. cinerea* L.—*Pyrola media* Sw. 96. Near Carrbridge, *F. A. R.* ! Nethy. — *P. minor* L. 95. Blacksboat ; in considerable quantity. 96. Grantown. Nethy. —*Primula acaulis* L.—*Trientalis europæa* L. Most abundant, and a great delight to the southerner. 94. Aberlour. Ballindalloch. 95. Blacksboat. Cromdale. 96. Carrbridge. Nethy. Kincraig, &c. —*Fraxinus excelsior* L. 96. Nethy. By L. Insh.—*Gentiana campestris* L. Remarkably frequent and locally abundant. 96. Already in flower on July 6th at Nethy. Grantown. Aviemore. Kingussie. —*Menyanthes trifoliata* L.

†*Anchusa sempervirens* L. 95. Blacksboat; several plants near a cottage garden.—*Lycopsis arvensis* L.—*Myosotis cespitosa* F. Schultz. Frequent. 94. Aberlour. Ballindalloch. 95. Blacksboat. Advie. Cromdale. 96. Culloden. Grantown. Nethy. By L. Insh. Kingussie.—*M. palustris* Relh. b. *strigulosa* Mert. & K. 94. Aberlour. 95. Blacksboat. 96. Nethy.—*M. repens* G. Don. 94. Ballindalloch. 95. Blacksboat. Advie. Cromdale. 96. Grantown. Kingussie.—*M. arvensis* Lam.—*M. versicolor* Reichb.—*Lithospermum officinale* L. 96. Nethy. Confirmatory record for the vice-county.

†*Verbascum Thapsus* L. 96. Nethy. Kincraig. Kingussie.—*Scrophularia nodosa* L.—†*Mimulus* ? sp. 94. In great quantity by R. Spey. 96. Carrbridge.—*Digitalis purpurea* L.—*Veronica agrestis* L. 96. Kingussie.—†*V. Tournefortii* C. Gmel. 95. Blacksboat. 96. Kingussie.—*V. arvensis* L.—*V. serpyllifolia* L.—*V. officinalis* L.—*V. Chamædrys* L.—*V. scutellata* L.—*V. Beccabunga* L. Seen only by R. Nairn at Culloden (96).—*Euphrasia officinalis* L. aggr. Abundant and flowering freely in the latter half of July, but not then showing mature fruit.—**E. stricta* Host. 96. Dry slopes above Aviemore; growing with *E. brevipila* in plenty, but more locally. Mr. Townsend remarks on my specimens, "In a very early state . . . flowers small for the species."—*E. brevipila* Burn. & Grem. Apparently far the most common eyebright throughout Strathspey; as in 1901 I found it to be in Clydesdale and West Ayrshire. Seen in plenty in all the following stations:—*94. Ballindalloch. *95. Advie. 96. Grantown. Nethy. Aviemore. Kingussie. Dalwhinnie. Found also in great quantity by R. Garry at Blair Atholl (Mid-Perth). After an examination of all my specimens from these localities, Mr. Townsend writes:—"This series of gatherings shows how variable *E. brevipila* is; and yet the forms run into one another to such an extent that it seems impossible to separate them except by an artificial and cumbrous creation of names."—*E. gracilis* Fries. 96. Hill above Kingussie. Dalwhinnie, in great quantity, with *E. brevipila*.—*E. scotica* Wettst. *96. Kingussie, in same locality as *E. gracilis*. Commenting on a note of mine to the effect that these two forms were "growing side by side" on the hill, Mr. Townsend writes:—"Though *E. gracilis* and *E. scotica* may be said to be growing side by side, it will be found that the former is on the drier and the latter on the wetter ground. I should say *E. gracilis* is 'ericetal,' *E. scotica* 'paludal' or 'uliginal.'" On some specimens from the Carrbridge Road, about two miles from Kingussie (96), Mr. Townsend writes, "*? curta* × *brevipila*"; and on others from the shore of L. Insh, "*E. brevipila* or *curta* × *brevipila*."—*Pedicularis palustris* L. 96. Common.—*P. sylvatica* L.—*Rhinanthus Crista-galli* L. *sp. coll.* Abundant and variable, but only just coming into flower.—*Melampyrum pratense* L.—Type and var. *hians* Druce. Common.—Var. *montanum* Johnst. 96. Kingussie.

Pinguicula vulgaris L.—*Thymus Serpyllum* Fr.—*Nepeta Glechoma* Benth.—*Prunella vulgaris* L.—*Stachys palustris* L.—*S. sylvatica* L.—*Galeopsis Tetrahit* L.—*Lamium amplexicaule* L. 95. Kingussie.—*L. purpureum* L.—*Teucrium Scorodonia* L.—*Ajuga reptans* L.—*Plantago major* L.—*P. lanceolata* L.—*P. maritima*, L. 96. By R. Nairn

at Culloden Moor, in plenty.—*Scleranthus annuus* L. 96. Kingussie. —*Chenopodium album* L.—†*C. Bonus-Henricus* L. 96. Carrbridge; near cottage.—*Atriplex patula* L.—*Polygonum Convolvulus* L.—*P. aviculare* L.—*P. Persicaria* L.—*P. amphibium* L.—*P. viviparum* L. —*Rumex conglomeratus* Murr. *94. Ballindalloch.—*R. sanguineus* L. *96. Tomatin.—*R. obtusifolius* L.—*R. crispus* L.—*R. crispus* × *obtusifolius*. 95. Blacksboat. *96. Nethy. Kingussie.—*R. Acetosa* L.—*R. Acetosella* L.

Euphorbia Helioscopia L.—*Mercurialis perennnis* L.—†*Ulmus montana* Stokes. 94. Aberlour. 96. Kingussie.—*Urtica dioica* L. —*U. urens* L.—*Myrica Gale* L.—*Betula verrucosa* Ehrh.—*B. pubescens* Ehrh. Apparently uncommon. 95. Advie. 96. Carrbridge. —*Alnus glutinosa* Medic.—*Corylus Avellana* L. By no means common. 94. Ballindalloch. 95. Advie. 96. Carrbridge.—*Salix cinerea* L. 96. Culloden Moor. Not observed on the high ground. —*S. aurita* L. Most abundant.—*S. Caprea* L. 95. Advie. 96. Culloden Moor. Grantown. Nethy. Kingussie.—*S. repens* L. Frequent.—*S. repens* × *aurita* (*ambigua* Ehrh.). 96. By L. Insh.—*S. phylicifolia* L. 96. Carrbridge.—*S. viminalis* L. 94. Aberlour. —*Populus tremula* L.—*Empetrum nigrum* L. Locally abundant. 96. Near Carrbridge. Grantown. Nethy.—*Juniperus communis* L. —*Pinus sylvestris* L. 96. Frequent.

Orchis incarnata L. *95. Cromdale. 96. Frequent.—*O. ericetorum* Linton. Very generally distributed.—*Habenaria conopsea* Benth. 95. Blacksboat. Advie. 96. Culloden Moor. Carrbridge. Grantown.—*H. albida* R. Br. 96. Culloden Moor, *F. A. R.*!—*H. bifolia* R. Br. 96. Culloden Moor.—*Iris Pseudacorus* L. Apparently rather uncommon. 96. Nethy. Aviemore.—*Scilla festalis* Salisb. Seen only by R. Nairn at Culloden Moor (96).—*Narthecium Ossifragum* Huds.—*Juncus bufonius* L.—*J. squarrosus* L.—*J. effusus* L.—*J. lamprocarpus* Ehrh. 96. Kingussie.—*J. acutiflorus* Ehrh. —*Luzula vernalis* DC.—*L. maxima* DC.—*L. campestris* DC.—*L. erecta* Desv.—*Triglochin palustre* L.—*Potamogeton natans* L. 96. Near Kingussie.—*P. polygonifolius* Pour. 96. Nethy. Kingussie. —*Scirpus cæspitosus* L.—*Eriophorum vaginatum* L.—*E. angustifolium* Roth.

Carex pulicaris L. 95. Blacksboat. 96. Grantown.—*C. echinata* Murr.—*C. curta* Good. 95. Cromdale. 96. Frequent and locally abundant. Carrbridge. Grantown. Nethy. Kincraig. Kingussie.—*C. ovalis* Good. Common. A slender distinct-looking form by L. Insh (96) is considered by Mr. Bennett to go "towards the var. *argyroglochin* (Horn.)."—*C. aquatilis* Wahlenb. *94. By R. Spey at Aberlour. 96. L. Insh.—*C. Goodenowii* J. Gay. Type common.—b. *juncella* (T. M. Fries). 96. Kingussie. A beautiful form from L. Insh is named by Mr. Bennett "f. (var.) *atra* Blytt." I did not recognize it as belonging to this species.—*C. flacca* Screb. —*C. pilulifera* L.—*C. verna* Chaix. 96. Carrbridge.—*C. pallescens* L. 95. Blacksboat. 96. By R. Nairn at Culloden Moor. Kingussie.—*C. panicea* L.—*C. binervis* L.—*C. fulva* Good. 96. Culloden Moor. Carrbridge. Kingussie.—*C. flava* L. Type. 94. Ballindalloch. 95. Blacksboat. 96. Kingussie.—Var. *minor*

Towns. Common.—*C. rostrata* Stokes. 96. Frequent. Carrbridge. Grantown. Nethy. L. Insh. Kingussie. — *C. vesicaria* L. 96. L. Insh.

Anthoxanthum odoratum L.—*Alopecurus geniculatus* L. — *A. pratensis* L.—*Phleum pratense* L.—*Agrostis palustris* Huds.—*A. vulgaris* With.—*Aira caryophyllea* L.—*A. præcox* L. — *Deschampsia cæspitosa* Beauv.—*D. flexuosa* Trin.—*Holcus mollis* L.—*H. lanatus* L.—*Avena pubescens* Huds. 96. By R. Nairn at Culloden Moor.— *A. pratensis* L. 96. Field bordering Culloden Moor. Grantown.—*Arrhenatherum avenaceum* Beauv. 96. First open flowers seen on July 19th at Kingussie. Aviemore.—*Sieglingia decumbens* Bernh.—*Phragmitis communis* Trin. 96. Near Kingussie. — *Cynosurus cristatus* L.—*Kochleria cristata* Pers. 95 and 96. Remarkably common.—*Molinia varia* Schrank. 95. Advie. 96. First open flower seen at Grantown on July 11th. Kingussie.—*Dactylis glomerata* L.—*Poa annua* L.—*P. nemoralis* L. 96. Grantown. Kingussie. — *P. pratensis* L. —*P. trivialis* L.—*Glyceria fluitans* R. Br. — *R. plicata* Fr., b. *pedicellata* (Townsend). A few plants that I put to this variety at Nethy and by L. Insh (96). I looked in vain for typical *R. plicata* Fr.—*Festuca sciuroides* Roth.—*F. ovina* L.—*F. rubra* L.—† *Bromus steri(is* L. 96. Near railway station at Boat of Garten. — † *B. racemosus* L. and † *B. commutatus* Schrad. 94. Near railway station at Ballindalloch.—*B. mollis*, L.—*Lolium perenne* L.—*Agropyron repens* Beauv. Type common.—b. *barbatum* Duval-Jouve. 96. Nethy.—*Nardus stricta* L.

Pteris aquilina L. — *Lomaria Spicant* Desv. — *Athyrium Filix-fœmina* Roth. — *Scolopendrium vulgare* Symons. Observed only at Inverness and Kingussie (96). — *Lastræa Oreopteris* Presl. 95. Blacksboat. — *L. Filix-mas* Presl. Type and c. *paleacea* Moore. Very common.—*L. spinulosa* Presl. 96. In one spot near Nethy.—*L. dilatata* Presl.—*Polypodium vulgare* L.—*P. Dryopteris* Fée. 96. Locally abundant at Carrbridge and Nethy. — *Equisetum arvense* L. —*E. pratense* Ehrh. 96. Nethy. — *E. sylvaticum* L. Remarkably abundant.—*E. palustre* L.—*E. limosum* Sm.—*Lycopodium Selago* L. 96. Near Carrbridge, *F. A. R.*!— *L. clavatum* L. 96. Near Tomatin, hillside above R. Findhorn.

WAYFARING NOTES FROM THE TRANSVAAL.—IV.

By R. Frank Rand, M.D., F.L.S.

Johannesburg: Early July, 1903. — The weather is probably now at its coldest, the usual dry crisp winter of the high veld. The coming of spring is not so long-drawn-out as at home, for in August the earlier spring flowers are appearing, and therefore each week brings new contingents. In late August, passing by rail between Johannesburg and Pretoria, one sees very conspicuously the bush-like clusters of *Trichodesma* sp. in full bloom, the flowers delicate and fugitive. It marks the early spring season up to far north in Rhodesia.

I was fortunate in getting one day (Feb. 19th) upon the Magaliesberg range, just to the east of Pretoria. The formation is mainly sandstone and quartzite, but the dip-slope faces the north, whereas in the Witwatersrand range the dip is to the south. The granite intervening between the two series weakens down into a soil which carries a more varied flora than that yielded by the more purely quartzite rocks. The shales of the Witwatersrand series carry much iron, and when they lie close beneath the surface the grass is apt to be thin over them.

On the dip-slope of the Magaliesberg I found *Strychnos spinosa*, *Combretum* sp., *Ceratotheca Kraussiana*, all common far north in Rhodesia. Upon the flats hard by were *Pretræa eriocarpa* and *Triumfetta trichocarpa*, and under cultivation were fields of *Arachis hypogæa*, the "nuts" nearly ripe. It seems likely that the Magaliesberg range may afford a convenient demarcation-line when further experience permits an attempt at delimitation of Transvaal species.

Several weeks in June were spent in the Greylingstad district, about sixty miles to the south-east of Johannesburg. There are large hills in this neighbourhood composed of ancient basic laval flows; this district probably carries a more varied flora in spring and summer than is seen around Johannesburg. Where unburnt the veld was dry and brown. It was noticeable that two plants so widely diverse as an Asclepiad, *Raphionacme Galpini*, and a Composite, *Dicoma anomala* var., had analogous devices in their method of seed-distribution. Both are procumbent. The follicle of *Raphionacme* splits, and its feathered seeds after extrusion form little heaps which lie upon the veld close by the parent. In the case of the Composite the densely-pappose achenes are tipped off the receptacle, and likewise form little heaps close by. In both cases the seeds, well adapted for flight, lie entangled among the surrounding herbage, and so their dispersal is damped-down. The idea may be to obviate too broad a distribution, conceivably undesirable, as separating individuals too widely to admit of ready cross-fertilization. Where the heap is caught up by a gust of wind, the individual achenes would be likely to be dropped in close neighbourhood.

Eucomis sp. (1328, 1329), is common upon the open veld, and also in precipitous places upon the hills round about. No. 1328 is the veld form. No. 1329 the hill form, which has larger scape and leaves. In both forms, as the seeds are ripening the scape undergoes a curious change, becoming gradually tapered-off to a point, so as to resemble a marlin-spike. Thus pinched off from the fast-withering parent plant, the scape, in the case of the veld form, lies upon the veld alongside, to little purpose, as it would seem. When, however, as in the hill form, the plant is growing upon a steep slope, the extruded scape rolls down hill, and may so scatter its seed. Such dispersal alone would have resulted in the plants all being at the foot of the hill. But they are plentiful at the higher levels, nevertheless, and, as the seeds carry no sail, animal agency must be called in to get them up the hill again.

Barleria macrostegia (7245). — The grouped capsules with their

large enclosing bracts form a short sausage-shaped mass which, when the fruits are ripe, breaks off from the creeping parent stem, when it is free to roll about the veld, and this it does. In wet weather the roll relaxes, exposing the capsules, and it is likely only then that the capsules discharge their seeds.

Crabbea hirsuta (1244).—This fruit with enclosing bracts differs widely in shape from the last-named, forming a flattened globular mass. It separates from the prostrate stem of the parent, and is then blown about the veld. It is probable that in wet weather the bracts fold downwards to give exit to the seeds. Here, as in the case of *Barleria macrostegia*, the masses remain tightly contracted so long as the weather continues to be dry, or until they encounter moist ground.

In the rayed Composites, in which, as so often happens, the ray-florets are female with the male element more or less aborted, it is often interesting to compare the style and stylar arms of the ray-floret with the style and stylar arms of the bisexual disc-floret. The style of the disc-floret has to strike a compromise between its two functions of brush and stigma. In the female ray-floret, where there is greater simplicity of function, one may probably more clearly see the type-distribution of the stigmatic lines. The stigmas of the ray-florets of a capitulum are often receptive when the outer disc-florets are expanding; as these are universally protandrous, the ray-florets will be the earliest fertilized; their peripheral position is also in their favour as exposing them to less crowding. *Othonna* probably marks an advanced point upon such a road.

Gamolepis laxa (752).—The ovaries are often infested with grubs, from which the capitulum appears to be indifferently protected. In repelling aerial insect-attack one notes how many Composites have their ovaries effectually fenced in various ways, notably by close packing of the florets upon the receptacle; tight spring-light clasp of the involucre; glandular emergences upon the corolla-tube; and, most effectually of all, by the pappus, whether barbed or glandular.

Little rain falls during the winter months, and so it happens that the dead leaves are dry leaves, not undergoing the wet rot of moister climates. Where there is little difference of tension between the two surfaces of the dead leaf, it may show a simple undulation. Again, the edges are often rolled or curled inwards towards the midrib. There may be a spiral twist of the blade, or a rolling along the length of the midrib. Where one side is woolly, the curling is usually away from the woolly side, but exceptions were noted. Leaves of the veld with white, woolly under-surfaces may thus come to be much more conspicuous in death than in life.

A small Cucurbit, with ripe gourd of bright yellow, and about the size of a hen's egg, is plentiful upon the veld. The gourds appear to furnish food to field-mice or shrews, which gnaw their way in to the pulp. One may sometimes see little heaps of pips, mostly cracked open, at the entrances to their holes. The fittest pips would hardly be likely to survive in such case; in the great scheme of Nature probably a good general average is aimed at, and

not, what we might be disposed to esteem, the finer or more perfect.

Panicum sp. (1319). — The main floral axis snaps off near the base, so that the whole inflorescence is carried off by the wind. In sheltered holes or trenches, or in pools of a stream, one may see great numbers of these heaped-up together. Although many of the glumes examined were found to be empty, so universal is the case, that I suspect the breaking-off has as its object the distribution of the seed.

Bidens pilosa is one of the commonest weed-pests of the country, and there is little cultivated land without it. Sometimes one finds it growing at the bottom of holes in isolated places far out upon the veld. Hard by one may often see bones or a fleece pointing to the distributing agent.

The early closing of *Gerbera*—about 2 p.m.—was noted in a previous paper. This may be with a view to the protection of its pollen from rain, as the storms of its season rarely come on before late afternoon.

Landolphia capensis Oliv. (707).—The fruit is edible, and is ripe in March. It is coloured something like an apricot, but more brilliantly; it is, however, smaller in size, and more oval. It has a subacid pulp. The Boer children appear to like it, as I found them collecting it.

Note.—The determinations of the plants collected have been carried out by the staff of the British Museum and Mr. Spencer Moore. I cannot too heartily thank these gentlemen for the ready help and encouragement they have always given me, wanting which much of my collecting must have been a mere groping in the dark.

EPIPACTIS ATROVIRIDIS W. R. Linton.

By Arthur Bennett, F.L.S.

In the *Flora of Derbyshire* just published the Rev. W. R. Linton figures this as a new species, which he describes as follows:—

"This plant is in some respects intermediate between *E. latifolia* and *E. atrorubens*. It has the broad rounded leaves of the former, but rather more numerous lanceolate leaves between the lower leaves and the flowering spike; the label is furnished with two side hunches and one median linear hunch descending lower than the side ones; in size and robustness it is like *E. latifolia*; its flowers are not rose-coloured, or not so much so as in *E. atrorubens*. *E. media* of Bab. Man. is considered by J. Freyn (B. E. C. Rep., 1897) to be merely a form of *E. latifolia*, which view is held also by Rev. W. H. Purchas (J. B., 1885, 201), "the larger and more general plant which Prof. Babington pointed out to me as his *E. media*, but which better answers to his description of *E. latifolia*, *E. media* Bab. Man., 1874; *Watson*, Cyb. Brit., 1847."

In his *Flora of Herefordshire* (p. 298) the Rev. W. H. Purchas, quoting from his paper in this Journal for 1885, p. 201, expresses the opinion that many of the so-called specimens of *E. atrorubens* Schultes do not belong to the original *E. ovalis* of Babington, but represent a form of the genus that holds a place between the original *ovalis* and the narrower forms of *latifolia*. I have for a long time been convinced that Mr. Purchas was right, by the comparison of specimens from every locality in Britain recorded for *E. ovalis*, and these with many European specimens from wide areas. The original *ovalis* does indeed seem to stand fairly apart, yet as soon as you compare the Herefordshire with the Westmoreland so-called *ovalis* and with specimens named *media* by Babington and others, it becomes evident that there is no actual stopping-point; they represent phases of variation which, regarded as of specific value, would render the limitation of species in the genus impossible. In woods that are cut down at stated intervals, the *epipactis* of the succeeding year will have very wide leaves; as the underwood grows the leaves will become sensibly narrower, while the *latifolia* would almost pass for *media*. I have specimens named *atrorubens* from Giggleswick Scar base, in which the leaves are half as wide again as Mr. Linton's drawing, and the lower bracts are eight times the length of the flower; I call it *E. latifolia*. At the other end I have a Settle specimen named *E. ovalis* Bab. gathered by Mr. Tatham, July, 1844, that has truly oval leaves, gradually merging into very small bracts at the base of the flowering spike; *all the floral bracts* are shorter than the flowers; in fact, it is more like *microphylla* than *ovalis*. Between these two extremes I have specimens of almost every degree of size, although the Settle 1844 *ovalis* stands apart from all. Many of the Great Orme's Head examples have leaves at the base that may be called subrotund, the next pair becoming oval or nearly so; with this some of the Co. Clare examples closely correspond, the Sutherland specimens being rather less rotund. With these specimens spread out before me, I do not see how Mr. Linton's plant can be considered specifically distinct; I should call it a variety, and would place under Mr. Linton's name specimens from Hereford, Westmoreland, and Silverdale, Lancashire. At Symond's Yat, W. Gloster, there occurs a plant sent me by Miss Armitage that is difficult to place; by the characters it is *atrorubens*, but its habit is more that of *atroviridis*. There is another plant from Brecon, gathered by Mr. C. B. Clarke, who notes on the label, "basal hunches crenate rugose; lips equalling sepals." In habit it is *atrorubens*, but the bracts are large, the floral (lowermost) twice the length of the flowers. These plants seem difficult to cultivate; I could not keep the Orme's Head plant through the winter. I hoped to see the effect of cultivation on the leaf and bract development, but failed.

SHORT NOTES.

Leicestershire Records, 1903.—The following flowering plants, not previously recorded as occurring in Leicestershire, or only sparingly distributed and rarely recorded, have been noted by myself during the season 1903:—*Papaver Rhœas* L. var. *Pryorii* Druce. Near Syston. This is undoubtedly the first recorded occurrence of the variety, the type being commonly found. The following have previously only once been recorded:—*Carum segetum* Benth. & Hook. fil. Hungarton, well established; previously recorded from Barrow-on-Soar. — *Euphrasia stricta* Townsend. Hilly ground, South Croxton, well established in two places; first found in the county at Hamilton Grounds, Barkby, by W. Bell, some weeks previously.—A. R. Horwood.

Atriplex rosea L. in Sussex.—I found this species growing on the foreshore at Southwick, Sussex, in September, 1900. Its continental distribution would render it a plant likely to be found on our southern or eastern coasts, since it is found in Germany, Southern Sweden, and France. But in this instance there is little doubt as to its being an introduced plant, since *Caucalis daucoides* grew with it. *A. laciniata* of British botanists has sometimes been recorded as *A. rosea*, but they are quite distinct species.—G. Claridge Druce.

Salsola Kali L. var. tenuifolia Moq.-Tand.—I gathered this on the foreshore at Southwick, Sussex, in September, 1900; my specimens agree with those distributed in Wirtgen's Herb. Plant. Select. etc., *Floræ Rhenanæ*, Fasc. vi. 252. When growing, its habit was quite unlike that of *S. Kali*, as it was a tall, slender plant without prickles. It was probably of foreign origin, since *Atriplex rosea* grew with it, and some rubbish had evidently been "dumped" there.—G. Claridge Druce.

Poa Chaixii Vill.—In 1902, when visiting Middleton Park, the seat of the Earl of Jersey, I was surprised to see the herbage of what I felt certain was this species growing in the plantations near the house, and eventually I found a portion of the panicle, which supported my belief as to its identity. The gardener, himself a botanist, who had lived there many years, was unaware of its being in any way introduced, either intentionally or accidentally, and from the portion of the ground where it grew being kept rather shortly mown, it might have escaped notice, or have been hurriedly passed over for *Luzula maxima* (*Juncoides sylvaticum*). Lord Jersey also had no remembrance of any grass-seeds having been sown there. This year it was allowed to flower, and I have a specimen over five feet high. From its occurring in what is practically a portion of the ornamental grounds of the house, its status there as a native species is most questionable, since it may have come with garden plants, or even with pheasant-food. As bearing upon the subject, the following note (dated 14 May, 1873), which is preserved in Prof. Babington's herbarium at Cambridge with the original

plant collected by Mr. A. Brotherston, who did such good work at the botany of Peebles, Selkirk, and Roxburgh, may be worth giving in full:—"Being at Springwood Park yesterday, I found *Poa sudetica* in considerable plenty and apparently wild, being growing on a steep bank and in level ground under old trees, which never could have been under cultivation owing to the steepness of it. If I had time I will search other woods in the district, where I have hopes to find it also. I got Mr. Wemyss, head gardener at Springwood Park, to go to the place where it was growing; he thinks it is truly wild. He has been upwards of twenty years here, and he says he cannot see any way how the seeds could be introduced. I sent [a] paragraph to the *Scottish Naturalist* to see if others had not found it in more satisfactory localities, but there is no notice of it yet. However, I have as little doubt now about its being truly wild as I have of the other grasses growing with it." In Berkshire the plant occurs in a remote copse on the Wiltshire border, where I think it may be native; and Professor Hackel favours that opinion. See Fl. Berks, pp. 578–9. I should not be surprised to hear of its being found in Gloucestershire or Somersetshire.—G. Claridge Druce.

Viola lutea in Somerset.—Mr. E. G. Baker has confirmed my identification of *Viola lutea* from Exford, Somerset. The plant was found by Arthur Lyons, of Weston-super-Mare, in the summer of 1901, and was sent to me for naming. It is a new record for the county.—E. S. Gregory.

Cestrum nervosum Mill. Dict. ed. viii. no. 3.—In *Index Kewensis* and elsewhere this is quoted as a synonym of *Tabernæmontana amygdalifolia* Jacq. It would appear, however, from the two named sheets in Miller's Herbarium (now in the National Collection) that under *Cestrum nervosum* were included two very different plants. One sheet, from Carthagena, is the *Tabernæmontana;* the other, which is not localized, is *Palicourea Pavetta* DC.—the *Psychotria Pavetta* of Swartz, who has himself written this name on the sheet. In his description (Prodr. 46) Swartz cites as synonyms of his plant *Lonicera foliis lanceolato-ovatis* Plum. Ic. 156, f. 1, and *Ceraso affinis*, &c. Sloane (Nat. Hist. Jam. ii. 96, t. 189, p. 4)—the latter, however, as an inspection of Sloane's specimen shows, must be referred elsewhere. Miller's diagnosis might apply to either species; his description better fits the *Tabernæmontana;* and he cites Carthagena as the locality; but Houston's descriptive phrase (in Miller's hand) is on the sheet with the *Palicourea.* "*Cestrum nervosum* in part" must therefore stand as a synonym of each.—James Britten.

Polygonum cuspidatum Sieb. & Zucc.—This fine shrubby plant, a native of Japan, often seen in gardens in the West of England, has begun to disseminate itself here and there by roadsides and in waste places, as at Church Stretton, Salop, where, in September last, I noticed it, abundantly in one place and sparingly in another. While it can as yet have no claim to be even partially naturalized, yet no harm can be done by placing on record the fact of its appearance, here and there, mingling with the native vegetation of the roadside. It is probable that twenty or thirty years hence it

will have so largely increased as to have the semblance of a truly indigenous production. In the same way *Mimulus Langsdorffii* has extended, as, for instance, on both sides of the small stream that intersects Carding Mill Valley, Church Stretton, where it is by far the most conspicuous and plentiful plant.—J. Cosmo Melvill.

NOTICES OF BOOKS.

Klebahn, H. *Die wirtswechselnden Rostpilze.* Berlin: Gebr. Borntträger, 1904. Pp. xxxvii, 447. Price 20 marks.

In 1865 De Bary published a paper bearing on the heterœcious nature of certain rusts. He had proved, by infection experiments, that the spores of an *Æcidium*—till then regarded as an autonomous genus—would, when sown on another host, produce uredospores and teleutospores, the rust form that did so much damage to cereals. The idea that such an interchange of hosts existed was not a new one, but what had hitherto been a matter of opinion among unscientific observers became a matter of fact and a basis for further research. Many workers, since his day, have been busy, in various parts of the world, tracing the rust from one host to another, always settling the question beyond dispute by infection experiments, so that now the number of heterœcious *Uredineæ*, of which the alternate hosts have been ascertained, amounts to 150. Klebahn gives a chronological list of these discoveries, but remarks that, even yet, we are but at the beginning of our knowledge of the life-histories of these fungi.

The subject matter of Klebahn's books falls into two divisions. The first part, occupying about 200 pages, deals with the history and theory of heterœcious rusts. He finds six different types of development occurring within the order according to the season at which the different forms of spores make their appearance on the host plants. He then discusses the methods of dissemination of Æcidiospores and Uredospores and the conditions most favourable to their germination, with an account of those rusts that have succeeded in growing without going through the whole life cycle.

The question as to the propagation of rust on cereals naturally occupies a good deal of attention, the rusts of these grasses being of such great economic importance. The persistence of the disease may be largely due to the universal cultivation of cereals, few of which are wholly "unrusted," and to the action of the wind, which has been found to carry heavier bodies than rust spores hundreds of miles. He examined microscopically the cotton wool that closed the opening of a glass case in which infection cultures were being carried on, and found many fungus spores, a large percentage of which were the Uredospores of cereals. Considering the wide-spread scattering of these spores, Eriksson's mycoplasma hypothesis appears to him an altogether unlikely and unnecessary explanation of the spread of the disease. No outbreak of rust need ever be looked on as mysterious or unaccountable. In some

cases which he records the fungus has been active for a year or two and has then disappeared, or it has persisted seemingly without the intervention of the alternative host. Eriksson has used similar facts in support of his theories, but Klebahn thinks that some natural explanation may easily be found to interpret such phenomena.

A long chapter is devoted to explaining culture methods, and the geographical relation of the different hosts is discussed. The data to hand on this latter point are rather confusing; the hosts belong not infrequently to different soil formations and grow in nature far apart, necessitating a distant transference of spores. The much-debated question as to the function of the spermogonia receives a due amount of attention, and an account is given of the various theories as to fertilization and to the fusion of nuclei in the teleutospore termed by Dangeard and Sapin Trouffy "pseudo fécondation."

The second part of the book takes up the different species of heterœcious rust in detail. A complete index of parasites and host-plants is also given.

The author tells us that the book grew under his hand as he collected notes bearing on his own investigations. A bibliography occupying some twenty-seven pages testifies to the amount of literature that exists on the subject scattered about in many magazines, and which he has searched through to amass his material. He expresses the hope that the recapitulation of what is known on this question will prove as useful to other workers in this branch of fungology as it has been to himself. It is safe to say that this hope will be amply justified. The book will prove a boon if not a necessity to all who desire to know what has been done, or to begin research in such an inviting field. No points of importance have been omitted, and the whole is arranged in an interesting and orderly sequence. Klebahn's own contributions are of great value. He has certainly earned the thanks of all fungologists, especially of those who are interested in rusts.

A. L. S.

Prodromus Floræ Britannicæ. Part IV. By Frederic N. Williams. Agent: C. Stutter, 110, High Street, Brentford. 30 Nov., 1903.

This part of thirty-two pages contains the account of thirty species; it finishes the genus *Hieracium*, to which is added a complete index of all the names of the species mentioned in this and the preceding part. Short notes are supplied, giving the *Hieracium*-list of the last edition of the London Catalogue, so that most of the names of the Catalogue which had not been otherwise dealt with are accounted for. Next follow the genera *Hypochæris*, *Taraxacum*, *Lactuca*, *Sonchus*, and *Tragopogon*, thus ending the family *Asteraceæ* (*Compositæ*) and the order *Astrales*. There have been given altogether 187 species in *Compositæ*, which cover about 189 pages, and compare with 234 species enumerated in the London Catalogue; if the same standard for comparison is maintained

throughout, it may be anticipated that the *Angiospermæ* will consist altogether of about 1500 species, and require as many pages.

The only other families in this part are *Dipsacaceæ*, with five species, and *Valerianaceæ* not quite finished; in the former of these two families the British botanist will observe that the genera *Succisa* Vaillant and *Trichera* Schrad. are adopted, and that the contained species are called *S. præmorsa* Aschers. Fl. Brandenb. p. 285 (1864) and *T. arvensis* Schrad. Cat. Sem. Hort. Götting (1814) respectively. In the case of the devil's-bit scabious the synonym *S. pratensis* Moench, Meth. Pl. p. 489 (1794), is quoted and discarded, with an apology :—"Ascherson's name for the plant, here taken up, is defended for the following reasons, When an author founds a new genns, or revives an old generic name, the specific names which he adopts for the plants transferred are not usually impugned, even though he has not preserved the old specific names in the new genus. In the present instance Moench's name is not taken up, because he neither founded the genus nor revived the name of *Succisa*, nor did he use it in the now current sense in which four years before him it was more correctly used by Necker. Moench's *Succisa* included also *Cephalaria* and part of *Scabiosa*." It is needless to point out that the doctrine enunciated in the latter part of the passage quoted, if generally recognized, would lead to undesirable consequences.

In the case of the field scabious, the generic name *Knautia* fails to be recognized for the following reason :—Linnæus described four species of *Knautia*. Their present names are *Scabiosa orientalis* Lag., *Scabiosa propontica* Lag., *Callistemma palæstinum* Hálacsy in Denkschr. Akad. Wien, ix. p. 477 (1894), and *Pterocephalus plumosus* Coult., Mém. Dipsac. in Mém. Soc. Phys. Hist. Nat. Genève (1824)." This statement, if correct, appears fully to justify the course taken; but on the other hand it may be urged that *Scabiosa orientalis* Lag. is retained in *Knautia* by Höek in Engler & Prantl, Nat. Pflanzenfam. iv. 4, p. 188 (1891); that the name *K. orientalis* is still valid; and that *K. arvensis* Coult. should therefore be the name of the British plant. Mr. Williams is to be congratulated on the well-sustained quality of his work. Great care has been taken in the use of words expressing colour.

W. P. Hiern.

BOOK-NOTES, NEWS, &c.

At the meeting of the Linnean Society on November 5th, 1903, Professor Weiss exhibited some preparations and photographs of a mycorhiza or mycorhizome from the Coal-Measures. They showed the existence in a small rootlike organ of fungal filaments presenting all the appearances of those found in the roots of many orchids and in the rhizome of *Psilotum*. In the outer layers of the cortex the hyphæ run along the inside of the cell-walls and form smaller and larger vesicles in some of the cells, comparable with those found in the mycorhiza of living plants. In the deeper layers of the cortex the contents of the cells are collected into a central dark mass con-

nected to the cell-walls by delicate strands some of which are clearly fungal hyphæ. These masses very closely resemble those described by Shibata in the mycorhiza of orchids. Small bodies, similar to the "sporangioles" described by Janse, are also met with occasionally. From the occurrence of these various stages Professor Weiss was inclined to infer that a symbiotic relationship existed between the fungus and the host-plant similar to that of an existing mycorhiza. With regard to the plant in which the fungus occurred, he was inclined to think that it might have been epiphytic, a view which would be supported by the absence of large air-spaces such as are found in the young roots of *Calamites* and in the rootlets of *Stigmaria*.

At the same meeting Mr. L. A. Boodle read a paper on the structure of the leaves of *Pteris aquilina* in relation to environment. It is well known that in dry exposed situations the bracken produces leaves of a hard dwarf habit, while in very sheltered localities the leaves are quite soft. This difference in external characters is accompanied by a difference in structural characters. The exposed leaf has a hypoderm and is a distinctly xerophytic "sun-leaf"; the other type of leaf is a pronounced "shade-leaf," having no hypoderm, and weakly developed palisade-tissue or no definite palisade. A similar difference may occur in different leaves of the same plant, or in different parts of the same leaf when shelter and exposure are sufficiently localized. A slightly xerophytic plant, when transferred to a greenhouse, produced shade-leaves only (though the illumination was fairly strong), and in these leaves the indusia were considerably reduced. The bracken is thus very plastic in its relation to environment.

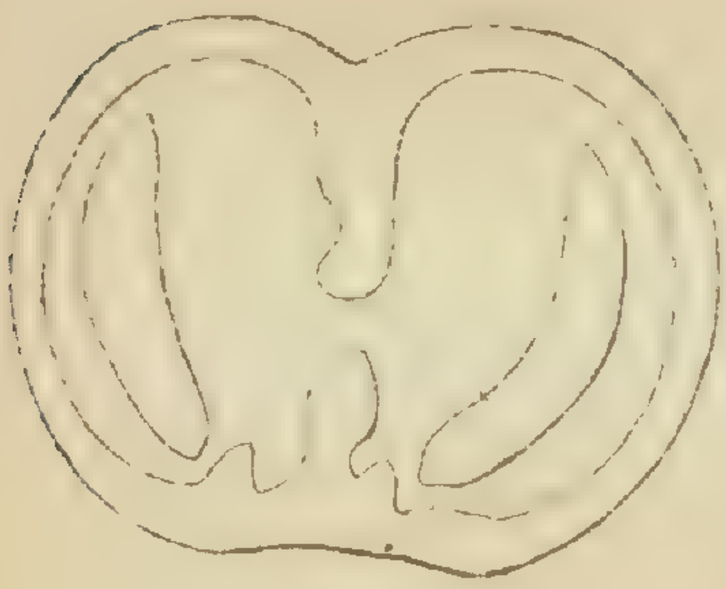
At the meeting of the same Society on 19th November, Dr. M. T. Masters, F.R.S., F.L.S., gave an abstract of his paper "A General View of the Genus *Pinus*," which was illustrated by specimens of cones, and lantern-slides. He stated that the object of the paper was to discuss the nature and value of the characters made use of in discriminating the various species of *Pinus*, and to supply additional points of distinction derived from the anatomical structure of the leaf and other sources. Reference was made to the tegumentary, mechanical, and other leaf-tissues, to the position of the resin-canals, the number of cells in the endoderm-layer, the shape of the central half-cylinder or "meristele," the simple or branched condition of the fibro-vascular bundle, etc. A comparison was made in many cases between the perfected structure of the adult foliage, and the imperfectly developed arrangement in the cotyledons and in the primordial leaves. By the aid of the "characters" above mentioned, together with those derived from the bud-scales, the number of leaves in the fascicle, the conformation of the male flowers, and of the cones and cone-scales, the author has framed an analytical table of the species, which, although mainly artificial, may be of assistance hereafter in facilitating the determination of the species and in arranging them in more natural groups. The two main divisions adopted are the thin-scaled Pines or *Tenuisquamæ*, and the thick-scaled Pines or *Crassisquamæ*, according to the relative thickness of the cone-scales. With these are associated so many

other differences that the groups in question appear to be natural. Further subdivisions are founded on the points of distinction previously mentioned. Notes are supplied relating to each of the seventy or more species, and intended to be complementary to the descriptions already published.

In the discussion which followed, a question was asked as to whether Dr. Masters had not something to say from the evolutionary point of view, as to the phylogeny and morphology of the genus in question. In reply he confessed that he could say no more in this connection than that when pine-cones are first met with, in the Permian, they are just as truly cones, as perfect in structure and development as those of the present day. The President, Professor Vines, subsequently observed that, in his opinion, Dr. Masters had acted wisely in refraining from the treatment of questions which, as age advances, are felt to be better left to younger men; for with increasing experience the conviction grew that facts alone are of substantial value, speculations cease to interest us, and we come to realize that a theory, however industriously and ingeniously established by one investigator, is pretty sure to be demolished no less conclusively by another.

"Early in the year Messrs. Methuen will publish a book by Mr. John Parkinson—'Paradisi in Sole Paradisus Terrestris'; or, 'A Garden of All Sorts of Pleasant Flowers.' This will be issued at 30s. net, but twenty copies will also be issued in Japanese vellum at 10 guineas each." This from the *Daily News*, which evidently regards "Mr. John Parkinson" as a living author. It is not so long since an enterprising press-cutting agency sent an application addressed "T. A. Kempis, Esq." to a publisher of an edition of the "Imitatio."

It is somewhat startling to find in the part of the *Icones Plantarum* issued last November two plates signed "W. Hood Fitch." No explanation is given of this posthumous publication—Mr. Fitch died in 1892—but we believe they were prepared for a paper "On the Apocynaceous Caoutchouc-yielding Plants of Malaya and Central Africa," stated to have been "read" by Sir W. T. Thiselton-Dyer (then Mr. W. T. T. Dyer) before the Linnean Society on June 15, 1882 (Proc. Linn. Soc. 1880–2, p. 35), but never published. They are excellent plates, although one is badly printed, and show how much botanical illustration lost by Fitch's death. The other contents of the number are of more than average interest; they include a remarkable new *Brachystelma* (*B. Johnstoni* N. E. Br.) with "very long woolly tails" to the petals; an exposition by Mr. Hemsley, with a good plate, of *Rhopalocarpus*, a genus of doubtful affinity placed by Engler and Prantl in *Flacourtiaceæ*; and the following new genera—*Androtium* Stapf (*Anacardiaceæ*, *Buchanania*), *Eucorymbia* Stapf (*Apocynaceæ*, near *Callichilia*), *Glumicalyx* Hiern (*Scrophulariaceæ*, near *Digitalis* and *Isoplexis*), *Xylophragma*, Sprague (based on *Bignonia pratensis* and *B. myriantha*). Mr. Hemsley continues his investigation of the Central American species of *Eryngium*; Miss Smith seems to us at her best when figuring this genus.



8

st.

2

4

1

9

5

3

ov

6

7

ov

S. Moore anal.
S. C. Hendrey del. et lith.

West, Newman imp.

Tremacanthus Roberti *S. Moore.*

MONS. A. ROBERT'S MATTO GROSSO PLANTS.—I.

The paper, of which the following pages form the first instalment, will comprise a list, together with descriptions of novelties, of the more interesting of the plants collected in 1902–3 in Matto Grosso and Northern Paraguay by M. A. Robert. M. Robert's expedition, which was generously supported by Mrs. Percy Sladen, widow of the late esteemed Zoological Secretary of the Linnean Society, established its head-quarters at Sant' Anna da Chapada, situated on the plateau which rises a few miles east of Cuyabá. Here the greater number of the plants and the considerable zoological collections now at the British Museum were obtained. In addition, M. Robert gathered plants at Cuyabá, Corumbá, Porto Murtinho, a station on the Rio Paraguay between Corumbá and the Rio Apa, and lastly at Terere in Northern Paraguay.

Of recent years much attention has been directed to the botany of Matto Grosso and Paraguay, work now being carried on, in connection with the former, chiefly by the admirable monographs of Swedish authors, with the latter by Professor Chodat and those who are assisting in his *Plantæ Hassleriannæ*. In spite of this activity, however, the collection before us yields a few novelties, and, as will be seen, is not without points of interest in respect of geographical distribution. It should be observed that, as most of the specimens are from Sant' Anna da Chapada, only localities other than that are given. The names of very common species are omitted.—S. M.

Acanthaceæ.

By Spencer le M. Moore, B.Sc., F.L.S.

Tremacanthus, *Acanthacearum* e tribu *Ruelliearum* genus novum. Calyx alte 5-partitus, lobis inter se æqualibus. Corollæ tubus elongatus, superne amplificatus, limbus æqualiter 5-fidus, lobis æstivatione contortis. Stamina 4, inclusa, tubo per paria inserta, didynama, addito staminodio parvulo omnino ananthero; antheræ 2-loculares, loculis æqualibus vel levissime inæqualibus, oblongis, basi sagittatis. Pollinis grana circuitu subsphæricalia, aliquanto compressa, faviformi-exsculpta (Wabenpollen), poris 3 indutis. Ovarium incomplete 2-loculare; stigmatis lobus alter abbreviatus, alter elongatus et lineari-lanceolatus; ovula quove in loculo 1–2. Capsula ovoidea, basi contracta, 1–4-sperma, valvis septo parallelis aliquantulum compressis. Semina maxime compressa, orbicularia, fere omnino glabra.—Suffrutex caule simplici vel parum ramoso. Folia integerrima. Flores solitarii vel bini, ex axillis superioribus orti spicam constituentes. Bractea minuta. Bracteolæ 0.

Tremacanthus Roberti, sp. unica. Caule erecto subtereti breviter furfuraceo-pubescente, foliis brevipetiolatis oblongo-ovatis basi apiceque obtusis subcoriaceis supra scabridis subtus furfuraceo-pubescentibus, spicis plerumque folia excedentibus plurifloris, foliis

floralibus anguste ovato-oblongis quam calyx multo longioribus, pedicellis brevibus, bractea subulata, calycis pubescentis lobis lineari-lanceolatis obtusiusculis sursum attenuatis, corolla extus puberula, limbi lobis obovatis obtusissimis, filamentis glabris, ovario ovoideo compressiusculo furfuraceo-tomentoso, stylo pubescente, ovulis quove in loculo 2 quorum 1 (raro 2) nonnunquam cassis, capsula calycem excedente glandulis minutis sessilibus nitentibus dense obsita.

Hab. Sant' Anna da Chapada; August. 468.

Caules saltem 20 cm. alt., e rhizomate crasso confertim oriundi. Folia basi nonnunquam parum obliqua, modice 4·0–6·0 cm. long., juxta medium 1·5–2·0 cm. lat., juniora vero 2·0–3·0 cm. × 1·0 cm.; costa media supra plana, subtus prominens; costæ secundi ordinis utrinque 5–7, parum arcuatæ, una cum nervulis reticulatis subtus eminentes; petioli summum 0·4 cm. long. Spicæ 5·0–6·0 cm. long. Folia floralia sæpissime 1·0–2·0 cm. long., saltem 0·5 cm. lat. Bractea 0·15 cm. long. Calycis lobi summum 1·0 cm. long, dorso carinati. Flores verisimiliter albi. Corollæ tubus 3·5 cm. long., deorsum 0·3 cm., sursum 1·0 cm. diam.; lobi 0·8 cm. long., 0·7–0·8 cm. lat. Filamenta majora 1·0 cm., minora 0·5 cm., antheræ 0·35 cm., ovarium 0·3 cm., stylus circa 2·0 cm. long., stigmatis lobus alter triangularis 0·07 cm., alter fere 0·3 cm. long. Capsula 1·5 cm. long., valvæ apice indurato-mucronatæ. Semina 0·4 cm. diam., grisea, albo-marginata, humectata margine floccosa; retinacula tenuia, vix 0·5 cm. long.

The affinity of this genus is obviously with *Pentstemonacanthus* Nees, which has a three-lobed calyx, five complete stamens, and a completely 2-celled ovary. *Blechum* Nees has with this last character no staminode, and at least three ovules in each cell of the ovary.

DESCRIPTION OF PLATE 456.—Fig. 1. *Tremacanthus Roberti* (nat. size). 2. Corolla, opened (nat. size), *st.* the staminode. 3. A pollen-grain. 4. Top of style, showing the short and the long lobes of the stigma. 5. Ovary, opened to show the ovules, in this case two in number. 6. Ovary more advanced. 7. The same, with the ovule (*ov.*) pulled forward to show the opening (*op.*) between the cells and an abortive ovule (*ab.*) in the opposite cell. 8. A transverse section of the ovary, showing the opening between the two imperfect cells. (Figs. 4–8 more or less magnified.) 9. Valve of capsule showing seed in position.

Ruellia Beyrichiana (*Dipteracanthus Beyrichianus* Nees). 468*a*.
R. Puri Mart. 351.
Justicia oreadum S. Moore. 444.
J. chapadensis S. Moore. 483.

Beloperone chapadensis, sp. nov. Suffruticosa caule erecto angulato ad nodos aliquantulum tumido pilis longis simplicibus albis necnon aliis brevioribus glandulosis intermixtis hirsuto, foliis brevipetiolatis ellipticis utrinque obtusis membranaceis in sicco pallide viridibus paginis ambabus pilis albis simplicibus hirsutis, petiolis hirsutissimis, cyma in thyrso terminali brevi plurifloro glanduloso-pubescente disposita, bracteis oblanceolato-oblongis bracteolas oblongo-lineares subæquantibus et quam calycis lobi plane brevioribus, calycis lobis 4 oblanceolato-oblongis obtusis glanduloso-pubescentibus trinervibus, corollæ extus glanduloso-

puberulæ tubo calycem multo superante, labio postico amplo superne gradatim leviterque attenuato apice bilobo, labio antico quam posticum angustiori late oblongo breviter 3-lobo lobis rotundatis obtusissimis, staminibus faucibus affixis, antherarum loculis inter se æquilongis oblongis pilosis loc. inferiore calcarato, pollinis granis anguste ellipsoideis, stigmate capitellato, capsula ——.

Hab. Sant' Anna da Chapada; July. 408.

Planta semimetralis verisimiliter rhizomate robusto sustentata. Folia 8·5–10·0 cm. long. (summa equidem 5·5 cm. vel etiam minus), 2·0–3·5 cm. lat., cystolithis inconspicuis; petioli ± 0·5 cm. long. Cyma circa 4·0 cm. long.; rami erecti, approximati, graciles. Pedicelli perbreves, sc. circiter 0·1 cm. long. Bractea 0·6 cm., bracteolæ 0·5 cm., calycis lobi 1·2 cm. long., hi 0·2 cm. lat. Corollæ tubus 3·2 cm. long., basi 0·3 cm. sub limbo 0·6 cm. diam.; labia 1·5 cm. long., labium posticum deorsum 1·2 cm. lat.; hujus lobi ovati, vix 0·2 cm. long.; labium anticum 0·6 cm. lat.; lobi 0·25 cm. long., laterales fere 0·25 cm., intermedius 0·35 cm. lat. Filamenta complanata, glabra, 1·2 cm. long. Antherarum loculi 0·22 cm. long.; loc. inf. calcar 0·08 cm. long., parum curvatum. Ovarium anguste ovoideum, glabrum. Stylus 5·0 cm. long.

Known by its hirsute stem and leaves, together with the glandular-pubescent cymes, four-lobed calyx, &c.

The four-lobed calyx is curious, though not enough, in my opinion, to warrant a new genus, even if the character be constant. The pollen diverges somewhat from the normal, inasmuch as the fine tubercles of the exine are prolonged as bands over part of the area adjoining the two pores; but isolated round masses of fine tubercles sometimes take the place of these bands, and then the grain has more of the ordinary look of *Beloperone* pollen. The "stoppers" are very conspicuous.

Compositæ.

By Spencer le M. Moore, B.Sc., F.L.S.

Vernonia eriolepis Gardn. 378.

Vernonia (§ Lepidaploa, Macrocephalæ) **Roberti,** sp. nov. Suffruticosa, erecta, caule gracili aliquatenus flexuoso angulato striato puberulo glabrove, foliis sessilibus brevissimeve pedunculatis linearibus vel anguste lineari-lanceolatis acutis vel acuminatis basi paullulum rotundatis glabris vel evanide scabriusculis coriaceis subnitentibus prominenter uninervosis nervulis eleganter reticulatis utrinque eminentibus, capitulis mediocribus circa 30-flosculosis in exempll. mihi obviis binis pedunculatis pedunculis puberulis capitulorum vetustiorum plus minus abbreviatis, bractea unica foliis simili nisi minore, involucri campanulati puberuli 5–6-serialis phyllis lanceolatis vel lanceolato-linearibus intimis lineari-oblongis exterioribus abbreviatis acuminatis interioribus gradatim longioribus acutis intimis sursum purpuratis, flosculis longe exsertis, achæniis cylindricis 8-striatis appresse pubescentibus, pappi setis scabridis sordide albis exterioribus quam interiora multoties brevioribus.

Hab. Sant' Anna da Chapada; October. 608*a*.

Planta 30–40 cm. alt. Folia 10–12 cm. lat., petioli dum adsint nec ultra 0·2 cm. long. Pedunculi capitulorum vetustiorum 0·5–vix 3·0 cm., juniorum fere adusque 6·0 cm. long. Capitula usque ad 1·8 cm. long. et diam. Involucri phylla exteriora 0·4–0·6 cm., intermedia 0·7–0·8 cm., intima circa 1·0 cm. long. Corollæ in toto 1·7 cm. long.; tubus deorsum attenuatus superne gradatim et leviter amplificatus; lobi lineari-lanceolati, 0·4 cm. long. Stylus exsertus, sub ramis parum incrassatus et pubescens. Achænia 0·22 cm., pappi setæ exteriores 0·1 cm., interiores 0·8 cm. long.

A *Vernonia* of familiar appearance, which, however, I have been unable to name either from specimens in this country or from the many descriptions published of recent years. It is nearest *V. grandiflora* Less., two-headed forms of which it much resembles, but the leaves are broad at base instead of acute, the heads are smaller and have fewer florets, and the involucral leaves are quite different.

V. desertorum **Mart.** 608.
V. simplex Less. var. *β latifolia* Bak. 656.
V. obovata Less. 539, 601, 661.
V. ruficoma Schlecht. 374, 394.
Piptocarpha rotundifolia Bak. 431.
Eupatorium lævigatum Lam. 349.
E. ivæfolium L. Paraguay. 847.
E. Christieanum Bak. Porto Murtinho. 877. Terere, Paraguay. 855.
E. Christieanum Bak. var. **pubescens**, var. nov. ramis foliisque dense pubescentibus, capitulis 11–12-flosculosis. Porto Murtinho. 875.
E. horminoides Bak. 458.
E. Vitalbæ DC. 484.
E. amygdalinum Lam. 348.
E. trigonum Gardn. 657.

Eupatorium (§ Campuloclinium) **Sladenianum**, sp. nov. Herba erecta caule fistuloso tereti striato setuloso, foliis oppositis lineari-oblanceolatis obtusis basi in petiolum brevem longiuscule attenuatis crenato-serrulatis trinervibus scabriusculis, capitulis campanulatis majusculis multiflosculosis ad apicem pedunculi elongati bracteis alternantibus distantibus linearibus onusti superne purpureo-pubescentis cymosis, cymis paucicapitulatis, pedunculis propriis capitula excedentibus vel subæquantibus, involucri phyllis circa 18 exterioribus ovatis vel ovato-lanceolatis obtusis pubescentibus puberulisve dilute purpureis interioribus lanceolatis vel linearibus decoloribus, stylis ex involucro longe eminentibus, achæniis angustis basin versus sensim attenuatis 5-angulatis glabris, pappi setis achænia paullulum excedentibus scabriusculis sordide albis.

Hab. Porto Murtinho; October. 871.

Stirps ultra semimetralis. Folia firme membranacea, in sicco viridia, modice 6·5–8·5 cm. long., 1·2–1·5 cm. lat., costæ utriusque faciei plerumque paullulum eminentes; petiolus ± 1 cm. long., ima basi dilatatus. Pedunculus circa 30·0 cm. alt., strictus, purpureus, hujus bracteæ 2·0–3·0 cm. long. (summæ equidem breviores),

et 0·25 cm. lat. Cymæ circa 5·0 cm. diam. Involucrum 1·0 cm. long., 1·3 cm. lat.; phylla exteriora summum 1·0 × 0·7 cm., exstant vero minores; phylla interiora sæpissime 0·2–0·3 cm. lat. Corollæ verisimiliter purpureæ, 0·6 cm. long., glabræ; lobi deltoidei, 0·06 cm. long. Stylus ipse corollæ æquilongus; rami 0·65 cm. long. Achænia 0·45 cm., pappus 0·5 cm. long.

Among recently described species of § *Campuloclinium* this comes closest to *E. stigmatosum* Chodat, which has small, ovate-oblong, incised-crenate setose leaves, and oblanceolate and acute outer involucral leaves.

E. Candolleanum Hook. & Arn. Cuyabá. 702*a*.
Solidago microglossa DC. Porto Murtinho. 870.
Marsea capillipes (*Conyza capillipes* S. Moore). Cuyabá. 701.

Baccharis (§ Aphyllæ) **curtifolia,** sp. nov. Verisimiliter suffrutex ramosissimus ramulis gracillimis sæpissime oppositis vel subopositis prominenter angulatis vix alatis microscopice furfuraceis demum glabris, foliis sæpissime abortivis subabortivisve summum brevibus subulatis obtusis integerrimis sursum recurvatis, capitulis fem. (masc. ignotis) parvulis cylindricis ad apicem ramulorum brevium solitariis vel 2–3-nis circa 25-flosculosis, involucri circa 6-serialis phyllis exterioribus abbreviatis ovatis vel ovato-oblongis interioribus longioribus lanceolatis vel lanceolato-linearibus omnibus obtusis, receptaculo breviter fimbrillifero, achæniis crudis turbinatis 10-striatis glabris, pappi setis pluriseriatis glabris albis involucrum paullo superantibus.

Hab. Porto Murtinho; January. 880.

Ramuli 0·1 cm. diam. vel etiam minus; ramuli capituliferi modice 0·5 cm. long. Folia 0·1–0·2 cm. rarissime 0·3 cm. long., firma, costa media dorso eminente. Capitula 0·5 cm. long., 0·3 cm. diam. Involucri phylla extima ± 0·15 cm. interiora vix adusque 4·0 cm. long., plurima margine ciliolata, in sicco dilutissime straminea, haud nitentia. Corollæ sursum leviter attenuatæ, 0·22 cm. long. Styli fere 0·3 cm. long.; rami fusci, 0·06 cm. long. Achænia vix 0·1 cm., pappus 0·35 cm. long.

Nearest *B. notosergila* Griseb., from which it can be distinguished by its inflorescence, its narrower capitula, shorter achenes and pappus, &c.

B. serrulata Pers. Cuyabá. 703*a*.
B. rufescens Spreng. var. *tenuifolia* Bak. 356. Differs from the type in having a white pappus, but there are specimens in the Kew Herbarium showing this peculiarity.
B. trinervis Pers. 427.
Lagascea mollis Cav. Corumbá. 799.
Ichthyothere Cunabi Mart. 580.
I. ovata S. Moore. 410.
Wedelia brachycarpa Bak. Porto Murtinho. 890. Terere. 854.

Viguiera squalida, sp. nov. Caule stricto rariramoso oligocephalo longitrorsum multistriato hispido-scabro deinde glabro, foliis inferioribus oppositis paucis junioribus alternis (omnibusve oppositis) sessilibus ovato-oblongis obtusis basi levissime rotundato-

cordatis margine denticulatis a basi 5-nervibus subcoriaceis utrobique scaberrimis vetustioribus glaucis, pedunculis folia excedentibus scabridis superne (præsertim sub capitulo) hispide pubescentibus, capitulis majusculis multifloseulosis, involucri 2-serialis phyllis lineari-lanceolatis acutis deorsum induratis striatisque sursum membranaceis pilis albis hispidis haud copiose onustis interioribus exteriora æquantibus vel quam ea brevioribus vel nonnunquam longioribus, ligulis 13, achæniis immaturis a latere compressis minute sericeis, pappi paleis 2 lanceolatis additis 2–4 brevioribus ovatis oblongisve basi breviter connatis.

Hab. Sant' Anna da Chapada; October. 640.

Planta fere metralis rhizomate valido copiose fibroso sustenta. Folia modice 7·0–9·0 cm. long., 3·5–4·0 cm. lat., pauca vetustiora necnon juvenilia minora; costæ utrinque conspicuæ, costulæ arctissime reticulatæ. Pedunculi adusque 22·0 cm. long. Capitulum pansum circa 6·0 cm. diam. Involucri phylla 1·0–1·3 cm. long. pauca interiora 0·8–0·9 cm. Receptaculi paleæ late oblongæ, obtusissimæ, dorso hispidulæ, 0·75 cm. long. Ligulæ oblongæ, circa 3·0 cm. long., apice 2–3-fidæ, raro integræ, 10–12-nervosæ, dorso puberulæ. Corollæ disci 0·5 cm. long.; lobi deltoidei, extus pubescentes, 0·1 cm. long. Achænia radii fere calva; disci 0·4 cm. long., horum paleæ longiores 0·2–0·25 cm., breviores 0·1 cm. long.

Nearest *V. discolor* Bak., which has leaves densely tomentose below, densely pilose involucres, and glabrous achenes, those of the ray florets provided with a well-developed pappus.

Spilanthes ureus Jacq. 635.
Calea cuneifolia DC. 532.
C. platylepis Sch. Bip. 680.
Pectis odorata Griseb. Porto Murtinho. 889, 893.

Rubiaceæ.

By Spencer le M. Moore, B.Sc., F.L.S.

Sickingia hexandra, sp. nov. Foliis ad normam generis parvis brevipetiolatis late ovatis obtusis vel obtuse acutis nonnunquam breviter cuspidatis basi rotundatis vel parum cuneatis leviter repandis utrinque eleganter et arcte reticulatis chartaceis cito coriaceis costis pag. inf. puberulis pubescentibusve exemptis glabris, cymis abbreviatis a foliis longe superatis, rhachi fulvo-pubescente, bracteis ovato-triangularibus obtusis extus pubescentibus intus glabris, floribus sessilibus, calyce cupulari ovario æquilongo imparite 6-undulato-dentato dense fulvo-pubescente, corolla calycem ter excedente lobis brevissimis 6 coronata æstivatione ad $\frac{2}{3}$ irregulariter rupta extus fulvo-pubescente intus supra staminum insertionem fulvo-villosa haud membranifera, staminibus 6 inter se liberis, filamentis exsertis villosis, ovario cylindrico fulvo-pubescente, disco subhemisphærico, stylo quam corolla paullo breviore glabro, stigmatibus lineari-oblongis obtusis, ovulis numerosis.

Hab. Corumbá; December. 715*a* and 771.

Ramuli teretes, cortice cinereo lenticellifero obducti, apicem versus solummodo foliosi. Folia 6·0–12·0 cm. long. (rarissime

14·0 cm. attingentia), 4·0–9·0 cm. lat., in sicco læte viridia; costæ pag. sup. planæ, pag. inf. eminentes; costæ secundi ordinis utrinque circa 20; reticulum utrobique prominens; petioli validi, supra late canaliculati, pubescentes, circa 0·7 cm. long. Stipulæ 0·5 cm. long., dorso juxta basin setulosæ. Cyma 3·0–5·0 cm. long. Bracteæ 0·2 cm., calyx 0·25 cm., corolla 0·75 cm. long. Corollæ lobi 0·1 cm. long., rotundati, setosi. Stamina ad 0·13 cm. supra basin corollæ affixa; filamenta 0·45 cm., antheræ 0·3 cm. long., hæ oblongæ. Ovarium fere 0·3 cm. long., 0·15 cm. diam., deorsum paullulum angustatum. Discus 0·08 cm. alt. Stylus 0·3 cm., stigmata 0·25 cm. long.

Distinguished, among other points, by its small leaves, short cymes, and hexandrous flowers with villous filaments.

Ferdinandusa elliptica Pohl. 618.
Sipanea pratensis Aubl. 333, 364.
Sabicea humilis S. Moore. 687.
Coccocypselum Condalia Pers. 573.
Thieleodoxa lanceolata Cham. 437.

Alibertia obtusa K. Schum. 425. I now think that my Nos. 37, 53, and 158, referred in Trans. Linn. Soc. 2nd Ser. iv. p. 370, to *A. myrciifolia* K. Schum., belong to this species.

A. amplexicaulis S. Moore. 491.
Basanacantha spinosa K. Schum. Corumbá. 714 *a*.
Tocoyena hirsuta Moric. 655.
Guettarda viburnoides Cham. & Schlecht. var. *pannosa* Müll. Arg. 639.
Chomelia ribesioides Benth. 582, 624.

(To be continued.)

R. BROWN'S LIST OF MADEIRA PLANTS.*

By James Britten, F.L.S.

(Continued from p. 8.)

Lotus glaucus. [The description in Ait. Hort. Kew. iii. 92 was drawn up from Masson's specimens. The citation of this in *Ind. Kew.* as "[Dryand. in] Ait." shows the undesirability of attempting to differentiate the contributions to Aiton's work, as the MS. description shows that it was the work of Solander. See Fl. Mad. i. 175 for notes on the various specimens in Herb. Banks.]

L. divaricatus [*L. hispidus* Desf.]
L. diffusus [*L. angustissimus* L.]
L. corniculatus [*L. neglectus* Masf. (*Pedrosia neglecta* Lowe).]
Medicago lupulina.
M. interrupta [*M. tribuloides* Desv. Brown's MS. confirms Lowe's suggestion that "*interexta*" was intended.]

---

* On p. 1, l. 4 from bottom, "409" is a misprint for "509"; the actual number of names in Buch's list is however 535, as some of the numbers are repeated.

M. ORBICULARIS.
M. MURICATA [*M. lappacea* Desv.]
POTERIUM SANGUISORBA [*P. verrucosum* Ehrenb.]
AGRIMONIA EUPATORIA.
ROSA GALLICA.
RUBUS FRUTICOSUS [*R. discolor* W. & N.]
R. PEDATUS [*R. grandifolius* Lowe.]
FRAGARIA VESCA.
POTENTILLA REPTANS [*P. procumbens* Sibth. This stands correctly as *Tormentilla reptans* in Masson's list, and Banks & Solander's specimens are so named by Smith in Herb. Banks. Brown, however, transcribed the name as *P. reptans*.]
PRUNUS LUSITANICA. "Ad ripas rivulorum. Cural de Romeiros. Gingeira brava."
CRATÆGUS CORIACEA [*Chamæmeles coriacea* Lindl.]
SAXIFRAGA GERANIOIDES. In rupibus Ribeira de Fayal [*S. maderensis* D. Don! in Trans. Linn. Soc. xiii. 414, which is based on Masson's plant.]
SEDUM DIVARICATUM. [This is the type of Ait. Hort. Kew. ii. 108, and is placed in Ind. Kew. following DC. Prodr. as a synonym of *Sempervivum aizoides*, from which, as Lowe points out, it is "perfectly distinct." The Kew Index introduces a further complication, as it gives Lowe's name, *Sempervivum divaricatum*, for the same plant as equivalent to *S. punctatum*.]
S. NUDUM. [The type of Ait. Hort. Kew. ii. 112 (1789). Lowe (p. 325) queries the identity of *S. suffruticosum* Sol. MSS. (a name not in *Index Kewensis*) with this, but a reference to the MSS. shows conclusively that the two are the same.]
SEMPERVIVUM ARBOREUM. ["A specimen in Banks Herb. marked '*Semperv. arboreum* Linn. Sp. Pl. 664, Madera,' collected by Banks and Solander, is assuredly not *S. arboreum* L., but a vigorous young plant, first beginning to branch before flowering, of *S. divaricatum*. This was however doubtless the sole original authority for *S. arboreum* of both Solander's and Buch's Madeiran lists." Lowe, Fl. Mad. i. 337.]
S. CANARIENSE. [Lowe (p. 336) rightly shows how the mistake arose of including this in the Madeiran lists. The correction of the misnomer to *S. glutinosum* was made by Solander in the Masson list, and by Dryander on the sheet in the herbarium.]
S. VILLOSUM.
S. GLANDULOSUM.
S. GLUTINOSUM. [These three species were described in Ait. Hort. Kew., and the type-specimens, collected by Masson, are in the Banksian herbarium. In DC. Prodr. *S. villosum* Ait. is placed as a synonym under *S. stellatum* Sm. The plants are retained as distinct in Ind. Kew., but Sims (Bot. Mag. t. 1809) is doubtless right in uniting them, in which case *villosum* has precedence. The dates are:

S. VILLOSUM Ait. Hort. Kew. ii. 148 (1789).
S. stellatum Sm. in Trans. Linn. Soc. i. 250 (1791) excl. synon. Seguieri.]

CALLITRICHE VERNA. [The Madeiran plant is referred by Lowe and Hegelmaier (in Herb.) to *C. stagnalis* Scop.]

MYRTUS COMMUNIS LUSITANICA.

[There are specimens and finished drawings by S. Parkinson of *Eugenia Jambos* L. and *E. uniflora* L., both (see Lowe, Fl. Mad. i. 268–9) commonly cultivated in Madeira. The former was collected "in Horto Fratrum Sti Francisci. Fructus maturos legimus medio Septembris 1768. Arbor in aliis hortis etiam culta ob fructus palato gratus."—Solander's MS. Lowe, however, says the fruit is scarcely ever admitted to the table, but is left to be eaten by children or devoured by birds.]

LYTHRUM JUNCEUM. "Foliis alternis linearibus, floribus hexapetalis dodecandris Fil. 6 brevissimis." [There can be no doubt as to the identity of this with *L. Græfferi* Ten., for which *L. junceum* is the earlier name. It was described in Russell's *Aleppo* (ed. 2, ii. 253 (1794); the types of the Aleppo and Madeiran plants are in the Banksian herbarium, and the descriptions in Russell and in Buch are practically identical with each other, and with that of Tenore. Dr. Koehne (in Bot. Jahrb. i. 318) gives 1819 as the date for Tenore's name, which he supersedes by *L. flexuosum* Lag. (Gen. & Sp. Pl. 16, 1816): he does not seem to have seen either of the descriptions of *L. junceum*, and cites the name only from Lowe's *Primitiæ*, published in 1831; nor does Lowe (Fl. Mad.) appear to have noticed its undoubted priority, as he retains *L. Græfferi*, placing *L. junceum* as a synonym. The names stand:

L. JUNCEUM Banks & Sol. in Russ. Aleppo, ed. 2, ii. 253 (1794), and in Herb.; Br. in Buch Fl. Canar. Ins. 197 (1825).

L. Græfferi Ten. Prod. Fl. Nap. lxviii. (1811–15); Lowe, Fl. Mad. i. 278 (1864).

L. flexuosum Lag. Gen. & Sp. Pl. 16 (1816); Koehne in Bot. Jahrb. i. 318 (1881).]

CACTUS OPUNTIA. "Prope Funchal." [*Opuntia Tuna* Mill.]

AIZOON CANARIENSE.

MESEMBRYANTHEMUM NODIFLORUM.

BUPLEURUM SALICIFOLIUM. "Frutescens, fol. lanceolatis, acuminatis, involucris lanceolatis, ramis lævissimis." [This is the first publication of the species, which stands in the Kew Index as of "Soland. ex Lowe in Trans. Camb. Phil. Soc. vi. (1838) repr. 21"; for this "Br. in Buch Canar. Ins. 195 (1825)" should be substituted. The descriptive phrase quoted was taken by Brown from Solander's MSS., but the publication was due to Brown.]

CAUCALIS ARVENSIS [*Torilis lævigata* Lowe.]

DAUCUS VISNAGA [*Ammi Visnaga* L.]

AMMI MAJUS.

SELINUM DIVARICATUM. "Fol. subbipinnatis, foliolis oblongis ternatis, trifidisque, incisis glabris, stylis persistentibus erectis longis." [*Œnanthe pteridifolia* Lowe.]

CRITHMUM MARITIMUM.

C. LATIFOLIUM. "Porto San Lorenço." [Brown's MS. shows that this should have been printed as a var. "*β latifolium*" of *C. maritimum*.]

Sium nodiflorum.
Imperatoria Ostruthium. "Ribeira Joao Gomez locis humidis."
Anethum Fœniculum [*Fœniculum vulgare* Mill.]
Sambucus lanceolata. [If this—the *S. maderensis* of Lowe—is to be retained as a species, it should take the name *lanceolata*. The synonymy is:

Sambucus lanceolata Br. in Buch, Canar. Ins. 195, n. 284 (nomen); Herb. Banks ex Lowe, Prim. 31 (1831)!
S. nigra β lanceolata Lowe, *l. c.*
S. maderensis Lowe, Prim. ed. 2, App. iv. (1851); Fl. Mad. i. 381 (1868).

In the Index Kewensis *lanceolata* is reduced to *nigra*, while *maderensis* is maintained; the two are of course identical.]
S. Ebulus.
Lonicera Caprifolium [*L. etrusca* Santi.]
Hedera Helix [*H. canariensis* Willd.]
Galium Mollugo [*G. productum* Lowe.]
G. rotundifolium [*G. ellipticum* Willd. *α. lucidum* Lowe.]
G. Aparine.
Rubia tinctorum [*R. angustifolia* L.]
Sherardia arvensis.
Valantia Aparine [*Galium saccharatum* All.]
Phyllis Nobla.
Scabiosa Columbaria [*S. maritima* L. var.]
Valeriana Locusta [*Valerianella olitoria* Poll.]
Centranthus Calcitrapa.
Geropogon glabrum.
Picris echioides.
Sonchus oleraceus.
S. pinnatus.
S. squamosus [a misprint for *squarrosus*: *S. fruticosus* L.]
S. dentatus [*S. ustulatus* Lowe.]
Lactuca sativa.
Leontodon nudicaule. ["The sheet in BH. [Banksian Herbarium] inscribed by Solander *propriâ manu* '*Leontodon nudicaule* Mscr. Madera' is truly the common Mad. *T. hispida* Roth, var. *a* Lowe *supra*. But *L. nudicaule* Sol. MSS. in BH. is a mixture of this with English *T. hirta* Roth. For though Solander in his MSS. says of his *L. nudicaule* 'Radix præmorsa,' it is distinctly fusiform or tapshaped in this his original Mad. spec. And his other localities, 'Revesby in Lincolnshire' and 'Petersfield in Hampshire,' show him clearly to have had mainly in view *T. hirta* Roth." (Lowe, Fl. Mad. i. 535.) The entry in the Kew Index is somewhat misleading: it ignores this confusion of two plants under one name pointed out by Lowe, and stands:

[Leontodon] *nudicaulis* [*nudicaule*] Banks, ex Lowe, in Trans. Camb. Phil. Soc. iv. (1831), 28; Soland. ex Lowe, Man. Fl. Mad. i. 535 = Rothii.

(*Rothii*, a name proposed, quite unnecessarily, for the plant by Ball in Journ. Linn. Soc. (Bot.), xvi. 543, is later reduced in the Index to *saxatile* Lam., the name to be retained for the species.)

The note quoted above from Lowe shows that the words "ex parte" should be added after "Soland." in the above reference, and that there should be a second entry in the Kew Index, *i. e.*

nudicaule Soland. MSS. ex parte, ex Lowe, Fl. Mad. i. 535 = *hirtum*.]

CREPIS CRENATA [a misprint for *crinita*. *Tolpis umbellata* Bertol.]

C. AURICULATA, C. COMATA.

C. auriculata and *C. comata* are reduced by Lowe (Fl. Mad. i. 557), after careful comparison, to one species, which he calls *Barkhausia hieracioides* F. Schultz, transferred this to *Crepis*, and Schultz Bipontinus renamed it *C. Lowei*, the name *hieracioides* being preoccupied in *Crepis*. It seems clear, however, that the species must stand as *C. comata*, for it is retained in the *Index Kewensis*, where *C. Lowei* also stands, that being the name first published with description under *Crepis*. The synonymy is as follows:

CREPIS COMATA Br. in Buch Canar. Ins. 194, n. 228 (1825), nomen; Banks & Sol. MSS. & Herb.! ex Lowe, Prim. 27 (1831); DC. Prodr. vii. 157 (1838).

Borkhausia comata Lowe l. c.; DC. l. c. (*Barkhausia*).

C. auriculata Br. in Buch, l. c. n. 224 (nomen); Sol. ex Lowe, Fl. Mad. i. 557 (1868).

B. hieracioides Lowe, Prim. 28 (1831); DC. l. c.

C. hieracioides F. Schultz in Flora, xxiii. 718 (1840); Lowe, Fl. Mad. i. 556 (1868); non aliorum.

C. Lowei Sch. Bip. in Webb & Berth. Phyt. Canar. ii. 461 (1850), excl. var. β.

C. DIOSCORIDIS, C. BIENNIS [*C. laciniata* Lowe.]

C. DENTICULATA [*C. divaricata* Lowe and *robusta* Lowe.]

C. MACRORHIZA [*Tolpis macrorhiza* DC. Lowe (Fl. Mad. i. 524) points out, and Watson (Godman, Azores, 184) concurs, that the *Tolpis macrorhiza* of Azorean catalogues was *T. nobilis*, and that the former had not been found in the Azores. Mr. Trelease (8th Report Missouri Bot. Gard. t. 33) figures as an Azorean plant what seems to be *T. macrorhiza* under the name of *T. nobilis* var. *petiolaris*. Our large series of specimens—including under *macrorhiza* the type of the species collected by Masson, Mandon's no. 160, and many from Lowe, and under *nobilis* specimens from Masson, Drouet, Nuttall (the type of his *Calodonta azorica*), and Hunt (distributed by Watson as *T. macrorhiza*), all of which agree with Seubert's figure (Fl. Azorica, t. 11)—seems to justify the retention of the two as distinct. It may be, however, that, as suggested by Mr. Trelease, all are forms of one extremely variable species; his figures (t. 34, figs. 1, 2) certainly bear little resemblance to Seubert's plate, or to any of the specimens in the National Herbarium. I should be inclined to place under *macrorhiza* a Flores specimen from Drouet labelled "*T. nobilis* Hochst.?"]

C. TENUIFOLIA, SUCCULENTA, FILIFORMIS [*Tolpis fruticosa* Schrank.]

ANDRYALA VARIA, PINNATIFIDA, DENUDATA [*A. cheiranthifolia* L'Hérit. according to Lowe (Fl. Mad.), who cites the above names under one or other of his forms of this very variable species. In *Index Kewensis* Lowe's name for the species (*A. varia*) dating from

DC. Prodr. vii. 245 (1838) is preferred to *A. cheiranthifolia* L'Hérit. (1784), and the earliest name, *A. glandulosa* Lam., is omitted. Lowe's note (Fl. Mad. i. 564) on the *A. pinnatifida* var. *β* of Ait. Hort. Kew. iii. 128, although accurate in its facts, is, I think, wrong in its conclusions. It is quite true that Solander's original description of *A. pinnatifida* was based on Masson's Madeira plant, but he subsequently extended it to two varieties, the latter—the *β* of Hort. Kew.—being, as stated in that work, the Teneriffe plant collected by Masson and referred to by Lowe. This view is adopted by De Candolle (Prodr. vii. 244) and by Schultz-Bipontinus in Webb & Benth. Phytogr. Canar. ii. 412, who limits the name *pinnatifida* to the var. *β* of Aiton. This, by the way, is not a Madeiran plant; Lowe (*l. c.*) proposed for it the name *canariensis*, which is not taken up in the *Index*. Lamark's description was from a plant in the Paris Garden: he says, "Elle provient, je crois, des graines du voyage du Cook." I find no specimens from Banks and Solander, nor is any *Andryala* indicated in Banks & Solander's MS. list.

The following synonymy is not intended to be exhaustive, but it tabulates the preceding remarks, and deals incidentally with names in or omitted from the *Index*:

A. GLANDULOSA Lam. Encycl. i. 154 (1783).
A. cheiranthifolia L'Hérit. Stirp. Nov. p. 35, t. 18 (1784); Ait. Hort. Kew. iii. 129 (1789); Lowe, Fl. Mad. i. 561 (1868).
A. tomentosa Scop. Delic. Insub. ii. p. 12, t. 6 (1786).
A. pinnatifida Ait. Hort. Kew. iii. 129 (1789), excl. var. *β*.
A. varia Br. in Buch Canar. Inseln, 194, n. 233 (1825), nomen; Lowe ex DC. Prodr. vii. 245 (1838), and in Trans. Camb. Phil. Soc. vi. 540 (1838).
A. denudata Br. in Buch Canar. Inseln, 194, n. 236 (1825), nomen; Sol. ex Lowe, Fl. Mad. i. 563 (1868).
A. robusta Lowe in Trans. Camb. Phil. Soc. vi. 540 (1838).
A. erecta Sol. ex Lowe, Fl. Mad. i. 561 (1868).
A. crithmifolia DC. Prodr. vii. 246 (1838); Lowe in Trans. Camb. Phil. Soc. vi. 540 (1838); non Ait.

A. PINNATIFIDA Ait. Hort. Kew. iii. 129 (1789), excl. var. *α*; DC. Prodr. vii. 244 (1838); Sch. Bip. in Webb & Berth. Phytogr. Canar. ii. 412 (1850).
A. canariensis Lowe, Fl. Mad. i. 564 (1868).]

A. CRITHMIFOLIA.
HYOSERIS HEDYPNOIS [*Rhagadiolus Hedypnois* All.]
HYPOCHÆRIS GLABRA.
CICHORIUM INTYBUS [*C. pumilum* Jacq.]
SCOLYMUS HISPANICUS [*S. maculatus* L.]
CARTHAMUS TINCTORIUS.
C. LANATUS.
C. INTEGRIFOLIUS [*Carlina salicifolia* L. f.]
C. CŒRULEUS [*Carduncellus cæruleus* L. *a. dentatus* DC.]
ARCTIUM LAPPA [*A. minus* Bernh.]
CARDUUS GALACTITES [*Galactites tomentosa* Mœnch.]
C. PYCNOCEPHALUS [*C. tenuiflorus* Curt.]

Cynara horrida [*C. Cardunculus β ferocissima* Lowe: the type of *C. horrida* Ait. Hort. Kew. iii. 148.]

Centaurea romana. "Var. foliis subpinnulatis, altero latere tantum decurrente." [*C. sonchifolia* L.]

C. salicifolia. [*C. Massoniana* Lowe in Hook. Journ. Bot. viii. 297—the type of the species.]

C. Calcitrapa. "In pascuis iuxta Coryssa."

C. solstitialis. "In campis iuxta Ilheo." [*C. melitensis* L.]

Artemisia arborescens [*A. argentea* L'Hér., founded on Masson's specimens.]

Gnaphalium rupestre. [This is the type of *Gnaphalium melanophthalmum* Lowe, Prim. 29, first placed under *Helichrysum* in Holl's list. The synonymy is:

Helichrysum melaleucum Reichb. ex Holl in Flora, xiii. 382 (1830).

Gnaphalium melanophthalmum Lowe, Prim. 29.

Helichrysum melanophthalmum Lowe in Hook. Journ. Bot. i. 35 (1834); Fl. Mad. i. 482; et auct.]

G. crassifolium [*Helichrysum obconicum* DC. This stands in *Index Kewensis* as of "Lowe ex DC. Prodr. vi. 181," but it was published earlier by Lowe in Hook. Journ. Bot. i. 35. The references are:

Helichrysum obconicum DC. Prodr. vi. 181 (1837); Lowe in Trans. Camb. Phil. Soc. vi. 538 (1838).

G. crassifolium Banks & Sol. MSS., ic. pict., et in Herb.!; Br. in Buch Canar. Inseln, 194, no. 255 (1825), nomen; Lowe in Hook. Journ. Bot. i. 35 (1834), et ex DC. Prodr. vi. 181 (1837); non L.

G. orientale [*H. orientale* DC.]

G. luteo-album.

Conyza saxatilis [*Phagnalon saxatile* Cass.]

C. rupestris [*P. calycinum* DC.]

Erigeron canariensis [a misprint for *canadensis*.]

Senecio viscosus [*S. vulgaris* L. and *S. sylvaticus* L.]

Cineraria populifolia [*Senecio maderensis* DC.]

Chrysanthemum lacerum [*C. pinnatifidum* L. f., established on specimens from Masson.]

C. Myconi.

C. segetum.

Matricaria Parthenium.

Anthemis Cotula.

Achillea Ageratum.

Buphthalmum aquaticum "Deserta" [*Odontospermum aquaticum* Sch. Bip.]

Coreopsis leucantha [*Bidens pilosa* L.]

Calendula arvensis.

Xanthium strumarium.

Filago germanica [*F. micropodioides* Lange.]

Campanula lobelioides [*Wahlenbergia lobelioides* Link.]

C. aurea [*Musschia aurea* Dum. Originally described from specimens from Masson; we have in the Department of Botany two drawings of the plant by Masson.]

C. Erinus.

Lobelia urens.

Erica arborea. "In summis montibus sæpe 40 ped. alt. caule 3 ped. diametro."

E. fucata. Scoparia. [*E. scoparia* L. This entry is explained by the fact that the plant was named *scoparia* in Masson's list, for which Solander substituted *fucata*; only the latter name appears in Brown's list.]

Clethra arborea. [Established in Ait. Hort. Kew. ii. 73 upon specimen from Masson, from whom we have two drawings.]

Vaccinium Arctostaphylos. "Uveira." [*V. maderense* Link, as stated by Lowe, but this name (which dates from 1821) must be superseded by the earlier *V. padifolium* Sm. in Rees Cyclop. xxxvi. no. 22 (1817). It is true that Smith includes under the name Pallas's Caucasian plant, which, as his specimens, now in the National Herbarium, show, belongs to *V. Arctostaphylos* L.; but the Madeiran plant stands first in Smith's description, and indeed his English name for the species is "Madeira Whortle-berry," which had been employed by Andrews in 1798. Willdenow and other authors included *V. padifolium* in their description of *V. Arctostaphylos*, but the *Index Kewensis* is in error in citing *V. Arctostaphylos* Willd. as equivalent to *V. maderense*; this is only the case with regard to the Madeiran plant. The description in the *Hortus Kewensis* relates to the Madeiran plant, of which the specimens in Herb. Banks bear the name at first assigned to it by Solander, who in his MSS. distinguished it from *V. Arctostaphylos*. Dryander subsequently added a note: "Nil differt a *V. Arctostaphylo*"; the addition of "the Levant" to the description resulted from this misidentification. The Banksian sheet includes specimens collected in Madeira by Banks and Solander and one from Kew Gardens, to which the plant was introduced by Masson in 1777.

The following is the synonymy of the species:

V. padifolium Sm. in Rees Cyclop. xxxvi. n. 22 (1817) (excl. Pall. citat.).

V. Arctostaphylos Ait. Hort. Kew. ii. 13 (1789); Andr. Bot. Rep. t. 30 (1798); Willd. Sp. Plant. ii. 353 (1799), ex parte; Brown in Buch Canar. Ins. 194 (1825); non L.

V. maderense Link, Enum. Pl. Hort. Berol. i. 375 (1821); DC. Prodr. vii. 567 (1839); Lowe, Fl. Mad. i. 580 (1868).

Statice Limonium [*S. ovalifolia* Poir.]

Anagallis arvensis.

Leucophylum excelsum [*Ardisia excelsa* Ait. Is, as Lowe points out (Fl. Mad. ii. 32), a misprint for *Leucoxylum*, as written in Brown's * MS. list. Neither of these names is in *Index Kewensis*.]

(To be continued.)

* Lowe says "*Leucoxylum* Sol.," but Solander called the plant *Heberdenia*.

LEICESTERSHIRE LICHENS, 1886–1903.

By A. R. Horwood.

When the *Flora of Leicestershire* was published in 1886, the number of species and varieties of lichens found in the county amounted to one hundred and seventy-seven. Since then a large number of additions have been made by various workers; and it appears desirable to place these on record.

Those responsible for the material which formed the basis of the list published in the Flora were the late Rev. Andrew Bloxam and the Rev. H. P. Reader, O.P. Father Reader continued to add many to the list until 1898, when he went to reside in another county. It is owing to his kindness and encouragement that I have been able to pursue my own recent researches.

The number of species and varieties new to vice-county 55, found or recorded between 1886 and 1903, is one hundred and one, which raises the total to two hundred and seventy-eight species and varieties,—about a quarter of the total number found throughout the British Isles.

The order adopted in the list is that employed by the Rev. J. M. Crombie in his Monograph on British Lichens (1894), in so far as the genera are concerned; but as that work has not been completed, the arrangement of species from *Lecidea* to *Verrucaria* is that of Leighton's *Lichen-flora*, third edition, 1879.

The following abbreviations have been employed throughout the list:—*B. M.* = British Museum Herbarium (all the records under this head are taken from Mr. Crombie's Monograph; the Leicestershire specimens therein mentioned being from the collection of the Rev. A. Bloxam); *R.* = H. P. Reader; *M.* = F. T. Mott, F.R.G.S.; *A. J.* = A. Bruce Jackson; *E. J.* = E. Jeays; *M.-D.* = Otto Murray-Dixon; *W.* = Miss M. E. Whitton; *Herb. Lit. Soc.* = the Herbarium of the Leicester Literary and Philosophical Society; *Herb. Mus.* = the Herbarium of the Leicester Corporation Museum (a general not a local collection). Where no other indication is given, I am myself responsible. The species to which an asterisk is prefixed are those first found by myself in the county.

Collemodium biatorinum Nyl. Charnwood Forest, *B. M.*

Leptogium lacerum Gray. — Subspecies *pulvinatum* Nyl. Twycross, *B. M.* — *L. tremelloides* Gray. No locality given, but undoubtedly from the county, and in all probability Market Bosworth, *Herb. Lit. Soc.*

Sphinctrina anglica Nyl. Twycross, *B. M.*

Calicium melanophæum Ach. — Var. *β ferrugineum* Schaer. Gopsall Wood, *B. M.*

Coniocybe furfuracea Ach. Twycross, *B. M.* Twycross, *Herb. Lit. Soc.*

Trachylia stigonella Fr. Gopsall Park, *B. M.*

Sphærophorus compressus Ach. No locality given, but undoubtedly Leicestershire, and probably Market Bosworth district, *Herb. Lit. Soc.*

Stereocaulon denudatum Fl. No locality given, but undoubtedly

Leicestershire, and probably Market Bosworth district, *Herb. Lit. Soc.*

Cladonia pyxidata Fr.—Var. *β pocillum* Fr. Charnwood Forest, Leicestershire, *B. M.*—*C. pityrea* Fl.—Charnwood Forest, *Herb. Lit. Soc.*—*C. fimbriata* Fr. No locality given, but undoubtedly Leicestershire, and probably Market Bosworth district, *Herb. Lit. Soc.*—Form 1, *macra* Cromb. Charnwood Forest, *B. M.*—Subspecies *C. fibula* Nyl.—Var. *β subcornuta* Nyl. Swithland, *M.-D.*—Form 2, *tortuosa* Nyl. Charnwood Forest, *B. M.*—*C. gracilis* Hoffm.—Form 3, *aspera* Fl. Charnwood Forest, *B. M.*—*C. cornuta* Fr. Gopsall, *B. M.* Gopsall Park, *Herb. Lit. Soc.*—*C. cervicornis* Schaer. Charnwood Forest, *Herb. Lit. Soc.* Swithland, *H. Mus.*—*C. furcata* Hoffm.—Var. *β corymbosa* Nyl. Charnwood Forest, *B. M.*—Var. *γ spinosa* Hook. Brandon (= Bardon) Hill, *B. M.*—Subspecies *C. racemosa* Nyl.—Form 1, *recurva* Fl. Charnwood Forest, *B. M.*—*C. pungens* Fl. Charnwood Forest, *B. M.*—Subspecies *C. muricata* Cromb. Charnwood Forest, *B. M.*—*C. squamosa* Hoffm. Charnwood Forest, *B. M.* Bardon Hill, *Herb. Lit. Soc.* South Croxton, Barkby Thorpe, Swannington.—Subspecies *C. adspersa* Nyl. Charnwood Forest, *B. M.*—*C. cæspititia* Fl. No locality, but probably Market Bosworth district, *Herb. Lit. Soc.* Swithland Wood, *M.-D.*—*C. macilenta* Hoffm.—Form 3, *scolecina* Nyl. Gopsall Park, *B. M.*—Var. *δ ostreata* Nyl. Charnwood Forest, *B. M.*—*C. Flærkeana* Fr.—Form *trachypoda* Nyl. Bardon Hill, *B. M.*

Cladina sylvatica Nyl.—Var. *γ alpestris* Nyl. Charnwood Forest, *B. M.*

Ramalina pollinaria Ach. Twycross, *B. M.* Theddingworth, *Herb. Lit. Soc.*; *R.* Kibworth, *W.*—Form *humilis* Ach. Gopsall, *B. M.*

Usnea florida Ach. Gopsall, *Herb. Lit. Soc.*—*U. dasypoga* Nyl. var. *β plicata* Nyl. Bardon, Etoby, *Herb. Lit. Soc.*—*U. ceratina* Ach.—Var. *γ scabrosa* Ach. Gopsall, *B. M.*

Cetraria aculeata Fr.—Form 1, *hispida* Cromb. Charnwood Forest, *B. M.* Charnwood Heath and Bardon Hill, *Herb. Lit. Soc.*; *R.*

Platysma ulophyllum Nyl. Bardon Hill and Gopsall Park, *B. M.*

Evernia furfuracea Fr. Twycross, Gopsall, *Herb. Lit. Soc.* Probably Bloxam's specimens.—Form 2, *scobicina* Nyl. Gopsall Park, *B. M.*

*Parmelia *tiliacea* Ach. Barkby.—*P. saxatilis* Ach.—Form *furfuracea* Schaer. Charnwood Forest, *B. M.* Evington, Barkby, South Croxton.—*P. sulcata* Tayl. Theddingworth, *Herb. Lit. Soc.*; *R.* Baggrave, *A. J.* Evington, Stoughton, Barkby, South Croxton. Kibworth, *W.*—*P. incurva* Fr. Charnwood Forest, *B. M.*—*P. acetabulum* Dub. Bilston, *Herb. Lit. Soc.* Theddingworth, *R.*—**P. exasperata* Nyl. South Croxton, Queniboro'. Kibworth, *W.*—*P. subaurifera* Nyl. Gopsall Park, *B. M.*—*P. fuliginosa* Nyl. Husband's Bosworth, Theddingworth, *Herb. Lit. Soc.*; *R.* South Croxton, Baggrave, Glen Gorse, Woodhouse Eaves. Kibworth, *W.*—*P. physodes* Ach.—Form 1, *labrosa* Ach. Charnwood Forest, Gopsall, *B. M.*—Var. *β platyphylla* Ach. Gopsall Park, *B. M.*

Peltigera rufescens Hoffm. — Form *prætextata* Fl. Buddon Wood Quarry, *M.*

Physcia parietina De Not.—Form 2, *cinerascens* Leight. Twycross, *B. M.* Barkby Thorpe, Stoughton. Kibworth, *W.*—Var. *β aureola* Nyl. Twycross, *B. M.*—*P. polycarpa* Nyl. Twycross, *B. M.* Market Bosworth district, *Herb. Lit. Soc.*—*P. lychnea* Nyl. Theddingworth, *R.*—**P. aipolia* Nyl. South Croxton.—Var. *γ cercidia* Nyl. Twycross, *B. M.*—*P. cæsia* Nyl. Twycross, *B. M.*—*P. ulothrix* Nyl. Gopsall Park, *B. M.*—*P. adglutinata* Nyl. Gopsall Park, *Herb. Lit. Soc.* (Bloxam).

Coccocarpia plumbea Nyl. Probably Market Bosworth district, *Herb. Lit. Soc.* (Bloxam).

Lecanora dissidens Nyl. Gopsall, *B. M.*—*L. citrina* Ach. Gopsall, *Herb. Lit. Soc.* (Bloxam). Old Humberstone, Queniboro'.—*L. luteo-alba* Nyl. Twycross, *B. M.* Twycross, *Herb. Lit. Soc.* (Bloxam).—*L. roboris* Nyl. Charnwood Forest, *B. M.*—*L. circinata* Ach. Congerstone, *B. M.*—*L. allophana* Nyl. Twycross, *B. M.*—*L. parisiensis* Nyl. Gopsall Park, *B. M.*—**L. rugosa* Nyl. Oadby.—Subspecies *chlarona* Nyl. Gopsall Park, *B. M.* Theddingworth, *R.* Scraptoft. South Croxton.—Var. *β geographica* Nyl. Desford, *B. M.*—**L. angulosa* Ach. South Croxton. Scraptoft.—*L. conizæa* Nyl. Gopsall Park, *B. M.*—*L. effusa* Ach. Gopsall Park, *B. M.*—**L. erysibe* Nyl. Scraptoft.—*L. gibbosa* Nyl. Markfield, *J.*; referred doubtfully to this species, found a week later at Barkby Thorpe.—**L. glaucocarpa* Ach. Hungarton, Queniboro'.—*L. fuscata* Nyl. Charnwood Forest, *B. M.*

Pertusaria multipuncta Nyl. Twycross, *B. M.*—*P. globulifera* Nyl. Charnwood Forest, *B. M.* Hinckley, Theddingworth, *R.* Baggrave Park, *Beeby.*—*P. amara* Nyl. Gopsall, *Herb. Lit. Soc.* (Bloxam). Theddingworth, Aston Flamville, Hinckley, *R.* Baggrave, Glen Gorse.—*P. velata* Nyl.—Form *aspergilla* Cromb. Gopsall Park, *B. M.*—*P. pustulata* Nyl. Gopsall, *Herb. Lit. Soc.* (Bloxam).—*P. leioplaca* Schaer. Gopsall Park, *B. M.* Gopsall Wood, Gopsall, *Herb. Lit. Soc.*

Lecidea ostreata (Hoffm.). Gopsall Park, *Herb. Lit. Soc.*—**L. parasema* (Ach.). Scraptoft. Oadby.—*L. tenebrosa* (Flot.). Charnwood Forest, *Herb. Lit. Soc.*—*L. myriocarpa* DC.). Theddingworth, *R.* Scraptoft, South Croxton, Queniboro', Braunstone. **saxicola* form. Queniboro'.—*L. grossa* (Pers.). Gopsall Wood, *Herb. Lit. Soc.*—*L. anomala* (Fr.). Gopsall Wood, *Herb. Lit. Soc.*—*L. lutea* (Dicks.). Gopsall Church, *Herb. Lit. Soc.*—*L. caradocensis* Leight. Gopsall Park, *Herb. Lit. Soc.*—**L. alboatra* (Hoffm.). Scraptoft.—*L. milliaria* Fr. Gopsall Park, *Herb. Lit. Soc.*

**Opegrapha vulgata* Ach. Stoughton, Scraptoft.

Stigmatidium crassum Dub. Gopsall Wood, *Herb. Lit. Soc.*

Arthonia cinnabarina (Wallr.). (?) Market Bosworth district, *Herb. Lit. Soc.*

Graphis scripta Ach.—Var. *serpentina* Ach. Gopsall Wood, *Herb. Lit. Soc.*

Verrucaria lævata Ach.—Var. *nigrata* Leight. Thurlaston, *R.*—**V. glaucina* (Ach.). Scraptoft. Hungarton.—*V. hymenogonia* Nyl. Husband's Bosworth, *R.*

LINCOLNSHIRE PLANT NOTES.

By E. Adrian Woodruffe-Peacock, F.L.S.

While I have been engaged in collecting a typical herbarium, with full notes of every rock-soil found in this county, a few facts of general interest have been observed, which are perhaps worth recording at once.

A caryophyllaceous plant has been known for the last twelve years on Lincolnshire limestone, cornbrash, and a mixture of this last rock with peat. It was always discovered in cereal crops after harvest, but was never found in flower or seed, though in luxuriant growth. The late Prof. Babington and half-a-dozen other critical botanists declined to risk their reputations by naming it for me. While gathering the species from Kellaway's Rock, on August 7th last, I for the first time came across a specimen in flower on the clear space where a roadside stone-heap had been. The plant proves to be a form of *Arenaria serpyllifolia*. It is absolutely decumbent, except when flowering or on the point of flowering, and very much branched from the crown of the root. Internodes very short indeed, except on the end of the flowering branches. Leaves distinctly petioled, hispid-setose, many hairs with tumid bases. Sepals ovate-lanceolate; petals as in type. The capsule I have not yet seen. Colour dark green, not the grey-green of type. This form is easily distinguished in the herbarium. I have only found it in quantity on the limestones, and only once there on the top of a wall. The type in small quantity may sometimes be found growing with it in the stubbles. The petioled leaves, with such very short internodes, made every botanist suggest a form of *Stellaria media* as the most probable solution of the enigma. Can this form be the winter resting-state of a monocarp? I know no instance, however, exactly like it in the case of a so-called annual.

The great oolitic clay of S. Lincs. 53 produces a form of *Epilobium hirsutum*, quite grey and hoary with dense hairs; it is found growing with the type. Can it be produced by diseased roots? The same question may be asked of the similar form (*incana*) of *Vicia Cracca*, from the cultivated estuarine silt of N. Lincs. 54. The plants in both cases were normal above ground, except for their heavy coating of hairs, which gives them a most striking woolly appearance, even at a distance. Late in the summer or autumn, the upper leaves of *E. hirsutum* type are drawn together by larvæ. They can hardly be said to be galled. This does not increase the hair growth, as in the analogous case of the jointed hairs on the leaves of *V. Chamædrys* galled by *Cecidomyia veronicæ*, and in a score of such instances that could be named. In all galled species, as far as my experience goes, the new hair-growth is local, but in the forms of *V. Cracca* and *E. hirsutum* the whole plant is equally densely hairy, and yet perfectly normal above ground in every other respect.

Arable peat supplies us in Lincolnshire with a curious form of *Galeopsis Tetrahit*. The corolla is white, with a purple patch on

the outside of the upper lip. The lobe of the lower lip is rarely notched as in *bifida*. The corolla is so short and so inwardly reflexed that it stands well inside the calyx-teeth, which are stiff and very sharp-pointed when dry. In harvesting in "the good old times" before the advent of the "self-binder," this form of "the hemp-nettle" was locally known as "the venom-nettle," from poisoning the hands of "the sheaf-tiers." It is not easily distinguished in the herbarium. The flowers of various species of *Galeopsis* are much eaten by the larvæ of an insect in Lincolnshire, and it is no easy matter to obtain perfect herbarium specimens. The nymph or imago, however, I have never been able to obtain for identification. Thinking that "the venom-nettle" forms were galled plants, unable properly to develop, I did not take more than passing notice of them for years. I now find, when every specimen of the type is ruined by larvæ in drying, the form referred to here is quite free from insect pests.

Another form of *G. Tetrahit*, from arable blown sand, I mentioned in *The Naturalist*, 1896, p. 181. It was sent to me as *Nepeta Cataria*, and superficially the flowers were wonderfully like a large form of that species; being white, with the upper lip tinged with yellow on the outer surface, and pink spots on the inner surface of the lower lip. Flowers nearer the shape of *G. versicolor*, but not quite so large. Though there was some quantity found of it at the time, it has never been seen since, although frequently hunted for on the old spot. Can it have been a mere floral monstrosity? It certainly was a thing of beauty, and scientifically of interest, for it seemed a half-way form between *Tetrahit* and *versicolor*. Has it ever been met with elsewhere?

REPORT OF DEPARTMENT OF BOTANY, BRITISH MUSEUM, 1902.

By George Murray, F.R.S.

The fine collection of Diatoms of the late Thomas Comber, of Parkgate, Cheshire, was presented to the Department by his widow. It consists of 2926 microscope-slides, 2225 photographic negatives and lantern-slides, and upwards of 500 photographic prints; of numerous samples of Diatomaceous deposits; of 52 volumes of MS. descriptions forming an illustrated catalogue; of several volumes of MS. notes, and 38 tracts. This carefully elaborated collection forms an important addition to the already immense series of Diatomaceæ in the possession of the Department.

The other additions to the collections by presentation have consisted of:—249 phanerogams and 1 cryptogam from India, from Major Prain; 80 phanerogams from South Africa, from Dr. S. Schönland; 379 phanerogams and 12 cryptogams from South Africa, from Capt. G. C. H. Barrett-Hamilton; 401 phanerogams and 7 cryptogams from South Africa, from Dr. Rand; 876 phanerogams and 114 cryptogams collected by the late J. W. Statter in

East Australia and also in the British Isles, from E. A. Benjamin; 14 specimens from South Spain and Tangiers, from Lord Walsingham; 5 specimens from Teneriffe, from Rev. R. P. Murray; 124 phanerogams and 6 cryptogams from Patagonia, from H. H. Prichard; 60 phanerogams and 19 cryptogams from China, from Dr. J. M. Dalziel; 8 specimens from India, from Miss M. K. Wall; 21 specimens of cultivated plants, from E. A. Bowles; 11 specimens of cultivated Orchids, from Sir Trevor Lawrence, Bart.; 2 specimens of cultivated plants, from J. Sparkes; specimen of *Helichrysum* and cone of *Pinus*, from Dr. M. T. Masters; 34 specimens from North Beluchistan, from A. H. Savage Landor; 1 phanerogam from Corea and 3 cryptogams from the Faroe Islands, from A. Bennett; 45 specimens of plants from the Cape, from Col. H. W. Feilden; 18 specimens from Nairobi, British East Africa, from A. Blayney Percival; 94 specimens from the neighbourhood of Johannesburg, from H. T. Ommanney; 5 specimens of cultivated plants, from F. W. Burbidge; 6 specimens of monocotyledons, from Miss E. Willmott; 3 specimens of cultivated plants, from Messrs. Veitch & Sons; 51 specimens from Syria, from Dr. Post; 552 phanerogams and 11 cryptogams from Tropical East Africa, from A. Whyte; 100 plantæ exsiccatæ Grayanæ from Dr. B. L. Robinson; 2 specimens of cultivated plants, from R. I. Lynch; 6 specimens of cultivated plants, from A. Worsley; 2 specimens of cultivated plants, from Rev. W. Dod; 3 specimens of orchids, from A. H. Kent; 3 specimens of *Ceropegia*, from Mrs. Brightwen; 28 tubes of Plankton material from the Atlantic Ocean, from Lieut. Woolridge; 8 Brazilian mosses, from Mons. A. Robert; a new freshwater alga from India, from Dr. Prain; spirit material of a freshwater alga from Rhodesia, from J. ffolliott Darling; 9 marine algæ from Bermuda, from Marshall A. Howe; a fungus from Lagos, West Africa, from — Strachan; 5 hepatics from the Sandwich Islands, from Prof. W. G. Farlow; 11 tubes of freshwater algæ, from the Superintendent of the Royal Botanic Gardens, Sibpur, Calcutta; 15 microscope-slides of diatoms from Socotra and from Munipur, from Lieut.-Col. H. H. Godwin-Austen; specimens of a fungus infesting a maritime Madeiran plant, from Miss F. Grabham; specimens of a New Zealand moss, from E. S. Salmon.

The following additions have been made by presentation to the British Herbarium:—103 specimens, from Arthur Bennett; 279 phanerogams and 1 *Chara*, from Rev. E. S. Marshall; 12 phanerogams and 2 cryptogams, from C. E. Salmon; 56 specimens, from G. C. Druce; 11 specimens of fruit and 2 of woods of British plants, from Clement Reid; specimens of *Splachnum Wormskioldii* from Teesdale, from E. C. Horrell; 13 rare hepatics from West Scotland, from S. M. Macvicar; specimen of *Isoëtes Hystrix* from Alderney, from E. D. Marquand; some microscope preparations of British diatoms, from Lieut.-Col. H. H. Godwin-Austen; specimens of *Kantia submersa*, from J. A. Wheldon; specimens of a rare mycetozoon from Merionethsire, from Arthur Lister; 4 new varieties of mosses, from H. N. Dixon.

The following additions have been made by exchange of dupli-

cates:—138 phanerogams and 5 cryptogams from various localities, from Prof. Hans Schinz; 10 phanerogams and 6 cryptogams, mostly from Sardinia, from Prof. Ugolino Martelli; 100 Kryptogamæ exsiccatæ, from the K.K. Naturhist. Hofmuseum of Vienna.

Among the additions acquired by purchase, special mention must be made of the herbarium of hepatics purchased from Mr. W. H. Pearson, consisting of about 9000 specimens. As being the collection upon which is based Mr. Pearson's recently completed 'Hepaticæ of the British Isles,' it is of the greatest importance to British botanists; and it is a most welcome addition to the previously inadequate herbarium of British hepatics preserved in the Department. The collection also contains the numerous types and the material elaborated by Mr. Pearson for his papers on the hepatics of New South Wales, Tasmania, Canada, Madagascar, and South Africa; and also numerous camera-lucida sketches and MS. notes.

The following have also been acquired by purchase:—Herb. Normale: fascicles xlii. and xliii., by Schultz (Dörfler); 275 phanerogams and 38 cryptogams, by Zenker; 19 specimens from Angola, by John Gossweiler; Flora Exsiccata Carniolica, centuries 1 and 2, by Paulin; set of European cereals, 218 specimens, by John Percival; Flora Polonica Exsiccata, fascicle ix., by E. Wolo-szczak; 388 phanerogams and 7 cryptogams, Plantæ Amuricæ, by F. Zaro; 344 phanerogams and 21 cryptogams from Georgia, by R. Harper; 96 phanerogams and 13 cryptogams from Costa Rica, by Ad. Tonduz; 100 specimens from Vancouver Island (including 8 cryptogams), by C. O. Rosendahl & Carl J. Brand; 240 specimens, Flora Bulgarica, by V. Stribrny; 395 phanerogams and 59 cryptogams from Gulf Coast, America, by S. M. Tracy; 993 phanerogams and 36 cryptogams from Tropical East Africa, by T. Kässner; fascicles i.–iv. of specimens from Transcaspia, by Sintenis; 544 specimens, Plantæ Australiæ Occidentalis, by E. Pritzel; 270 specimens from West Australia, by L. Webster; Gramineæ Exsiccatæ, fasc. vii.–x., Cyperaceæ, fasc. iii. & iv., 201 specimens, by A. Kneucker; 251 phanerogams and 15 cryptogams from Margarita Island, Venezuela, by Miller & Johnston; 134 phanerogams and 9 cryptogams from German East Africa, by Dr. Busse; 100 phanerogams and 5 cryptogams from Vermont, U.S.A., by W. W. Eggleston; 125 sketches of British Basidiomycetes, by Worthington G. Smith; 100 Bohemian mosses, by Bauer; 100 mosses of the Indian Archipelago, by Fleischer; 325 mosses from Chile and Patagonia, by Dusén; 125 micro-fungi, by Vestergren; 75 North American algæ, by Collins, Holden, & Setchell; 200 North American fungi, by Bartholomew, Ellis, & Everhart; 50 American algæ, by Tilden; 100 fungi of Saxony, by Krieger; 400 Italian fungi, by Saccardo; 100 Uredineæ, 50 Ustilagineæ, 150 Phycomycetes and Protomycetes, by Sydow; 50 Ascomycetes, by Rehm; 30 algæ from the Bosphorus, by Richards; and 40 microscope-slides and 23 herbarium specimens of British micro-fungi, by Miss A. L. Smith.

SHORT NOTES.

Filago minima Fries.—On bare sandy spots among the pine-woods of Finchampstead, Berks, between Wokingham and Wellington College, there grows a curious form of *Filago minima*. It is exceedingly attenuated in all its parts. Its slender, thread-like stems are from one and a quarter inches to five inches high, the greater number averaging three inches. It is generally *unbranched*, but sometimes bears two or three stems from the base, branched or unbranched. The tiny flower-heads are usually placed *singly* up the stem, four or five of them; occasionally there are two heads together, rarely three, not more. In October, 1903, I found it in abundance, and also *Centunculus minimus* L. The plants of the latter were the largest I have ever seen. Specimens of this little *Filago* are deposited in the National Herbarium; I shall also be glad to send some to any applicant.—Eleonora Armitage; Dadnor, Ross, Herefordshire.

Westmoreland Plants. — Last August the Rev. H. J. Riddelsdell and myself spent a couple of days at Kirkby Stephen, in a search, which proved fruitless, of *Saxifraga Hirculus*, which used to grow at the juncture of the Balder Brook. Near Barras Station we were fortunate enough to meet with a *Hieracium* which the Rev. W. R. Linton refers without doubt to *H. cumbriense* F. J. Hanb. This hawkweed was first found on Dolly Waggon Pikes, Cumberland, by the Rev. H. E. Fox, and briefly described in this Journal for 1893, p. 17, by Mr. Hanbury (under the letter *a*); as further material was not forthcoming, no more elaborate description has been published, although Mr. Hanbury later (Journ. Bot. 1894, 226) named it *H. cumbriense*. This Barras locality, which is on limestone, is therefore a new county record. On account of the insufficient material, *H. cumbriense* is omitted from the enumeration of Hieracia in Mr. F. N. Williams's *Prodromus Floræ Britannicæ*, although he refers to it on p. 178. Near Barras we also gathered *Euphrasia nemorosa*, *Cochlearia alpina*, *Arabis hirsuta* (without personal authority in Top. Bot.), *Sagina nodosa*, *Draba incana*, *Gentiana Amarella* L., and *Crepis hieracioides* Waldst. & Kit. *Sedum villosum* grew on the Fells. Near Kirkby Stephen, in a wettish field, occurred *Scirpus Caricis*, *Glyceria plicata*, and *Festuca rubra* L., all new county records; also *Rosa glauca* Vill., *Mentha piperita* L., *Cratægus monogyna* Jacq. (the only form seen), *Carex paludosa* Good., *Orchis maculata* var. *ericetorum*, *Thymus Chamædrys* Fries, *Alchemilla vulgaris* var. *filicaulis*, *Vicia angustifolia*, *Arctium nemorosum*, *Salix Smithiana*, *S. purpurea*, *S. cinerea*, *S. triandra*, and *S. pentandra*—G. Claridge Druce.

[The present seems a favourable opportunity for expressing the regret widely felt and generally expressed among British botanists at the cessation of Mr. Hanbury's *Monograph of British Hieracia*. The latest issue (part viii.) appeared in March, 1898, and, so far as we can ascertain, there is no prospect of the continuance of the work.—Ed. Journ. Bot.]

Ctenomyces serratus: a Correction. — Mr. E. S. Salmon has drawn my attention to the descriptions and figures of *Arthroderma Curreyi* Berk. published by Currey in Quart. Journ. Micros. Sci. ii. 241, t. ix. figs. 6–8 (1854), and again described and figured by himself in Journ. Quekett Microscop. Club, ser. 2, vii. 374, t. 20, figs. 11–13 (1900). Each time the fungus is described and figured as a Hyphomycete with torulose hyphæ and sessile globose conidia. Mr. Salmon has kindly allowed me to see a preparation of his fungus, and also a specimen collected by Dr. Cooke and now in the Kew Herbarium. They are identical with the Ascomycete *Ctenomyces serratus* Eidam, the description of which was published in this Journal for 1903 (p. 257). None of the British specimens show the comb-like resting mycelium or the white fluffy conidial stage described by Eidam; there is only the outer peridium and the central mass of asci. *Arthroderma Curreyi* has of course many years' priority, and must stand as the name of the plant. The asci, though minute, were very distinct in the specimen submitted to me, and it did not occur to me to look for previous records among the Hyphomycetes.—A. Lorrain Smith.

Vaccinium vacillans. — In recent American floras this name is attributed to Kalm, on faith of a reference in Torrey's *Flora of New York*, i. 444 (1843), where the plant was first published (misspelt *vaccillans*), to "Kalm, MSS. in Herb. Banks." In *Index Kewensis* it stands as "Soland. ex A. Gray Man. Bot. N. U. St. ed. i. 261" (1848), and this, though not the first publication, gives the true author of the name. We have in the National Herbarium two sheets—one from Hort. Kew, 1774, the other from Hort. Fothergill—named by Solander, and in his MSS. there is a full description of the plant. There is, however, nothing to connect the plant in any way with Kalm, either by specimen or MS., and the attribution to him is clearly a mistake. If the Decandollian law, that "the author who first *published* the name" should be quoted as its authority, were followed, it would stand as *V. vacillans* Torr.: it cannot stand as "Soland. ex Torr.," for Torrey makes no mention of Solander, and to cite it as of Kalm is manifestly an absurdity.—James Britten.

Discelium nudum Brid. in Northants. — I found this rare moss in a clay riding in Stowe Wood, Northamptonshire, in September of last year. It was in very young fruit, and was unfortunately almost entirely destroyed at a later date by a combination of wet weather and fox-hunting. As this is, so far as I am aware, the first occurrence of this moss, so far as Great Britain is concerned, south of Cheshire, it may be worth recording here.—H. N. Dixon.

Pottia Heimii Fürnr. inland. — I gathered this, perhaps next to *Grimmia maritima* our most distinctly maritime moss, on a gravelled walk in the grounds of Rushton Hall, Northants, in July last; it was, as usual, richly fruiting, and covered several square yards of ground. On enquiry, I was told that salt had been put down to kill weeds at that spot, some time previously. *P. Heimii* has been recorded in the neighbourhood of saline springs in a few inland

localities, but there is nothing of the kind to account for its occurrence in the above station. It occurs in abundance at Hunstanton, and probably in other localities about the Wash, but the nearest possible station in proximity to the sea would be at least forty miles distant.—H. N. Dixon.

Wild Flowers at a Railway Station.—It may interest some of your readers to know that while waiting for a train at an important station in Cornwall on September 7th, 1901, I counted fifty-two species of flowering plants and ferns, in flower or fruit, without going beyond the platform on either side. The fact that the station is in a cutting, with a good deal of bare or nearly bare rock exposed, accounts for the presence of most of the ferns (eight species) and many of the other plants. Among the more interesting plants observed were—*Dianthus Armeria* (introduced many years ago), *Epilobium lanceolatum* (frequent in the district), *Spiræa salicifolia* (of course planted), *Solidago Virgaurea*, *Jasione montana*, *Scrophularia nodosa*, *Stachys arvensis*, *Teucrium Scorodonia*, *Luzula sylvatica*, *Pteris aquilina*, *Lomaria Spicant*, *Asplenium Adiantum-nigrum*, *Athyrium Filix-fœmina*, *Scolopendrium vulgare*, *Lastræa Filix-mas*, *L. dilatata*, and *Polypodium vulgare*. There is reason to believe that all fifty-two, except the *Dianthus* and *Spiræa*, are of spontaneous growth; and it may be mentioned that *Linaria viscida*, which I have seen growing between the metals in many parts of England and the Continent, was conspicuous by its absence.—H. Stuart Thompson.

Bromus maximus Desf. in West Lancashire. — On Saturday, October 31st last, Mr. Charles Bailey pioneered me to the place on the sandhills to the south of St. Anne's-on-Sea, where *Ambrosia artemisiæfolia* L. was found by him to be so well established. Hard by, a large and very tall green tuft or two of a handsome *Bromus* attracted us both simultaneously, and recalled at once to my mind the appearance of *B. maximus* Desf. in a similar lonely situation at Millbrook, St. Aubin's Bay, Jersey. Upon examination this surmise has proved to be a correct one.—J. Cosmo Melvill.

NOTICES OF BOOKS.

Flora of the Southeastern United States. By John K. Small, Ph.D. Being descriptions of the Flowering and Fern Plants growing naturally in North Carolina, South Carolina, Georgia, Florida, Tennessee, Alabama, Mississippi, Arkansas, Louisiana, and the Indian Territory, and in Oklahoma and Texas east of the one-hundredth meridian, with analytical keys to the Orders, Families, Genera, and Species, and the geographical distribution of each species. Large octavo, cloth, pp. xii. + 1370. Price 3 dols. 60 cents. Published by the author, Bedford Park, New York City.

This handsome and well-printed volume is an important addition to our collected knowledge of North American Botany, taking

rank beside Dr. Britton's *Manual of the Flora of the Northern States*. Dr. Small has very wisely followed the Northern *Manual* in its principal features; the sequence of orders is in the main that of Engler and Prantl, and the nomenclature appears to be that of what Dr. Kuntze calls "the inexecutable Rochester resolutions." In each work the entire absence of even the briefest bibliographical references is, we think, a somewhat serious defect, accentuated by the further absence of any indication of the species or names now for the first time published. A list of these is indeed given at the end of Dr. Small's volume; but here again the convenience of workers is overlooked, for the arrangement is systematic, not alphabetical, and the page on which the names occur is never indicated; the adding of this would have given no trouble to the author, and would have greatly increased facility of reference. In certain details—*e. g.* in the omission of all "English" names save those in actual use, and the inclusion of all names in one index—Dr. Small's book has improved upon its predecessor; on the other hand, we miss the information as to the extent and distribution of the genera and the origin of their names. The work is enriched by the contributions of specialists; the plan adopted in the Kew floras of placing the name of the author and of the genus at the head of each page might have been followed with advantage.

No fewer than forty-six new genera, mostly segregates, are established; the number of "species"—a term here taken to include new names—occupies nearly sixteen pages of small print; the indication of the "type" of each novelty is a useful feature, though it suggests that the species are for the most part established on single specimens, as only one is cited for each novelty. This may perhaps account for the very large number of new species published in this and other American works. They seem to abound especially in the genus *Cratægus*, which occupies in North American botany the position which Brambles and Hawkweeds fill among ourselves. For the last few years, species have been described in various journals, mainly by Prof. Sargent, whose supply is apparently inexhaustible; the last part (iii.) of his *Trees and Shrubs* contains six new species. In the Flora before us, Mr. C. D. Beadle bases his "treatment of the genus" "only on the material at the Biltmore Herbarium, supplemented by brief notes taken at several of the leading herbaria." This material yields 185 species, divided into 33 sections: of this number 142 owe their literary existence to Mr. Beadle's ingenuity; most of them, we fancy, are here first published, but here we are face to face with a difficulty, for not one of them appears in the "List of Genera and Species published in the Flora"!

Among the many changes of nomenclature, without which no American flora is complete, our attention is arrested by the adoption of *Svida* for plants which authors generally are content to leave under *Cornus*, where they were originally placed. *Svida*—for such is the original spelling—was published without any diagnosis in 1852 by Opiz (*Seznam*, p. 94), who referred to it two species, *O. sanguinea* and *O. alba*, retaining *Cornus* for *C. mas* L. It is to

be regretted that Dr. Small does not give us some reason for the adoption as of generic rank of a name which Harms (in Engler and Prantl) does not even accept for a section or subsection, and which, one would think rightly, has been ignored by systematists and is not adopted by Dr. Britton and American authors. It is impossible to avoid a suspicion that a love of change and a liking for attaching one's own name to the resultant combinations have much to do with action of this kind, which encumbers nomenclature without, so far as we can see, any resultant benefit.

Lexicon Generum Phanerogamarum inde ab anno MDCCXXXVII cum Nomenclatura legitima internationali et systemate inter recentia medio auctore Tom von Post: opus revisum et auctum ab Otto Kuntze. 8vo, pp. xlvii, 714, cloth. Price 10 marks. Stuttgart: Deutsche Verlags-Anstalt. 1904.

With commendable promptitude, the Lexicon of which we noticed the introductory essay—*Codex brevis maturus*—in our December number made its appearance during that month. Before referring to its contents, we must at once compliment all concerned on the admirable manner of its production. Convenient in size, closely but clearly printed, bound in such a way that it readily lies open upon the table, and, owing to the generous subvention of three benefactors, exceedingly cheap—ten marks for nearly 800 pages—the book should find a place in every botanical library, however small, for in no other work can so complete an enumeration of genera be found, brought up as it is to the end of March, 1903.

The Lexicon is the outcome of a recommendation of the Conference on nomenclature held at Geneva in 1900; and the compilers—or rather Dr. Kuntze, for the English of the prefatory matter is full of the charm which his pen confers upon our native tongue—express their belief in the beneficent results of its adoption in a sentence in which pious aspiration is blended with confident assurance: "May our Lexicon re-establish international order in nomenclature and reasonable harmony between botanists! There seems no other remedy." And indeed it will be bad for the Vienna Congress if it does not adopt the Codex, at any rate, as the basis for its deliberations to "replace other regulations"; for Dr. Kuntze himself tells us: "That is the only way at the last time to arrange by a Congress—three Congresses having already worked thereabout in vain—still the international order in botanic nomenclature. Otherwise the Codex brevis maturus and the Lexicon generum based on it will remain the rock of bronze for that international order and the standard for all exact botanists." "The Codex," we are told, "is also published separately (at 3 sh. a copy) as the inevitably polemic commentaries shall not be inserted into the Lexicon to make it free from polemic. As by the subvention of the Lexicon the charge of the Lexicon is became very cheap, anyone who likes polemic can easily buy it." We take this to mean, though it certainly does not say, that "polemic" is absent from the Lexicon; and this conclusion, we are glad to say, is borne out by an examination of its pages.

The first part, which constitutes the bulk of the book, is an alphabetical arrangement of all generic names, with authorities—those retained being in black type, and the rest reduced to their equivalent. Under each retained genus are given the date of establishment, its order, the estimated number of recent and fossil species, the geographical distribution, the synonyms reduced to it, and the sections, if any, into which it has been divided, thus:—

"61; 8. **Abelicea** Rchb. 1828, Ulmaceæ.
Sp. 6. Creta, Caucasus—Japonia.
Sp. foss. 6, tota regio borealis.
Syn.: Planera Desf. 1815 non Gm. 1794. Planera.
§ Abelicea Endl. 1837, Zelkoua Spach 1841."

The type, though close, is clear, but we think the use of italics for certain details would have made consultation easier. The figures preceding the genus refer to the number of the order and genus in the systematic arrangement which forms the second part of the volume. It may be doubted whether more information has ever been got into so small a compass.

Some names appear here for the first time, and are accompanied by a short diagnosis—e.g. *Clarkeifedia* O. K. 1903, based on *Patrinia monandra* Clarke, has a note: "Genus alterum monandrum Valerianacearum, ab gen. Phu flore ecalcarato fr. triloculari non plumoso differt." The plant had already been named *Monopatrinia*, as a section of *Patrinia*; this name is dismissed—"nom. delendum sesquipedale." Dr. Kuntze's sensitiveness on this point is not quite easy to understand, as he revives and retains Burman's much longer *Myrtoleucodendrum* in place of *Melaleuca*.

One name, the identification of which has escaped both Mr. Jackson and Dr. Kuntze, may be cleared up by a reference to this Journal for 1889, p. 21, where it is shown on the authority of Miers's own specimens that *Micræa dulcis* Miers = *Ruellia dulcis* Cav.

Only in one small point do we find material for unfavourable criticism. Mr. B. D. Jackson some years since denounced "the vile practice of intermingling I with J and U with V" as "a relic of barbarism"; the Lexicon perpetrates the former, although we are glad to say it eschews the latter.

Index Kewensis Plantarum Phanerogamarum, Supplementum Primum [1886–95]. Confecerunt Theophilus Durand et B. Daydon Jackson. Fasciculus iii. [Iviha–Physaria]. 4to, pp. 225–328. Bruxelles: A. Castaigne. [Nov. 1903.]

We are glad to announce the publication of a third instalment of the Supplement which forms an indispensable companion to the equally indispensable *Index Kewensis*, bringing that work ten years nearer to the present time. The progress is at least as rapid as can be expected, seeing that M. Durand is unfortunately becoming more and more incapacitated by failure of sight for his task of seeing the work through the press. It is to be regretted that no one can be found to relieve him of this irksome task, especially as it is to be feared that the usefulness of the undertaking, great as it will always be, is to some extent impaired by this affliction; for,

it must be said, the references in this instalment, unless we have been exceptionally unfortunate in our random selection, do not appear to have been as carefully checked as the importance of the work demands.

The slips are for the most part in references, and in one sense are thus the more serious, on account of the reprehensible practice, indulged in by too many writers, of quoting at second hand. Thus in *Pandanus* we have, under *sparganoides*, "Journ. Bot." where "Journ. Linn. Soc." is meant; under *Welwitschii*, "v." instead of "t."; under *Livingstonianus*, "336" for "326"; under *Barterianus* the name "Barteriana" follows the reference, implying, but not accurately, that it is there so spelt. Under *Jasminum* we note under *nummularifolium* "100" for "109"; under *Walleri* "93" for "95"; the ? under *octocuspe* should be removed; *tenuifolium* is a misprint for *ternifolium;* and the identity of *J. brevipes* Baker (1895) with *J. ternum* Knobl. (1893), pointed out in this Journal for 1895 (p. 255), has not been noted, both names being retained as distinct. In one entry under *Pentas* several corrections are required:

"monbassana, Hiern. ex Oliver, in Trans. Linn. Soc. Ser. II iii (1887) 335"

should run:

"*mombassana* Hiern (nomen) ex Oliver in Trans. Linn. Soc. Ser. II. ii. (1887) 335 = parvifolia."

P. involucrata Baker, although retained, is synonymous with *Spermacoce dibrachiata* Oliv. The entry

"*Schimperi* Hochst. ex Engl. Pflanzenw. Ost. Afr. A (1895) 92 = P. Schimperi Vatke?"

seems to have been made under a misapprehension; the reference to Engler shows neither attribution to Hochstetter nor indication of a new species, and the whole entry should disappear. A small matter of frequent occurrence is the placing of a period (a sign of abbreviation) after names which are not curtailed.

We cannot think it necessary or desirable to include artificial hybrids; of the seventeen entries under *Nymphæa*, at least nine are creations of this kind.

Lehrbuch der Botanik für Hochschulen. Von Dr. Ed. Strasburger, Dr. Fritz Noll, Dr. Heinrich Schenck, u. Dr. George Karsten. Sixth edition. Large 8vo, pp. viii, 591, tt. 741, many coloured. Jena: Fischer. 1904. Price 7 m. 50 pf. (8 m. 50 pf. bound).

The sixth edition of this well-known text-book maintains the high standard reached by the previous editions which have been reviewed or noticed from time to time in the pages of our Journal. It represents, in our opinion, the limit of possibility of the single text-book, and its excellence as such is to a great extent due to the appreciation of the principle of the differentiation of labour. For more advanced work the student must avail himself of separate handbooks on the various phases of the subject. While on the

same lines as previous editions, the present volume introduces some considerable alterations, mainly in the portion dealing with the special treatment of the seed-plants. The late Professor Schimper's place has been taken by Dr. George Karsten, and the change has given the opportunity for a revision and re-arrangement of the subject-matter of this section, which now follows more closely the order of arrangement of Engler's Syllabus. The Gymnosperms are treated somewhat more fully, and in the accounts of the families of the Angiosperms more space is devoted to the description of individual plants which are of importance from an economic or medicinal standpoint. The number of figures in this section has been increased, and it is now most profusely illustrated; many of the coloured pictures occupy the whole or the greater part of the page; they show also a marked improvement on some of those in former editions, which were poor and inadequate. In fact, so copious and helpful towards the elucidation of the text are the figures, that we fear lest many students may consider it unnecessary to procure specimens for examination, or to make themselves familiar with the plant as it grows.

Among the results of revision of, or addition to, the subject-matter in other sections, we may note that in the chapter on Physiology, by Dr. Noll, the portion dealing with the mechanical tissues of the plan has been enlarged, and the increasing interest in the œcological aspect of plant-life finds expression in additional subject-matter, and some excellent figures borrowed mainly from Professor Schimper's *Pflanzen-geographie*. The weakest part of the volume seems to be that on the Algæ, and especially the *Chlorophyceæ*, which are disposed of in eight pages, and on the same lines as in the original edition under the three orders, *Protococcoideæ*, *Confervoideæ*, and *Siphoneæ*; the treatment of the Fungi is more satisfactory, but in both these great groups it would be helpful if more space were given to the discussion of general principles. Finally the volume is produced with that degree of excellence which we are wont to associate with the works issued by Messrs. Fischer of Jena.

A. B. R.

Anatomical Potamogeton-Studies and Potamogeton fluitans. By C. Raunkiær. (*Botanisk Tidsskrift*, xxv. 3, pp. 253–280 (1903)).

In this admirable paper (written in English) Mr. Raunkiær, who has studied the anatomy of *Potamogeton*, shows that, by the structure of the stems and leaves, many species can be separated, even better than by systematic or morphological characters. He points out that this must be done with all the species before a complete monograph of the genus can be attempted. He also remarks on the difficulty there is in procuring material for this purpose, and it behoves all who have it in their power to help him with either dried, in spirit, or fresh specimens. He has examined, more or less, some fifty-three species, and gives figures of the axial cylinders, sections of leaves, etc., of several. For the present he divides these fifty-three species into seventeen groups, naming them from the most typical species of the groups; but he points out that this arrange-

ment may be altered or modified as the knowledge of the anatomy of the other species is studied. The author considers that the "leaf endowed with sheath (and ligula) is more primary than the sheathless." In this I entirely agree, as, I believe, does Mr. Fryer; in fact, I much doubt whether, if the younger growth were studied, any species would be found sheathless, though they certainly often become so at an early stage.

As the result of his study of *Potamogeton fluitans*, Herr Raunkiær shows that the plant generally accepted as hybrid *P. lucens* × *natans* has sub-epidermal bast-bundles in the bark and vascular bundles in the walls of the lacunæ, while the "Neckar" plant has not; the hybrid also differs from that in having the axial cylinder smaller and differently arranged. The difference in the two figures of the sections is certainly very noticeable. He goes on to discuss which of these should bear Roth's name, and arrives at the conclusion that it should be the Neckar plant. Unfortunately, he does not seem to have noticed the remark I made (Journ. Bot. 1901, 198) respecting Schreber's specimens at Munich, which, from the observation of Roth, seems to me to make it certain that these specimens had been seen by him; if so, they are of equal authority to specimens named by him. The author misunderstands an observation of mine in Journ. Bot. 1893, 296:—"A specimen from 'Varde, leg. Hempel,' which (except it has no fruit) might well have been gathered in the United States as *Lonchites*." I was, of course, saying that an American botanist would have named it *Lonchites;* not that *it was Lonchites*, for I knew that was not so.

I must utter a protest against calling the Neckar plant "*fluitans* of Roth," unless the two are combined, as they are by Ascherson and Graebner (Syn. Mitteleurop. Fl. i. pp. 308–9 (1897))—a view which the author shows to be untenable. If the Neckar plant is not the same as the American *P. Lonchites* Tuck, it must have another name. By almost every author in Europe Roth's *fluitans* is looked upon as a hybrid, and to call the Neckar plant "*fluitans* of Roth" seems most undesirable.

ARTHUR BENNETT.

BOOK-NOTES, NEWS, &c.

THE Fourteenth Report of the Missouri Botanical Garden (1903) is almost wholly occupied with a synopsis of *Lonicera*, by Dr. Alfred Rehder, which, so far as a cursory inspection enables one to judge, is exhaustive and careful. A hundred and fifty-four species (including many novelties) with numerous varieties are described, and there are twenty plates, mostly from photographs of herbarium type-specimens. We do not know what grounds Mr. Rehder has for supposing that *Periclymenum racemosum* of Miller is a species of *Loranthus;* Miller's specimen in the National Herbarium shows that the *Index Kewensis* rightly refers it to *Chiococca racemosa*.

THE last two parts of the *Vegetationsbilder*, issued by Messrs. Fischer, of Jena, with Dr. G. Karsten and H. Schenck as editors, came to hand too late for mention in our notice in the Journal (see 1903, p. 414). Part 7, by Dr. Schenck, illustrates the coast-vege-

tation of Brazil, and comprises the *Ipomœa Pes-Caprœ* formation (two plates), and the so-called "restinga-formation" (four plates), with characteristic Bromeliads, species of *Cereus*, &c. Part 8, for which Drs. G. Karsten and E. Stahl are responsible, is entitled Mexican, Cacti-, Agave- and Bromeliad-vegetation, and includes two excellent photographs of species of *Cereus*, also general views showing habit of *Echinocactus*, *Agave*, and various Bromeliads. All concerned are to be congratulated on the completion of this useful series of pictures illustrating plant-life.

Dr. Bolus and Major Wolley-Dod contribute to the *Transactions of the South African Philosophical Society* (xiv. part 3, Oct. 1903) a "List of the Flowering Plants and Ferns of the Cape Peninsula, with notes on some of the critical species," which should prove extremely useful to every worker on South African botany. Although modestly styled a "list," it contains much more information than this title implies; localities are given for the more interesting species; and, although no novelties are published, critical remarks are frequent. The authors enumerate 2,117 native species of phanerogams, 179 being entered as foreign or doubtfully native. There is an exceedingly interesting introduction by Dr. Bolus, dealing with the various features of the vegetation, the relations of the peninsular flora to others, the peculiarities of various regions; an important note on the effects of bush fires on the vegetation seems to demand the attention of practical farmers. Copies of the paper may, we believe, be obtained from Messrs. W. Wesley & Son.

In connection with the above it may be useful to call attention to the MS. *Florula Capensis*, compiled by Solander and annotated by Dryander, which is in the library of the National Herbarium. It is a systematic list (on the Linnean classification) with indications of the collectors and localities and notes on the species, mainly, though not exclusively, of the plants in the Banksian Herbarium. These are usually localized in the herbarium with some general indication, such as "Cap. B. Spei," but the special locality can be ascertained by reference to the MS. list. The collectors indicated are Banks, Masson, Oldenburg, Auge, Nelson, Thunberg, Brande, Robertson, and the Forsters. Mr. Hiern has found the volume (which is indexed) of considerable interest in connection with his work for the *Flora Capensis*, and it should certainly be consulted by all who take part in the work.

Prof. Henslow's unpretending little volume on *South African Flowering Plants* (Longmans, 5s.), "for the use of beginners, students, and teachers," is just the kind of handbook wanted by the classes for whom it is specially intended. We are constantly asked by those making a long visit or proposing to reside in one of our colonies to recommend a book which should enable them, with a reasonable expenditure of trouble, to obtain some general idea of the plants they are likely to meet with in the local flora, or might serve as an introduction to botany; but we usually have to regret that no such work exists. We hope that what Prof. Henslow, who acknowledges help from Prof. McOwan and Dr. Schönland, has done

for South Africa will be done for many other colonies. The volume is illustrated by over a hundred figures, and clearly printed; there are two indexes, though one should suffice. With this volume and the list by Dr. Bolus and Major Wolley-Dod, the intelligent resident should have no difficulty in working at the botany of the Cape Peninsula.

The Rev. John Stevenson, who died at Glamis, near Forfar, on November 27, 1903, was born at Coupar Angus, on the borders of Forfarshire and Perthshire, in 1836. In 1850 he went to the University of St. Andrews (which in 1888 conferred on him the degree of LL.D.) and was licensed as a preacher in the Established Church of Scotland in 1859, and became Minister of Glamis in 1873. Here he prosecuted with much success the study of fungi, sending a large number to Berkeley, who named and recorded them in his "Notices." Not content with discovering and forwarding forms to be named, Stevenson made a careful personal study especially of the Hymenomycetes, and was recognized as an authority on these fungi. He took an active part in the foundation of the Scottish Cryptogamic Society in 1874, of which he was secretary almost from its formation until 1903, when he was compelled by ill health to resign that post. In 1879 he published through the Society his *Mycologia Scotica*, in which were enumerated all the forms that had been published by Greville, Johnstone, Gardiner, and Dickie in their local floras, by Berkeley and others in British floras, and by writers in journals and transactions of scientific societies. He did not himself contribute largely to periodical publications; three short papers from his pen appeared in the *Scottish Naturalist* for 1877–8. In 1886 appeared his principal work, *British Fungi (Hymenomycetes)*; this is based on Fries, for whose work he had great admiration, but embodies the researches of Berkeley and other mycologists. A fuller notice of Stevenson will be found in the *Annals of Scottish Natural History* for January, to which we are indebted for the above information.

The Rev. H. J. Riddelsdell, M.A., of St. Michael's College, Aberdare, Glamorgan, is accumulating material for a preliminary list of Glamorganshire plants. He would be much obliged if readers of this Journal would furnish him with any material, either literary or the result of individual field-work, such as lists of plants made in any locality of the county, or information as to specimens contained in herbaria. Mr. Riddelsdell would at once acknowledge any communications made to him at the above address.

Miss Beatrice Harraden's recent novel *Katharine Frensham* contains a good deal about Norwegians and plants, and a severe criticism on un-English methods which we trust is unmerited. "It is a barbarous country, this England," says one of the characters. "I know nothing about politics, thank heaven, nothing about war, and so forth. But this I can tell you: that England is the only country which refused to exchange botanical specimens with our Botanical Museum. The barbarian director wrote a rude letter." We think there must be some mistake; at any rate, no offer of exchange has been received at the National Herbarium. Miss Harraden has not a high opinion of the intelligence of botanists; one of her characters is styled "an unilluminated botanical duffer."

A.B.Rendle anal.
S.C.Hendrey del.et lith.

West,Newman imp.

A. Bromus interruptus *Druce.*
B. Viola calcarea *Gregory.* C. V. hirta *L.*

BROMUS INTERRUPTUS.

By G. Claridge Druce, Hon. M.A., F.L.S.

(Plate 457 A.)

The above plant, which was diagnosed in this Journal for 1895 (p. 344), and fully described in the Journal of the Linnean Society (Botany), xxxii. p. 426 (1896), has also been alluded to in the *Flora of Berkshire*, p. 593, in the Reports of the Botanical Exchange Club for 1895, p. 503 (1897), for 1901, p. 30 (1902), and 1902, p. 64 (1903), the *Flora of Kent*, p. 413, and this Journal for 1897, pp. 18–20.

In addition to, or in emendation of, the description already given, it may be observed that in the wild state, growing as it usually does in annual crops, its duration is usually annual. Its alliance is evidently with *B. mollis* L., but it differs from this, and indeed from every British grass, in having the palea always split nearly to the base; and in the almost sessile lower spikelets being often compound. It is normally of a taller growth; for instance, when associated with *B. mollis*, as this year, in a field near West Wycombe, Buckinghamshire, at an altitude of over 500 feet, *B. interruptus* was on the average 25 per cent. taller than *B. mollis*.

In luxuriant specimens four feet high the splitting of the palea was equally complete, and the stiff interrupted panicle equally definite in character.

The late Mr. F. Tufnail, one of the managers of Messrs. Sutton at Reading, who knew the British grasses well in all their stages of growth as well as their fruits, grew *B. interruptus* and *B. mollis* side by side in the "Trial Grounds," collected the fruits, and cultivated them for some years. From the result of this test he became convinced that they were distinct species. The grains of one could be picked out from the other when mixed, and while *B. mollis* showed in cultivation considerable variation in small particulars from year to year, *B. interruptus* remained remarkably constant.

In 1895 Mr. L. V. Lester, having found it plentifully in a sandy cornfield at Elsfield, near Oxford, noticed the palea was spilt, and drew my attention to the character. The result of my examination of many hundreds of specimens showed that this character was constant, and in that year it was duly diagnosed and published as a full species.

Since that time I have met with *B. interruptus* in many counties of southern, eastern, and central England, but have not observed it abroad in Europe, Asia, or Africa, although the countries which were once the granaries of Rome have been especially searched; I have not seen it in any continental herbarium, nor has Professor Hackel seen a continental specimen.

As to its grade of citizenship, one cannot speak confidently; from its apparent absence from continental herbaria, and from the fact that Professor Hackel has not seen any other than British specimens, it may be urged that in *B. interruptus* we have an

endemic species. Against this view there is the fact that it has not yet been found in ground undisturbed by man, indeed it is more usually found, not in crops of British clover, but in fields of vetches and "seeds." In these places it often forms a considerable percentage of the individual grasses. So abundant sometimes is it that once in eight square yards I gathered a hundred specimens. In these fields it is associated with *B. mollis*, *B. commutatus*, *B. racemosus*, *B. secalinus*, and *B. sterilis*; but I have never seen *B. arvensis*, *Silene dichotoma*, *Crepis nicaensis*, *Vicia villosa*, or other southern or eastern casuals.

Its British distribution, so far as it is known, is English-Germanic, and this may also be held to militate against its being indigenous. In the majority of localities where it has been observed it is not permanent, and this is caused by the temporary nature of the crop with which it is associated. The vetches and "seeds" are either cut in the early stage for forage, or eaten off by sheep, so that specimens are not allowed to go to seed. That it can seed if allowed the chance is evident by its occurrence in small quantities for a year or two after it had been plentiful in a rye crop which had been allowed to ripen, and it has been seen in small quantity in a wheat crop which had replaced a clover crop in which it was plentiful.

This year I have distributed specimens through Dörfler's *Herbarium Normale*, and this may lead to its being detected (as I should expect) in foreign cornfields, and afford information which is at present lacking as to its distribution and origin.

That it is not a recent introduction is proved by the fact that a plant collected by Miss Barnard at Odsey, Herts, gathered in 1849, was sent to the Botanical Society of London, and is reported on by Mr. H. C. Watson in the *Phytologist*, iii. 807–8 (1850), as follows:—"'*Bromus pseudo-velutinus*.' This is sent by Miss Barnard from a field at Odsey, in Hertfordshire (or Cambridgeshire?). It much resembles that usually dwarf and littoral state of *B. mollis*, which has been erroneously called '*B. velutinus*' by several British botanists. These inland specimens have culms fully four times as tall as the shore plant, and the pubescence of the glumes, or pales, is shorter. They are, indeed, simply examples of *B. mollis*, with the pedicels and spikelets much shortened, and the panicle thus rendered more close or compact." A specimen is preserved in the herbarium of Mr. H. C. Watson at Kew, and there is another in the British Museum Herbarium; both are *B. interruptus*.

The following is the comital distribution: where no other authority is named, I am responsible:—

Bromus interruptus Druce, see Pharm. Journ. Suppl. Oct. 5 (1895); Journ. Bot. 1895, p. 344; Journ. Linn. Soc. xxxii. pp. 426–30 (1896).

B. mollis Linn. var. *interrupta* Hackel in Rep. Bot. Exch. Club, 1888, 240.

B. pseudo-velutinus Barnard ex Watson in Phyt. iii. pp. 807–8 (1850); sine diagnose.

Kent (Wolley-Dod, see Fl. Kent, pp. 413–4, and Rep. Bot. Exch. Club, 1893, p. 429); *Surrey* (G. Nicholson); *Hants* (A. Bruce

Jackson, Journ. Bot. 1898, 274, and Miss C. E. Palmer, Journ. Bot. 1902, 264); *Middlesex* (Druce, Journ. Bot. 1898, 319); *Oxford; Berks* (Druce, Rep. Bot. Exch. Club, 1888, p. 240, and Flora of Berks, p. 595); *Suffolk*, Lowestoft (Tufnail, Journ. Linn. Soc. xxxii. p. 428 (1896)); *Norfolk* (Druce, *l. c.*); *Wilts, South* (T. A. Preston, Journ. Bot. 1892, p. 106); *Cambridge* (Marshall Ward, *in litt.*); *Herts* (Barnard, 1849); *Beds; Northants; Lincoln, South* (Tufnail, 1890).

[I have pointed out to Mr. Druce that in my judgement and in that of others whom I have consulted, Miss Barnard's name must stand for the plant which we have been calling *B. interruptus* Druce. It is true there is no description, although some of the points insisted upon by Mr. Druce as distinguishing the plant—*e. g.* the greater height and the "more close or compact" panicle—are clearly indicated by Watson; but the distribution "among leading public collections, of numbered specimens, accompanied by printed or autograph tickets, bearing the date of the sale or distribution," which is considered by the Decandollean laws as constituting publication, is in the main fulfilled by Miss Barnard's ticket: "1356 c *Bromus pseudo-velutinus*. Odsey, Herts. June 1849. A. M. Barnard coll. & comm." I do not know how widely the plant may have been distributed—now that attention has at last been called to it, Miss Barnard's specimens may be found in many herbaria—but it appears from Watson's note (*l. c.* 810) that the Botanical Society at that time numbered "near two hundred and fifty members." I think therefore that the synonymy given by Mr. Druce must be reversed, and that the species must stand as *B. pseudo-velutinus* Barnard; hardly, I think, even if the generally ignored Art. 50 be followed, as of Watson, as the names therein directed to be individualized by the addition of the name of the author who publishes them are those from "non-distributed collections."—Ed. Journ. Bot.]

Explanation of Plate 457 a.—*Bromus interruptus*. 1, Flowering culm, from specimen sent by Mr. Druce from Upton, Berks; 2, Floret opened to show split glume (enlarged).

VIOLA CALCAREA AS A SPECIES.

By Mrs. E. S. Gregory.

(Plate 457 b.)

For many years I have studied the genus *Viola* with much care, more especially the hybrids of *V. odorata* × *hirta* and the so-called variety *calcarea* of *V. hirta*. This latter plant grows freely on the limestone hills of Somerset, and was identified for me some years ago by Mr. Beeby. Since then the growing plant has been under my close observation during the spring and early summer of each year. Neither in its wild state nor under cultivation does it change its very marked characteristics. I have also examined carefully the

type-specimens in Babington's herbarium at Cambridge, and find that they are identical with our Somerset plants.

V. calcarea was looked upon formerly as essentially a Cambridgeshire plant, growing only on the Gogmagog Hills, and was there recognized by Babington, who, oddly enough, gave no adequate description of the plant in his *Manual*. The characters he mentions are minor ones, and do not touch the plant's main features. Syme writes of it, "A curious *state* of this species" (*hirta*); Hooker calls it "a dwarf, starved *form*, with petals narrower." Beeby says (*Journ. Bot.* 1892, p. 68), "Judging by the plants cultivated by Watson and myself, this *form* does not revert to the type. I believe it to be a *variety*, and not a mere *state* due to situation." (Italics mine.)

With the concurrence of other botanists, and convinced by my own investigations, I would now go further and claim for *Viola calcarea* specific rank. A description of the plant follows:—

Viola calcarea (pro specie).

Viola hirta L. var. *calcarea* Bab.

Stolonibus destituta, *radice ramosa, ramis lignosis crassis*, foliis parvis ovatis vel oblongo-ovatis cordatis pilosis, *pedunculis foliis multo longioribus*, sepalis oblongo-ovatis, petalis *angustis* (superis quattuor inusitate compositis, forma crucis decussatæ) *calcare vix viso brevissimo recto conico*. In pratis siccis et collibus calcareis.

Flores parvissimi violacei vel malvacei, faucibus eodem colore tinctis. Folia post anthesin peractam paulo ampliora.

Without stolons; *rootstock branched, branches thick, woody;* leaves small, ovate or oblong-ovate, cordate, pilose; *peduncles much longer than the leaves;* sepals oblong-ovate; petals *narrow* (the four upper ones placed at a curious angle, resembling a St. Andrew's cross); *spur almost imperceptible, very short, straight, conical*. In dry pastures on limestone hills.

Flowers very small, violet, or mauve, with throat of the same tint. Leaves (after flowering) enlarging but little.

There is a small form of *hirta* which has doubtless been sometimes taken for *calcarea*. The two plants (*V. calcarea* and the small form of *V. hirta*) grow side by side on Worle Hill, near Weston-super-Mare, and, as far as size of leaves and size and colour of flowers are concerned, are at first sight indistinguishable. On examination, however, one finds in the *hirta* form hairy petioles, and a much longer and *distinctly hooked spur;* while the *calcarea* plant has a *straight, almost imperceptible spur* (its most strongly-marked characteristic), and its surface might almost be termed glabrate. A flower of *V. hirta* is figured for comparison.

In the British collection of the National Herbarium I find specimens of *V. calcarea* from three localities:—Eastwear Bay, Folkestone (Rev. G. E. Smith in Mrs. Robinson's Herbarium); "Downs near St. Margaret's, E. Kent, May 8, 1889" (Rev. E. S. Marshall); and "Boxhill, in the turf, April 6, 1861" (H. Trimen).

NOTES ON POTAMOGETON.

By Arthur Bennett, F.L.S.

(Continued from Journ. Bot. 1902, p. 149.)

Potamogeton limosellifolius Maxim. ex Korshinsky in Act. Hort. Petrop. xii. 393 (1893).

Amur (lat. 53°, long. 120°). "Hab. in aquis stagnantibus ad fl. Zawitaja prope Michailowskoje inter Zejam et Burejam 28 Jul. [1891]. et fr. imm. [leg. S. Korshinsky]. A fl. Ussuri medium prope Buldshi a Maack inventa (Regel, Fl. Ussur. p. 139, sub nom. *P. pusilli*); eadem planta a Wright in insulis Loo-Choo (Lu-tschu) collecta est (herb. Horti Petrop.)"

The Abbé Faurie has sent from Corea specimens collected in 1901, in rice-fields near Chinhampo, which seem exactly to accord with this plant. Dr. Britton writes me that it is not in Wright's collection from the Loo-Choo Islands (Exped. Ringgold and Rodgers in 1853–6). There are specimens in the National Herbarium from Manchuria (prov. Wanfangoo) collected in 1902 by Dr. Litwinow (no. 1633).

The aspect of the plant is much that of a delicate *P. Miduhikimo* Makino, or *P. cristatus* Regel & Maack; unfortunately there are no ripe fruit on the Abbé's specimens. With *P. lateralis* Morong and *P. javanicus* Hassk. it forms a group remarkable for their close resemblance to each other in facies, yet with very different fruits. Maximowicz compared *P. limosellifolius* with *cristatus* Regel & Maack, but that has the most complex fruit of any species of the genus, and would form an excellent object of study in evolution if it could be grown for that purpose. As *P. limosellifolius* was collected in 1891, and Maximowicz died in February of that year, it must have been one of the last plants which that estimable botanist examined before his death. In writing to me only a few months before, he mentioned that he expected to be able to send me some interesting specimens of the genus from Asia, a hope he did not live to fulfil.

The other Corean species kindly sent me by the Abbé Faurie include *P. mucronatus* Presl (*P. maliana* Miq.), *P. oxyphyllus* Miq. (known only from Japan before), *P. crispus* L., *P. serrulatus* Regel & Maack (= *P. Robbinsii* Oakes, var. *japonicus* Ar. Benn.), and specimens that are probably the plant named by Franchet, as "*P. polygonifolius*," not the plant of Pourret, but probably a new species, which will be described as such by M. Baagoe. Another sheet, marked "*Potamogeton* in rivulis Syou. Ouen, No. 692," is probably a new *Aponogeton*. Among Japanese specimens distributed by Faurie are those numbered 4135 Shiobara and 4135 *bis* —mine are poor examples; it may be, better specimens are extant in other sets. One at least of my examples seems to be referable to *P. epihydrum* Rafin., var. *Cayugensis* Wiegand (sub *P. Nuttallii* Cham.). The species is sometimes difficult to separate from *P. americanus* Cham. (*P. lonchites* Tuck.) by the submerged leaves only, but my specimen has the peculiar structure of *epi-*

hydrum. If correctly identified, this is another North American species found in Japan and not elsewhere recorded. The var. *Cayugensis* Wiegand (in *Rhodora*, ii. p. 102, 1900), occurs in the lakes and rivers of Central New York. I possess a specimen from "Ste. Rose, Quebec, Canada, 10. 7. 1889. D. N. St. Cyr," from Prof. Macoun; this matches specimens sent me by Mr. Wiegand from Cayuga Lake. The floating leaves are larger than in the type, the submerged much longer, broader, and with more numerous veins; it is altogether a larger plant in all its parts, including the fruit, It is probable it was the form seen by the Rev. E. J. Hill in Michigan (Bot. Gazette, 1881, 260).

P. HETEROPHYLLUS f. MYRIOPHYLLUS Morong, N. Amer. Naiad. 24 (1893). Herr K. Maly has sent this remarkable form from Lake Blidnije, Herzegovina, Aug., 1900. A specimen from Leopoldshafen (A. Braun, 1839) comes near this, and specimens in Kovat's herbarium are closely allied to, if not identical with it; but specimens from Sweden so named by Dr. Tiselius do not seem to agree with Dr. Robbins's examples. Morong speaks of local conditions producing it in the original locality (Apponang Pond, Mass.), but this can scarcely be the case in Lakes Quinsigamond and Saltonstall, U.S.A., where it also occurs.

P. PRÆLONGUS Wulfen.—In his paper on the Potamogetons of Loch Clunie, Perthshire (Scott. Nat. 1875-6, 351) Dr. Buchanan White says of this:—"The upper leaves in many of the fruiting specimens were shortly petioled, subcoriaceous, and almost floating, a state of the plant of which I can find no mention." I learn from Mr. Barclay, of Perth, there are no such specimens in the Perth Museum herbarium, nor have I ever seen such, living or dried. Mr. Barclay suggests that Dr. White afterwards discovered this was not *prælongus*. It is possible the plant seen was *P. angustifolius* Bertch & Presl (*P. Zizii* Roth), as I have seen in Scottish collections specimens of this named *prælongus*.

P. AMPLIFOLIUS Tuckerm.—Two forms of this occur that do not seem to be noted in American floras. One (var. *ovalifolius* Morong, *in litt.*) has oval, submerged, and semi-coriaceous floating leaves of the same shape, giving the plant a facies very different from the ordinary state. Another (f. *amphibius*) "in pools nearly dry, E. Massachusetts, U.S.A., 1880, T. Morong (*N. American Naiadaceæ*, p. 17), has the leaves smaller than the ordinary plant, and less coriaceous, with the veins far less prominent, and of course there is no sign of any submerged leaves. That the leaves are less coriaceous is rather remarkable, as usually the absence of water contributes to make them more so. Forms with an extraordinary development of the submerged leaves occur in Cache Lake and Navy Island, Canada, and rather less in Pringle's Vermont specimens of 1879; these have the leaves three times the size of the usual plant, and well exemplify the name of the species. Specimens of a puzzling plant have been sent by Prof. Macoun from "Chilliwack Valley, British Columbia (lat. 49° and 49° 10′, and long. 121° 25′ and 122°). No. 26816, 21. 8. 1900. J. M. Macoun. International Boundary Commission Collection." In my notes to Prof. Macoun

on these specimens, I remarked that they could not be referred to *P. lucens* or to *P. Zizii*, as the former does not produce floating leaves, and the floating leaves of these specimens were unlike any form of *Zizii* known to me, while the stipules did not agree with either. I also noted that they reminded me of specimens collected in 1848, in San Miguel, Azores, by Mr. T. C. Hunt, which were named "*P. lucens*?" by Mr. Watson. This likeness is remarkable, but only superficial. The same plant was gathered (but not in flower) by Mr. Trelease in 1894, probably from the same lagoon in San Miguel.

I have not yet been able to name these specimens satisfactorily. Coming under *lucens* in a wide sense, they are neither exactly *lucens*, *longifolius*, or *Zizii*; I am inclined to regard them as an endemic variety of *lucens* which may be named var. *azorica*. In habit they somewhat resemble the "*P. lucens* L." gathered by Gardner (No. 2756) in Brazil, which Dr. K. Schumann accepts as *lucens* in Fl. Brasil. iii. part 3, 689 (1894). I do not know to what these British Columbian specimens can be referred, unless the suggestion of hybridity be called in, i. e. *P. epihydrum* Raf. (*P. Claytonii* Tuck.) × *P. angustifolius* Bercht. & Presl (*Zizii*). This to a large extent is surmise, and the working out of the idea must be left to those who can study the living plant. *P. epihydrum* occurs in Vancouver's Island and Griffin Lake, associated with a peculiar form of *P. Zizii*; but the numerous lakes, lagoons, &c., have never yet been systematically examined. The plant is certainly nearer *Zizii*, of which it has the submerged leaves of the narrow-leaved forms, except that the nervation is towards *epihydrum*; the spikes also are *Zizii*, but the stipules and floating leaves are almost exactly those of *epihydrum*.

P. UPSALIENSIS Tiselius. Dr. Tiselius, in *Botaniska Notiser* (1884), p. 15, identifies his plant with *P. salicifolius* Wolfg., Roem. & Sch., *Mantissa*, iii. 355, 1827, and *P. lithuanicus* Gorski ex Reich. Ic. Fl. Germ. vii. 19 (1845), and Mr. Fryer, in this Journal for 1890 (p. 138), seems to coincide with this view. Ascherson and Graebner (Syn. Mitteleurop. Flora, Band i. p. 328 (1897)), on the contrary, consider that *lithuanicus* and (*salicifolius*) is a hybrid—*P. alpinus* × *lucens*, and keep it distinct from *P. decipiens* Nolte, with which Tiselius and Fryer unite it. I concur with Ascherson and Graebner's, for I have always felt that if *salicifolius* was a hybrid, *alpinus* was clearly one of the parents. They have seen Gorski's specimens, as have I; and I also possess types of Wolfgang's, and a beautiful series of the *upsaliensis* of Tiselius; and a microscopic examination of Wolfgang's specimens confirms this view. I believe the matter could be settled at once if the chemical matter contained in the leaves of *P. alpinus* were subjected to chemical analysis; I know of no other species in which you can revive the peculiar colouring. If this were present in the slightest degree in Wolfgang's plant it would decide in favour of *P. alpinus* × *lucens*.

Mr. Fryer considers the *decipiens* of the Cambridgeshire fens to be certainly *P. lucens* × *P. perfoliatus*, and in this I entirely agree,

as does Almquist in Hartman's Skand. Fl. ed. 12, 47 (1889). Ascherson and Graebner (*l. c.*) place *decipiens* under two heads—*P. lucens* × *perfoliatus* and *P. lucens* × *prælongus*. It is possible that some of Dr. Tiselius's specimens of his *upsaliensis* may be *lucens* × *prælongus*; the great majority of the specimens named *decipiens* are to me *lucens* × *perfoliatus*.

P. ALPINUS Balb. (*P. rufescens* Schrad.). On the receipt of a sheet of specimens of this species from the herbarium of Prof. Kinashi, of Japan, I was impressed by the dark colour (almost black), the narrow leaves, and the absence of floating leaves. On looking up my Asiatic and American specimens, I found that all the former were of the same tint, and lacked floating leaves; out of eleven American examples only one had any sign of them, and in the British Museum Herbarium they are present in only one example.

Dr. Robbins, in Gray's *Manual*, ed. 5, 486 (1879), says, "floating leaves often wanting (*P. obrutus* Woods)." These dark-coloured narrow-leaved forms are the *P. rufescens* "forma angustifolia" of Chamisso (*Linnæa*, ii. 211 (1827) = *P. microstachys* Wolfgang in Roem. & Schultes, *Mantissa*, iii. 360 (1827).

These specimens look very different from the forms named *P. nerviger* Wolfg. (*l. c.* 359) and those named var. *maximus* Mert. & Koch, Deutschl. Fl. i. 841 (1823), and were it not for the numerous connecting links might well be considered a distinct species. From observations made in Norfolk, I am inclined to think that plants produce floating leaves one year, and then not; but as this has not been tested by cultivation, it is better to consider it not proved. In ponds or lakes, the level of the water and the amount of sunshine may influence their production, but my notes have been made in backwaters of rivers, or on the local Broads, which are subject to conditions and water-level different from those of land-locked lakes and ponds; being influenced occasionally by salt-tides, low neap-tides, and high spring-tides with an east wind. These often occasion great destruction of fish, the floating rejectamenta is driven up the backwaters, and heaped up and left on the banks on the outward flow of the tide, and large quantities are "didled" out and thrown in the "rond." This causes the Potamogetons to be cut off; they have to begin a fresh growth, and it is probable that in the year in which this occurs many have not time to produce floating leaves.

P. distinctus, sp. nov. Stems from a long creeping rootstock; when dry compressed, striated, branched. Lower leaves lanceolate to linear-lanceolate on petioles 1½–2½ in. long; secondary nerves (not basal) produced along the central nerve about halfway up; middle and upper (floating) leaves semi-coriaceous, variable in shape, firm, lance-linear to oblong-lanceolate, 13–18-nerved, on petioles 1¼–6 in. long (with a mean of 2½–3 in.). Peduncles produced often from fascicles of leaves at the apex, stout, gradually tapering to the base of the spike. Spikes dense, cylindrical. Fruit with the ventral side nearly straight, the dorsal semicircular with three keels, the middle one subacute, undulated. the exterior ones

less acute. produced here and there into small knobs, the spaces between filled with irregular lines; base of the fruit usually with two small bosses, produced below the fruit attachment, terminated by a short style, forming a continuation of the ventral margin; sides of fruit impressed with very faint raised lines. Embryo incurved, much as in *P. alpinus*. Stems 16 in. high, rooting at the lower branches. Upper leaves $3\frac{1}{4} \times 1\frac{1}{4}$–$5\frac{1}{2} \times \frac{3}{4}$ in., petioles $4\frac{1}{2}$–6 in. Lower leaves $5\frac{1}{4} \times \frac{5}{8}$ in., petioles $1\frac{1}{2}$–3 in. Stipules 1–$1\frac{1}{4}$ in. Peduncles $2\frac{1}{4}$–$3\frac{1}{2}$ in. Spikes $1\frac{1}{2}$ in.

Habitat. Japan (herb. Prof. Kinashi); Amori, July, 1902 (ex Abbé Faurie); Manchuria (prov. Zizikar), Dr. Litwinow, no. 2424 (Herb. Mus. Brit.).

I had formerly confounded this with *P. mucronatus* Presl (*P. maliana* Miq.), having seen specimens with only the lower leaves, and without flowers or fruits, and partly because the specimens named *P. maliana β tenuis* Miq. seemed to have the leaves very near it, but the specimens were badly preserved. The fruit is very different in *mucronatus*, and very distinct, and the form of the upper leaves also, as is well shown in Morong's figure of his *P. Wrightii* (= *mucronatus*), Bull. Torr. Bot. Club, xiii. t. 59 (1886). The specimens gathered by Abbé Delavay (nos. 4757, 2805, "prov. Yun-nan, China, 17.8.1887"), and named by me for M. Franchet "*P. mucronatus* Presl," are perhaps referable to *P. distinctus*, but the specimens were returned, and I only possess leaf-outlines and notes. In the many specimens seen by me of *P. mucronatus* there is no trace of floating leaves, but in two specimens at Kew (Formosa, A. Henry, 1203, 1203 *a*) they are present; the lower leaves have the structure of *mucronatus*, but there is no fruit. Whether these are a form of *mucronatus* or a new species must remain doubtful until more material is available.

P. SULCATUS Ar. Benn. In the British Museum Herbarium there is a sheet of specimens of a Potamogeton from Mauritius, collected by Sir J. McGregor in 1819, that, so far as that island is concerned, I have seen in no other herbarium. There are three specimens, one with two immature spikes, the other two with one spike each, also immature. This bears a great resemblance to the Australian *P. sulcatus* Ar. Benn., and, so far as external resemblance goes, is undoubtedly the nearest to it of any known species. The lower leaves have the same broad central nerve, with its peculiar cross nervation; the upper leaves with numerous nerves, and the same outline and consistence of leaf as in *sulcatus*. There is unfortunately no fruit; the fruit* is so distinct from any other species (except perhaps *tricarinatus* Muell. & Ar. Benn.) that even immature examples would have been decisive. Chamisso and Schlechtendahl in *Linnæa*, ii. p. 200, 1827, mention having received an incomplete specimen from the Mauritius; but, from the description of it, it may have been the plant I mention.

The plant is of a distinctly Australian type, represented in N. America by *P. amplifolius* and *P. pulcher*; in S. America by an

* *i. e.* of *sulcatus*.

undescribed plant; and in the Old World by *P. indicus*. From the Mauritius to Melbourne is 4500 miles, and if the plant represents the Australian *sulcatus* (as I believe it does), it is a very interesting fact in distribution, as the other Mauritian species (except one unpublished) are cosmopolitan.

P. AUSTRALIS F. Philippi ex Ar. Benn. in Journ. Bot. 1895, 374 (nomen).

P. striatus Ruiz et Pavon, Fl. Peru. i. 70; v. iv. 1798–1802.

In this Journal for 1895, 374, I remarked that Dr. Schumann had referred Spruce's no. 5886 from the Andes of Ecuador to *P. striatus*. I denied this, and referred Spruce's plant to *P. australis* F. Phil.; in this I was right, but wrong also, as *australis* is the same as *striatus*, and Dr. Schumann was quite right in his reference, and I am sorry I made so dogmatic a denial to a fact.

It is probable that Prof. Philippi had never seen specimens of *striatus*, as it seems one of the rarest in herbaria, and the only specimens I have seen, beyond the original ones of Dombey, are those collected by "Dr. Barranca, Expedition 'Donau' Frigate, 1868–71," in herb. Vienna.

On the same page I remarked I had a note of *P. striatus* as from Chili; so specimens were named distributed by the "Unio itener. Chili, 1829," herb. Vienna, but the fruits are not those of *striatus*, and cannot be referred to it.

Prof. Philippi's specimens extend the distribution of *striatus* to "Lacus Budi, in Araucaria." This will be in Patagonia (now subject to Chili), the inhabitants of part being called Araucarians.

P. Maackianus Ar. Bennett, sp. n.

P. serrulatus Regel & Maack Tent. Fl. Ussur. 139 (1861), non Schrad. nec Opiz.

P. Robbinsii Oakes var. *japonicus* Ar. Benn. in Bull. Herb. Boiss. iv. 549 (1896).

Further study of this plant seems to point to its differences from the American *P. Robbinsii* being specific rather than varietal. It differs from *Robbinsii* in the scattered and irregular arrangement of the leaves, in the leaves being shorter, blunt at the apex, the medial part of the leaf being continued beyond the leaf itself as a wide mucro; in the lesser number (5 as against 18–24 in *Robbinsii*) and greater prominence of the nerves, cross nerves being as stout as the others. The fruits are rather smaller, the peduncles shorter, and the whole plant is much smaller and less robust. In *Robbinsii* the arrangement of the leaves and branches is symmetrical, though this is sometimes lost in autumnal shoots, and in the flowering shoots; in the autumnal shoots (Lake Zurich, Ill., U.S.A., Rev. E. J. Hill), the leaves are all semi-erect. The lower leaves are usually alternate, regularly arcuate-recurved, the middle ones patent, the upper patently-ascending. In *Maackianus* no such arrangement exists, the lower leaves being irregularly scattered, the upper usually semi-erect; thus the habit of the two plants is very different.

P. Chamissoi, sp. n.—In *Linnæa*, ii. 200 (1827), Chamisso has the following note: "Amicissimus Bory de St. Vincent ex eadem insula (mare au centre dans les bois de l'île de France; il y a

assez d'eau) retulit specimen haud floriferum cui folia omnia submersa, oblonga, basi attenuata, subpetiolata, acuta et brevissime obtuse mucronata, nervo medio basi crassissimo usque in mucronem excurrente, margine tenuiter serrulata, $3\frac{3}{4}$ poll, longa, 7–8 lin. lata. Stipulæ in setas secedunt. Rete vasculosum ut in *lucenti*." Mr. J. G, Baker (*Fl. Mauritius*, 392) mentions *P. crispus* L. as a Mauritian species; I believe the same plant is intended, as I find it placed sometimes with *crispus* and sometimes with *lucens* in herbaria, while I have never seen true *P. crispus* from that island. Bojer (Hort. Maurit. p. 358 (1837) gives *P. tuberosum* Roxb. (=*P. crispus* L.) as a native, and I believe this also was the plant which I now describe. Placed by the side of the *lucens* he knew thence and also from Madagascar, it would appear more like *crispus* than any other species.

P. crispus is not on record, save as above, from any Mascarene island, nor from any of the other African islands, being in Africa essentially continental. In Asia it is recorded from Sumatra! (a relic of a former connection with the continent*) the Loo Choo isles!, and has been lately found in Formosa!. In Australasia it is not recorded from any of the Polynesian or Australian groups of islands, only from the mainland.

Chamisso (*l. c.*) mentions another plant, but his description, from a poor specimen sent by Commerson, is insufficient. Neither, however, is his *P. mascarensis* (l. c. p. 228), which = *P. natans* L. h. *mascarensis* Kunth Enum. iii. 128 (1841). On the original specimen of this Chamisso has written "*rufescens*," which the lower leaves resemble. He remarks that in the Paris Herbarium it was referred to the *natans* tribe, but it is probably a geographical or endemic form of either *P. americanus* Cham. or *P. fluitans* Roth.

The plant to which I am calling attention occurs in Mauritius!, Bourbon!, and Rodriguez!, and is, I believe, undescribed. I propose to call it *P. Chamissoi*, and proceed to describe it:—

Stems from a creeping rootstock, 3–4 ft. long, much branched, often destitute of leaves for eighteen inches or more, *Leaves* very variable in length, 2–5 in. long by $\frac{1}{4}$–$\frac{5}{8}$ in. broad, lower sessile, alternate lance-linear to oblong-lanceolate, the margins strongly waved and recurved when dry, but not serrulate (occasionally there is a minute cell extending beyond the leaf-margin), 5–11-nerved, the central one prominent beneath, all connected by cross straight or waved nerves. Upper leaves petioled, $2\frac{1}{2}$ in. long, and usually wider in the upper half, 9-veined, becoming rarely semi-coriaceous; whether any are actually floating the specimens seen do not show. *Stipules* short, soon decaying, and becoming frayed. *Peduncles* $2\frac{1}{2}$–3 in., equal; spikes $\frac{1}{2}$–$\frac{3}{4}$ in. No fruit seen.

Hab. Mauritius; *Roxburgh*, 1819 (as "*P. crispum*"). *Roubillard* (no date) in Herb. Brit. Mus.; "In aquis lente fluentium in insul. Mauritii. W. Bojer, 1833," in herb. C. de Candolle; Rivière de Moha, 1100 ft. above sea-level, July 7, 1889. H. H. Johnston. Mauritius.

---

* Wallace, *Island Life*, ed. 2 (1892), 385.

A distinct plant, combining the aspect of *crispus*, structure of *lucens*, and with peduncles and spikes like some of Nolte's specimens of *P. nitens* Web., but the flowers seem perfect. I know of no species to which it can be compared or related, even from Madagascar, though the Mauritian *lucens* form also occurs in that island; both were gathered by Bojer, who gave them a MS. name. The surface of the leaves is covered with what appears to be minute dots, each of which reflects the light; treated with boiling water or acids they appear (under a half-inch) as curled hair-like bodies; they also occur on some species of Aponogeton, especially in *A. subconjugatus* Schum. & Thonn.

P. OXYPHYLLUS Miq. Prol. Fl. Japonicæ, Fasc. 7 (1867), 325. var. nov. FAURIEI.—Whole plant stricter in habit; leaves much more rigid, with the centre nerve consisting of 4-compacted ones, three on either side of it, connected by straight ones (the whole consisting of vascular-bundles), five, rarely six less distinct ones on either side, the leaf thus having 17–19 nerves. Spikes interrupted. The author of the species describes it as with 4–5 nerves on either side of the middle one, *i. e.* 9–11 in all. A linear-leaved plant from Japan, with strict leaves and stems, in habit like the type, but differing in the structure of the leaves, having as many as 17–19 (very rarely 21 !) closely-packed nerves, in this resembling *P. zosterifolius* Schum., but with the blackish colour of the type. This colour can hardly be the result of the chemical composition of the water, as *P. zosterifolius*, which occurs rarely in Japan, retains the usual amount of colour.

Hab. Japan; Shona, *Faurie* 39 ! 45 ! (mixed with *P. oxyphyllus*); Muori, *Faurie* 46 !.

P. ACUTIFOLIUS Link. sub-sp. nov. P. MANCHURIENSIS.—Stems diffuse, less compressed and narrower, irregularly branched; leaves less rigid, with the primary intermediate nerves less conspicuous, at times partly obsolete; stipules shorter. Peduncles longer, $\frac{3}{4}$–$1\frac{1}{4}$ in.; spikes longer. Fruits rather smaller, less inflated, the dorsal face more crested (*i. e.* the carina is almost winged and waved); ventral tooth straighter and nearer the centre.

Hab. Manchuria. "Ad fl. Sungari, pr. Taladshao, 19 July, 1903." Dr. Litwinow, No. 3347 !; also 495 ! 501 ! 2338 ! 2463 !

The whole habit of the plant is less rigid, less symmetrical, in one of the sheets simulating the habit of *P. Friesii* Rupr., having fascicles of leaves in the axils of the upper ones produced by short branches. In *acutifolius* the habit differs considerably; in some specimens the branches are aggregated, with erecto-patent short branches, leaves shorter, and the whole neat and symmetrical; in others the branches are long and loosely erect, leaves long, and the aspect unsymmetrical. The Manchurian specimens correspond more with the latter.

P. FLORIDANUS Small.—In his *Flora of the South-eastern United States*, p. 37 (1903). Dr. Small has described this new Potamogeton from the Blackwater river, Florida, May. 1886. It seems closely allied to *P. natans*, but Dr. Small tells me there are no

duplicates at present available. Florida is already credited with a species not known elsewhere—*P. Curtisii* Morong, found only by Mr. A. H. Curtis. Very few specimens of this are extant, and it is little known. It is placed by Morong (*N. Amer. Naiad.* p. 36), between *P. confervoides* Reich. and *P. crispus* L., and of other species is nearest *P. trichoides* Cham., and especially to some original specimens I possess of *P. tuberculatus* Guépin from Angers, France. Dr. Small seems to have overlooked the occurrence of *P. amplifolius* Tuck. in Georgia!, Arkansas!, and Florida!.

GLYCERIA FESTUCÆFORMIS IN IRELAND.

Dr. Rendle's paper in this Journal for 1903, pp. 353–6, on this grass, which was discovered by Mr. Praeger last summer in Co. Down, is most interesting. In the article in the *Irish Naturalist*, from which Dr. Rendle quotes, the lucky finder of this plant expresses himself as perfectly confident that it is indigenous to Down, because, as he thinks, it was impossible for the seeds to have been introduced by land or sea from the shores of the Mediterranean Sea, which is the nearest place to Ireland where *Glyceria festucæformis* has a native habitat.

Yet I have more than a shadow of a doubt as to its being indigenous on the shore of Strangford Lough. I think it probable that it has been introduced by a happy chance.

No doubt, as Mr. Praeger writes, "in the whole of Strangford Lough there is no port where foreign vessels call. The sea traffic is confined to small local boats with cargoes of coal, bricks, and so on." But I cannot agree with his next statement, that "the introduction by land is equally out of the question." For there is a way by which it seems to me quite possible for the seeds of this Mediterranean shore-grass to have got on to the shore of Strangford Lough. It occurred to me when I first heard of Mr. Praeger's surprising discovery, and previous to the publication of his account of it in the *Irish Naturalist* for Oct. 1903, and I wonder how it escaped his experience and acuteness.

About eight miles straight across the Lough, north-west from the Ards locality, is the little town of Comber, situated barely half a mile from the shore of Strangford Lough. In it is a well-known, old-established, and flourishing distillery, where barley from various sources is from month to month used in the manufacture of whisky.

A small stream, known locally as the Comber River, runs past the works, and any refuse and sweepings from the distillery which get into it are carried into the tideway in Strangford Lough. When this occurred to me, and I recollected that many alien plants are found growing on any waste ground near distilleries, the seeds having been imported with foreign grain, I enquired from the manager of the Comber Distillery whether grain from a Mediterranean port was ever used by his firm; and his reply was:—"We have imported barley from Algeria, but have not had any of this

barley since 1892. Sweepings from our lofts sometimes get into the river." Hence my doubt as to *Glyceria festucæformis* being indigenous in Co. Down.

But, in addition, there are in Comber, besides the distillery, large flour mills, which, though now like most similar mills throughout Ireland idle, yet formerly did a large business, and used a considerable quantity of Egyptian wheat in the course of the trade. And my correspondent has very kindly taken the trouble to ascertain that before this Mediterranean wheat was ground it had all to be washed, so that various seeds from this source must have found their way into the Comber River.

When a map of Down is examined, it is easy to see that on the ebb of every tide, whatever objects are carried by the Comber River into the head of Strangford Lough must go with the run of the water south-east, precisely in the direction of the Ards shore from Comber, and when it is borne in mind that our prevailing winds are westerly, it does not require an elastic imagination to suppose seeds from Comber Distillery lofts, favoured by stream and tide and wind, finding a resting-place where Mr. Praeger had the good fortune to gather his plants of Irish-grown *Glyceria festucæformis*. While the fact which he mentions, that these plants grew nearer the water's margin than the *Aster Tripolium* and *Glyceria maritima* of the indigenous flora, suggests their having only lately come there, and that they were too recent immigrants to have had time to mingle more thoroughly and further afield with the real natives.

H. W. Lett.

I am obliged to the Editor for allowing me (with the writer's consent) to see Canon Lett's note before publication, and I have read his statement with much interest. In the following remarks, I treat his hypothesis at some length, because it seems to me that we field botanists sometimes fail to pay due regard to the nature and value of evidence in cases of this kind, and proceed on lines which cannot be classed as either logical or scientific. First, let me say that I was not unmindful of the existence of distilleries and former flour-mills at Comber. On many occasions during the last twenty years I have studied the alien plants which languish on the rubbish-heaps there.

Canon Lett's theory is that seeds of *Glyceria festucæformis* came to Comber with foreign grain, were thrown into the Comber River, carried by wind and tide down and across Strangford Lough, and obtained a foothold along the several miles of coast on which at present the plant is known to grow. Now, to bring the hypothesis within the range of probability, several factors must contribute. First, some evidence is required of the probability, or even possibility, of the seed of the grass reaching the distillery, or flour-mill. What is the case as regards this point? The foreign grain which is quoted as having been used at Comber, is barley from Algeria and wheat from Egypt. Now, *G. festucæformis* does not grow in Algeria, nor in Egypt, nor indeed anywhere on the southern shores

of the Mediterranean; and with the failure of this key-stone of the arch, where is our hypothesis?

But despite this reverse, let us, "in the interests of science," pursue the matter, and see whither the next step in the hypothesis will lead us. Assuming, for the sake of argument, that grain from, say, Northern Italy, where the plant *does* grow, had at some time been imported, it surely requires a very elastic imagination to conceive how the seed of a plant which affects such a habitat as *Glyceria festucæformis* is likely to become mixed with cereals. The bulk of distillery and corn-mill aliens are weeds of cultivated or waste ground—Melilots, Medicks, Sisymbriums, Silenes, and a hundred more—and plants of other situations, such as seashores, or marshes, or woods, are generally conspicuous only by their absence. An examination of the Comber casuals shows that they are no exception to this rule.

Would it be rational to doubt that *Scirpus triqueter* is native on the Shannon estuary because it could be shown that one of the Limerick flour-mills had, at some time or other, used wheat that came from the South of England? Yet the Limerick casuals are legion, several of them have established themselves, and *S. triqueter* grows within a stone-throw of some of these.

Then, further. Having, by some strange chance, got the seeds of our maritime grass (they are not particularly light seeds, nor gifted with any special means of dispersal) mixed with our foreign grain, and that grain duly transported to Comber, and the seeds safely launched thence into the river, how comes it that, though capable even as a recent immigrant of forming an extensive colony across eight miles of sea—a remarkable feat—the plant has not established itself by the Comber River, where the ground is quite suitable, and where there must have been a hundred seeds floating for one which reached its distant actual station? Yet *G. festucæformis* has never been detected on that well-worked ground. Could it even be shown that any one of the Comber aliens has spread down the river and established itself, this at least would be a straw to which we might cling. But even this collateral evidence is not forthcoming. I need not pursue the matter further. Of course it may be argued that plants *do* spread to unexpected places, and that we cannot prophesy the range even of an alien from the known facts of its introduction. Quite so. But in the present case, the fraction representing the probability of each step in the hypothesis is so small, that the product is a fraction which is for practical purposes insignificant.

Not only in our distilleries and flour-mills, but in stores, and indeed in every grocer's shop and hen-run over the country, foreign grain is to be found. It is little exaggeration to say that seeds of foreign plants rain down year by year all over our islands, and this it is that makes the work of the field botanist nowadays so difficult; but, unless built on some foundation of fact, and supported by buttresses of probability, an hypothesis raised on this circumstance alone will not stand. Could Canon Lett—who, by the way, does not say that he has studied either the plant, or its Irish habitat, or

the Comber casuals—put forward a connected argument such as Mr. Colgan (*Journ. Bot.* 1894, 104) introduced in connection with Prof. Areschoug's plea in favour of *Artemisia Stelleriana*, then indeed the claim of *Glyceria festucæformis* to native rank would be seriously imperilled. But at present the facts seem to point the other way. It is the very absence of any working hypothesis such as Canon Lett endeavours to set up, coupled with the mode of occurrence of the plant in relation to its environment, that has caused me to believe that it is native. The working out of its distribution in the North of Ireland will probably throw light on the question. It will afford me much gratification if Canon Lett will help in this.

R. Lloyd Praeger.

THE LATE REV. W. H. PURCHAS.

(With Portrait.)

William Henry Purchas was born on December 12th, 1823, at Ross, Herefordshire, in which town his father occupied at that time the position of a wine-merchant. As the eldest son, he was destined for his father's business; and his father being in weak health, he yielded to the strongly expressed wishes of his parents, and followed the business for a few years, until his younger brothers were able to take his place. From the first his personal wish had been to devote himself to religious work. He was the originator of, and for some years a diligent teacher in, the Sunday School at Ross, and Secretary to the Church Missionary Society. In the autumn of 1855 he proceeded to Durham University, and, having passed through the course, he was, on December 20th, 1857, ordained to the ministry of the Church of England, in the service of which he laboured unremittingly to the day of his death. The fields of his work were—Tickenhall, in South Derbyshire, 1857 to 1865; Lydney, Gloucestershire, 1865; Gloucester, 1866 to 1870; Alstonfield, North Staffordshire, 1870 to 1903. Here he died on December 16th, 1903.

From early boyhood his tastes had lain in the direction of Natural History. Entomology first attracted him, and while still a boy he made a very fair collection of butterflies; but botany was also an early pursuit; his elders used to complain that it was impossible to walk with William Purchas, he was so continually stopping to examine the things growing in the hedges. The taste for botanical study grew with his years. In the winter of 1851–2 he, in conjunction with the late M. J. Scobie, R. M. Lingwood, and a few others, founded the Woolhope Naturalists' Field Club, which has since done so much to make known the scientific and archæological treasures of Herefordshire. At that period he had already a wide knowledge both of general British botany and of that of his native county, and was in touch with the leading British botanists. His botanical work in Herefordshire was very thorough; he mapped out the county into fourteen districts, and, having got round him an

WILLIAM HENRY PURCHAS, ætat. 77.

ardent band of workers, he investigated and recorded energetically. The work flagged on his removal from the county in 1857 and the multiplication of ministerial and family cares; but in 1889 its results were at length published by him, in conjunction with myself, in the *Flora of Herefordshire*.

All Mr. Purchas's botanical work was painstaking and thorough. He spared himself neither time nor trouble in the investigation of critical points. He was self-distrustful to an excessive degree, and was very averse from publishing results until he felt perfectly sure of his ground. This, while diminishing from the fruits of his labours as regards science in general, rendered his knowledge of British plants singularly complete and accurate; and, with his great and unfailing courtesy towards all with whom he was brought into contact, made him a most delightful companion and correspondent.

He was early attracted by what are called "critical genera"—*Rubus*, *Rosa*, *Hieracium*, *Epipactis*, and others. These it was his wont to watch, to study, to go again and again over the points demanding attention, and often to end where he began with "After all, I doubt." The tangle of the fruticose *Rubi* was a study which gave full scope to his peculiarities of temperament. Here he had the advantage, on the one hand, of living in a district which seems to be prolific beyond any in Britain in bramble forms, and, on the other, of the friendship and co-operation of the band of early bramble students—Bloxam, Coleman, Newbould, and Babington. The last-named was a frequent visitor to Lingwood at Lyston, near Hereford, and Purchas joined in the investigations which led to the publication, in 1870, of Babington's *British Rubi*.

In those days, and indeed until the great enlargement of our knowledge of the genus in the nineties, through the help of the late Mr. Archer Briggs, Prof. Focke, and Rev. W. M. Rogers, the study of British brambles was a hopelessly puzzling affair; it involved trying to fit some 150 forms into 30–40 descriptions, and resembled the attempt to force 150 apples into a basket designed to contain 40: as fast as one was forced in another jumped out; and this confusion was worse confounded by innumerable inconsistent determinations given by those who were supposed to know, due in great measure to incomplete or misleading specimens. The marks of this early confusion are seen in the synonymy of many of our British forms. The bramble appropriately chosen by Mr. Rogers to perpetuate Mr. Purchas's name—*Rubus Purchasianus*—is a very local form, extraordinarily plentiful near Ross; the synonymy of this form is a good illustration of the fluctuation of these early discussions.

It is characteristic of Mr. Purchas that, although for many years this genus was his special subject of study, he never named more than one British bramble, and only (I believe) two other British plants (hawkweeds). Here again his real work is by no means adequately represented by the plants which he described. He knew, more thoroughly than any other man, the hawkweeds inhabiting the lower Herefordshire Wye valley, and the Derbyshire and North Staffordshire valleys of the Dove and Manifold. Yet, rich as these districts are in hawkweed forms, one from the Wye (*H. pachyphyllum*)

and one from North Staffordshire (*H. cymbifolium*) were the sole plants he described. Both of these have stood the test of later criticism.

Roses became a favourite study with Mr. Purchas, especially in the later years of his life, when his lot was cast in a district where the bleak uplands of the Peak break away into deep glens, a country rich in roses, but poor in brambles. It is a matter of regret that he did not earlier and more actively take up the study of the rose-forms of this district, and do something to reduce to order the *mollis-tomentosa* group, for which science would have been grateful. He was always dissatisfied with Mr. J. G. Baker's ingenious arrangement of *Rosa canina*, thinking it too artificial; and he frequently pointed out to me how *R. coriifolia* could at once be distinguished in winter from *R. canina* by the clustered stems, short internodes, and upright growth.

On the puzzling forms of the genus *Epipactis* Mr. Purchas thought and observed much; see his remarks upon the so-called Herefordshire *E. ovalis* Bab. in *Fl. Heref.* p. 298. One of his favourite studies was the *fluitans-plicata* section of *Glyceria*; a variety described by him without a name in the *Phytologist* (iii. 736 (1849)) was the plant since known as *G. pedicellata* Towns.

In 1895 Mr. Purchas began publishing in *Science Gossip* a series of papers on the "Characteristic Branching of British Forest Trees," which work a vein of observation hitherto neglected by botanists; these papers merit perhaps more attention than has been bestowed upon them.

It was due in part to the modesty of Mr. Purchas that observations of his of real scientific value were never recorded—such as the gradual untwisting of the capsule in the genus *Orchis* during the ripening of the seeds; and the uniform perishing of the terminal bud in certain species of *Salix*, so that the next year's growth starts from the first lateral bud.

He was an occasional contributor to the *Botanical Gazette*, 1849–1851; the *Phytologist*, Old Series, vols. ii.–iv.; the *Journal of Botany*, 1865–1895; and to *Science Gossip*, 1895. He also contributed to Watson's *Topographical Botany*. Numerous notes on plants contributed by him to the London Botanical Exchange Club appear in the Reports of that Club. His collections will be offered to the British Museum.

AUGUSTIN LEY.

NOTES ON DIANTHUS.

BY EDMUND G. BAKER, F.L.S.

IN the course of rearranging the genus *Dianthus* in the National Herbarium in accordance with Mr. F. N. Williams's Monograph (Journ. Linn. Soc. xxix. pp. 346–478), I have made the following notes, which may be worth while placing on record.

D. FERRUGINEUS Miller, Gard. Dict. ed. viii. no. 9 (1768); Linn. Mant. 563 (1771).

This plant, of which we have in the Herbarium good specimens from Miller, is referred by Mr. Williams to *D. Carthusianorum* L. γ *ferrugineus* Williams, while Dr. Gürke (Pl. Europæ, ii. 357) retains it as a distinct species. Caruel (*Flora Italiana*, ix. 254) has placed *D. ferrugineus* and *D. Guliæ* Janka as synonyms of *D. Carthusianorum* ∂ *Guliæ*.

D. FRUTICOSUS L. Sp. Pl. ed. 1, 413 (1753).

This is figured by Tournefort (*Relation*, i. 183, tab. 9) under the name of "Caryophyllus græcus, arboreus, Leucoii folio peramaro." We have specimens from Tournefort, and from the island of Seriphos, collected by Sibthorp.

D. PUMILUS Vahl, Symb. Bot. i. p. 32 (1790).

Mr. Williams (p. 468) places this among species which cannot be identified. Vahl diagnoses and describes this plant briefly, and quotes as a synonym *D. uniflorus* Forsk. Cat. Pl. Arab. p. 111, no. 284 (1775). In the National Herbarium there is a sheet from Forskåhl bearing a MS. name of this author, but written up by Vahl (who worked in the Banksian Herbarium) as his *D. pumilus*. It is easily recognizable (as noted by Vahl) by its cæspitose and acaulescent habit, and sessile solitary flowers. Boissier omits all mention of it, but it is enumerated by Deflers (*Voyage au Yemen*, 112). Specimens were distributed by Schweinfurth (no. 1660) from Gebel Schibam, in Yemen. *D. uniflorus* Forsk. (1775) takes precedence of *D. pumilus* Vahl (1790).

D. STRICTUS Banks & Solander in Russ. Aleppo, ii. p. 252 (1794), non Sibth. & Smith, Fl. Græca, tab. 403 (*D. syriacus* Steudel), is placed by Mr. Williams among his "species excludendæ et non satis definitæ." Russell's material is not sufficient for dissection. It is described as "caule ramoso, foliis lineari-subulatis, inermibus, vaginiis brevissimis, squamis calycinis ovatis acutis, petalis oblongis integris" (Russ. Alepp. ii. 252). The types of Russell's plants are, as is well known, in the National Herbarium.

Since the publication of Mr. Williams's Monograph much work has been done on the genus, and many new species have been published. Of *D. Carthusianorum* alone Dr. Gürke (Pl. Europ. t. ii. fasc. iii. 351) enumerates thirty varieties. He considers worthy of specific rank many of the plants subordinated as varieties by Mr. Williams—e. g. *D. atrorubens* All., *D. sanguineus* Vis., *D. Pontederæ* A. Kern., *D. curticeps* Borbás, *D. tenuifolius* Schur, *D. giganteiformis* Borbás, *D. puberulus* Simk., *D. mœsiacus* Vis. & Panc., *D. cruentus* Griseb., *D. Guliæ* Janka, and the already-mentioned *D. ferrugineus* Miller.

BANKS'S NEWFOUNDLAND PLANTS.

By James Britten, F.L.S.

In *Rhodora* for December, Dr. Fernald has an interesting paper on *Dryas tenella* Pursh, the original locality for which is given by its author as "On the White Hills of New Hampshire. Prof. Peck," with the added remark "v.s. in Herb. Banks." It appears that the plant has been sought in vain on the White Hills for nearly a century, and Dr. Fernald, assuming that Peck's plant "was in the herbarium of Sir Joseph Banks," suggests that Banks had "mentioned the White Hills of Newfoundland" as having produced the plant, and that Pursh confused these mountains with the "White Hills of New Hampshire."

This suggestion is plausible, but I do not think it is the true explanation. In the first place, I am not clear that Pursh meant to convey the impression that Peck's plant was in Herb. Banks, but only that he had seen *D. tenelia* therein, as Dr. Fernald shows to have been the case. The few plants from Peck which are in Herb. Banks are only localized "North America." Nor do I think that Banks was familiar with the White Hills of Newfoundland by name—this I conclude from the fact that I find no mention of the locality in the MS. journal of his voyage to Newfoundland, nor in his list of plants collected there. I am therefore rather inclined to suppose that Pursh's entry is entirely erroneous, being based upon an inaccurate remembrance of the plants which he had seen in Peck's herbarium.

The name *tenella*, although published by Pursh, was originally given to the plant in the Banksian Herbarium, probably by Dryander, who has written up the sheet "*tenella* MSS." The name appears on Ehret's drawing, I think in Dryander's hand. The indication "MSS." usually refers to Solander's unpublished descriptions: I do not, however, find it among them, though there is a brief diagnosis—"*tenella*; foliis subsagittatis subintegris acutis"—perhaps in Solander's hand, in our interleaved copy of *Willdenow's Species Plantarum*. The drawing does not seem to have been seen by Pursh, as he makes no reference to the colour of the flower as differing from that of *D. octopetala*.

The present seems a suitable opportunity for calling attention to the Newfoundland material in the Banksian collection. Besides the large number of specimens scattered through the National Herbarium, each sheet being written up on the back by Banks himself, we have a MS. list in his own hand of the plants observed, with localities, and a transcript made in 1772 by his sister, Sarah Sophia Banks, of his "Journal of a Voyage to Newfoundland & Labrador: commencing April y^{e} seventh & ending November the 17th, 1766." At this time Banks was in his twenty-fourth year; his journal, which it is hoped may some day be published, is full of notes upon the natural history of the island, especially on the plants, of which the following is an example:—

"Croque, June 15, 1766. Weather to Day extremely hot: walk out in the Evening, find a kind of Butter Bur with Palmated Leaves [*Petasites palmatus*]: Broad leaved Kalmia [*K. glauca*], in prodigious abundance, scattered without distinction over Bogs & Hills, wherever it is not shaded by Trees, but rather affecting dry soil: a kind of Rush, upon the highest and dryest tops of Hills; one-blade [*Maianthemum bifolium*] everywhere in great abundance, most commonly with 3 Leaves on each stalk, from the Luxuriancy with which it grows; a kind of very small Carex; a kind of Andromeda [*Vaccinium macrocarpon*], whose Calyx & Corolla are both 4 fid, growing always upon Bogs; a kind of Bilberry, growing on the most exposed sides of Rocks."

On his return, Banks compiled the list already referred to—probably the earliest in existence for Newfoundland. It is in itself sufficient evidence of his botanical attainments. He employed Ehret to make drawings of the more interesting of his plants; these, of which a list follows, are most beautifully executed on vellum, each being signed "G. D. Ehret, 1767."

Anemone parviflora Mich.	**Kalmia glauca* Ait.
Potentilla nivea L.	*Rhodora canadensis* L.
**P. tridentata* Ait.	*Ledum groenlandicum* Œd.
Dryas integrifolia Vahl.	*Pleurogyne rotata* Griseb.
Mitella nuda L.	*Halenia deflexa* Griseb.
Epilobium latifolium L.	*Shepherdia canadensis* Nutt.
Senecio Pseudo-arnica Less.	*Comandra umbellata* Nutt.
**Petasites palmatus* A. Gr.	*Listera convallarioides* Nutt.
Vaccinium ovalifolium Sm.	*Habenaria obtusata* Richards.
**V. macrocarpon* Ait.	*Smilacina trifolia* Desf.
Chiogenes serpyllifolia Salisb.	**Clintonia borealis* Raf.

Of these twenty-two, seventeen are bound together in a volume in the Department of Botany. The remaining five (marked * in the above list) are in a volume containing the originals of the thirteen plates in Aiton's *Hortus Kewensis*; there is no indication in the preface as to whence the plates were taken, and I do not think it is generally known that they were supplied from the Banksian collection. On the drawings of *Kalmia glauca*, *Vaccinium macrocarpon*, and *Potentilla tridentata*, is a note by Banks stating that they were taken from dry specimens from Newfoundland; the first of these and *Rhodora canadensis* are noted by Aiton as introduced to Kew Gardens in 1767 by Banks, which suggests that he also brought home living plants.

Potentilla tridentata Ait. (1789) is based upon Banks's specimens; if, however, Willdenow and the *Index Kewensis* are right in considering *P. retusa* O. F. Muell (Fl. Dan. t. 799 (1778)) as the same plant, that name is earlier. According to Lange (*Nomencl. Fl. Dan.* 129), however, this is a doubtful plant, differing from *tridentata* in having yellow flowers and in other characters. The *Index* incorrectly refers *Horkelia tridentata* and *H. Tilingi* to *Potentilla tridentata*, with which they have little in common; if *Horkelia* be placed in *Potentilla*, the name of the two plants, which

are now considered identical, will be *P. Tilingi* Greene in *Pittonia*, i. 105 (1887).

It may perhaps be worth while to call attention to the plate in Hort. Kew. of *Massonia latifolia*, as to the identification of which there seems some doubt. Mr. Baker does not cite it in his monograph in *Flora Capensis;* Gawler (in Bot. Mag. 848) quotes it without doubt under his *latifolia*, which = *sanguinea* Jacq. The plate seems to have been taken from a Banksian specimen from "Hort. Lee"; Dryander notes on the original drawing, "Colored from Mr. Masson's description, those which have flowered in Kew gardens have allways had greenish flowers." *M. latifolia* was originally described by the younger Linnæus (Suppl. 193) from Masson's specimens; there are two sheets from him in Herb. Banks, which may be considered typical for the species. Salisbury, in a letter to Dryander dated 1 Feb. 1791, takes exception to the plate in Hort. Kew., on the ground that the petals are not represented as reflexed; but they are not so in the specimen from Hort. Lee. It may be that the *M. latifolia* of Hort. Kew. is different from *M. latifolia* Linn. f., and it certainly does not seem the same as the plant figured as *latifolia* by Jacquin in Hort. Schoenbr. t. 455. This, however, must be left for the future monographer to determine; my present purpose is only to direct attention to the material which exists in the National Herbarium.

BIBLIOGRAPHICAL NOTES.

XXXI.—A. St. Hilaire's 'Plantes usuelles des Brasiliens.'

This work was issued in fourteen livraisons, each containing five plates, with their corresponding text, the text to each plate having its own independent pagination. From the *Bibliographie de la France* it appears that the work began to be issued in Jan. 1824, and, from the record of the sheeting, the title-page must have appeared with that first part; hence the date thereon, as frequently the case with works serially issued in France about that period, is misleading. A manuscript list inserted in a copy of the work, formerly the property of Mr. John Miers, F.R.S., and now in the Botanical Department of the British Museum, shows that the plates were issued in regular order as numbered. The publication of the work was suspended during 1826, owing to the author's ill-health, and only resumed (livr. 9) on his obtaining assistance from Adrien de Jussieu and J. Cambessèdes; the share of these two botanists in the book consequently dates from 1827.

The following table gives the contents of the parts, with the dates when their appearance is chronicled in the *Bibliographie de la France*:—

Fasc.	Pl.	Sheets.	Bibl. Franç.
1.	1–5.	Text 3½	31, i. 24, p. 69.
2.	6–10.	,, 3	12, vi. 24, p. 370.
3.	11–15.	,, 2¾	14, viii. 24, p. 490.
4.	16–20.	,, 2¾	6, xi. 24, p. 673.
5.	21–25.	,, 3	8, i. 25, p. 23.
6.	26–30.	,, 2¼	30. iv. 25, p. 296.
7.	31–35.	,, 2	25, vi. 25, p. 419.
8.	36–40.	,, 2½	21, xii. 25, p. 878.
9.	41–45.	,, 2¼	3, iii. 27, p. 197.
10.	46–50.	,, 2¾	21, iv. 27, p. 341.
11.	51–55.	,, 2½	16, vi. 27, p. 493.
12.	56–60.	,, 2¼	15, ix. 27, p. 765.
13.	61–65.	,, 2¾	5, iv. 28, p. 255.
14.	66–70.	,, 2½	9, viii. 28, p. 601.

Fasc. 1 was reprinted in 1827, Bibl. Fr. 5, ix. 27, p. 733.

B. B. Woodward.

XXXII.—Giovanni Francesco Buonamici.

We have in the Department of Botany a small 4to MS. of twenty-two pages, bearing the title "Joh. Fran. Bonamici De Plantis quæ in Melita et Gaulo observantur," and at the foot of the page "ex Biblioth. Boisy. [or Boisg.] MS. no. 21." There is no history of how it came to us, but it is not a Banksian MS. At the end, in the same hand as the title, which is not that of the body of the MS., is the following: "Note. Ce manuscrit est copié sur l'original de l'auteur, qui était dans la bibliothèque du Commandeur de Smitmer [?]. Il est à rémarquer que ce petit ouvrage quoiqu' imprimé par Cavallini, et sous son nom, n'a point été composé par ce medecin; mais par Buonamici, comme le remarque avec raison le père Allegranza.[a] On sait par une lettre datée de la Valette à Malte Kal. Sept. 1670 que Buonamici l'avait dedié à Dominique Magri Chanoine de Viterbe. On a retranché dans l'édit. donnée par Cavallini intitulée *Pugillus Meliteus* . . . . ainsi que dans celle publiée depuis par M. Brückmann (Epist. itiner. centuria secunda) les noms maltois de plusieurs plantes, qui sont ici dans le MS."

This note seems to supply information additional to that given by Prof. Saccardo in his most useful *La Botanica in Italia*, in which the name stands as "Bonamico." Beyond the identification of the Maltese list in Cavallini as the work of Buonamici—as I assume his name should be written—nothing is there added to the information given by Cleghorn in Trans. Bot. Soc. Edinb. x. 112 (1870), who writes "J. F. Bonamicus, a medical practitioner in Valetta, may be regarded as the first Maltese naturalist. He wrote a dissertation, 'Di fuco spicato coccineo Melitensi' [*Cynomorium*], and afterwards 'Brevis Notitia plantarum quæ in Melita et Gaulos insulis observantur,' 1670. In this 243 species are enumerated." In a subsequent

[a] "P. Allegranza, Vita Joh. Franc. Bonamici med."

note (*l. c.* 115) Cleghorn says that the former, in which the *Cynomorium* is described as "Fungus spicatus coccineus melitensis, planta singularis et rarissima nunc primum curiosis evulgata," is a MS. in the public library at Malta. It seems probable, though Cleghorn does not say definitely, that the 'Brevis Notitia' is also to be found there.

It is evident that our MS. is a copy of this, the number of species included being the same; the copy, however, was made by someone unfamiliar with botanical terminology, a number of the names being misspelt. A reference to Allegranza's biography will doubtless supply full information as to this little-known botanist.

I have not seen Cavallini's *Pugillus:* according to Cleghorn (*l. c.*), it "consists mainly of Bonamicus' 'Notitia,' with the addition of 83 plants and a preface," and is therefore not a mere copy of Buonamici's list.

JAMES BRITTEN.

SHORT NOTES.

NEW BRITISH HEPATICÆ.—LOPHOZIA GUTTULATA (Lindb. & Arnell) Evans (*Jungermania guttulata* Lindb. & Arnell, Musc. Asiæ bor. 1888, p. 51). Discovered by Mr. George Stabler on decaying wood at Ballochbine, Aberdeenshire, July, 1884. This species, which appears to be confined to decaying wood, was accompanied by *Cephalozia curvifolia* and *Blepharostoma trichophyllum*. It is considered by some botanists to be a variety of the plant named by Nees as *J. porphyroleuca*, which is generally now considered as being only a form of *J. ventricosa;* but Lindberg and Arnell's plant seems fairly well entitled to specific rank. At the time of gathering Mr. Stabler thought that the plant was distinct, but the species had not been described at that time.

ODONTOSCHISMA MACOUNII (Aust.) Underw. (*Sphagnoecetis Macounii* Aust. Bull. Torr. Bot. Club, 1872, p. 13. *S. communis* var. *tessellata* Berggr. Musc. et Hep. Spetsberg. 1875, p. 101). Discovered by Mr. P. Ewing on bare soil, Ben Heargarnich, Perthshire, July, 1900, and on the same mountain by Mr. William Young in 1903. When reading Dr. Evans's paper on "*Odontoschisma Macounii* and its North American Allies" (*Botanical Gazette*, xxxvi. 1903, p. 321), I recognized as this species a plant which I had published as a green alpine form of *Cephalozia denudata*. As I had not an authentic specimen for comparison, I sent some of the Perthshire plant to Herr E. Jörgensen, who confirmed the determination of its being Berggren's plant. Dr. Evans, in the above paper, which should be in the hands of everyone interested in hepatics, has compared original specimens of Austin's with plants from Greenland and Norway, and has found them to belong to the same species. For those who follow Spruce in his subgenera of *Cephalozia* the plant will have the name *C. tessellata* (Berggr.), as *C. Macounii* is preoccupied for another species. For this reason Mr. Pearson gave the name *C. Austini* to the *Odontoschisma* in his List. Canad. Hep. 1890.—SYMERS M. MACVICAR.

Flowering-season of Ranunculus Lenormandi F. Schultz.—This is given as June to August both by Prof. Babington and Sir J. D. Hooker. Without, however, paying special attention to the matter, I have repeatedly observed the plant blooming in Surrey both in December and January. This year I saw it flowering freely in bogs between Connagh Hill and Monaseed, Co. Wexford, on Jan. 25th; also near Carnew, Co. Wicklow, on Jan. 27th; *R. hederaceus* L., on the contrary, was quite flowerless in the same localities. Edward S. Marshall.

Villous forms of Epilobium hirsutum, &c. (p. 50).—I do not think that these can be due to diseased roots, as the phenomenon is not marked by any vegetative debility. It appears to arise, in some cases, from a dry, sunny situation; in others, from a clay soil: on which I have frequently observed the "forma *aprica*" Hausskn. of *E. parviflorum* Schreb. in decidedly wet places, such as, in lighter ground, produce glabrescence. *Vicia Cracca* var. *incana* Thuill. is a plant of shallow or rocky soil, usually growing in places fully exposed to the sunlight.—Edward S. Marshall.

A Hybrid Galeopsis?—The Rev. E. Adrian Woodruffe-Peacock's interesting note (p. 50) induces me to inquire whether the plant he refers to on p. 54 as a form of *Galeopsis Tetrahit* may not be a hybrid between that species and *G. speciosa*. I found (see Ann. Scott. Nat. Hist. 1904, p. 41) at Fort William plants which were certainly not ordinary *Tetrahit*, neither were they *bifida*, nor was the corolla nearly as large as that of *speciosa*. The outline of the corolla and of the lateral lobes was that of *speciosa*. The colouring, although less brilliant than *speciosa*, differed from that of *Tetrahit* or *bifida*. When botanizing with Mr. Alfred Fryer at Chatteris, in the autumn of last year, we noticed in a field, containing both *speciosa* and *Tetrahit*, the same form. Mr. Fryer agreed with my suggestion of its being a hybrid, but further evidence is needed before we can treat this as an established fact. G. Claridge Druce.

Pottia Heimii Fürnr. (p. 55).—To Mr. Dixon's interesting note I may add that I have gathered this moss in a flint gravel-pit here at Bromley, Kent, where there is nothing to indicate any saline quality in the soil. It was also noted by the late Dr. Spruce as occurring at Thorp Arch, Yorks. (v.-c. 64), and was still there on the occasion of the visit of the Yorkshire Naturalists' Union in April, 1897. Thorp Arch is on the Wharfe, but I believe I am right in stating that the river at that place is not influenced by tides.—Ll. J. Cocks.

The distribution of this moss appears to be somewhat singular. As a rule, it is found on muddy banks of estuaries, usually almost within touch of sea-water, or on the banks of brackish ditches. I was surprised a few months since at receiving undoubted specimens of this species from near Knaresborough, growing on dolomite. In Journ. Bot. 1879, p. 369, I find it recorded from "Quarry Moor, Ripon, *Miss Morton*." In a list given by the late Dr. Thwaites it is recorded from Durdham Down, near Bristol; and in one by Mr.

W. A. Shoolbred of Chepstow, from the Wye Valley. It appears probable that its distribution may be affected by the magnesia in the sea-water, and by the same mineral in the dolomite and oolite formations. Further information concerning its inland distribution is desirable, and would interest me as much as it evidently does my friend Mr. H. N. Dixon.—E. M. Holmes.

Pembrokeshire Plants.—I observed on June 30th, 1903, about New Milford, Llanstadwell, and Walterston, the following species, which appear to be unrecorded for v.-c. 45. Mr. Arthur Bennett has kindly checked the list:—*Polygala oxyptera* Reichb.; *Stellaria umbrosa* Opiz; *Trigonella purpurascens* Lam.; *Rubus erythrinus* Genev.; *R. Selmeri* Lindeberg; *R. lasioclados* Focke, var. *angustifolius* Rogers; *R. dumetorum* W. & N.; *Potentilla procumbens* Sibth.; *Epilobium adnatum* Griseb.; *Glyceria declinata* Bréb.; *Festuca rubra* L. *Fumaria confusa* Jord. has already been recorded; but its occurrence at Llanstadwell (confirmed by Mr. Pugsley) may be worth mentioning, as *F. Boræi* has frequently been mistaken for the true *F. confusa*.—Edward S. Marshall.

Deschampsia discolor in Yorkshire. — Last August I observed a large quantity of a grass which seemed new to me in a very wet bog on Skipwith Common, East Riding, v.-c. 61; and I came to the conclusion it must be *Deschampsia discolor* Roem. & Schult. = *Aira setacea* Huds. = *A. uliginosa* Weihe. The name has recently been confirmed by my friend Mr. J. W. White, F.L.S. The grass was spread over about an acre, and much of it was actually growing in the water. This species appears to have been recorded from only one spot in Yorkshire, *viz.* "Sparingly in very wet peat in the southern part of Thorne Moor," which is in the extreme east of the West Riding (v.-c. 63), and due south of Skipwith. Though yet recorded from so few counties, the range of this species in Britain appears to extend from Hampshire to Sutherland. — H. Stuart Thompson.

NOTICES OF BOOKS.

Legré, Ludovic. *La botanique en Provence au XVI^e siècle.* Les deux Bauhin, Jean-Henri Cherler, et Valerand Dourez. Marseille: H. Aubertin & G. Rolle. 1904. 8vo, pp. xi, 119.

In the publication of this volume, M. Legré has completed the work which he set himself to accomplish several years back, and inaugurated with his *Pierre Pena et Mathias de Lobel* in 1899, which was reviewed in the pages of this Journal for that year, pp. 88–92. Since then, in rapid succession, we have had to thank the author for a series of most interesting volumes, each displaying an enormous amount of loving labour expended on the works of the old botanists and their contemporaries, so that by piecing together sundry hints and expressions, scattered through these volumes, some clearer view might be obtained of the lives, travels, and doings of these old masters of botany.

The concluding volume of this series of biographic monographs now before us has, like its predecessors, to do with some whose names are imperishably enshrined in the annals of the science, and one whose modesty has hitherto hidden him from view, though the plant named after him *Samolus Valerandi*, is a fitting memorial to a modest student of plants. It is of interest to remark, as the author points out, that the two brothers Bauhin were sprung from French parents, who left their native country for conscience' sake, and found that security in Switzerland which was wanting to them at Amiens. The elder, Jean or Johann, was born soon after his parents reached Basel, in 1541, and nineteen years later his brother Gaspard or Caspar was born in the same city. M. Legré then follows the career of the elder, and especially the one year which he spent at Montpellier: three years later Pena and Lobel traversed the same ground, which has become classic from its constant mention in the books of the numerous botanists who studied in the same university. Many passages are given from the *Historia Plantarum*, in which Bauhin notes the various localities in which he had found plants; the three folio volumes with their 3600 pages in double columns have been closely scrutinized by the author—a labour of immense industry—to ascertain how much is the work of Bauhin, and how much is to be ascribed to his son-in-law, Cherler. The result is, that most of the book is the work of Bauhin; his son-in-law is occasionally revealed by some such sign as the use of "Ego Chelerus," but it is far more frequent to find "Ego Bauhinus" or "Gener meus" in the text, unmistakably showing whose was the pen which wrote that portion of the work. The writer of this vast collection died in 1612, with no prospect of his long labour ever attaining the dignity of print; his son-in-law had predeceased him about two years before, and it was not till thirty-eight years later—that is, in 1650—that the first volume issued from the press, under the care of Chabrey, and at the expense of Graffenried, who provided the 40,000 florins requisite to bring it out.

Cherler's life was a short one, and was not marked by the issue of any important work of his own, save only his *Sciagraphia;* his share in bringing out the *Historia Plantarum*, as just mentioned, is his chief title to fame. Still, M. Legré in his laborious investigation of that vast work is able to bring out, on the direct statement of his father-in-law, the fact that Cherler had botanized in Provence.

Following these two notices, the author of the work before us appends many critical remarks to clear up doubts as to some of the plants described by Bauhin, and since then misunderstood; for these reference must be made to the volume. The younger brother, who is so well known by his *Pinax*, the handbook of reference to pre-Linnean botanists, also gathered plants in Provence, and M. Legré discusses his material in the same method as in the foregoing examples.

The last individual brought forward in this volume is Dourez. He was born at Lille, in Flanders; but all details appear to be wanting, except that he seems to have been of Spanish descent; in some way he was a connection of the Bauhins, possibly by

marriage. Johann Bauhin was for some years in Lyons, and we learn that while there he instructed his relative in the art of compounding medicines, especially the Theriacum, a medicine of great repute. The passages which are quoted concerning Dourez show him to have been passionately fond of herborizing, liberal in giving plants, critical in his knowledge, skilled in his craft as an apothecary, and of singular modesty. His farthest voyage seems to have been to Syria, from Venice; he coasted along Greece, landed in Crete, and came back by Venice as he started. The date of his death is not known; M. Legré places it between 1571 and 1575, for he was still living when Pena and Lobel brought out their *Adversaria* in 1571, and in the Appendix, which was printed at Antwerp in 1575, he is mentioned as "piæ memoriæ." The collections of Dourez came into the possession of Johann Bauhin after his decease.

With this botanist M. Legré ends his labours. We have to thank him for a series of portraits on each of which he has by his assiduity shed additional light; he suggests that other botanists, each for his own province, should do similar work; and, if this suggestion be acted upon, and be followed by a series of volumes at all comparable with those now completed, botanic science will be doubly indebted to M. Legré. As it is, the thanks of the botanic world are worthily his due, not only for the results achieved, but also for a pattern by which others may profit.

B. Daydon Jackson.

The Physiology of Plants. A Treatise upon the Metabolism and Sources of Energy in Plants. By Dr. W. Pfeffer, Professor of Botany in Leipzig University. Second fully revised Edition. Translated and edited by Alfred J. Ewart, D. Sc., &c. Vol. II. Growth, Reproduction, and Maintenance. Royal 8vo, pp. viii, 296, tt. 31. Clarendon Press. 1903. Price 16s.

In pursuance of the plan adopted for the first volume, a notice of which appeared in this Journal (1900, p. 324), the present one, corresponding to Th. i. Bd. ii. of the German edition, is issued as a book complete in itself. English students of plant physiology will be glad to have in their own tongue a presentation of Dr. Pfeffer's well-known work, with the additional advantages of Dr. Ewart's editorial revision and critical notes. There are ten chapters, the more important of which are subdivided into parts, while the subject-matter throughout is arranged in sections (seventy-five in all), thus facilitating reference. Chapter i., entitled "Growth," supplies a general discussion of the subject, and the limitations to its study under present conditions. "The term growth may be used to indicate all formative processes leading to a change of shape or of structure." Growth is usually accompanied by an increase in volume, which may, however, involve no increase of organic substance, while a permanent change of shape may occur without any change of volume, as when the growth in length of an organ is just counterbalanced by its increase in diameter. The growth of simple and more complicated plants and plant organs under constant external conditions is discussed, and the various ways of measuring

rate of growth are described. A short chapter follows on the mechanics of growth, in which growth by apposition and intussusception are discussed in the cases of the cell-wall and the starch-grain respectively. The relation between nuclear and cell-division, the differentiation of tissues as affected by inherent mechanical conditions, and the order of cell-division form the subjects of the third chapter; while the fourth deals with the elasticity and cohesion of the plant-body as a whole, of the cell-wall and of the tissues, and is followed by a brief chapter on tissue-strains and stresses.

The influence of external conditions on growth is the subject of Chapter vi. Essential formal conditions, comprising (*a*) sources of energy and food, and (*b*) stimulating factors, such as temperature, oxygen, &c., can be distinguished from accessory non-essential factors which act mainly as stimuli. The influence of temperature, of light, of magnetism and electricity, of gravity and centrifugal force, of chemical agencies, of the percentage of water and of turgidity, and of mechanical agencies on growth are discussed in detail. "The Causes of Specific Shape" (Chapter vii.) forms a chapter of very great interest. The subject is treated under the headings—differentiation of cells and of organs; correlation and reproduction; symbiotic reactions; review of the internal factors determining specific shape; and hypotheses of ultimate structures and heredity. It is followed by a short chapter on variation and heredity. Periodicity of growth, daily and yearly, and the influence of external conditions upon, and the origin of, these phenomena are discussed in the ninth chapter; while the tenth, and last, is entitled "The Power of Resistance to Extremes." In the latter, the causes of death, resistance to heat and cold, power of resistance to light, effects of withdrawal of water and chemical changes, including the action of poisons, form the subjects of discussion. An exhaustive index completes the volume.

Numerous references to special papers are given throughout the book, and add considerably to its value to the special student of plant-physiology. The general botanist will find in the subject-matter an exposition of a phase of his science, treated in a more readable way than was the subject of the earlier volume.

A. B. R.

BOOK-NOTES, NEWS, &c.

At the meeting of the Linnean Society on 21st January, Dr. Eric Drabble exhibited a lantern-slide showing diagrams of bi-carpellary fruits of the French Bean. These specimens of *Phaseolus vulgaris* were obtained from a garden on the middle coal-measures of North Derbyshire. In the simplest case there is present on the posterior aspect of the normal carpel a second smaller carpel with reversed orientation and without seeds. In other cases the second carpel attains to at least one-half the size of the normal anterior one, and is fused with the latter proximally in such a manner as to give rise to a unilocular fruit with parietal placenta-

tion, the carpels being free from one another in their distal portion. In other cases the two carpels are of approximately the same size, and both bear seeds, They are completely fused below to form a unilocular ovary, while above they divaricate from one another. It was pointed out that, although the *Leguminosæ* are typically monocarpellary, certain members of the order are bi- or even polycarpellary; but in these cases the polycarpellary fruit is of an apocarpous nature. It would appear, therefore, that the specimens described in some sense revert to ancestral conditions in so far as their bicarpellary nature is concerned, but that their syncarpous nature is anomalous. Comparison with related orders, *e. g.* the *Connaraceæ*, confirms this opinion.

At the meeting of the Society on 4th February, Mr. C. E. Salmon exhibited two specimens of *Epilobium collinum* C. C. Gmel,, from Scotland, with a series of *E. montanum* and *E. lanceolatum* for comparison, and read a note which will appear in this Journal in an extended form. Dr. S. H. Vines, the President, gave an account of some researches into the physiology of the Yeast-plant (*Saccharomyces Cerevisiæ*). Mr. E. S. Salmon gave an account of his "Further Researches on the Specialization of Parasitism in the *Erysiphaceæ*." The comparative inoculation-experiments of 1650 leaves of various species of *Bromus*, carried out by the author at the Cambridge University Botanical Laboratory, have shown that a very high degree of specialization has been reached in the adaptive parasitism of *Erysiphe Graminis* DC. to the different species of the genus *Bromus*. This specialization has involved the evolution of a considerable number of "biologic forms" of the fungus. The complicated inter-relations of these "biologic forms" with their host-species were shown by means of diagrams. Evidence was given of the distinctive infection-powers of the "biologic forms" on *B. interruptus*, *B.* "*hordeaceus*," *B. commutatus*. *B. racemosus*, *B. velutinus*, *B. arvensis*, *B. tectorum*, and *B. arduennensis*. The author pointed out that it is possible, by using the index of the reaction to the attacks of these "biologic forms," to show the presence of specific physiological (or constitutional) characters in a plant. As a rule, each species of *Bromus* shows physiological characters which hold good for all examples of the species obtained from different localities. But there are exceptions to this rule, and the author pointed out that "biologic forms" of host-plants exist. Details of experiments were given in which definite proof was obtained of the function of certain species of *Bromus* as "bridging species." In inoculation-experiments with *Sphærotheca Humuli* on *Potentilla reptans*, the results obtained showed that in the genus *Sphærotheca*—as in *Erysiphe*—specialization of parasitism and the evolution of "biologic forms" have taken place. The experiments with *Erysiphe Cichoracearum* on *Plantago major* proved that this "biologic form" cannot infect *P. lanceolata*, but that it is able sometimes to infect *P. media*. The fungus transferred to *P. media* produced perithecia on some of the inoculated leaves after the *Oidium*-stage. From observations made in the field, the author has ascertained the constant association of a mycophagous larva with the *Oidium*-stage of many species of the *Erysiphaceæ*. A

number of these larvæ feeding on the conidia of species of *Erysiphe* and *Sphærotheca* were reared, and a Dipterous fly belonging to the *Cecidomyiidæ* was obtained. This fly has been determined by Abbé Kieffer as belonging to the genus *Mycodiplosis*.

The interesting and beautiful show of varieties of *Primula sinensis* which filled the tables at the Linnean Society's meeting on Feb. 18 attracted much attention from the Fellows present, and Mr. Bateson's paper upon heredity and variation as exhibited by them was anticipated with interest. Unfortunately, it was preceded by an exhibit of West Australian plants stuck into a scrapbook in various grotesque devices, including the representation of a house, which seemed absurdly out of place at a meeting of a learned Society; this was followed by Mr. Biffen's paper on wheat hybrids, succeeded by a disquisition, as long as the paper, on waltzing and pink-eyed mice and their hybrids, from Prof. Weldon. The Director of Kew protested his inability to see the connection between wheat and mice, except in granaries, and the President somewhat feebly endeavoured to restrict the length of the demonstration, but, notwithstanding signs of impatience on the part of some persons, Prof. Weldon held on his way; and the necessity of catching trains caused many to leave without hearing the paper in which they were specially interested. We think it would be well to arrange that the principal paper of the evening should occupy the first place in the proceedings, and assuredly time should not be wasted upon exhibitions such as that to which we have referred.

James Thomas Powell, who died at Parkstone, Dorset, on Jan. 14, was born at Daventry, Northamptonshire, on April 3, 1833. For many years he was "Method Master" and Tutor of the Government Training College of Teachers under the Congregational Board of Education, but in 1900 resigned his post through ill-health and settled at Parkstone. He was Treasurer of the Watson Exchange Club from 1885–1900; his name is commemorated in *Rubus Powellii*, which he discovered, and which is described in this Journal for 1894, p. 47. Mrs. Rogers is anxious to dispose of his herbarium of British plants, which is contained in a suitable cabinet; communications may be addressed to her at 77, Broadfield Road, Catford, S.E.

We are accustomed to eccentricity in connection with "Bulletins," but the one of which "No. 1" has just been issued by the Colorado College Museum is perhaps the oddest, as it is certainly the smallest, that has yet appeared. It is a single leaflet of two pages, and is devoted to an article on "The Colorado Rubber Plant" by Mr. T. D. A. Cockerell, who describes a new species, *Picradenia Earlei*, and two subspecies. The leaflet is dated 11 Dec. 1903. It is, we think, a matter for consideration as to whether a fragment such as this can be reckoned as a publication; but even if so, it is difficult to justify its existence. Surely Mr. Cockerell would do better to publish his brevities in one of the American botanical journals, where they would receive a publicity which this literary fragment can hardly be expected to obtain.

The Religious Tract Society has just issued (price 3s. 6d.) a volume giving an account of Thomas Wakefield, "Missionary and

Geographical Pioneer in East Equatorial Africa." Mr. Wakefield, whose claim to a notice in these pages rests on the fact that in 1880 and 1884 he sent collections to Kew, was born in Derby on the 23rd of June, 1836. He was apprenticed to a printer, but as soon as he was out of his time became a minister of the Methodist Free Church. In 1861 he resolved to devote himself to missionary work, and early in the following year arrived at Zanzibar. Here he made the acquaintance of Sir John Kirk and Colonel Grant, who encouraged him to collect plants; he also paid much attention to the customs and folk-lore of the country of the Gallas, where he established a mission. Failing health compelled Wakefield's return to England in 1901, where he died on the 15th of December, apparently at Southport, Lancashire, though this is not definitely stated, and was buried in St. Cuthbert's Churchyard, North Meols. In an appendix are given lists of the plants sent to Kew; it is greatly to be regretted that these were not submitted to some botanist, or at least to some one acquainted with the names of plants, for correction; as they stand, they are almost unintelligible—*e. g.* "Comberbum au C. elæ agnoides. Kl. ?," "Lamftnothamnus Zangurbaricas, Hn." The collector, whose portrait appears as a frontispiece to the volume, is commemorated in *Turræa Wakefieldii* Oliv.

David Thomson Playfair, M.D. Edinb., of Bromley, Kent, who was born in March, 1855, died at Bournemouth on 1st February. He became a Fellow of the Linnean Society in 1888, and was a member of the Scottish Alpine Botanical Club and of the Watson Exchange Club. Dr. Playfair was an excellent field botanist, and had formed a good herbarium of British phanerogams. At a student at Edinburgh University he obtained the Herbarium Gold Medal.

We are glad to learn that Mr. Samuel Alexander Stewart, of the Belfast Museum, has been elected an Associate of the Linnean Society. Mr. Stewart was born at Philadelphia in 1826. Twelve years later he came to Belfast, where he has since remained. Attendance at classes conducted by Ralph Tate under the Science and Art Department developed his taste for natural history, and from that time onward he has frequently contributed papers to the Belfast Naturalists' Club, some of which have been published in the *Irish Naturalist* and elsewhere. His most important work is the *Flora of the North-east of Ireland* (1888) in conjunction with Mr. T. H. Corry, and was carried to completion by Mr. Stewart after Corry's untimely death. We have always maintained that the Associateship of the Linnean Society should be reserved for those who have done useful scientific work, but are unable to become Fellows: and this appears to be the view of the Fellows of the Society who, at the meeting at which Mr. Stewart was elected, rejected another candidate not possessing such qualifications.

The Association Internationale des Botanistes proposes to issue at a cheap rate an annual volume containing all the diagnoses of new species, subspecies, and varieties which have appeared during the year. Further information may be obtained from the Secretary of the Association, Dr. J. P. Lotzy, Leiden.

C. Lisker ad.

West, Newman collotyp.

Erionema aureum *Penzig.*

NOTES ON MYCETOZOA FROM JAPAN.

By Arthur Lister, F.R.S., and Gulielma Lister.

(Plate 458.)

In the spring of 1902, Prof. Marshall Ward enquired of Prof. Miyoshi, of the Botanical Institute, Imperial University, Tokio, whether the study of Mycetozoa had been pursued in Japan, and added that he would be grateful for any examples of the group that could be supplied to him. In October of the same year Prof. Miyoshi sent eighteen excellently preserved specimens, which Prof. Ward kindly submitted to us for examination. The list is as follows:—

Physarum polymorphum var. gyrocephalum Rost., Botanical Gardens, Tokio, leg. S. Kusano, Aug. 1901. This specimen corresponds in all respects with those from the United States; the clusters of yellow, compressed, and convoluted sporangia form somewhat globose heads, each supported on a yellowish brown stalk about 1 mm. long.

P. compressum A. & S. *l. c.*, leg. S. Kusano, July, 1901. It is the form commonly met with in Europe; the sporangia are much compressed, more or less clustered on short thick stalks, or sessile.

P. didermoides Rost. *l. c.*, leg. S. Kusano, Aug. 1899. The sporangia are crowded and sessile on a scanty, white, membranous hypothallus; the capillitium and very dark spores are typical of the species.

P. gyrosum Rost. *l. c.*, leg. S. Kusano, Sept. 1902. On dead leaves. This is an interesting gathering; there are several small clusters of compressed and confluent sporangia; they are similar to those described and figured in this Journal* from specimens supplied by Dr. Jahn from a hothouse in the University Gardens, Berlin, and from Blumenau, Brazil, recorded by him in 1902;† but the bulk of the Japanese specimen consists of a labyrinthine network of compound sporangia attaining the uniform height of about 0·7 mm., and covering an area 15 mm. across. Among the specimens from Brazil, referred to above, there is also an æthalium‡ of the same character as that described from Japan, and nearly equalling it in size; the statement in our former paper that *P. gyrosum* formed only small æthalia, though true with regard to the gatherings hitherto obtained in Germany, is thus shown to be not of universal application; for, though the Japanese growth is small as compared with the dense æthalia of *Fuligo septica*, it is large in comparison with the type in

---

* Journ. Bot, 1902, p. 210, where, on line 41, for 0·2–0·3 mm., read 2–3 mm.

† Ber. Deut. Bot. Ges. 1902, Bd. xx. Hft. 5, p. 272, fig. 4.

‡ The term æthalium is here used for convenience, though not in all cases strictly applicable.

the Strassburg collection and those from Berlin; the capillitium and spores, 8 μ diam., are similar to those in former gatherings.

ERIONEMA AUREUM Penzig, Pl. 458, *l. c.*, leg. S. Kusano, Sept. 1902. This gathering represents the second recorded occurrence of the species; the first was obtained by Prof. Penzig in Java in December, 1896, and was described by him in his account of the Mycetozoa of the Buitenzorg Gardens.* The minute round granules of lime composing the calcareous deposit of the sporangium-wall and the presence of lime-knots in the capillitium indicate the close relation of this form with the genus *Physarum;* but the reasons given by Prof. Penzig may warrant its being placed in a separate genus. The specimen from Japan presents precisely the same characters as that from Java, and, as no figure has hitherto been published, we give a plate to illustrate its exceptional habit. The prominent features are the bright yellow cylindric and often branching sporangia, and the remarkable capillitium. The latter consists of a uniform, close, elastic network of very slender colourless threads, interspersed with a few scattered yellow lime-knots; on maturity the column of capillitium expands longitudinally, often to several times its original length, carrying with it fragments of the sporangium-wall; this is strikingly seen in the bunches of pendulous sporangia which are connected by long branching yellow stalks. The spores are violet-brown, minutely spinulose under the $\frac{1}{15}$ in. obj., and measure 6–7 μ diam. Some ecorticate forms of *Fuligo septica* show a near relationship to *Erionema*.

DIACHÆA ELEGANS Fr. *l. c.*, leg. S. Kusano, July, 1898. Quite typical. This widely-spread species is very constant in its characters; specimens from Europe, N. and S. America, India, Central and S. Africa, and Australia show little or no variation.

DIDYMIUM DIFFORME Duby, var, COMATUM, *l. c.*, leg. S. Kusano, Aug. 1898. This specimen is the variety described in a previous article in this Journal.† The sporangia are of the usual form met with in this country; the capillitium consists of crowded, straight, colourless, anastomosing threads; they are of equal thickness throughout their length, and do not taper upwards from a thickened base, as in the typical form. In January, 1903, we met with this variety in abundance on dead fern and nettle leaves on the Undercliff, Lyme Regis; the normal form was also present, but sparingly; several sporangia had capillitium of intermediate character showing various stages connecting the profuse slender threads of the var. *comatum* with those of the normal type; this confirms the view that the var. *comatum* is not a distinct species.

D. NIGRIPES var. XANTHOPUS Fr. *l. c.*, leg. S. Kusano, Aug. 1898. On decaying herbaceous stalks. Typical.

STEMONITIS FUSCA Roth, *l. c.*, leg. S. Kusano, Aug. 1901. On grass. The sporangia are 6 mm. in total length; the capillitium

---

* *Die Myxomyceten der Flora von Buitenzorg*, 1898, p. 37.
† "On Cultivation of Mycetozoa from Spores," Journ. Bot. 1901, p. 8.

is normal; the spores are pale purple-brown, minutely reticulate with about six meshes across the hemisphere, and measure 6–7 μ diam.

S. HERBATICA Peck, *l. c.*, leg. S. Kusano, Aug. 1899. Total height 4 mm., the stalks equalling the sporangia in length; the meshes of the surface-net of the capillitium are small, measuring 10–20 μ across; spores 6–7 μ diam., pale purplish brown, nearly smooth.

S. SPLENDENS Rost. *l. c.*, leg. S. Kusano, Aug. 1898. A slender form; the meshes of the surface-net measure about 30–40 μ across; spores 7 μ diam., pale purplish, minutely spinulose.

COMATRICHA LONGA Peck, *l. c.*, leg. S. Kusano, Sept. 1902. A beautifully typical specimen. *C. longa* is not unfrequent in several of the Eastern States of North America, and has been obtained in the West Indies, Nicaragua, Brazil, and also in Java; the earliest gatherings of this species we are acquainted with were made by Welwitsch in West Africa in December, 1855, and August, 1857. He named it *Sternonitis æquinoctialis* Welw., but the name was not published. These specimens are in the British Museum Collection, and are precisely similar in character to that from Japan.

LAMPRODERMA ARCYRIONEMA Rost. *l. c.*, leg. S. Kusano, Aug. 1898. This is a delicate form with slender capillitium; it is similar to the specimen from Epping Forest figured in Brit. Mus. Cat. Myc. pl. xlviii.; in examples from the United States, where the species is common, the threads are usually coarser.

TUBULINA FRAGIFORMIS Pers. *l. c.*, leg. S. Kusano, Aug. 1899. This is the typical form met with in Europe and America.

ARCYRIA ALBIDA Pers. *l. c.*, leg. S. Kusano, Aug. 1901. On dead wood. The capillitium is minutely warted, and is of the type most frequently met with in this country. The sporangia are shortly cylindrical, and are either simple, or clustered on a column of the combined stalks; the clustered form is usually found in warm climates, where the sporangia sometimes attain a great length; it has been given specific rank as *A. digitata*, but is doubtfully deserving of even a varietal name.

A. PUNICEA Pers. *l. c.*, leg. S. Kusano, Aug. 1901. Typical.

LYCOGALA MINIATUM Pers. *l. c.*, leg. S. Kusano, Aug. 1901. Typical.

L. FLAVO-FUSCUM Rost. *l. c.*, leg. S. Kusano, July, 1899. A firm æthalium measuring 32 mm. diam.; typical.

DESCRIPTION OF PLATE 458.

Erionema aureum Penzig. — *a.* Sporangia, × 20. *b.* Capillitium with fragment of sporangium-wall and spores, × 280. *c.* Spores, × 600.

MONS. A. ROBERT'S MATTO GROSSO PLANTS.—II.

By Spencer le M. Moore, B.Sc., F.L.S.

Rubiaceæ (continued from p. 39).

Coutarea speciosa Aubl. var. *pubescens* K. Schum. Corumbá. 807.
Machaonia acuminata H. B. K. Corumbá. 741, 792.

Faramea (§ Eu-Faramea) **chapadensis,** sp. nov. Glabra ramulis attenuatis in nodis paullum incrassatis obtuse quadrangularibus vel fere subteretibus, foliis brevipetiolatis lanceolatis sursum cuspidatis apice obtusis basi acutis tenuiter coriaceis parum nitidulis subtus pallidioribus costis secundariis utrinque sæpissime 12–15 ad angulum fere rectum insertis marginem versus arcuatis utriusvis faciei eminentibus, costularum rete perspicuo, stipulis e basi latissima subulato-acuminatis, cymis terminalibus sessilibus 3-(an semper ?) brachiatis, brachiis brevibus compressiusculis 2-bracteatis inter bracteas 3- (an semper ?) floris, bracteis amplis ovatis obtusis dilute viridibus, calycis limbo ovarium subæquante cupulari impariter 4-dentato intus glandulis paucis onusto, corolla bracteas bene excedente extus et intus glabra tubo gracili sursum gradatim dilatato lobis 4 lanceolatis quam tubus multo brevioribus, staminibus supra medium tubi insertis, antheris linearibus apice acutis, disco alto glabro, stylo glabro, stigmatibus verisimiliter oblongis, fructibus ——.

Hab. Sant' Anna da Chapada; September. 557.

Folia 6·0–8·0 cm. long., 0·15–0·35 cm. lat.; petioli 0·4 cm. long. Stipularum pars ampla 0·2 cm., pars attenuata 0·4 cm. long. Bracteæ circa 1·0 cm. long. et 0·6–0·7 cm. lat. Calycis tubus vix 0·2 cm. long.; glandulæ fuscæ, majores 0·01 cm. diam. Corollæ verisimiliter albæ tubus 1·5 cm., lobi 0·6 cm. long. Stamina 0·5 cm. infra fauces inserta; filamenta 0·1 cm. antheræ 0·5 cm. long., hæ 0·1 cm. lat. Stylus 0·65 cm., stigmata 0·2 cm. long.

Resembling *F. pulchella* Müll. Arg. in habit, but easily distinguished from it by the smaller green bracts, glandular calyces, &c.

Psychotria xanthophylla Müll. Arg. 670.

P. homoplastica S. Moore. 631. The specimens under this number are young and not at all satisfactory; others, also from Sant' Anna da Chapada, but without number, agree well with the type.

P. tomentosa Müll. Arg. 393.
Palicourea rigida H. B. K. 576.

Borreria (§ Eu-Borreria) **perangusta,** sp. nov. Herbacea, humilis, caule ascendente juxta basin vel altius pauciramoso, ramis foliosis gracilibus leviter undulatis teretibus una cum foliis scabriusculis, foliis sessilibus elongatis anguste linearibus paucis latioribus apice mucronulatis marginibus revolutis firmis, stipulis late deltoideis setis 4–5 se ipsis æquilongis onustis, inflorescentiis axillaribus et terminalibus, floribus dense confertis sessilibus, calycis lobis

2 subulatis ciliolatis quam ovarium longioribus, corolla extus puberula calycem longe excedente adusque circa $\frac{1}{3}$ in lobos lanceolatos obtusos divisa, staminibus faucibus affixis, filamentis abbreviatis, stylo exserto glabro apice breviter 2-lobo, capsula parva ovoidea puberula calycis lobis æquilongis coronata, seminibus oblongis atropurpureis microscopice punctulatis.

Hab. Porto Murtinho; February. 884.

Stirps circa 20·0 cm. alt. Folia ex ramulis perbrevibus sæpe oriunda et tunc quasiverticillata, ± 2·0 cm. long., 0·1 cm. lat., accedunt paucissima vetustiora usque ad 0·3 cm. lat. Stipularum setæ stramineæ, centrales 0·1–0·12 cm. long., laterales sæpe paullo breviores. Flores verisimiliter dilute lilacini. Calycis lobi 0·1–0·14 cm. long., erecti; dentes interpositi nulli. Corolla tota 0·42 cm. long.; tubus ima basi 0·06 cm. faucibus ægre 0·2 cm. diam.; lobi 0·15 cm. long. Filamenta 0·05 cm., antheræ 0·1 cm. long. Ovarium 0·06 cm., stylus 0·45 cm. long.; hujus lobi 0·04 cm. long., papillosi. Capsula 0·1 cm., semina 0·08 cm. long.

In floral structure comes nearest *B. verticillata* Mey., which is quite different in habit, has interposed teeth between the lobes of its calyx, has filaments markedly longer than the anthers, a different stigma, &c.

Borreria tenella Cham. & Schlecht. 328, 395.

Borreria (§ Galianthe) **cristata**, sp. nov. Herbacea, probabiliter perennis, caule erecto sursum ramoso fistuloso 4-angulari glabro, foliis subsessilibus lanceolatis apice indurato-acutis chartaceis leviter plicato-nervosis scabridulis, stipulis latis dorso fusco-scabridis setis debilibus adusque 11 se ipsas superantibus subæquantibusve coronatis, paniculis amplis folia multoties excedentibus scabridulis ex bostrycibus brevibus paucifloris permultis compositis, floribus sessilibus, bracteolis quam calyx insigniter brevioribus, calycis lobis 4 ovario turbinato brevioribus dente setiformi unico sæpe interjecto, corolla calycem quater excedente ad $\frac{2}{3}$ in lobos ovato-oblongos obtusos intus pubescentes divisa, staminibus florum omnium a me scrutatorum faucibus affixis, filamentis quam antheræ brevioribus, stylo exserto bifido, capsula parva ovoidea calycis lobis onusta glabra, seminibus oblongis brunneis minute punctulatis.

Hab. Sant' Anna da Chapada; June. 368.

Folia haud raro spurie verticillata, modice 3·0–4·5 cm. long., et 0·6–1·2 cm. lat., supra viridia subtus pallescentia. Stipularum vagina 0·2–0·3 cm. alt., cauli arcte applicata; hujus setæ adusque 0·6 cm. long., sed sæpe breviores. Bostryces ± 1·0 cm. long. Calycis lobi 0·1 cm. long. Corolla 0·4 cm. long.; tubus 0·12 cm., lobi fere 0·3 cm. long. Filamenta 0·05 cm., antheræ 0·1 cm., ovarium 0·15 cm., stylus 0·4 cm. long.; hujus lobi papillosi, 0·07 cm. long. Capsula 0·25–0·3 cm. long., 0·2 cm. diam. Semina 0·22 cm. long.

The affinity of this is with *B. centranthoides* Cham. & Schlecht. and its allies, but the inflorescence and small bracts, flowers, and capsule serve as easy marks of distinction.

Mitracarpum villosum Cham. & Schlecht. 329, 336.

COMPOSITÆ.—II. (*Vide ante*, pp. 35–38.)

Aspilia leucoglossa Malme ?. 535, 644. As respects the leaf, two of the specimens agree with Malme's figure and description, but most have much broader leaves, rotundate-cordate at base; the pappus also is somewhat different, as it has only two longer setæ, and not four as described by Malme. The ligules have apparently been white. If this identification be correct, the species has a considerable range of variation.

MYRSINEÆ.

Cybianthus collinus S. Moore. 314, 376. The specimens are males, but the leaves are so exactly those of my plant collected also at Sant' Anna da Chapada, that I name them as above without any hesitation, in spite of the difference in the flowers. Instead of being broad, as in my plant, the pedicels are slender, 0·2 cm. long, and 0·02 cm. broad. All the flowers examined are 4-merous and 0·3 cm. in diameter, the filaments inserted near the base of the corolla-lobes are 0·03–0·04 cm. long, and the anthers, nearly 0·1 cm. long, dehisce by two terminal longitudinal pores.

In his monograph of the *Myrsineæ* (Engler, *Das Pflanzenreich*, Heft iv. 236, p. 398), Dr. Mez has refrained from placing *C. collinus* in its proper position. I can assure Dr. Mez that the doubt he throws upon the accuracy of my measurements is quite unwarranted, except for the pedicels being said to be 0·8 cm. thick, which is an obvious *lapsus calami* or printer's error for 0·08 cm. In fact, my specimen is the female or hermaphrodite form of the species; that it is the latter I cannot state with certainty, as, possibly owing to the advanced stage of the flowering, no pollen could be found, though the anthers, very small it must be admitted, seem well-developed and quite capable of holding pollen. In any case, with this specimen before me, I cannot agree with Dr. Mez in calling the genus *Cybianthus* "optime" dicœcious, for the "polygamo-dicœcious" of Bentham & Hooker's *Genera Plantarum* seems more likely to prove correct when the plant becomes fully known.

The affinity for *C. collinus* suggested by me was with *C. nitidus* Miq., and this is borne out by Dr. Mez's clavis, the stamens of my specimen being inserted about the middle of the lobes of the corolla. Dr. Mez's proposed affinity is with *C. cujabensis* Mez, and this is correct for the male plant, which has filaments inserted near the base of the lobes. The coexistence in one species of these two kinds of staminal insertion, a point to which Dr. Mez attaches classificatory importance, is only one more instance of the way in which Nature is apt to spoil the attempts of the most laborious writers to classify her productions.

Weigeltia densiflora Mez. 375, 527, 619. The two last numbers are those of specimens in fruit, which may thus be described—fructus sphæroidei, glabri, in sicco levissime bullulati, 0·4 cm. diam.

Conomorpha peruviana A. DC. 322.

Symplocaceæ.

Symplocos nitens Benth. 589.

Styraceæ.

Styrax nervosum A. DC. 377, 417.
S. tarapotensis Perk. Sant' Anna da Chapada. Without number.

Apocynaceæ.

Rauwolfia Weddelliana Müll. Arg. (e descript.) (*R. elliptica* Malme ex ic. et descript.). Sant' Anna da Chapada. Without number. The specimens agree well with Müller's description, but I have not seen the type. My plant is certainly conspecific with the recently described *R. elliptica* Malme, also from Sant' Anna da Chapada. The only difference between *R. Weddelliana* and *R. elliptica* at all worthy of note is that, whereas the former is described as having verticils of four or five leaves, the ternate arrangement usually prevails with the latter, though sometimes verticils of four leaves are seen. This I cannot think sufficient warrant for a distinct species.

Rauwolfia sessilifolia, sp. nov. Planta glabra caule tereti sparsim lenticellifero, foliis 3–4-nato-verticillatis omnibus in verticillo inter se omnino vel fere æquimagnis sessilibus oblongo-ovatis acutis sæpe breviter cuspidatis basi sensim angustatis membranaceis supra læte viridibus subtus aliquanto decoloribus costis secundariis utrinque circa 16 utravis facie leviter eminentibus subrectis vel summum apertissime arcuatis, inflorescentiis apicem versus ramorum ternis, pedunculis sat elongatis sed foliis insigniter brevioribus, cymis 3-chotomis plurifloris patulis verisimiliter demum reflexis, pedicellis quam flores brevioribus, calycis lobis ovato-lanceolatis acutis, corollæ tubo calycem 5-plo excedente faucibus leviter augustatis intus dimidio superiore præsertim juxta staminum insertionem pubescente lobos late oblongos obtusissimos duplo excedente, staminibus faucibus insertis, disco leviter undulato, ovariis discum bene superantibus, drupa ——.

Hab. Sant' Anna da Chapada; September. 494.

Folia adulta 6·0–7·0 cm. long., et 4·0 cm. lat., margine leviter undulata; costa media supra plana subtus valde eminens, ut costæ secundariæ pallidissima. Pedunculi ± 3·0 cm. long. Bracteæ subulatæ, circa 0·2 cm. long. Pedicelli raro adusque 1·0 cm. sæpius circa 0·5 cm. long. Calyx 0·2 cm., corollæ tubus vix 1·0 cm., lobi 0·5 cm. long. Antheræ lineares, 0·13 cm. long. Discus vix 0·1 cm. alt. Ovaria late oblonga, obtusissima, 0·18 cm. long.

Near *R. Weddelliana* Müll. Arg., but certainly distinct from it on account of, among minor points, the differently shaped thin sessile leaves, the shorter pedicels, and the corolla-lobes only half as long as the tube.

Aspidospermum macrocarpon Mart. 430.
Anisolobus Zuccarinianus Miers. 545.
Macrosiphonia longiflora Müll. Arg. 461.
Dipladenia illustris A. DC. 600, 652.

ASCLEPIADEÆ.

Oxypetalum capitatum Mart. & Zucc. 686. Styles very thick and terminating in two short ovate fleshy lamellæ. Fournier gives the stigmas of this species as bilamellate, whereas Malme describes and figures them as semiterete, but I suspect this difference to be merely individual.

Asclepias candida Vell. var. 658. Differs from the type in having the axial part of the upper edge of the corona-scales quite entire instead of conspicuously toothed. The horned appendix also ascends so as to stand at an angle of about 120° with the axis of the scale, instead of at right angles to it. But examination of a series of specimens would probably reveal intermediate forms.

Morrenia brachystephana Griseb. Porto Murtinho. 886.

Vincetoxicum (AMPHISTELMA) **Roberti,** sp. nov. Glaberrimum caule volubili gracili folioso foliis magna pro parte ex ramulis brevissimis oriundis sæpissime pseudoverticillatis breviter sed clare petiolatis elongatis anguste linearibus acutis basi obtusis leviterve rotundatis marginibus revolutis, cymis brevipedunculatis plurifloris, pedicellis flores minimos excedentibus, bracteis lineari-setaceis a pedicellis superatis, calycis lobis lineari-lanceolatis acutis quam corollæ tubus longioribus, corollæ rotatæ lobis ovato-oblongis obtuse acutis æstivatione levissime dextrorsum obtegentibus, coronæ phyllis in cyathum 5-undulato-lobatum basi gynostegio adnatum et huic fere æquialtum connatis, corpusculis minutissimis, caudiculis horizontalibus pollinia longitudine æquantibus, stigmate vertice plano.

Hab. Corumbá; December. 718.

Folia sæpius 4·5–6·0 cm. long. (juvenilia vero breviora), 0·1–0·2 cm. lat., graminoidea, in sicco læte viridia, costa media subtus perspicua; petioli 0·3–0·4 cm. long. Pedunculi ± 0·4 cm. long., cito decurvi. Pedicelli 0·15 cm. long. Flores pansi 0·25 cm. diam. Calycis et corollæ lobi 0·1 cm. long., hi 0·07 cm. lat., in sicco fusci. Corona circiter 0·03 cm. gynostegium 0·04 cm. alt. Antherarum appendices rotundatæ, stigmati breviter impendentes, hoc 0·05 cm. diam. Pollinia pyriformia; glandula minutissima.

Known at once by its long grass-like pseudoverticillate leaves, and the lobulate corona almost as long as the gynostege of its minute flowers.

I have followed Bentham in sinking *Amphistelma* in *Vincetoxicum*, as I cannot see any essential difference between them, and the same applies to *Orthosia* as well. Malme also, to whom we owe some valuable recent work on this group, is not satisfied about *Orthosia* and *Amphistelma*, although he does not solve the difficulty in Bentham's way.

GENTIANEÆ.

Irlbachia cærulescens Griseb. 609.

BORRAGINEÆ.

Heliotropium indicum L. 620. Terere, Paraguay. 850.
H. inundatum Sw. Corumbá. 787. Terere, Paraguay. 853.
H. polyphyllum Lehm. Terere, Paraguay. 841.

Convolvulaceæ.

Ipomœa virgata Meissn. 674, 701, 715.

I. bahiensis Willd., var.? Porto Murtinho. 885. Not having seen the type, I am very doubtful about this determination. The petioles at their longest are 6·5 cm. in length, the lamina, very broadly triangular, reaching 5·5 cm. in width at the base. The 1–several-flowered peduncles have a length of 5·0–12·0 cm.

Convolvulus prælongus S. Moore. Cuyabá. 706*a*.

Evolvulus nummularius L. Porto Murtinho. 868.

Solanaceæ.

Solanum pilcomayense Morong var. *brevipetiolare* Chod. Cuyabá. 760. I have not seen an authentic specimen of this variety, but, inasmuch as the present plant differs from the type in just the points mentioned by Chodat, *viz.* shorter petioles and more hairy clothing, I think there can be no doubt about the determination.

S. corumbense S. Moore. Corumbá. 733.

S. turneroides Chod. Corumbá. 721.

S. fragile Wright. 370*a*. A considerable extension to the range of this Cuban species. The Matto Grosso plant seems absolutely identical with the type.

Solanum (§ Leptostemonum, Tovaria) **wissaduloides,** sp. nov. Inermis saltem inflorescentias versus, fruticosum, ramulis subteretibus primo arcte griseo-stellato-tomentosis cito glabrescentibus, foliis solitariis longipetiolatis lanceolato-cordatis cordatisve apice cuspidato-acuminatis basi nonnunquam obliquis integris supra breviter stellato-pubescentibus subtus paullo pallidioribus necnon arcte griseo-stellato-tomentosis costis secundariis 7–10-jugis fac. sup. planis inf. plus minus eminentibus, cymis quam folia brevioribus unilateralibus plurifloris, floribus mediocribus extus tomentosis pedicellos pariter vestitos longitudine excedentibus, calycis parvi lobis triangularibus acuminatis tubum campanulatum subæquantibus, corolla adusque $\frac{2}{3}$ partita deorsum plicata lobis anguste ovato-oblongis obtusis intus glabris, filamentis brevibus, antheris sat elongatis subæqualibus, bacca nuda globosa nitente glabra.

Hab. Paraguay (probably Terere); December. 825.

Foliorum lamina 8·0–13·0 cm. long., 4·5–6·0 cm. lat., firme membranacea, supra dilute viridia; petioli 3·0–4·0 cm. long., deinde glabrescentes. Pedunculi circa 2·0 cm. long. Cymæ tandem 6·0 cm. diam. Calycis tubus 0·25 cm., lobi 0·2 cm. long. Corolla in toto 1·5 cm., hujus lobi 1·0 cm. long. Filamenta 0·15 cm., antheræ 0·75–0·85 cm. long., deorsum 0·15 cm. apice ipso circa 0·07 cm. diam.; loculi poris parvis ellipticis dehiscentes. Stylus 1·4 cm. long., stellatim pilosus. Bacca circa 0·8 cm. diam.

Differs from *S. Hartwegi* Benth. in shape of leaf, longer petioles, closer, more crowded cymes, and more deeply divided corollas with narrower lobes.

S. vexans S. Moore. Corumbá. 754.

S. gomphodes Dun. (e descript.). 396, 654. At first sight the

two specimens to which the above numbers are attached look very different from each other. I have not seen the type.

Cestrum coriaceum Miers. 443.

Scrophulariaceæ.

Angelonia Gardneri Hook. Porto Murtinho. 869.

Buchnera rosea H. B. K. 406.

B. juncea Cham. & Schlecht. 592.

Gesneraceæ.

Gesnera Sceptrum Mart. 596.

(Obs. *Drymonia Lindmanniana* Fritsch in Bih. t. K. Sv. Vet. Akad. Handl. Bd. 24, Afd. iii., appears from the figure and description identical with my previously described *Drymonia picta*.)

Bignoniaceæ.

Arrabidea coleocalyx Bur. & K. Schum. Corumbá. 719, 812.

Adenocalymna croceum S. Moore. Corumbá. 814. The specimen is in fruit. The capsule is linear-oblong, somewhat narrowed at base, obtuse at apex, smooth with largish scattered lenticels, 13·0–14·0 cm. long, and 2·0 cm. broad.

Anemopægma glaucum Mart. 542.

A. acutifolium DC. (e descript.). 384. If the identification be correct, which I believe to be the case, this is an interesting plant. K. Schumann, who monographed the *Bignoniaceæ* for the *Flora Brasiliensis*, did not see a specimen of it.

A. mirandum A. DC. 467.

Pithecoctenium Aubletii Splitz. Corumbá. 749.

Distictis Mansoana Bur. & K. Schum. Corumbá. 653.

Cremastus Sanctæ-Annæ, sp. nov. Verisimiliter scandens ramulis gracilibus subteretibus longitrorsum multistriatis breviter glanduloso-pubescentibus, foliis parvis ternatis conjugatisve cirro valde abbreviato sæpe terminatis, foliolis breviter petiolulatis lanceolatis acutis vel breviter acuminatis pubescentibus mox puberulis margine integris glanduloso-ciliatis tenuiter coriaceis costis secundariis circa 5-jugis distantibus fac. inf. parum perspicuis, paniculis terminalibus elongatis multifloris patulis rhachi breviter ferrugineo-glanduloso-pubescentibus bracteis summis bracteolisque imminutis lineari-setaceis glanduloso-pubescentibus, pedicellis quam calyx brevioribus vel eum subæquantibus, calyce tubuloso-campanulari tenuiter membranaceo puberulo impariter 4-lobo lobo unico late rotundato reliquis paullo longioribus ovatis omnibus glandula magna apicali instructis, corolla tubulosa faucibus amplificata extus puberula intus basin versus glanduloso-pubescente lobis brevibus rotundatis, disco magno incrassato pulvinato, ovario cylindrico glabro, ovulis biseriatis quove in ordine circa 20, capsula ——.

Hab. Sant' Anna da Chapada. 317.

Foliola 2·5–3·5 cm. long., 1·1–1·7 cm. lat., basi obtusa rotundatave, fac. sup. nitentia necnon eleganter reticulata. Panicula circa 25·0 cm. long., 20·0 cm. diam., ejus rami primarii maxime patentes. Pedicelli adusque 1·0 cm. long. Calyx in toto 1·5 cm.

long., 0·8 cm. diam.; lobus major 0·25 cm. × 0·8; lobi reliqui 0·4–0·6 cm. × 0·4–0·5 cm. Corolla tota ± 4·5 cm. long.; limbus circa 2·5 cm. diam.; tubus deorsum ad 0·35 cm. angustatus, sursum gradatim ampliatus, medio 1·0 cm. faucibus 1·5 cm. diam.; lobi 1·2 cm. long. Stamina ad 0·7 cm. supra basin corollæ inserta; filamenta basi incrassata et sparsim glandulifera, majora 1·8 cm. minora 1·5 cm. long. Anther. loculi 0·22 cm. long., anguste lineares. Staminodium vix 0·5 cm. long., capitellatum, omnimodo glabrum. Discus 0·1 cm. alt. Ovarium 0·35 cm. long. Stylus complanatus, fere 2·0 cm. long. Stigmata lanceolata, 0·2 cm. long.

Easily distinguished by means of its small leaves, 4-lobed calyx, and glabrous ovary.

Stizophyllum perforatum Miers. 566.
Perianthomega Vellozii Bur. Corumbá. 747.
Tabebuia nodosa Griseb. Paraguay. 835.

ACANTHACEÆ.—II. (*Vide ante*, pp. 33–35.)

Ruellia Tweediana Griseb. Porto Murtinho. 856, 864,
R. geminiflora H. B. K. var. *subacaulis* Nees. 587.
R. uda (*Cryphiacanthus udus* Nees), var.? Corumbá. 712*a*. This is the same plant as my No. 964, also from Corumbá. Besides the differences from the type already noted (Trans. Linn. Soc. Bot. Ser. 2. vol. iv. p. 426), the somewhat larger corolla is worthy of remark. Possibly a distinct species. I have not seen the type.
R. Lorentziana Griseb.? (e descript.). Porto Murtinho. 865.

Salpingacanthus, *Acanthacearum e tribu Ruelliearum* genus novum. Calyx amplissimus, foliaceus, phyllis 3 alte partitis ovatis ovato-lanceolatisve postico majori integro reliquis integris vel bifidis. Corollæ tubus maxime elongatus, sub limbo leviter ampliatus; limbus patens, subæqualiter 5-lobus, lobis æstivatione contortis. Stamina 4, subdidynama, prope fauces affixa, breviter exserta; filamenta deorsum per paria lateralia in membranam decurrentem connata; antheræ dorsifixæ, loculis inter se æqualibus basi muticis. Pollinis grana globosa, faviformi-exsculpta (Wabenpollen). Discus prominens. Ovarium oblongum, profecto 2-loculare. Stylus elongatus, stigmatè 1-lobo lineari terminatus. Ovula quove in loculo 5–6. Capsula compressiuscula, falciformis, fere a basi 6-sperma. Semina orbicularia, compressa, levia.—Verisimiliter frutex sursum foliosus. Folia normalia. Flores magni, speciosi, in axillis superioribus solitarii, subsessiles. Bracteæ bracteolæque 0.

Salpingacanthus nobilis, sp. unica. Foliis petiolatis ovatis ovato-lanceolatisve acutis vel breviter cuspidato-acuminatis basi obtusis sin aliter rotundatis membranaceis supra puberulis subtus præsertim secus nervos breviter pubescentibus, pedicellis quam petioli multo brevioribus validis minute pubescentibus, calycis puberuli phyllis minoribus ovato-lanceolatis postico ovato omnibus acutis membranaceis, corollæ extus pubescentis tubo calycem multoties excedente limbi lobis late obovatis obtusissimis, ovario glabro, stylo griseo-pubescente breviter exserto, capsula quam calyx brevi-

ori et revera ab eo obtecta, seminibus retinaculis brevibus compressis obtusis sustentis.

Hab. Corumbá, December. 713*a*, 800.

Ramuli hornotini breves, ex ramis annotinis nudis cortice albo jam obductis orti, minute puberuli. Folia modica 4·0–7·0 cm. long. (raro 8·0 cm. metientia), 2·0–4·5 cm. lat., integra; costæ secundariæ 6–8-juga, parum perspicuæ; petioli 0·5–1·0 cm. long. Pedunculi 0·3 cm. long. Calycis phylla minora 2·0–vix 2·5 cm. long., summum 1·0 cm. lat.; posticum adusque 1·3 cm. lat. Corollæ verisimiliter albæ vel lacteæ tubus 10·0 cm. long., maxima pro parte 0·3 cm. lat., ipso sub limbo subito fere usque ad 1·0 cm. dilatatus; limbus circa 4·0 cm. diam., lobi circa 2·0 cm. long. Filamenta ad 1·0 cm. infra fauces inserta, complanata, circa 1·5 cm. long.; antheræ 0·5 cm. long. Stigmatis lobus alter 0·2 cm. long., alter subobsoletus. Capsula 1·5 cm. long., bisulcata. Semina fusca, 0·4 cm. diam.; retinacula 0·2 cm. long., apice alba.

The position of this remarkable plant is clearly between *Ruellia* and *Pentstemonacanthus*. From the former it is at once marked off by reason of the broadly foliaceous three-leaved calyx. This curious calyx resembles that of *Pentstemonacanthus*, a genus in which the fifth stamen is present, whereas *Salpingacanthus* has not even a trace of a staminode. The absence of bracts and bracteoles and the large corollas should also be noted.

Stenandrium spathulatum S. Moore. Corumbá. 716*a*.

Verbenaceæ.

Lantana coimbrensis S. Moore. Corumbá. 770.
Lippia geminata H. B. K. Porto Murtinho. 876.
L. turnerifolia Cham. & Schlecht. Porto Murtinho. 892.
L. primulina S. Moore. 407, 411, 536, 550, 561.
Stachytarpheta gesneroides Cham. & Schlecht. (e descript.). 694.
Verbena aristigera S. Moore. Terere, Paraguay. 849.
Ægiphila verticillata **Vell. 434.**

Labiatæ.

Ocimum micranthum Willd. Corumbá. 724.
Hyptis brunnescens Pohl. 342.
H. velutina Pohl. 340, 345.
H. sinuata Pohl. 312.
H. brevipes Pohl. 344.
H. lappacea Benth. Porto Murtinho. 872.
H. cæspitosa St. Hil. 612.

Hyptis (§ Cephalohyptis, Xylodontes) **frondosa,** sp. nov. Herbacea, perennis, caule stricto omnimodo folioso valido dense hirsuto-tomentoso deinde hirsuto-pubescente, foliis sessilibus orbicularibus basi alte cordatis apice obtusissimis supra scabridis bullatisque subtus pubescentibus maximeque venosis, glomerulis ex axillis summis oriundis globosis mediocribus plurifloris pedicellis dense hirsuto-tomentosis quam folia brevioribus fultis, bracteis ext. ovatis vel ovato-lanceolatis obtusis int. anguste lineari-lanceolatas acutas

æquantibus omnibus pubescentibus margine ciliatis firme membranaceis, receptaculo villoso, calycis tubuloso-campanulati setulosi ima basi villosi lobis subulatis rigidis inter floritionem tubo brevioribus, corolla calycem breviter excedente tubo subcylindrico labii postici lobis ovato-rotundatis obtusissimis antici lobis lateralibus posticos paullulum superantibus triangularibus obtusis lobo intermedio emarginato longiore, disco antice tumente, stylo integro, nuculis ——.

Hab. Sant' Anna da Chapada. 385.

Caulis circa $\frac{1}{2}$-metralis, a rhizomate valido sublevatus. Folia 2·0–4·0 cm. × 2·5–4·0 cm.; internodia foliis parum longiora breviorave. Pedunculi admodum evoluti 1·0 cm. long., ad angulum rectum vel fere rectum cauli inserti. Glomeruli circa 1·5 cm. diam. Bracteæ 0·7 cm. long., interiores summum 0·1 cm. lat., exteriores 0·25–0·4 cm. Calyx 0·4 cm. long.; lobi 0·15 cm. Corolla circa 0·6 cm. long.; tubus extus puberulus sursum 0·15 cm. diam.; labii postici vix 0·2 cm. lobi fere 1·5 cm. lat.; labii antici lobis lat. intermedio approximati 0·15 cm. long.; lobi omnes extus setosi. Stylus 0·6 cm. long., basi incrassatus.

Differs from *H. orbiculata* Pohl in more deeply cordate leaves, stalked inflorescences, broader outer bracts, and calyx with lobes shorter than the tube.

Salvia (§ Calosphace) **grewiæfolia,** sp. nov. Caule herbaceo erecto late 4-sulcato dense glanduloso-pubescente, foliis petiolatis cordatis apice acuminatis subgrosse serrato-crenatis supra pilis longis appressis pubescentibus subtus densius albo-pubescentibus membranaceis, foliis floralibus vetustioribus calyci æquilongis junioribus quam calyx brevioribus ovatis acuminatis pubescentibus, racemis simplicibus elongatis multifloris, verticillastris sat approximatis sæpissime 5-floris, pedicellis dense albo-pubescentibus calyce brevioribus, calycis tubuloso campanulati longitrorsum nervoso-striati pubescentis lobo postico rotundato obtuso lobo antico adusque $\frac{1}{2}$ bifido segmentis triangularibus acutis, corollæ majusculæ coccineæ tubo lato calycem duplo superante extus pubescente labii antici lobis brevibus intermedio quam laterales latiori labio postico (ut anticus) erecto antico subæquilongi extus pilis coccineis copiose induto, antheris subinclusis connectivis antice in laminam late oblongam connatis, stylo breviter exserto sursum barbato, stigmatibus elongatis.

Hab. Sant' Anna da Chapada. 460.

Folia solemniter 5·0–7·0 cm. long., et 4·0 cm. lat., in sicco supra olivacea subtus grisea; petioli 1·5 cm. long. Folia floralia summum 1·3 cm. long., juniora modo 0·5 cm. Pedicelli 0·5 cm. long. Calyx totus vix 1·5 cm. long., et 0·5 cm. lat., viridis, hujus nervi perquam eminentes; lobi 0·5 cm. long., posticus 0·6 cm. lat. Corolla tota 3·0 cm. long.; tubus ima basi 0·2 cm. diam., subito ad 0·5 cm. dilatatus, superne 0·7 cm. diam.; labia circa 1·0 cm. long. Filamenta 0·25 cm., antheræ 0·45 cm., connectivorum pars libera 0·8 cm. pars connata linguiformis 0·65 cm. long.

To be inserted in the genus near *S. Benthamiana* Gardn., from

which it is abundantly distinct in leaf and flower. It also comes near the recently described *S. mattogrossensis* Pilger, but this has ovate-lanceolate leaves narrowed at base, linear-subulate floral leaves, and corollas with the upper lip much longer than the lower.

EPILOBIUM COLLINUM Gmel.

By C. E. Salmon, F.L.S.

This willow-herb was first recognized by C. C. Gmelin in his *Flora Badensis*, iv. 265 (1826), and described as follows:—"Caule erecto, tereti, foliis alternis, subsessilibus, ovato-lanceolatis obtusis dentatis, stigmate quadrifido." A more detailed description of little specific value follows, and then the interesting note: "Differt ab *E. montano*, foliis caulinis omnibus alternis, multo copiosioribus minoribus, et angustioribus. Loco natali collino, sicco, aprico."

It is a plant that occurs in many parts of Europe in dry, open, more or less rocky places, ascending to some height; and I wish to bring this species to the notice of British (more especially Scottish) botanists from the fact that the Holmesdale Natural History Club's Museum at Reigate contains two sheets of *E. collinum* labelled "*Epilobium roseum?* To be examined. Scotland. *Dr. Power.*" It had previously been named *alsinifolium*.

So far, I have been unable to discover any further details respecting locality, &c., but the specimens were probably collected about sixty years ago by Dr. J. A. Power, who presented a large number of his plants to the Club. It would be both satisfactory and extremely interesting if botanists could re-discover the species in Scotland or Northern England, where there must be many spots suitable for its existence.

It may be helpful to botanists unfamiliar with this species to give here a few more of the characteristics of *E. collinum* to supplement Gmelin's diagnosis.

E. collinum evidently holds a middle place between *montanum* and *lanceolatum*, some botanists (Koch, Cosson, etc.) calling it a variety of the former, though Haussknecht, Rouy, Coste, and others give it good specific rank.

In his *Monograph der Epilobium*, pp. 35, 36 (1884), Haussknecht distinguishes the three species as follows:—

"*Turioniferæ:* turiones ab initio hypogæi, brevi postea epigæi, foliis innovatoriis carnosis crassis pallidis squamiformibus quadrifariam imbricatis, v. turiones ab initio epigæi, foliis innovatoriis majoribus recurvatis viridescentibus, rarius lusu soboliformes foliis innovatoriis subremotis . *E. montanum & collinum.*

"*Rosuliferæ:* rosulæ epigææ apertæ, internodiis fere suppressis, foliis innovatoriis frondosis, foliis caulinis referentibus, viridibus. *E. lanceolatum.*

"† Folia breviter petiolata, basi sub- v. cordata.

"Foliis majusculis, intermediis dense denticulatis, alabastris ovoideis breviter apiculatis; floribus mediocribus, 4–10 mm. longis.
E. montanum.

"Foliis parvis, intermediis remote denticulatis; alabastris subgloboso-ovoideis obtusis; floribus parvis, 4–6 mm. longis.
E. collinum.

"†† Folia manifeste petiolata, basi sensim angustata.

"Foliis intermediis grosse denticulatis; floribus mediocribus, ab initio albis dein roseis . . . . *E. lanceolatum.*"

Rouy and Camus (*Fl. de France*, vii. 189 (1901)) note that *montanum* and *collinum* possess seeds attenuated at the base, whilst those of *lanceolatum* are rounded at both ends.

E. collinum, as I saw it last summer in the Pyrenees near La Vernet, at about 2000 ft., certainly had a very distinct *habit* of its own, unlike that of either *montanum* or *lanceolatum*, and was easily recognizable at a glance. The shortly-stalked leaves, alternate in the middle and upper portions of the stem (for in spite of Gmelin's original description, I think the *lower* leaves, at least, are often opposite), and the *lanceolatum*-like small pinky flowers, combine to form a plant at once striking and unfamiliar to an English botanist. The Scottish examples in the Reigate Museum are unfortunately not complete plants, but are evidently forms nearer *lanceolatum;* but their leaves are broader-based, and not truly lanceolate, as in that species. The Rev. E. S. Marshall has seen the specimens, and believes them to be rightly named *collinum*.

RADNORSHIRE LICHENS.

By W. H. Wilkinson, F.L.S.

The following is a list of the lichens found in the Elan Valley and the Claerwen Valley (the sites of the new lakes for the Birmingham water supply), and in Llandrindod Wells, and the district around it.

Calicium hyperellum Ach. In fruit, on oak trees, Elan, Claerwen, Llandrindod.

Sphærophoron coralloides Pers. Claerwen.

Cladonia cervicornis Schaer. Sparingly in fruit, Elan.—*C. pyxidata* Fr. On soil, Claerwen, Llandrindod.—Var. *fimbriata* Hoffm. On soil, Llandrindod.—*C. furcata* var. *racemosa* Floerke. On moors, Llandrindod.—Var. *spinosa* Floerke. Amongst grass, Claerwen.—*C. digitata* Hoffm. On old trees, Claerwen.—Forma *clavata*. On old trees, Claerwen, Llandrindod.—Forma *ostreatiformis*. In fruit, on old trees, Llandrindod.

Cladina rangiferina Hoffm. Amongst grass, Llandrindod.

Usnea barbata forma *florida* Fr. In fruit, on trees, Elan,

Claerwen, Llandrindod.—Forma *hirta* Fr. On trees, Llandrindod. —Forma *ceratina* Schaer. On trees in fruit, Elan, Llandrindod.—Forma *articulata* Ach. On trees, Llandrindod.

Evernia prunastri (L.). On oak, ash, &c., Claerwen, Llandrindod.

Ramalina calicaris (Hoffm.). On oak trees, Llandrindod.—*R. farinacea* (L.). On oak trees, Llandrindod.—*R. fraxinea* (L.). On oak trees, Elan, Llandrindod.

Platysma sæpincola (Ehrh.). On rails, Llandrindod.—*P. glaucum* (L.). On trees, Elan, Claerwen, Llandrindod.

Peltigera canina (L.). In fruit, on turf, Elan, Llandrindod.—*P. rufescens* (Hoffm.). In fruit, on turf, Elan.—*P. horizontalis* (L.). In fruit, hedge-bank, Llandrindod.—*P. polydactyla* Hoffm. In fruit, hedge-bank, Llandrindod.

Parmelia olivacea (L.). On trees, Elan.—Var. *exasperata* (Ach.). Trees and rails, Llandrindod.—Var. *prolixa* Ach. On sandstone, Llandrindod.—*P. physodes* (L.). Elan, in fruit, Claerwen, Llandrindod.—Var. *vittata* Ach. On oak, Llandrindod.—Var. *labrosa* Ach. On oak, Claerwen, Llandrindod.—*P. perlata* (L.). On trees, Elan.—*P. saxatilis* (L.). Trees and rocks, Elan, Llandrindod.—Var. *sulcata* Tayl. On rails, Llandrindod.—Var. *furfuracea* (Schaer.). In fruit, Elan; on rock, Llandrindod.—Var. *omphalodes* (L.). On rock, Claerwen.

Physcia parietina (L.). In fruit, on trees and rocks, Claerwen, Llandrindod.

Placodium citrinum (Ach.). In fruit, on walls and rocks, Llandrindod.

Lecanora tartarea (L.). In fruit, on rocks, Elan.—Forma *grandinosa* Ach. In fruit, on trees, Elan, Claerwen.—Forma *leprosa* Nyl. Sorediate, on trees, Elan.—*L. subfusca* (L.). In fruit, on trees, Elan.—Forma *argentata* Ach. Ash and pine trees, Llandrindod.—Forma *intumescens* (Rebent.). On ash trees, Elan.—Forma *coilocarpa* Ach. On trees, Llandrindod.—*L. symmictera* Nyl. On pine and rose bush, Llandrindod.—*L. angulosa* (Ach.). In fruit, on ash trees, Llandrindod.—*L. ferruginea* forma *saxicola* (Huds.). In fruit, on rocks, Llandrindod.—*L. atrocinerea* (Dicks.). On rocks, Llandrindod.

Pertusaria multipunctata (Turn.). On oak, ash, and birch trees, Elan, Llandrindod.—*P. leioplaca* (Ach.). In fruit, on ash trees, Llandrindod.—*P. dealbata* (Ach.). In fruit, on trees, Elan.—*P. pustulata* (Ach.). In fruit, on trees, Elan.

Lecidia crustulata (Ach.). In fruit, on rocks, Llandrindod.—*L. sanguinaria* (L.). On oak trees, Llandrindod.—*L. parasema* var. *elæochroma* Ach. Old ash trees, Llandrindod.—*L. contigua* forma *nobilis* Fr. ? In fruit, on rocks, Llandrindod.—*L. confluens* (Weber). In fruit, on rocks, Llandrindod.

Opegrapha Turneri Leight. In fruit, on trees, Elan.

Arthonia astroidea Ach. In fruit, on trees, Elan, Claerwen.—*A. Swartziana* Ach. In fruit, on ash trees, Llandrindod.

Graphis scripta Ach. In fruit, on ash trees, Llandrindod.—*G. elegans* (Sm.). In fruit, on oak trees, Llandrindod.

Thelocarpon Laureri (Flet.). In fruit, on trees, Claerwen.

Verrucaria epidermidis Ach. On ash trees, Elan, Claerwen.—*V. punctiformis* Ach. In fruit, on ash trees, Llandrindod.—*V. lactea* (Körb.), var. ?, with smaller spores. In fruit, on pine trees, Llandrindod.—*V. mauroides* Schaer. ? In fruit, brown thallus, on slaty rock, Claerwen.—*V. polysticta* Borr. ? White thallus, on slaty rock, Claerwen.

BOTANICAL EXCHANGE CLUB REPORT, 1902.

[The following notes are extracted from the Report of the Botanical Exchange Club for 1902 (issued 10 December, 1903), which is edited by Mr. Arthur Bennett, to whose notes "Ed." is affixed. The Editor finds occasion to complain of the material sent: "The largest contributor's parcel is a model of 'how to do it,' while some of the smaller ones are just the opposite"—the "largest contributor" is the Rev. Augustin Ley, who sends 834 specimens. As we have said on other occasions, we think the Report would be improved by the omission of notes which convey no information—*e. g.* the very first, on a Batrachian Ranunculus, occupying seven lines, is followed by "Impossible to name the specimens." There are several misprints, the funniest being one (p. 65) which states that the characters which separate *Bromus interruptus* from *B. mollis* "are almost *enteric* rather than specific": "Bedford" (p. 64, l. 5 from top) should be "Bideford." We note that Mr. Druce still thinks his reference to *B. interruptus* in the Supplement to the *Pharmaceutical Journal* is equivalent to publication; we have (Journ. Bot. 1903, p. 220) given reasons, which still appear to us conclusive, against this view.—Ed. Journ. Bot.]

Ranunculus heterophyllus Web., c. *submersus* Hiern. Portbury Marshes, North Somerset, 27th May, 1901.—J. W. White. "Judging from this specimen, we think this may be a hybrid, with *heterophyllus* as one parent, the thick stem, ascending peduncles, and undeveloped fruits pointing in that direction."—H. & J. Groves.

Arabis ciliata R. Br., var. *hispida* Syme. Ref. No. 2650. This grew plentifully (24th June, 1902) on sandhills about a mile north of Castlegregory, Kerry, Ireland, associated with a fair amount of the type and a small quantity of *A. hirsuta* (probably var. *glabrata* Syme), which was remarkably distinct-looking from both. The only difference that we could detect between type and variety was in the latter having the leaf-surfaces hispid, instead of glabrous; it was also usually rather more robust. After seeing the true plant, I am doubtful about specimens formerly distributed by me as *A. ciliata* var. *hispida*.—Edward S. Marshall. "See *Journal of Botany*, 1903, p. 278."—Ed.

Erophila, sp. Ref. No. 2676. Downs above Rackham and Amberley, West Sussex, v.-c. 13, 10th May, 1902. Petals about two and a half times as long as the sepals. Stems usually depressed, except the short, erect, central one. It seems to approach

E. majuscula Jordan; though that is described as having veined petals, which I failed to observe in the fresh specimens. Plants often large for the genus.—Edward S. Marshall. "Cannot get this named."—Ed.

Subularia aquatica L. Llyn-y-fan-fach, Carmarthenshire, v.-c. 44. Very small plants, but quite characteristic and in good flower, with fruit well developed on the more forward specimens, 21st July, 1902. Apparently a new record for South Wales province of H. C. Watson. H. J. Riddelsdell.

Viola Riviniana var. *nemorosa* Neum., W., & Murb. Plentiful in Comber Wood, near Houghton, West Sussex, v.-c. 13, 3rd May, 1902. Flowers large and handsome; spur coloured, scarcely furrowed. Unfortunately, the colour is very fugitive; I have never yet succeeded in permanently preserving it.—Edward S. Marshall. "Rightly named."—W. H. Beeby.

Cerastium semidecandrum L., forma. This plant grows rather plentifully on the greensand formation at Bow Brickhill, Buckinghamshire, June, 1902. It has a very different facies from the ordinary plant of the Midlands, but I have been unable to match it with any named form.—G. Claridge Druce.

Sagina Reuteri Boiss., glandular form. Birkenhead Docks, Cheshire, 31st July, 1902. This has been referred to three different species by as many well-known botanists. I cannot agree that it belongs to any of our British forms. Mr. Williams says: "I have little doubt that it is *S. Reuteri*. You will notice that the valves of the capsules are emarginate truncate at the tip. In *S. apetala* the outer sepals have a small mucro, and in fruit all the sepals are patent. In your specimens all the sepals are much shorter than the capsule; in *S. ciliata* they are about the same length as the capsule. *S. Reuteri* is a small plant compared with other species of the genus. That it is a British plant is very doubtful, and, if found near Liverpool, I would suggest that it was imported with ballast from a Spanish port. I have seen Spanish specimens under this name quite as glandular as yours; but I suspect that such a character depends upon the station where it is found. That a plant introduced from the south of Europe would develop some modification in its glandular covering is quite likely. I think your specimens are quite distinct from the British members of the genus recognized as indigenous." Mr. Bennett, to whom also I submitted specimens, sent me *S. Reuteri* for comparison with my plants, and I could see no difference, except in the relative length of the internodes and the denser glandular pedicels of my plant. It is new to county 58.—J. A. Wheldon.

Rubus holerythros Focke, variety. Moorland ditches and plantation sides on Mitcheldean Meend, West Gloucester; altitude about 830 ft.; 20th August, 1902. This plant was seen *in situ* by Rev. W. M. Rogers in 1896. On taking these specimens to him in the present year, Mr. Rogers made the following remarks on them: "On the whole, this plant is nearest to *R. holerythros* Focke; but receding towards *R. latifolius* Bab., in the shape of the leaves.

Panicle laxer than in typical *R. holerythros*, and flowers smaller." The stem in the growing plant is burnished; petals pink.—AUGUSTIN LEY.

R. Sprengelii Weihe, f. or var. Yeldersley Lane, near Shirley, Derbyshire, 12th August, 1902. A few bushes of this grow in the hedge of the lane, which I have observed for several years. It differs from typical *R. Sprengelii* in its more robust habit; shape and texture of the leaflets, which are strongly reticulate underneath, with many shining white hairs on the veins; the many fine yellow prickles on the rachis; the sepals long-pointed, with red glandular hairs and yellow acicles; the styles, as in *Sprengelii*, are longer than the short stamens and green, the petals broad and pink. Dr. Focke remarked on its resemblance to his *R. cimbricus*, but this is only in the foliage, and in all other points it is distinct. Mr. Rogers agrees that it is connected with *R. Sprengelii*, and yet in many features different, and suggested a hybrid origin as the explanation. The bramble which prevails along the same part of the lane is *R. infecundus*, which exhibits just those features in which this plant differs from type *Sprengelii*, so that it may be very possibly *R. infecundus* × *Sprengelii*, more fertile than *Rubi* hybrids usually are.—W. R. LINTON. "Is it not a *Sprengelii* hybrid? I remember nothing like it from any other locality."—W. M. R.

R. radula Weihe. Almond Park, near Shrewsbury, July, 1901, and August, 1902.—W. HUNT PAINTER. "A strong form of my subsp. *anglicanus*, frequent in the north, and in its armature one step nearer to typical *radula* than the common South England form described in my *Handbook of British Rubi*, p. 63. Several sheets sent with *anglicanus* from Almond Park by Mr. Painter are *R. rosaceus* Wh. & N., subsp. *infecundus* Rogers."—W. M. R.

R. Griffithianus Rogers. Carey Woods, Herefordshire, 4th August and 5th September, 1902. This plant has been long known to me in Carey Woods, Herefordshire, and in a copse in Brockhampton parish. It was mentioned in *Journal of Botany*, 1896, p. 217, as "*R. radula* var. *anglicanus* Rogers." It is now placed without hesitation by Rev. W. M. Rogers under *R. Griffithianus*, but pronounced "not typical." New county record.—AUGUSTIN LEY.

R. foliosus Wh. & N. Rough ground between Bow Brickhill and Woburn Sands railway station, Buckinghamshire, 15th August, 1902. A form of stiff soil. In its stout greenish stem, thick leaves, and white petals nearer to the typical German plant than is usual with us, but also somewhat recalling forms of *R. scaber*. Whole plant unusually greyish, and leaves mostly 5-nate. Quite like *R. foliosus* and *R. saltuum* in the conspicuously shining upper surface of leaves (in living plant), and in the long narrow flexuose drooping panicle with strongly reflexed sepals.—W. MOYLE ROGERS.

Rosa tomentosa × *tomentella?* Hedges near Bickerton Lane, Cheshire, 27th July, 1902. This appears to be the same hybrid as I sent to the Club last year (*Report*, 1901, p. 10), though from a different locality. It formed a tall, straggling bush about nine feet high. The flowers are very pale rose, and the styles very woolly.

The general aspect of the bush recalled *tomentella*, and I think Mr. Marshall's suggestion that this is one of the parents is probably correct.—A. H. Wolley-Dod.

R. systyla, sp. coll. Near Lavington Church, West Sussex, 13th July, 1902. I send four forms which might, probably, have all been more correctly labelled *R. systyla*, but, as I cannot see characters restricting them to that segregate, I prefer to leave them under the aggregate species of the *London Catalogue*. Form 1 may represent normal *R. systyla* Bast. Form 2 differs essentially in its glabrous peduncles, and, in most of the specimens, in short styles and rather small, somewhat roundish fruit. Form 3 has small, very round fruit, and in this respect resembles interim states of Form 2, but the style-column is always conspicuously protruded, and the peduncles, though less strongly setose than usual, are decidedly so. Form 4 generally resembles normal *R. systyla* Bast., but has sessile styles. It has very pale rose flowers. I am sorry that I had no opportunity of noting the colour of the flower in the other three forms, and that I could not make an exactly equal number of all four forms, so that one of each could be distributed together.—A. H. Wolley-Dod.

R. pomifera Herrm. For several years I have known of the existence of one bush of this rose in a hedgerow near Tidenham Chase, and on one occasion sent specimens to the Club, but have never been able to get it satisfactorily named. This year, while out with me, Mr. Marshall discovered another bush at the border of the wildest part of the common, and specimens shown by him to the Rev. W. M. Rogers were by him named as above.—W. A. Shoolbred.

Pyrus intermedia Ehrh. Rocks in Cheddar Gorge, North Somerset, 30th July, 1902. This addition to the Somerset county flora is due to the keen eye of Rev. Augustin Ley, who detected one or two small bushes without fruit in the autumn of 1901. Other trees, yielding these specimens, were found this summer.—Jas. W. White.

P. latifolia Syme. Limestone rocks in Leigh Wood, North Somerset, 7th June, 1902. Only one tree of this was known in the vice-county until Rev. A. Ley in 1901 informed me that he had seen two or three small bushes in another part of the wood. After renewed search, I came upon the fine tree—thirty feet—from which these specimens were taken.—Jas. W. White.

Galium erectum Huds. Stony ground on Breakheart Hill, Dursley, West Gloucester, 27th August, 1902. I agree with Hewett Watson in his expressed opinion that this is a difficult species, and not well understood by all of us. And this is probably the reason why the station here given is the only one with which I am acquainted within many miles of Bristol. New county record.—Jas. W. White.

Aster Tripolium L., var. *discoidea*. Salt-marsh near Hunstanton, West Norfolk, 1st September, 1902. With these plants occurred a form intermediate in character, a few ligulate florets being noticeable. Major Wolley-Dod has noticed that this is particularly the case when the plants are liable to be covered at high tides. The Hunstanton

plants appeared to be a long distance from tidal influence.—A. B. Jackson.

Crepis taraxacifolia Thuill. Grass field on Henbury Hill, West Gloucester, 21st June, 1902. The records for this species in *Topographical Botany* are comparatively few, but the plant is believed to have spread rapidly in this country of late years, and is certainly more frequently met with about Bristol than it was formerly. In some districts, however, a good specimen may still be difficult to obtain.—Jas. W. White.

Hieracium euprepes F. J. H., form or variety. Fan-las Waterfall, at the head of Glen Collwng, Brecon Beacons, 24th July, 1902. I have great hesitation in describing the plant I now send under a fresh varietal name; but it is abundantly distinct, both from typical *H. euprepes* F. J. H., and from Linton's variety, *glabratum*, as a form, in that the peduncles are all lengthened, and consequently the plant almost entirely lacks the geminate heads which usually give it so marked an aspect. I am unable to point out any leaf-characters by which it stands apart from the type; in the clothing of the phyllaries and peduncles the tomentum is, as a rule, less dense than in the South Welsh type, but this is not so conspicuous when it is compared with the North Welsh or Scotch plants. Typical *H. euprepes* clearly varies considerably in the amount of hair and tomentum present in these parts. The difference, however, which the uniformly lengthened peduncles makes to the general aspect of the plant may be appreciated when I mention that the variety in question has been at various times named for me by good hawkweed authorities *H. Schmidtii* Tausch. and *H. cæsium* Fr. I have had this form under cultivation for about ten years, and in the garden the features above noted are fully maintained, and even developed. I have seen specimens of it from the Carmarthenshire Van, *Riddelsdell*, 1902; Kingshouse, Glencoe, *Marshall*; West Inverness, *Marshall & Shoolbred*; and I have picked it myself at the following Breconshire localities: Craig Gledsiau, Craig-ddu, Dyffryn Crawnon; Fan-las—all in the Brecon range; Taren Llwyd, Black Mountain. I should like to propose that it should stand for the present as *H. euprepes* F. J. H., type, forma *excuosa*, nov. form.—Augustin Ley.

H. vulgatum Fr., var. *mutabile* A. Ley. Wall-top and hedge-bank, Llanwrtyd, Breconshire, 22nd July, 1902. This seems to be a plant of hedge-banks and grassy mountain-slopes at a somewhat low elevation; I have never found it on the cliffs. When well developed it is unmistakable.—Augustin Ley.

H. diaphanoides Lindeb., *teste* A. Ley. Aberant, Aberdare, v.-c. 41, July, 1902. Mr. Ley refers all these plants to the same species. He says: "It differs much in size and in breadth of leaves, but I believe all to fall under type *diaphanoides*." The plants differ "little in clothing of heads, and I feel sure are all to be assigned to one species and one variety. *H. diaphanoides*, in my opinion, is often with difficulty distinguished from *H. dædalolepium*, and the latter ought to be taken from *H. vulgatum* and associated with it." The difficulty of distinguishing is apparent to one who

gathers the plants *in situ*, but here at least (Aberdare) on the railway embankments, coal-waste, etc., where both plants abound, *H. diaphanoides* is decidedly later in flower by as much as a fortnight.—H. J. Riddelsdell.

H. melanocephalum Lindeb. (Exsiccata No. 137). I append notes and description kindly furnished by the Rev. Augustin Ley. "Herba humiliori, capitulis nigricantibus amplioribus, squamis magis imbricatis, latioribus, minusque attenuatis, nudis et creberrime glandulosis, a proximo H. rigido Hart. est diversum (Lindeb.)." Mr. Ley writes that the form "is, as far as I know, unrecorded in Britain. This is a plant which last year I had confounded with *H. amphibolum*, but it is easily distinguished from that plant by the more leafy *rigidum*-like stem, and the numerous longish setæ on the involucre." Mr. Ley refers to *H. melanocephalum* Lindeb. plants from Goathland, v.-c. 62; Upper Teesdale, v.-c. 66; Aberdare, county 41; Defynog and Callwen, county 42. They differ widely in facies from one another, but all show their near relationship to *H. rigidum* Hartm. The Aberdare and Defynog plants are queried by Mr. Ley; some of those from Aberdare are sent for comparison.—H. J. Riddelsdell.

Limonium reticulatum Miller. Sandy margin of Burnham Overy, salt-marshes, West Norfolk, 25th July, 1902.—J. Groves. "Very nice specimens of a rare species. The reputed recurrence of this plant in East Suffolk was an error. I do not know of its having been gathered in Cambridgeshire since the record in Fl. Cambs., 1860. Specimens from Wisbeach in 'Herb. Brit. Museum,' 1796. It cannot be found in Lincolnshire, though it certainly occurred in District 12 ["on the sea beach at Freston"] (Banks Herb., Brit. Mus.), and in South Lincoln in District 17. So that probably East and West Norfolk are the only remaining vice-counties in which it at present exists."—Ed.

Linaria repens × *vulgaris*. From a deposit of chalk rubble brought from Upton, in Berkshire, to fill up a space near the railway station at Oxford, July, 1892. In this locality, where only *L. vulgaris* at one time grew, the advent of *L. repens*, the seeds of which were brought with the chalk rubble, led to a most beautiful series of the hybrid being produced. The first year (1891) plants were wholly hybrids near *repens*; the second year (1892) almost all stages between the two plants were represented; and in 1893 the hybrids were more numerous than the parents, and every step was practically complete. Since that date *L. repens* itself has given way to the competition of native species, as the chalk has gradually been covered with other soil, and the hybrids are fewer. This year they still exist, but the prevailing plant might be described *L. vulgaris* × *repens*; and this is not surprising, because *L. vulgaris* itself is now more frequent than *repens*.—G. Claridge Druce.

Orobanche cærulea Vill. (*O. purpurea* Jacq.). Sands of St. Ouen's Bay, Jersey, 26th June, 1902. Parasitic upon *Achillea Millefolium*. This is probably identical with the Alderney plant (which I have not seen) which has been named *O. Millefolii* Reichb. by Mr. Arthur Bennett. In Reichenbach's Fl. Germ. Excursoria, *O. Millefolii* is

put under *O. cærulea* Vill. as a doubtful variety. In many floras the anthers are said to be bearded at the summit, but bearded and glabrous anthers may be found on the same plant, and even in the same flower (!), and the character drawn from the shape of the corolla-lobes seems to me to be quite unsatisfactory. *O. arenaria* Borkh. should doubtless disappear from the next edition of the *London Catalogue*. It does not occur in Normandy, Brittany, or West France.—L. V. Lester.

Atriplex littoralis L. On the rubbish-heaps, brought from the metropolis, and deposited near the canal between Drayton and Iver, in Buckinghamshire, for which it is a new county record. It also grew, but less frequently, in Middlesex, in similar situation, October, 1892. A curious casual, for which it is rather difficult to guess the origin.—G. Claridge Druce.

Carex montana L. Wyre Forest, county 40, Salop, 27th April, 1902.—J. B. Duncan. "An interesting addition to the Salopian flora beyond the records in Top. Botany, ed. 2, 1883. These records are for East Kent, North Somerset, Derby, and Brecon."—Ed. "I had a specimen in my herbarium collected by the late Rev. J. H. Thompson, 8th April, 1876, near Cooper's Hill, Wyre Forest, which is also Mr. Duncan's habitat. This specimen was named by Mr. Thompson *C. longifolia* (?) Host, and in pencil (*montana* L. ?). This specimen, together with specimens from Mr. Duncan, has been placed in the Shrewsbury Museum."—W. H. Painter in *Record of Bare Facts*, p. 16, 1903, Caradoc and Severn Valley Field Club. "No doubt it has been passed by from the early date it flowers; in cultivation (in Sussex) it has flowered as early as 5th April in my garden."—Ed.

Catabrosa aquatica Beauv., nov. var. *grandiflora* Hackel *in lit.* The spikelets are two-flowered, and twice as large as in type. I found this conspicuous-looking grass in damp sand by the shore at Downreay, Caithness, August, 1902, but well above high-water mark. It grew in very large tufts. It appeared to be at least varietally different from the ordinary plant, and Professor Hackel, to whose kindness we are so much indebted, named it as above. It is probably the same as the plant found by Mr. Hanbury; see *Scottish Naturalist* (1889), p. 91, on Dunnet Links, and then named *β grandiflora* by Prof. Hackel.—G. Claridge Druce.

SHORT NOTES.

Viola calcarea Gregory (p. 67).—Besides the localities given by Mrs. E. S. Gregory, there is Portland, mentioned in Babington's *Manual* (ed. 8). And though I have never seen Portland specimens, I have gathered the true plant in the open woodland of Stubhampton Bottom, near Iwerne Minster, in another part of Dorset, where the flowers were uniformly of a bright pinkish mauve colour.—Edward F. Linton.

Bromus interruptus Druce (p. 67). — I may add Dorset to the geographical distribution of this plant, having found it in some quantity in a field of sainfoin between Edmonsham and Verwood Station, in 1902. With regard to its nomenclature, if the *Bromus* is to rank as a species, I think Mr. Druce ought to have the credit of naming it. Miss Barnard was an acute botanist, but I doubt if she had any intention of issuing her grass as a new species; and Mr. Watson's descriptive remarks are qualified by his statement that the specimens of the *Bromus* "are simply examples of *B. mollis*, with the pedicels and spikelets much shortened, and the panicle thus rendered more close and compact." The publication by specimens is modified at once by the publication in the Report of a criticism which sends it out as a mere variety.—Edward F. Linton.

[We publish Mr. Linton's note, but it has always seemed to us that sentiment is out of place in discussing questions of nomenclature. Whatever name may be adopted, Mr. Druce will always be entitled to the "credit" of having observed the plant independently, and of having elaborated its history; and this he would have even if it be shown that the plant had been duly named and described in some overlooked publication.—Ed. Journ. Bot.]

Trifolium repens var. Townsendii (see Journ. Bot. 1863, 216; 1864, 1 et 13). — The Rev. Sir George H. Cornewall, of Moccas Court, near Hereford, lately gave me a sheet of specimens of a clover with bright deep purple flowers, which he had gathered in June, last year, in a meadow near to Moccas Park. It seemed to me to be *Trifolium repens* L. var. *Townsendii* Bab., and I sent the specimens to Mr. F. Townsend and to Mr. A. Bennett, who confirm the name. The locality, which I hope to visit again this year, is very far from any portion of the gardens, and no plants have been there introduced from the Scilly Isles.—S. H. Bickham.

Rubus dumetorum Wh. & N., var. raduliformis, nov. var.—Stem glaucous, shortly pubescent, with some patent hairs and *crowded short subequal stalked glands*. Prickles subequal, scattered, rather short, with long stout bases, declining or nearly patent. Leaves mostly quinate-pedate, slightly strigose above, hairy or felted beneath, with regular compound teeth; terminal roundish, or broadly ovate-acuminate, with fairly long point, and emarginate or cordate base, and stalk about one-third of its length. Panicle strongly developed, somewhat irregular, with corymbose many-flowered top, and usually several distant, racemose or subracemose branches below; rachis and pedicels more or less felted, with moderately long hair, *many sunken shortly stalked or subsessile glands*, and short declining prickles. Sepals broadly ovate-attenuate, *densely glandular*, greenish, clasping the fruit. Petals large, white. Stamens white, apparently not greatly exceeding the greenish styles. Young carpels glabrous, shining; drupelets only moderately large, about 10–25.—Differing from other described forms of *R. dumetorum* in the almost complete absence of acicles and intermediate arms, and in the abundant clothing of short glands on stem, rachis, peduncles, and sepals. Nearest to *R. rubriflorus* Purchas, and to *R. tuberculatus* Bab.; but distinguished from the former by the colour of its flowers, and by the more regular panicle; and from the latter by the long

bases of the prickles, and the larger panicle; and from both by the glandular development, and the absence of acicles. Localities:—*Monmouth:* Trelleck, abundantly; first in 1890. *Flint:* The Logger-heads, near Molde; 1898. *West Kent:* Hedges near Halstead, abundantly, *Rev. W. M. Rogers*!; 1899. The plant at Trelleck has rounder leaves and more slender prickles than the Kent plant; which, growing in full exposure and in a less moist climate, has also a redder stem and more felted leaves.—Augustin Ley.

Glyceria festucæformis in Ireland (p. 77).—The reply of Mr. Praeger to my remarks on the possibility of this grass being an alien in Co. Down, does not embrace all that should be said To get at the truth in a question of natural history like this, both sides should be duly stated and weighed. Mr. Praeger is an able advocate, but he is a special pleader. For there is an omission in his reply which reduces the force of his elaborate arguments. Though I know Strangford Lough and the Ards, and the Quoil, and Comber for nearly fifty years, and think I might be able to show Mr. Praeger some things about their plants and casuals which he does not know, I must acknowledge that I got the idea of the seed of *Glyceria festucæformis* being introduced with grain in a foreign ship from Mr. Praeger himself. His words in his original account of his discovery in the Ards are:—"That the plant is indigenous there can be no shadow of doubt. In the whole of Strangford Lough there is no port where foreign vessels call." This surely implies that if such port or ship had ever existed there would be a possibility of the plant having been introduced by it. The words mean nothing else. In his reply Mr. Praeger does not take the slightest notice of having made this admission. But he cannot get over it. Then as to the mills and distillery at Comber:—Mr. Praeger, who in his original account did not even allude to their existence, tells us now that he knew all about them, and the seeds they deposit about Comber; while he would have us understand that nothing but mere corn-weeds and seeds are ever imported with barley from a Mediterranean source. I know of fourteen grasses that have been from time to time so imported, and specimens of some of these are now in my herbarium. It would be an interesting experiment to get a bag of the siftings and sweepings that contain these foreigners, and grow them for a season. Mr. Praeger argues as if I had stated that the cargo or cargoes of which I had been informed, and which I quoted, was the only Mediterranean grain that had ever been used in Comber. I have a guess that some of the barley that has been coming into the British Islands to the enormous amount of 150,000 tons per annum, chiefly from Asia Minor and the Levant, has come to Comber. And this it is which, owing to careless growing and threshing, is the source of the foreign seeds which are everywhere, and which give rise to the multitudes of casuals found about distilleries and malt-houses And though Mr. Praeger mentions only Northern Italy as a place where this grass does grow, Dr. Rendle gives "Taurus" as a locality, and Taurus I take to be that district of Asia Minor close to the Levant in which is the mountain range called Taurus. Mr. Praeger says (p. 79): "*G.*

festucæformis does not grow in Algeria nor in Egypt, nor indeed anywhere on the southern shore of the Mediterranean"; but Battandier and Trabut (*Flore d'Alger*, Monocotyledones, p. 210 (1895)) record it from "terrains marécageux salés: Tanger, Misserglim, Mostaganem, La Macta, Aïnsfa près Vialar, Batna."—H. W. Lett.

NOTICES OF BOOKS.

Three Text Books.

A Manual of Botany. By J. Reynolds Green, Sc.D., F.R.S., Professor of Botany to the Pharmaceutical Society of Great Britain. Vol. I.—Morphology and Anatomy. Third edition. Pp. xii, 395; figs. 778. London: Churchill. 1904. Price 7s. 6d.

An Introduction to Botany. By William Chase Stevens, Professor of Botany in the University of Kansas. 8vo, pp. viii, 436; figs. 340. London: Heath. 1904. Price 4s. 6d.

Second Stage Botany. By J. M. Lowson, M.A., B.Sc., late Lecturer at the University Tutorial College. 8vo, pp. viii, 452; figs. 312. London: University Tutorial Press. 1904. Price 3s. 6d.

The third edition of the first volume of Professor Green's well-known text-book, the first edition of which was favourably reviewed in this Journal for 1895 (p. 283), except for typographical changes, does not differ from the second edition, which was issued in 1897. The larger portion of the volume (Book i.), entitled "Morphological Botany," forms a concise and useful general account of the morphology of the higher plants in three chapters, entitled respectively "General Morphology of the Plant," dealing with the vegetative organs; "Morphology of the Reproductive Organs"; and "Morphology of the Fruit and Seed." Some reference is made in the first two chapters to groups other than the seed-plants, but the space devoted to these groups is very small. The general form and relations of the vegetative and floral organs are very fully treated, the descriptive matter is concise and clear, and illustrations are numerous. A student who has worked through these three chapters, and made himself familiar with examples of the living plant, should possess a good foundation for more detailed morphological work, or for purely descriptive botany. We should like to suggest that some other illustration than duck-weed might be found as an example of a root-cap; the cap is obvious, but does not represent what is generally understood by the term.

Book ii., "Anatomy of Plants," forms the smaller "half" of the book (pp. 271–388). It comprises chapters—"The Vegetable Cell" (by the way, why not *plant* cell?), "Formation of Cells and Tissues," "Tissue Systems," and three on the structure of the stem, root and leaf respectively. Here again it is mainly the highest group of plants that is dealt with, and the student will find this a useful book of reference to accompany a course of practical work on the elementary anatomy of this group. The volume is a handy size, but why did the printer use such faint ink?

Professor Stevens's book, published in Heath's Modern Science Series, forms an introduction to the study of plant-life on lines differing somewhat from those of the ordinary text-book. Each chapter begins with directions for practical work. The material required, its method of preparation, and the line of procedure are indicated, and the student is led through a series of observations the record of which, by means of notes and drawings, will form an introduction to the "discussion," which occupies the remainder of the chapter. Given a good teacher to supervise the practical work and amplify the statements of fact which follow, there is material for an excellent course in elementary botany. The writer insists on the value of careful drawings, made as far as possible to scale. For instance, directions are given for making floral diagrams, not in the crude way so often adopted by students, but to show the relative positions of the various members on a horizontal plane and in vertical section, the relative lengths of style and stamen, and other points of interest. The student who has worked through a few typical flowers on these lines should acquire not merely a useful knowledge of the objects examined, but also the beginnings of a habit of accurate observation.

In Chapters i. to x. a course on the general morphology and physiology of the Seed-plants is outlined; this is the most useful part of the book for ordinary class-work. In the next three chapters directions are given for the study of a few examples of the other groups, but, owing to the small amount of space devoted to them, a satisfactory knowledge can hardly be expected. Two chapters on the œcological aspect are followed by a short account of the distribution of plants in time and a brief chapter on the principles of classification. In a second and shorter part of the book, notes on the making of a herbarium and on laboratory equipment are given, while Part iii. comprises a glossary, with an explanation of the commonly used terms by means of line sketches.

Second Stage Botany, in the Organized Science Series, is an adaptation of the *Text-book of Botany*, by the same author, to the requirements of the second stage examinations of the Board of Education. The *Text-book* is, unfortunately, too well known among students, more especially those who take the examinations of the London University as external students. It reduces to a system the art of getting up botany for an examination, tending at the same time to crush all interest in the science. The aim is not to produce scientists, but bachelors of science. It is enough to say that what the older book does for the "more advanced" student, the present does for his junior.

A. B. R.

Flora Capensis: being a systematic description of the plants of the Cape Colony, Caffraria, and Port Natal (and neighbouring territories), by various Botanists. Edited by Sir WILLIAM T. THISELTON-DYER, K.C.M.G., &c. Vol. iv. Sect. ii. pp. 192. Price 8s. net. L. Reeve & Co.

WE welcome another instalment of this valuable addition to our colonial floras, which, after a resting period of more than thirty

years, renewed its existence in 1896, and has since made steady, if not precisely rapid, progress. A comparison of the present with any of the earlier volumes of the Flora—which was begun in 1859—shows how greatly extended our knowledge of South African botany has become, and suggests the hope that steps are being taken to bring out a new edition of those earlier instalments, which indeed have long been inadequate as anything like a presentment of the flora as we now know it. That the supply of novelties is far from exhausted has been shown by the contributions which appear from time to time in this Journal, in which, for example, ten out of the fifty-one species of *Ipomæa* enumerated in the *Flora* have been described by Dr. Rendle within the last three years. We note, too, that this fourth volume has so far exceeded the estimated space that it has been issued in two independently paged sections—a method which, however necessary, is likely to prove a fertile source of misquotation.

In the present instalment we have the *Hydrophyllaceæ*, *Borayineæ*, and *Solanaceæ*, by Mr. C. H. Wright, who, in conjunction with Mr. J. G. Baker, is also responsible for the *Convolvulaceæ;* and the beginning of the *Scrophulariaceæ*, by Mr. W. P. Hiern, who, at the request of the present editor of the Flora, undertook and completed the MS. about thirty years ago—in 1874–5, to be precise—in the view of what was supposed to be a then impending publication. One or two points present themselves for consideration in connection with the last-named monograph. Mr. Hiern, so far as we know, is the first of the botanists employed on the work to make use of the herbaria in the Sloane collection—among them those of Oldenland and Kiggelaar, and to quote the synonyms of Petiver and Burman. The Sloane collections are rich in material, and it would not be difficult for other workers to follow the example of Mr. Hiern in consulting them. A note by the editor on p. 139—so far as we are aware, the first by which he has enriched the work—suggests certain difficulties with regard to future citation which may as well be stated. The note in question runs—"Mr. Hiern would prefer to transpose the generic names *Hemimeris* and *Diascia*, and gives his reasons for this course in Journ. Bot. 1901, 103.—W. T. T.-D." This expression of subjunctive preference hardly conveys what has taken place. We understand that Mr. Hiern in his MS. actually made this transposition, in accordance with the position established in his paper referred to; but that the editor of the Flora, in his wisdom, set aside the names given by the author of the monograph and substituted others presumably in accordance with his own view, though this is nowhere stated. As a result, fifteen species of *Diascia* and one of *Hemimeris* are attributed to "Hiern," although he in no case so named them; the matter being further complicated by the citation of "*Hemimeris elegans* Hiern" (as a synonym under "*Diascia elegans* Hiern")—a name which the supposed author did not give, and of which he does not approve. How are such names to be quoted? We can hardly be right to attribute them to an author who never employed them; and the editor does not claim them. In the case of a full citation, perhaps "Hiern ex W. T. T.-D[yer]"

would meet the case; but for working purposes something shorter is required, though we cannot suggest how it should be provided. There can, we think, be no doubt that, as shown by Mr. Hiern, according to the rule of priority—the neglect of which by Bentham and Hooker in their *Genera Plantarum* and by other Kew botanists has tended greatly to the increase of synonymy—*Hemimeris* must be maintained for the genus to which the original species, *H. bonæspei* L., belongs; although we note that (probably owing to an oversight) it is not so employed by Drs. Kuntze and Post in their *Lexicon*.

BOOK-NOTES, NEWS, &c.

At the meeting of the Linnean Society on 18th February, Mr. R. H. Biffen read a paper on "Mendel's Laws and their application to Wheat Hybrids," illustrating his remarks with lantern-slides. An investigation of the various characters of the different races and varieties of wheat showed that the following characters were dominant:—Beardless paleæ, keeled glumes, lax ears, velvet chaff, grey coloration, red coloration in the chaff, and red coloration in the grain; the corresponding recessive characters being bearded paleæ, rounded glumes, dense ears, glabrous chaff, white coloration in the chaff and grain. In the second generation the plants showed the usual splitting into three showing the dominant character to one showing the recessive, with the exception of the rough chaff of Rivet wheat, which in several cases was followed by impure splitting. In this generation a considerable variation occurred, particularly among the colour-characters, grey, for example, becoming almost black in some cases and very pale in others. Nevertheless, the splitting into grey and white and grey and red chaff appears to be pure. An example of a hybrid intermediate in character between its parents was afforded by Polish Wheat × Rivet. The progeny bore glumes and grain intermediate in size to that of the parents. Evidence was also brought forward to show that certain anatomical characters, such as the presence of groups of bristles, the arrangement of sclerenchyma girders, the presence or absence of pith in the internodes, also followed Mendel's Laws. The same also appears to be true of certain "constitutional" characters, such as the time of ripening and the immunity to attacks of rust.

At the same meeting Mr. W. Bateson exhibited a large series of *Primula sinensis*, lent by Messrs. Sutton & Sons, illustrating the phenomena of heredity and variation which he had been permitted to witness in their nurseries during five seasons. As was well known, the species, since its introduction about 1820, had given off numerous mutational forms—*e.g.* fern-leaved, ivy-leaved, the "*stellata*" type, and others. Many of these in their inheritance follow simple Mendelian rules. Palm-leaf is dominant over fern-leaf and over ivy-leaf, reddish stem over green stem and over deep red stem, single flowers over double, and each recessive form breeds true or self-fertilization,

from whatever pedigree it be derived. Imperfect segregation of fern-leaf from palm-leaf occurs as a rarity. The original introduced plant was thrum-eyed, but the pin-eyed is almost exclusively cultivated now. Thrum-eye is dominant over pin-eye. "Homostyled" forms have appeared, and their character is recessive to both pin and thrum. The *stellata* and *sinensis* types give a blend-form on crossing. In the case of colour certain complications exist. Pure white with green stem is recessive to most and probably to all colours; but the evidence suggested that when a tinged or flaked white with a reddish stem is crossed with colour, the colour is practically recessive, as in poultry. More experiments on this important point were needed. Pinks are recessive to mauves, and consequently mauves cannot be bred true without individual selection. Blue is often altogether disintegrated on crossing, not again reappearing. Some heterozygous types exist—*e. g.* certain lavenders, and certain fancy reds. These each year give off two or more distinct colour types from the "self-crossing" of which they are formed. Of the two forms so given off, one at least breeds true at once, but the other may again break up in the succeeding generation. This case is exactly comparable with that of the Andalusian fowl.

At the meeting of the Society on 3rd March, Mr. L. A. Boodle exhibited photographic lantern-slides demonstrating the formation of secondary wood in certain regions of the stem of *Psilotum triquetrum*. In parts of the rhizome immediately below the aerial stems, and at the base of the aerial stems themselves, tracheides occur, often in considerable numbers, outside the primary wood. These external tracheides are found to be still in course of development, as shown by the imperfect lignification of their walls, at a time when the primary wood has long been completed; in some cases the external elements of the wood further show a distinct radial arrangement. These stems thus exhibit distinct remains of the secondary vascular tissues characteristic of the Palæozoic Sphenophyllales, with which on various groups there is reason to believe the *Psilotaceæ* to be allied. Mr. C. B. Clarke gave an account of his paper entitled "List of the *Carices* of Malaya." In all fifty-four species are enumerated, of which thirty-six, including the eleven here characterized as new, belong to the subgenus *Caricandra*, a natural group essentially tropical, and difficult to diagnose as to species; all possessing a trifid style, with a terminal spike male in the upper portion and female at the base.

The supposed rejection by the Fellows of the Linnean Society of a candidate proposed for the Associateship by the Council, to which reference was made in our last issue, has had a somewhat unexpected result. It had always been assumed that two-thirds of the votes given were necessary to such election, as is the case in the election not only of Fellows but of foreign Fellows; and the Council acquiesced in that belief. After a month's deliberation, however, a different conclusion was arrived at; and at the meeting of the Society on March 17—we quote from the official circular—"the Chairman announced that Mr. William Watson had been duly

elected an Associate on the 18th February in accordance with Bye-Laws, Chap. V., Sect. 2, by a simple majority of the Fellows voting." This as it stands is a misleading statement; the Bye-Laws contain no reference whatever to the election by "simple majority," which, as we have already shown, is contrary to the practice of the Society in all other cases. In the case at issue, the majority was indeed of the simplest—23 votes being recorded against and 24 for the election; and it may be that Mr. Watson will not see his way to accept an honour so grudgingly bestowed. At the meeting in question one of the Secretaries pointed out that the Council had for forty years exercised unchallenged the privilege of nominating Associates; this is, we believe, true, but is a manifest encroachment on the rights of Fellows, any three of whom have a right to such nomination. A Fellow who was present at the meeting on Feb. 18 points out to us the desirability of some improvement in the procedure of voting; not only were the candidates not announced from the chair, but the balloting was conducted in semi-darkness, owing to a lantern demonstration proceeding at the same time, and the balloting-box gave no indication whether a Fellow or an Associate was being put forward. Meanwhile the feeling of dissatisfaction at the Council's latest selection, which is not likely to be decreased by its belated and arbitrary action, is widespread and increasing.

The following Memorial, signed by seventy-three Fellows, has been addressed to the President and Council of the Linnean Society of London:—"The undersigned Fellows of the Society beg leave to put before you their opinion as to the qualifications which should govern the selection of persons to be proposed as Associates. The Charter defines the objects of the Society as being 'the cultivation of the Science of Natural History in all its branches, and more especially of the Natural History of Great Britain and Ireland'; that is, the promotion of pure, not applied, Science. We would point out that, the number of Associates being very limited, their election is justly regarded as one of the highest honours which the Society can bestow; and we feel that the choice should be based on their services to Natural History in cases where, owing to untoward circumstances, the subscription of a Fellow would be a burden. We also think regard should be had to the claims of British Natural History, as stated in the Charter." In addition to the signatories, a number of Fellows have expressed their concurrence in the tenour of the Memorial.

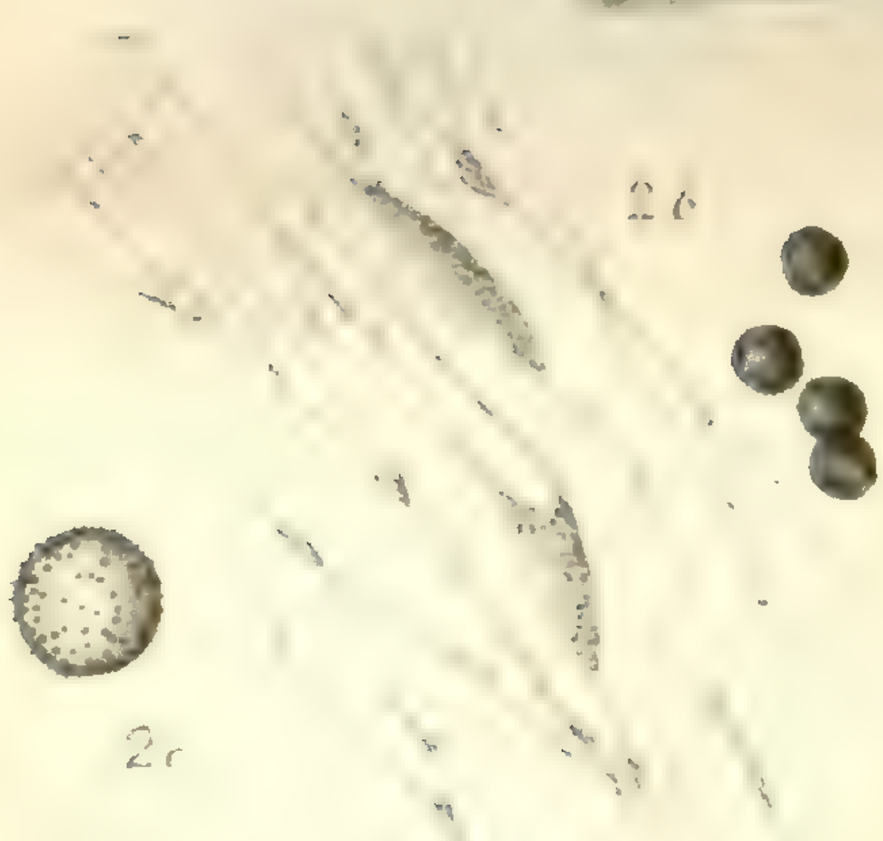
Charles William Webley Hope, son of James Hope, Deputy-Keeper of the Signet, was born in Edinburgh in 1832; he was by profession a civil engineer, and in that capacity went to India in 1859, where he became a member of the Government Civil Engineering Department. He began to collect in Kumaon in 1861, where he also collected in 1890; in 1871 he made collections in Simla, one result of which was to interest his chief, Mr. H. C. Levinge, who subsequently became an authority on Indian ferns, in the study. In 1879 Hope took pension; he lived until 1896 at Dehra Doon and Mussorie, during which time he thoroughly studied

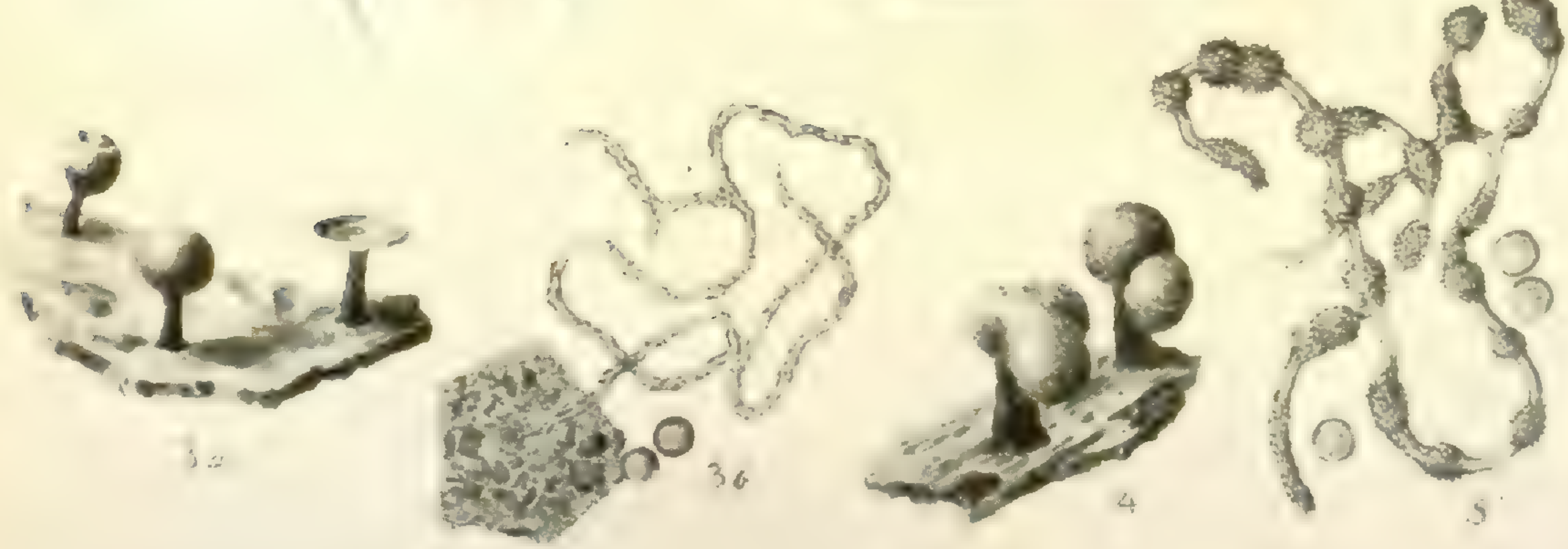
the ferns of the Western Himalayas. In 1896, after a succession of illness, he returned to England and settled at Kew, where he devoted himself to the elaboration of his extensive collections. The results of his work are given in an important and extensive paper on "The Ferns of North-Western India," published in vols. xii.–xv. of the *Journal of the Bombay Natural History Society* (1899–1903); this contains descriptions of about two hundred species, and is illustrated by excellent plates from drawings by Messrs. N. E. Brown and J. N. Fitch, and native artists. The distinctions on which Hope based his species were often minute; many of these will doubtless be reduced by future workers, but in the introduction to the paper just mentioned he explains and justifies his position, and there can be no doubt as to the carefulness of his work. In 1889 Hope presented a collection of Assam ferns to the National Herbarium; in 1890 he described four new Lastreas from Assam in this Journal, to which in 1896 he contributed a short paper on the ferns collected during the Chitral Expedition (1895). Hope's last published paper—an extremely interesting study of the botany of the "sadd" of the Upper Nile—appeared in the *Annals of Botany* for September, 1902. He died at Kew on the 18th of February.

In the late Dr. David Moore's Report on Irish Hepaticæ (Proc. Roy. Irish Academy, ser. 2, vol. ii. 1876, pp. 591–672), one hundred and thirty-seven species were enumerated. It represented forty years of work, and was trustworthy as to species and localities, nearly every one of the plants having been collected by Dr. Moore himself. Mr. McArdle has proved himself to be a worthy successor by his diligent investigations of the county hepatic floras; he has published some eighteen papers on the subject, two of which appeared in this Journal. His *List of Irish Hepaticæ* (Proc. Roy. Irish Acad. xxiv. 387–502 (1904)) is a summary of all that is known of the distribution of the hepatics in Ireland, and contains one hundred and seventy-two species and sixty-three varieties. The more important synonyms, references to literature, the localities, collectors, and dates are stated; and a short account of the earlier Irish collectors, of the physical features of the country, of the peculiarities of the Irish hepatic flora, and a bibliography of the principal papers on the subject, are added.—A. G.

Richard de Gylpyn Benson, who died at Church Pulverbatch, Salop, on Feb. 24, was born there June 25th, 1856. For many years he practised in London as a solicitor, but failing health compelled his retirement from practice, and he returned to Pulverbach, where he took up the study of mosses, which he pursued with much success. He was also collecting material for a new Flora of Shropshire, to be issued by the Caradoc and Severn Valley Field Club, of which he was a member. A collection of his Shropshire Mosses, containing about 250 species, is in the National Herbarium.

We regret to announce the death after a short illness of Professor Karl Schumann, of the Berlin Botanic Museum.





G. Lister del.

West Newman collotyp.

MYCETOZOA.

NOTES ON MYCETOZOA.

By Arthur Lister, F.R.S., and Gulielma Lister.

(Plate 459.)

Badhamia populina, n. sp. (Pl. 459, fig. 1). Plasmodium white. Sporangia white, globose or ovoid 1·2–1·7 mm. diam., crowded and sessile on a scanty pale ochraceous hypothallus, or more rarely solitary on short yellow-brown stalks; sporangium-wall densely calcareous, the outer layer often raised in folds or ridges frequently perforated by triangular or diamond-shaped openings, exposing the grey inner layer; capillitium a coarse network of white, very broad strands charged with lime throughout; spores 11 μ diam., in large clusters of about twenty, dark purple-brown, minutely warted, the warting being rather stronger on one side than on the other; they are traversed by a narrow, sometimes forked ridge, which projects on the spore margin. This species was found by Mr. T. Petch on Nov. 1, 1902, on the bark of an old prostrate stem of *Populus canescens*, about forty feet long, in Bush Wood, Epping Forest: during the following week we gathered many large clusters of sporangia an inch or two wide, scattered along the whole length of the log; some were mature, others were taking form from masses of white plasmodium issuing from the bark. In July, 1903, we obtained a further supply from the same source, and also from another fallen poplar stem, where the white plasmodium was just emerging; we removed this with a portion of the bark, and placed it under a glass shade; next morning the plasmodium had crept a short distance from its first position and had formed into sporangia, which developed perfectly in the course of about forty-eight hours. In general appearance this species resembles *B. hyalina*, from which it is chiefly distinguished by the white plasmodium and the banded spores. We have a specimen of *B. populina* gathered in mature condition from a stack of logs in Walthamstow, June, 1899.

B. foliicola List.* During the year 1903 we had the following records of the occurrence of this species. In June we were favoured by Messrs. Pavillard and Lagarde with a specimen from Montpellier on dead leaves; the sporangia are of the typical form, mostly on slender stalks. In August it occurred in vast profusion with both stalked and sessile sporangia on a stack of brushwood at Chigwell Lane, Essex, covering the slender twigs as if with hoar frost. In September we received it from Prof. Schinz, gathered in the summer near Zürich. In November we found it on a log in a pile of brushwood at Leytonstone. It was also discovered in abundance by Mr. T. Petch on branches and twigs in a ditch in East Yorkshire.

B. decipiens Berk. Messrs. Pavillard and Lagarde have recorded the occurrence of this species at Montpellier.† They describe

* Journ. Bot. 1897, p. 209.

† Bull. Soc. Myc. de France, t. xix. fasc. 2, p. 6.

the cultivation of the sporangia from milk-white plasmodium. The specimen they have kindly sent us corresponds with the type from Curtis in the Strassburg collection obtained from S. Carolina, and also with examples received from Mr. Bilgram, gathered in Fairmount Park, Philadelphia, Oct. 1900. In Aug. 1903, Mr. Petch collected four reniform plasmodiocarps of this species at Tansterne, Yorks. They are olive-yellow, either uniform in colour or varied by yellow ridges or broken bands formed by dense deposits of lime in the sporangium-wall; the capillitium is of the true *Badhamia* character, consisting of a coarse network of broad strands charged throughout with orange-yellow lime; the spores are purple-brown, spinulose, and slightly paler on one side, 11–12 μ diam. The specimen agrees closely with that from Montpellier, and is the first British example we have known.

B. RUBIGINOSA Rost., var. γ GLOBOSA, n. var. Sporangia subglobose, slightly umbilicate below, 0·5 mm. high, 0·7 mm. broad, purplish grey; stalks 0·6 mm. to 1 mm. long, 0·12 mm. thick, dark purple-brown; capillitium and spores as in var. β *dictyospora*. This form appeared in great abundance near Llan-y-Mawddwy, N. Wales, in the years 1895 and 1898. In Sept. 1902, it was equally plentiful in the same wild ravine; the yellow plasmodium spread widely over the face of a bare perpendicular rock and on moss, making a conspicuous object from a distance; the ripe sporangia were in multitudes on the moss and fern below. There is a specimen of this robust form in the Brit. Mus. collection, no. 1036, from Wilson's herbarium, gathered at Clough, Cheshire, in Nov. 1854, on *Hypnum loreum*, a moss on which it is also abundant in Wales. The constancy of the distinguishing characters renders it desirable to mark it as a distinct variety.

Physarum luteo-album, n. sp. (Pl. 459, fig. 2). Plasmodium? Sporangia subglobose, broadly umbilicate below, about 1 mm. broad, 0·7 mm. high, yellow, shading into white, somewhat rugose; sporangium-wall dense with innate clusters of white or yellow lime granules; stalks stout, smooth, 0·5–1 mm. long, 0·2 mm. thick, bright yellow or buff, often paler below, densely charged with lime throughout, their bases frequently connected by a thick ridge of hypothallus containing lime; columella large, hemispherical or shortly clavate, pale yellow; capillitium of extremely slender colourless threads, uniform in thickness, and loosely branching and anastomosing; lime-knots yellow, small, fusiform, sparingly scattered through the capillitium; spores dark purple-brown, spinulose, 11 μ diam. Collected by Miss Constance Pim on fir-needles in the gardens of Sir T. Hanbury, La Mortola, Ventimiglia, Jan. 1903. We have only a single gathering of about twenty sporangia of this species, but the characters are definite, and unlike those of any other *Physarum* with which we are acquainted, we therefore publish the description with a figure. Perhaps it is most nearly allied to *P. melleum*, but differs widely in the character of the capillitium and columella.

P. CRATERIACHEA List. = *Crateriachea mutabilis* Rost. Mr. Saunders again found this species "in great profusion on straw"

at Chaul End, near Luton, in June, 1902. The sporangia are similar to those of his former gathering in Sept. 1899.* A point of interest was the frequent occurrence in the capillitium of the purple-brown membranous expansions noticed in a Swedish specimen from Mr. Fries, mentioned in our former paper.

P. AURISCALPIUM Cooke. We have been favoured by Dr. Jahn with an example of this species gathered by Dr. Max Nordhausen, July, 1897, on an apple-tree at Vogelsdorf, near Rüdersdorf, Brandenburg.† The sporangia are subglobose, gregarious, about 0·5 mm. diam., yellow, and rugose from unequal lime deposits, sessile, or on short orange-brown stalks; the capillitium consists of large, irregularly branching yellow lime-knots connected by rather scanty hyaline threads; the spores are violet-brown, minutely spinulose, 10–11 μ diam. We are not aware of a previous European specimen having been recorded. It agrees essentially with Cooke's type from S. Carolina,‡ and only differs in the hyaline threads of the capillitium being rather more numerous. Dr. Jahn had named it *Badhamia decipiens*, and there was much to support this determination; indeed, the division between the two species is somewhat arbitrary; yet, accepting the view that the capillitium of *B. decipiens* is destitute of hyaline threads, it comes under the head of *P. auriscalpium*.§

P. DIDERMA Rost. Messrs. Pavillard and Lagarde have obligingly sent us an example of this species from Montpellier.‖ It chiefly consists of long plasmodiocarps, but there are a few globose and isolated sporangia. The outer calcareous layer of the sporangium-wall folds back from the persistent inner layer in the usual manner; the capillitium has the characteristic large lime-knots. Dr. Sturgis writes that he has precisely the same form from Berkeley Co., California, leg. Gardener, May, 1903. In September, 1900, we received three specimens of a similar type from Mr. J. Jackol, gathered by him in that year in the neighbourhood of Seattle in the State of Washington, U.S.A. The species was abundant on dead leaves and twigs in Wanstead Park, Essex, in Nov. 1903, together with *P. bivalve*, from which it is not always easily distinguished in the field.

P. ÆNEUM R. E. Fries. We are indebted to Mr. R. E. Fries for a fine example of this species collected by him at Tarija, Santa Anna, Bolivia, July 25, 1902, of which he has published a full description in the account of his South American collections.¶ We are satisfied that it is the same species as the gathering by Mr. Cran in Dominica, recorded in this journal under the provisional name of *P. murinum* var. *æneum*.** The abundant material and more perfect form obtained by Mr. Fries prove that it is clearly

---

* Journ. Bot. 1901, p. 83.
† Abh. Bot. Ver. Prov. Brand. xlv. p. 163.
‡ Brit. Mus. Cat. Myc. Pl. xxiii B.
§ Journ. Bot. 1898, p. 115.
‖ Bull. Soc. Myc. Fr. t. xix. fasc. 2, p. 11.
¶ Arkiv för Botanik, Bd. i. p. 62, Stockholm, 1903.
** Journ. Bot. 1898, p. 117, pl. 385, fig. 4.

entitled to specific rank, and our provisional name must be suppressed.

Fuligo ellipsospora List. Mr. Saunders collected this species on straw at Woodside, Beds, in Sept. 1903. It is essentially the same form as his previous gathering at Stopsley Common in Sept. 1899, already recorded,* only differing in the less even surface of the æthalium. There is little true cortex, and the individual sporangia are much more clearly defined; the snow-white lime-knots are often combined into a central pseudo-columella, connected with the sporangium-wall by delicate hyaline threads. It is more typical than the specimen from Yattenden figured in this journal,† but it supports the conclusion that the latter is a form of *F. ellipsospora*. The spores are ellipsoid, and measure 14 × 10 μ.

Trichamphora pezizoidea Jungh. Dr. Jahn has sent us several specimens of this species collected by Dr. A. Möller in Blumenau, Brazil, in Oct. 1901.‡ Dr. Möller describes it as growing on *Lentinus villosus*, "the sporangia hanging in clusters on stalks which are attached to the gills of the *Lentinus*." The specimens were preserved in spirit, and we cannot tell whether the slender capillitium contained lime. Messrs. Pavillard and Lagarde have recorded the appearance of the species in abundance at Montpellier in April, 1902,§ on decaying *Auricularia messenterica*, which appears to be its frequent host. They have favoured us with a generous supply of the growth. The capillitium has the character of a *Badhamia*, as they have shown in their plate; on the other hand, specimens from Java have capillitium of the *Physarum* type with rounded lime-knots and slender hyaline threads; others, again, from different parts of the world, have limeless capillitium. Messrs. Pavillard and Lagarde have described the species under the name of *Physarum pezizoideum*, but, considering the constancy in the shape of the sporangia and the inconstancy of the character of the capillitium, it is probable that Junghuhn's naming will generally be allowed to stand.

Chondrioderma simplex Schroet. Mr. Bilgram has presented us with three interesting specimens of this species collected in Fairmount Park, Philadelphia, in Aug. 1902, on dead leaves; they were gathered at the same time and in the same place. In one the subglobose and more or less scattered sporangia are pale brownish yellow, in another bright orange-brown, and in the third a more dull brown; Mr. Bilgram suggests that conditions of light or shade may affect the colour. The spores measure 6–7 μ diam.; the slender capillitium is like that in former specimens, except that the threads are less beaded with brown lime granules.

C. asteroides List.‖ A second example of this species was gathered on fir-needles in the gardens of Sir T. Hanbury, La

---

* Journ. Bot. 1901, p. 84.
† *Op. cit.* 1899, p. 148.
‡ Jahn, Ber. Deutsch. Bot. Ges. xx. (1902) p. 273.
§ *l. c.* p. 7.
‖ Journ. Bot. 1902, p. 209.

Mortola, by Miss Constance Pim, in Jan. 1903. Although the specimen is immature, the dark parallel lines on the orange-brown sporangium-wall leave no doubt that it is the same species as the mature form gathered at La Mortola in Jan. 1902.

C. Lyallii Mass. Dr. Jahn has sent us part of a gathering of this species from South Tyrol. It was collected by Herr Retsdorf at an altitude of 6000 feet, close to melting snow. The specimen was exhibited by Dr. Jahn at the meeting of a botanical society, and was noticed in its report*; it is the characteristic robust form. Another example was submitted to us by Prof. Schinz, obtained by Dr. Bockhart on *Carex sempervirens* near Zürich in 1903, at an altitude of 5800 feet. The bulk of the specimen consists of sessile globose sporangia, with the white, densely calcareous outer layer of the sporangium-wall separating freely from the grey inner layer. In close proximity, and formed we cannot doubt from the same growth of plasmodium, was a cluster of about twelve sporangia entirely destitute of lime; they were dark brown, with an iridescent lustre. There was no apparent outer layer to the sporangium-wall, and no lime in the obsolete columella or in the hypothallus. The capillitium was also modified; instead of the normal sheaf of nearly simple purple-brown threads, it consisted of a network of profusely branching flat strands of a pale brown colour, with wide expansions at the axils; careful examination, however, showed a few threads of the simple type. The spores were normal. It is an instructive case, for had the limeless sporangia been presented unassociated with the calcareous growth, they would have been difficult to determine. In other species of the *Calcarineæ* it is by no means exceptional to meet with sporangia in which the lime is absent, but that the deficiency of lime should be attended by so great a difference in the structure of the capillitium is remarkable. All our specimens of *C. Lyallii* where the place of gathering has been known are from high altitudes, and generally near melting snow.

C. lucidum Cooke. In September, 1902, we visited the ravine in the Dovey Valley, N. Wales, where we obtained this species in 1900, and found it again in considerable abundance. There had been heavy rain, and the orange-yellow plasmodium and young sporangia were conspicuous on the moss covering the slaty rocks. When the fruit is ripe and darker in colour it may easily escape detection. We are indebted to Mr. Burrell for another specimen collected by him at Rhaiadr-du, near Dolgelly, in June, 1903.

Didymium intermedium Schroet. Dr. Jahn received a specimen of this species with others sent to him by Dr. A. Möller from Blumenau, and kindly submitted it to us for inspection. He supposed it to have been hitherto unrecorded, in which view we concurred. He described and figured it under the name of *D. excelsum*, n. sp.† Since the publication of his article he investi-

* Verh. Bot. Ver. Brandenb. 1902, xliv.

† Ber. Deutsch. Bot. Ges. xx. p. 275, figs. 5, 6, 7, 10.

gated the collection of Mycetozoa in the Museum of the Royal Botanical Gardens, Berlin, and came upon a number of specimens brought by Dr. Ule from Blumenau; among these was one of *D. intermedium* Schroet. which he recognized as identical with that from Dr. Möller; the specimens had been examined by Schroeter, who described them in MS., giving *D. intermedium* as a new species; after Schroeter's death, Hennings published an account of them in *Hedwigia*.* Although Schroeter's description is short, yet with the specimen before us it is accurate as far as it goes, except that he speaks of the columella as wanting; Jahn correctly gives it as flattened, and figures it so in his plate. We have Dr. Jahn's permission to make this explanation and to withdraw the name *D. excelsum*. The species is allied to *D. effusum*, differing in the tall growth, the deeply umbilicate sporangia, the flattened, not prominent, columella, the smooth stalk, and essentially in the dark purple-brown spores; under a $\frac{1}{15}$ in. obj. they are seen to be strongly marked with raised flexuose lines and broken bands, sometimes combined into a net on part of the surface, and giving a rough outline to the spore. Among the specimens from Ule's Herbarium Brasiliense, procured by the British Museum about five years ago, there is one of this species (No. 1770 in the collection) marked "804 *D. intermedium* Schroet. n. sp. Blumenau, Ap. 1888."

Stemonitis ferruginea Ehr. Dr. Jahn has recently elucidated the vexed question of the correct naming of this species, and gives the result of his investigation in the following passage:—"*S. ferruginea* Ehrenberg† (not Fries or Lister). This species was first described and figured by Ehrenberg in 1818, who found it in the neighbourhood of Berlin;‡ he gives a list of the distinguishing characters of the three species of *Stemonitis* known to him (*S. fasciculata* = *S. fusca*, *S. ferruginea*, and *S. typhina*), and says of the spores in *S. fusca*, 'magnis, primo albis, dein fuscis et atrofuscis,' but of *S. ferruginea*, 'parvis primo albis, dein puniceis et ferrugineis,' that is to say, that the plasmodia of *S. fusca* and *S. ferruginea* are white. Unfortunately, Fries afterwards found, chiefly in Sweden, a rust-brown species which he considered identical with that of Ehrenberg, but he makes the addition, 'mucilago flavicat,' therefore the plasmodium was yellow. Rostafinski, who was unfortunate in his treatment of the genus, regarded all rust-brown species as one. On the authority of Fries it was assumed that *S. ferruginea* had a yellow plasmodium. When Zopf, in 1889, investigated the plasmodium in relation to its colouring matter, he found to his surprise that it was white; finally, Macbride, in 1893, made the same observation, and distinguished the species with white plasmodium as *S. Smithii* Macb.; it is also separated from *S. ferruginea* by other good characters, especially the long black stalk; the name *S. Smithii*, however, is not justified, and only arose from the later authors not having referred to Ehrenberg. I find Ehrenberg's original type in

* Hedwigia, xxxv. p. 209.
† Abh. Bot. Ver. Brandenb. xlv. p. 164.
‡ Syl. Myc. Berol. auct. Dr. C. G. Ehrenberg. Berolini, 1818, p. 25.

the Royal Herbarium, which proves that *S. ferruginea* is indeed the modern *S. Smithii*. It is at the present day very abundant in the neighbourhood of Berlin." Dr. Jahn has kindly sent us a part of Ehrenberg's type specimen from the Royal Herbarium, Berlin, which completely bears out his conclusion. He gives the new name of *Stemonitis flavogenita* Jahn to *S. ferruginea* Fries, based on the colour of the plasmodium. The size of the spores offers another marked specific character; those of *S. ferruginea* Ehr. measure 4 to 5 μ, and those of *S. flavogenita* Jahn 8 μ.

Echinostelium minutum De Bary. This minute species was obtained by Miss A. L. Smith near Hereford in the autumn of 1902; it is described in Trans. Brit. Myc. Soc. vol. ii. p. 54. The group of sporangia came up on a dead stick that had been placed for observation under a glass shade; they are scarcely visible to the naked eye, and by their slender pale stalks might be taken in the field for a Mucor. We are not aware of a previous record of its occurrence in Britain.

Licea biforis Morgan.* Mr. Bilgram has favoured us with an example of this species gathered by him in Fairmount Park, Philadelphia, Sept. 1903; there are about forty sporangia on a slip of bark, but they are so minute as hardly to be detected without the aid of a lens; in our specimen they are glossy yellow-brown in colour and fusiform in shape, about 0·2 mm. long by 0·07 mm. broad, dehiscing along a central ridge or depression running from end to end; when magnified 100 diam. they have a singularly close resemblance to a date-stone. Mr. Morgan gives the length as 0·25 to 0·4 mm. The sporangium-wall is an almost colourless membrane bearing a scanty deposit of discharged refuse-matter on the outer surface, of the same character though less in proportion as that observed on the wall of *L. flexuosa;* the spores are somewhat ovoid, 12 × 9 μ diam., almost smooth and colourless. We placed the spores from one sporangium in a hanging drop, where they remained unchanged for four days; they were then dried, and after an interval of four days were again wetted; during the following twenty-four hours many had produced swarm-cells, and these continued to emerge until a large proportion of the spores had hatched and showed bacteria in digestive vacuoles; there was no further development.

L. flexuosa Pers. was found on fir stumps in Savernake Forest, Oct. 1903; part was mature, and part emerging in rose-coloured plasmodium, which ripened into typical sporangia; this is in striking contrast to the dull yellow colour of the plasmodium we have hitherto observed in this species. A similar variation occurs in *Trichia fallax* and *Dianema depressum;* in both of these the plasmodium is either white or rose-colour.

Alwisia bombarda B. & Br. We are greatly indebted to Prof. Farlow for a mature example of this species collected by Capt. Wirt Robinson in the Blue Mountains, Jamaica, July, 1902; it is, we

* Journ. Cinc. Soc. Nat. Hist. 1893, p. 5, fig. 1.

believe, the only known specimen of this remarkable form, with the exception of the immature gathering from Ceylon, in the British Museum and Kew collections. The ellipsoid brown sporangia are about 1 mm. long, in clusters of four to ten, on straight or flexuose combined stalks from 1 to 5 mm. in length; the stalks are sometimes more or less free in the upper half; the slender tubular threads of the capillitium spring from the whole of the lower part of the sporangium-wall, which forms a persistent cup; they are straight and nearly simple, rising in a brush about 1 mm. long, and are again attached by slender points to the apical fugacious portion of the wall; they vary in thickness from 2 to 4 μ, and are either smooth or closely and minutely spinose as seen under a $\frac{1}{15}$ in. obj.; they are sometimes interrupted by bulbous swellings from 20 to 40 μ long by about 20 μ broad, and are more or less united by anastomosing processes at the upper ends; on full maturity the cup splits into reflexed lobes bearing the persistent capillitium in the form of a diffuse tuft; the spores are pale reddish brown, minutely reticulate, and are similar to those figured in the Brit. Mus. Catalogue. The mature specimen presents characters which modify to some extent the former description, but it confirms the view that the species belongs to the *Tubulinaceæ*.

Reticularia lobata List. We have a specimen of this species collected by Miss Agnes Fry near Argelés, Pyreenees, on a Spanish chestnut-stump, in May, 1902; it is the first record we have of its occurrence out of England. Mr. Petch also gathered it in June, 1903, on a stump near High Beech, Essex.

Trichia lutescens List. This form was described in the Brit. Mus. Catalogue, p. 169, as *Trichia contorta* var. γ *lutescens*, with a note stating that if other examples should be obtained similar in character to the single gathering there referred to, it should be regarded as specifically distinct. We afterwards described a specimen which met these requirements, and published the name *T. lutescens*.* In Sept. 1899, Mr. Fries found this species near Upsala, and sent us a part of the gathering; the chrome-yellow sporangia vary in size from 0·2 to 0·5 mm., and have a clear yellow membranous sporangium-wall; the capillitium resembles that in the former specimens in the thickness of the elaters and faint spiral markings; they are very long, and, though quite free, are difficult to separate in a preparation; the spores are yellow, minutely spinulose, 10–11 μ diam. In Aug. 1903, Mr. Petch collected the same form at North Cave, East Yorkshire, on a rotten plank; the gathering consists of sixty-six subglobose chrome-yellow sporangia from 0·4 to 0·7 mm. diam.; the membranous sporangium-wall is quite free from granular deposits, and the abundant pale yellow elaters are mostly long and often forked, though a few can be found not exceeding 90 μ; they are from 3 to 4 μ in thickness, and are faintly marked with about four spiral lines; the spores are yellow, minutely spinulose, 10 μ diam.: except for the difference in the length of the elaters, Mr. Petch's gathering is identical with that from Mr. Fries. In

* Journ. Bot. 1897, p. 216.

1902 Mr. C. Bucknall kindly submitted to us a glycerine-jelly mounting of *Oligonema furcatum* Bucknall;* it corresponds with *T. lutescens* in the character of the sporangium-wall and also in the thickness of the elaters in the faint spiral markings, and in the spores; the elaters are, however, scanty and short, the shortest being only 50 μ long, and either simple or forked. In Oct. 1903, Mr. Bucknall favoured us with a specimen recently gathered in the same spot at Abbot's Leigh in which he had obtained his first specimen in Nov. 1890; the sporangia are bright chrome-yellow, and measure about 0·4 mm. diam.; the elaters are much longer than in his previous gathering, though some can be found not more than 70 μ in length; in the spiral markings and in the character of the spores his two specimens agree perfectly; there is no question that both gatherings are the same species. Comparing the last Abbot's Leigh specimen with that from Mr. Petch, above referred to, we can detect no specific difference, for the greater length of the elaters in the latter can be of little weight, considering how widely this character varies in the genus *Trichia;* we are therefore of opinion that *Oligonema furcatum* and *T. lutescens* are forms of one species.

T. VARIA Pers. As an instance of the varying length of the elaters in the genus *Trichia* referred to in the last note, we may mention a specimen of *T. varia* gathered on the Undercliff, Lyme Regis, in March, 1902; the sporangium examined is of the frequent substipitate form, and the sporangium-wall is marked with the characteristic comma-shaped thickenings, but the capillitium is that of a *Hemitrichia;* there are indeed a few free elaters, but it almost entirely consists of a continuous network with many free ends and with frequent attachments to the sporangium-wall; it is, no doubt, an abnormal development, as the spiral bands are set closely and almost transversely to the threads; often they are incomplete, and reduced to half rings; in some parts, however, they show the typical spiral of two bands; the spores are normal.

OLIGONEMA FLAVIDUM Peck. This species was found in some abundance in August, 1902, near Horsham, Sussex, by Miss A. Hibbert-Ware, on the under side of a mossy alder log, half of which was under water at the edge of a pond. The shining yellow sporangia were loosely attached to the rotten wood and moss. They are either subglobose and heaped over one another to form large clusters, or more often shortly cylindrical and regularly arranged in one layer; the sporangium-wall is translucent yellow, and marked with minute close thickenings arranged in short wavy lines, which give an effect of delicate stippling. The abundant yellow elaters are long and often branched, but a few are short; they measure about 4 μ diam., and show occasional swellings and expansions from 8 to 10 μ diam.; they are marked with lines of minute warts, forming irregular spirals, which pass from the left above to the right below when the thread is viewed horizontally—

* Massee, Monogr. p. 173.

that is, in a reverse direction to the spirals of *Trichia* elaters; sometimes the lines run almost at right angles to the length of the elater, and more rarely the spirals pass from right to left for a short distance. The spores are bright yellow, 12–13 μ diam., regularly reticulated with narrow bands, which give a border of 1 μ to the margin, and show a network with four to five meshes across the hemisphere, In the British Museum Catalogue this species is included under *Oligonema nitens* Rost., but since the publication of that work we have had the opportunity of examining a number of specimens from Europe and North America, with the result that we are persuaded of the specific distinction of *O. flavidum*. *O. nitens* has the sporangium-wall smooth, except for scattered horseshoe-shaped thickenings enclosing thinner membrane; the elaters are not warted, but are nearly smooth and marked with a few rings, or show faint spiral bands passing from the right above to the left below when the thread is viewed horizontally, in the same direction as in the elaters of *Trichia*; the spores are usually reticulated with broad pitted bands, and resemble those of *Trichia affinis*. Of the eleven specimens of *O. nitens* we have examined, two are from the State of Massachusetts, and nine are from Europe and England. We have seen thirty-three specimens of *O. flavidum*; of these, two only are from England, and thirty-one from the United States of America. The markings on the sporangium-wall and on the elaters and spores are fairly constant for the two species. The length of the elaters is a most variable character, and we entirely agree with Dr. Sturgis in regarding *O. brevifilum* Peck as merely a form of *O. flavidum* with short elaters.* We have received from Dr. Celakovsky, from Bohemia, a specimen of *O. nitens* in which the elaters are long and repeatedly branched and anastomosing. Among the numerous gatherings from near Philadelphia that Mr. Bilgram has kindly sent us are two specimens of *O. flavidum* with elaters so long and branching as almost to form a net; they are marked partly with irregular spiral lines running in a reverse direction to those in the genus *Trichia*, and partly with a reticulation of minute warts; in one specimen the threads are here and there beset with prominent scattered spines; the sporangium-wall in both has the characteristic stippled markings; the spores show a network of five or six meshes across the hemisphere. These two specimens closely approach *Calonema aureum* Morg.,† which appears to differ chiefly in the bolder and more branching markings of the sporangium-wall. We have seen four specimens of *Calonema aureum* from different parts of the United States, all showing a more or less complete network of capillitium with some free elaters, marked with spines, delicate reticulations, and faint spirals passing from the left above to the right below; the spores have five to six meshes across the hemisphere, a closer network of bands than is usual in *O. flavidum*, but precisely similar to the two specimens from Mr. Bilgram above mentioned.

* Trans. Conn. Ac. Arts. & Sc. vol. x. pt. 2, p. 487, pl. lxi. fig. 25, 1900.
† Journ. Cinc. Soc. Nat. Hist., April, 1893, p. 33.

ARCYRIA FERRUGINEA Saut. (Pl. 459, fig. 5). An example of this species, found near Zürich, and submitted to us by Prof. Schinz, exhibits a remarkable divergence from the normal type in the character of the capillitium; the threads are beaded with globular or oval expansions about 10 μ diam., either crowded or separated by intervals of 10 to 20 μ; they are marked with a small-meshed reticulation and with spines; the intervening threads are narrow, about 3 μ thick, and nearly smooth; the sporangia are globose and sessile, rarely shortly stalked, and are provided with a persistent sporangium-wall; there are some monstrous spores, though as a rule they measure 10–12 μ. In most of the sporangia examined the capillitium was entirely such as we have described; in some, however, it was of a more typical form. Imperfect developments with globular expansions in the axils of the branches are not unfrequently met with in the capillitium of this species; the Swiss specimen is no doubt abnormal, but this great variation from the usual type is worthy of record because supposed distinct species have been described based on differences in the structure and sculpture of the capillitium of *A. ferruginea*.

PERICHÆNA VARIABILIS var. PEDATA, n. var. (Pl. 459, figs. 3, 4). This is a variable species, as its name implies, but it is not until recently that we have obtained a stalked form; it is usually found in vermiform or net-like plasmodiocarps, and less frequently as globose sessile sporangia. In April, 1902, we gathered seven examples of the stipitate form on dead leaves in an ivy-covered hollow on the Lyme Regis Undercliff; they were globose sporangia, ochraceous brown in colour, with nearly black stalks about 0·3 mm. long and 0·1 mm. thick; some sporangia were broken, leaving only a flat persistent base, as shown in the figure; the abundant capillitium was of the typical form; the spores were rather smaller than usual, 8–9 μ. We have received from Mr. Bilgram a specimen collected by him at Chestnut Hill, Philadelphia, in August, 1903, which resembles the Lyme Regis gathering in all respects, except that the stalks vary from 0·3 to 0·1 mm. in length, and the sporangia are often reniform; they are either solitary or in clusters of two to three on a single stalk, or sessile. In both the English and American specimens the inner sporangium-wall is nearly smooth, and the papillose character peculiar to the species is faintly indicated; in this respect it resembles the wall of *P. chrysosperma*, a species in which the sporangia are sometimes more or less stalked. The specimens are interesting inasmuch as they exhibit the near relationship between *P. variabilis* and *P. chrysosperma*, but they are distinguished from the latter by the absence of hooked spines on the capillitium-threads. It may be that they represent a distinct species, and they have a bearing on some perplexing sessile forms with similar sporangium-walls which we have provisionally placed under *P. variabilis*. The material at our disposal is, however, too limited to warrant our doing more than mark it as a variety of the nearest ally.

DESCRIPTION OF PLATE 459.

1. *Badhamia populina*, n. sp. — 1 *a*. Sporangia, × 20. 1 *b*. Fragment of capillitium, two clusters of spores, and one free spore, × 280. 1 *c*. Spore, × 600. From Epping Forest.

2. *Physarum luteo-album*, n. sp. — 2 *a*. Sporangia, × 20. 2 *b*. Fragment of capillitium and spore, × 280. 2 *c*. Spore, × 600. From La Mortola, Ventimiglia.

3. *Perichæna variabilis* Rost., var. *pedata*, n. var. — 3 *a*. Sporangia, × 20. 3 *b*. Capillitium attached to fragment of sporangium-wall and spores, × 280. From Lyme Regis.

4. *Perichæna variabilis* Rost., var. *pedata*. — Sporangia, × 20. From Chestnut Hill, Philadelphia.

5. *Arcyria ferruginea* Saut. — Abnormal capillitium, × 280. From near Zürich.

FLORAL VARIATIONS AMONG SURREY VIOLETS.

BY CHARLES E. BRITTON.

SOME few years ago, when paying especial attention to the collection of the various native forms of violets, I was interested in the occasional occurrence of flowers, differing in no respect at a casual glance from the ordinary flower, which, when examined closely, were seen to be widely divergent. These peculiar flowers were found on all the widely distributed violets, and fell naturally into two groups, although each group foreshadowed a form constructed on diametrically opposed plans, each tending towards the formation of a flower with actinomorphic symmetry, as opposed to the normal irregular zygomorphic blossom.

The subject seemed of sufficient interest to warrant systematic investigation, and it was decided to examine a certain number of flowers from each of the species. All were gathered in Surrey; had they been gathered elsewhere they would, no doubt, have yielded similar results, as I have noticed abnormal flowers on plants gathered in the adjoining counties. Whilst the blooms were examined in order to ascertain the frequency of aberrations pointing towards a regular flower, floral variations of all kinds were carefully noted. In certain species, the frequency and diversity of variations were surprising; on the other hand, allied species varied very slightly. I think some rather interesting deductions may be drawn from these latter results.

The species selected for the investigation of floral aberrations were *Viola odorata* L., *V. hirta* L., *V. silvestris* Reichenb., *V. Riviniana* Reichenb., and *V. ericetorum* Schrader.

To understand clearly much of what follows, it may be useful to recall briefly the chief characteristics of the usual violet flower. First, the calyx of five sepals with an outgrowth at the base, or "sepals produced at the base," as described in floras. Secondly, a series of five petals alternating with the members of the calyx-whorl. Interior to the petals is a series of five stamens, contiguous to each other and closely surrounding the ovary of three

combined carpels. The stamens, by their arrangement, form a 5-angled body, with the two upper angles smaller than the lower three. As the stamens alternate with the petals, it follows that an angle will be opposite each petal, which, in consequence, is very slightly hollowed at its lower part. The petals are so disposed that two appear to be at the upper part of the flower, one on each side; the fifth member, apparently the lowest of the whorl, is furnished towards its base with a hollow tubular outgrowth, varying in shape and size, termed the spur. Inside the spur are two elongated more or less club-shaped structures arising from the short filaments of the two lowest stamens. The characteristic appearance of the usual violet flower is due to the diverse sizes of the petals as well as to their shapes and the positions they assume, the result being that in one plane only, the vertical, can the flower be divided into two parts which reproduce each other.

The number of flowers to be examined of each species was fixed at 1000.

Viola odorata L.

1000 flowers, gathered on the northern lower slope of the North Downs, in the neighbourhood of West Horsley and East Clandon, March, 1902. Although each flower was carefully scrutinized, only one obvious variation was detected, and that of a trifling nature. The flower in question possessed lobed sepals. The two lower sepals were affected, one being once-fissured on each side, and the other twice-lobed on the lower edge. Judging by previous experience, more variations, and of a diverse nature, might have been expected. In the preceding week, among 200 flowers gathered at another part of the North Downs, at Marden Park and neighbourhood, I detected four instances of variation as follows: (*a*), with each lateral petal bifid at the upper edge; (*b*), with all five petals shallowly bifid; (*c*), with lateral petals obscurely 3-lobed and lower petal similarly lobed; (*d*), with six sepals, six petals, two of them, each bearing a spur, appearing to replace the lower petal, six stamens, and normal number of carpels. Inside one spur were two anther-processes, and inside the other one process. In this last flower it will be seen that there is an addition of one member to each floral whorl—except the carpels.

V. hirta, L.

It was the abundance and diversity of variations among the flowers of this species that induced me to take up the subject. Occasionally I had met with flowers deficient of the petalline spur, and others that possessed supernumerary spurs. On Albury Downs, in April, 1900, abnormal flowers seemed to be very freely produced. Had I then gathered a series similar to that gathered here at the end of March, 1902, the percentage of abnormal flowers, I am convinced, would have been great. One plant bore 25 expanded flowers, all of them departing from the usual type. One flower bore two spurs, 15 bore three, one bore four, and eight bore five. In all these the supernumerary spurs were somewhat smaller than the normal spur. In the case of flowers with three

or more spurs, these were often similar in size; when more than three, generally, the lower spurs exceeded the others in size. The two upper spurs were always smaller and sometimes were mere protuberances showing beneath or between the sepals, in the case of flowers with five spurs. Towards the end of April, 1900, I gathered indiscriminately 1000 flowers by the sides of, and adjacent to, the ancient highway known as the Ermyn Street, between Epsom Downs and Leatherhead Downs, of which 305, or more than 30 per cent., were abnormal. The variations ranged from slight divergences in appearance' to important modifications in structure. Taking these latter first, 222 flowers showed, in addition to the ordinary spur, saccate protuberances at the bases of the petals suggesting incipient spurs, and 65 flowers two, three, or four spurs each. Of these 65, three possessed four spurs, 18 three spurs, and 44 two spurs each. Two of the flowers with four petalline spurs showed traces of a fifth rudimentary spur. With regard to the perfect development of these auxiliary spurs, it may be noted that staminal-processes may or may not be developed inside. Thus, of the three flowers in question, one showed two staminal-processes in one spur, and two of the supernumerary spurs bore each one staminal-process. In a second flower only one supernumerary spur possessed a staminal process. In the foregoing instances it may be assumed that the spurs with two staminal-processes each were the normal spurs. The third flower was characterized by the absence of a pair of staminal-processes in one spur, but a single process had been developed in three of the spurs. Of the 18 flowers with three spurs each, eight possessed the normal pair of processes in one spur only, three were without the pair of processes in one spur, but had one process in each of two spurs. In one flower two spurs bore each a pair of processes, and a solitary process was developed in a third spur. One of the three-spurred flowers with the normal staminal-processes had developed, from the base of the ovary, a filiform organ about two-thirds as long as the ovary itself. It projected between the staminal-processes, and overhung, on one side, the entrance to the spur. In colour, *i.e.* differentiation of tissue, this curious organ resembled the staminal-processes, with which only could it be compared.

The chief variations found among the 44 flowers with two spurs each were as follows. Among 27, one spur (the normal) had enclosed within it two staminal-processes. Eight others were furnished, in addition, with a third staminal-process which entered the second spur; two flowers had one process in each spur, and one showed two processes in each spur. Five staminal-processes were developed in one flower, and, of these, three were curved and lay in the sacs at the bases of the petals, and two entered each a distinct spur. A curious metamorphosis was shown by one flower, in which one of the staminal-processes had become petaloid. One penetrated a spur, and in the centre of the flower was a curled petaloid organ showing on one side anther-cell and orange-coloured connective, the whole structure evidently representing a stamen

that should have borne the staminal-process. Among this group of 2-spurred flowers were three of tetramerous symmetry, though one of these possessed an additional rudimentary petal. Nine among this series of 1000 flowers showed an approach towards regularity in appearance, by reason of the spur being much shorter than usual (one flower); non-development of the spur (five flowers); or the petals being of about the same size (three flowers). Of the five flowers characterized by deficiency of the spur, three possessed all five petals distinctly saccate at base; one showed three lower petals, each with a protuberance at base; and the third had one petal saccate, and the remaining four less distinctly so.

I have referred to the abundance of abnormal flowers of *V. hirta* on Albury Downs, in April 1900, and I gathered here 1000 more at the end of March, 1902. The species was only just coming into bloom, and the flowers procured were only to be found in the more sheltered spots, such as under furze and other bushes. As those gathered in this locality on the former occasion grew in more exposed situations among the turf, this difference of situation may, perhaps, to an extent, account for the fact that the percentage of variations was small; only thirteen were at all abnormal, and the following is a detailed account of these;—1. Four petals, lower spurred as usual, the three others each with a small sac at base. 2. Lateral petals each with a rudimentary spur. 3. Five sepals and five petals normal in appearance. Three spurs, the lower normal, the lateral smaller and merely protruding between sepals; the lower spur the only one with staminal-processes. In this flower the two upper petals were distinctly staccate at base. 4. Five sepals; five petals, each with a spur; the lower spurs almost the same size, the two upper smaller and protruding between the sepals. Staminal-processes in the lower spur only. 5. Five sepals and five petals. Two spurs, lower normal, and possessing staminal-processes; the second lateral and not quite as large. 6. Five sepals and five petals; three distinct spurs, the lower normal and with staminal-processes, the lateral smaller and without processes. Being provided with three spurs, the two upper petals were saccate at base. 7. Five sepals and five petals; two spurs, lower normal and furnished with staminal-processes; the second lateral and smaller. The remaining three petals saccate at base. 8. Five sepals and five petals; two of these spurred and two others saccate. Staminal-processes in lower spur only. 9. Five sepals and five petals; upper two petals prominently saccate; lower three spurred; the normal spur only possessing staminal-processes. 10. Four sepals aud four petals; two spurs, one larger than the other; two petals with sacs at base, one of these being large enough to be described as a small spur. Four stamens; one staminal-process developed entering normal spur. Apparently two carpels only. A reduction by one member in each floral whorl. 11. Five sepals and four petals; two spurs, one smaller than the other; one staminal-process entering lower spur. 12. Five sepals and five petals; three spurs, the lateral smaller; two processes in lower spur. 13. Five sepals and five petals; four spurs, lower and

lateral about the same size, the upper protruding between bases of sepals. Fifth sepal saccate at base. Staminal-processes in lower spur only.

V. silvestris Reichenb.

A series of 1000 flowers were gathered at the beginning of May, 1900, in the wooded country about Farley and Chelsham, where the plant is very distinct in appearance; only four flowers were normal, the remaining 993 were distinguished by the appearance at the bases of the petals of the slight protuberances which suggest to my mind incipient spurs. In the case of two flowers an auxiliary spur had been developed from one of these sacs. One flower somewhat resembled *Dielytra* in appearance, save that it was trimerous. There were three sepals, three large petals (and a fourth rudimentary) of about the same size, two erect and the third slightly spreading. From these had developed three spurs, two slightly smaller than the third, but larger than the spur is normally. Four stamens; three staminal-processes, one protruding between the petals, the others entering distinct spurs.

V. Riviniana Reichenb.

Examination of 1000 flowers gathered between Bookham and Westhumble showed that as many as 890 were marked by the formation of distinct sacs at the bases of the petals (in addition to the usual spur). Thirteen of the remainder possessed the common feature that some or all the petals were lobed in a varying degree. This lobing of the petals extended from an obscure lobing to a more distinct fissure, and occurred once or twice on a petal. In the case of the upper petals, the lobing was usually down the centre, and on the other petals the lobing usually occurred laterally.

The following flowers varied diversely:—1. Normal in appearance when viewed from above. No petalline spur, but all five petals saccate at the base. The lower petal that should have borne the spur possessing a more distinct sac than the others. Staminal-processes suppressed. In addition to the usual tufts of hair on the lateral petals a similar tuft was developed on the lower petal. 2. Regular in appearance by reason of the petals being all more or less of the same size and spreading. Three petals distinctly saccate at base. Staminal-processes suppressed. 3. With the usual petal spurred and the remainder saccate, one to such an extent as to form a small spur. 4. Four sepals as usual; a fifth lying along the spur and so assuming an opposite direction to the others. Four petals only, the lower spurred, the others saccate at base. Four stamens and one staminal-process developed. 5. Four normal sepals. Partly in lieu of the fifth sepal there was developed an organ, half-sepal, half-petal, green in colour on the smaller lateral portion, and petal-like in its greater part. It was shortly spurred and one staminal-process entered this. As only four petals were developed, this curious organ evidently did duty for a missing petal as well as sepal. The four petals were normal, one with a spur and staminal-processes. Of the stamens four were normal and one shrivelled and abortive.

Four flowers were furnished with protuberances at the base of each petal, in addition to the development of the usual spur; three were developed to such an extent as to form rudimentary spurs.

V. ericetorum Schrader.

Of the 1000 examples of the flowers of this species the greater number were gathered on Farley Green, near Warlingham, and the remainder on the downs near Clandon. Those from this latter locality exhibited but few variations. Four flowers showed a tendency to lobing of the petals; one possessed a very short spur not exceeding the sepalline appendages; and one showed, in addition to the usual spur, two petals protuberant at the base, suggesting incipient spurs. Among the flowers gathered at Farley Green variation was rife. The normal form was represented by 496 flowers of the number gathered there. Sixty-five showed protuberances at the bases of the petals. Approximation to a regular form of flower was seen among seven flowers, where the petals assumed different positions from the usual, by reason of the posterior and lateral petals (and sometimes the spurred petal) being recurved or reflexed. Nineteen flowers were characterized by the two upper petals being very much reduced in size, some, indeed, being mere rudiments. Not merely reduction in the size of the posterior petals, but reduction in the number of sepals, petals, and stamens, to four each, was exhibited by thirteen flowers, and a similar reduction (except in the number of stamens) was shown by three others. Certain curious aberrations appeared among these. Four flowers possessed either a sepaloid petal, or a sepal partaking of the character of a petal, in addition to the four sepals and petals. In the case of a sepal becoming petaloid, characters such as the sacs at the bases of the petals, and the distinctive tufts of hairs of the lateral petals, appeared. One tetramerous flower showed an abnormal growth of the orange-coloured prolongation of the anther, this becoming enlarged and purplish. A trimerous condition characterized five flowers, and these also possessed additional petaloid sepals. One had developed a shrivelled petaloid structure in lieu of the missing stamens. Mention has been made of a reduction in the size of the two upper petals, and six flowers were noted with either one or both upper petals missing. Here, again, as a compensation, petaloid development of the anther-connective had occurred. The following account of the characteristics of certain flowers that I found rather difficult to classify, gives some idea of the extraordinary variation that occurred:—

a. One sepal petaloid, and with a tuft of hairs. *b*. Five sepals; four petals; five stamens, one sterile and half-stamen, half-petal. The connective of another stamen tinged with purple. *c*. Three sepals and three petals, plus one sepal-like organ, produced at the base and inserted at the level of the sepals. Four perfect stamens and one shrivelled abortive stamen partly petaloid. Three staminal-processes, one of them rudimentary. *d*. Five sepals; four normal petals and a fifth organ petaloid to the extent of being expanded

and purplish on one side, and staminoid to the extent as to bear on the opposite side pollen-chamber and yellow connective; three perfect stamens. *e*. In this flower, one of the stamens, bearing a honey-process, apparently formed the base of a petal. *f*. Three sepals; three petals, the lower largest, the others smaller and sepal-like; four stamens.

Before leaving the flowers of *V. ericetorum* Schrader, it may be as well to note that other variations observed among the series of 1000 flowers were: non-development of the petalline spur; lateral union of sepal and petal; suppression of one or both staminal-processes; development of processes by stamens that do not normally bear them; processes failing to enter petalline spur.

Summary of Variations.

Detected among 1000 flowers of each of the following species:—

V. odorata L.—Lobing of sepals:—Other variations do occur, such as suppression of the petalline spur and staminal-processes; also an addition to the number of members of the three outer whorls of the flower.

V. hirta L.—Approaching regularity in appearance by reason of petals being of about the same size, or, assuming similar positions, arrestment in growth of the spur; suppression of the spur; development of "sacs" at the bases of petals in addition to the spur; development of "sacs" at the bases of petals and absence of spur; development of one, two, or three auxiliary spurs; branching of spur; sepalody of petal; chorisis of petal; petalody of stamen; development of a honey-process by carpels similar to the staminal-processes; tetramerous flowers; other structural variations; production of additional sepals; suppression of one or both staminal-processes; development of more than two staminal-processes.

V. silvestris Reichenb.—Development of "sacs" at the bases of the petals in addition to the usual spur; development of auxiliary spurs; trimerous symmetry.

V. Riviniana Reichenb.—Approaching regularity in appearance; petalody of sepal; lobing of petals; non-development of spur and formation of "sacs" at the base of all five petals; production of auxiliary spurs; development of "sacs" at the base of petals in addition to the usual spur; suppression of staminal-processes; development of additional staminal-processes; tetramerous flowers.

V. ericetorum Schrader.—Approaching regularity in appearance; petalody of sepal; adhesion of sepal and petal; arrested growth of posterior petals; suppression of one or both posterior petals; dwarfing of spur; non-development of spur; sepalody of petals; adhesion of petal and stamen; petalody of stamen; formation of additional staminal-processes; suppression of staminal-processes; tetramerous flowers; trimerous flowers.

Conclusions.

An inspection of the preceding summary shows that variation is least prevalent among the flowers of *Viola odorata* and *V. silvestris*, and is most abundant among the flowers of *V. ericetorum*, *V. hirta*,

and *V. Riviniana*. I think this well accords with what we know of these species. Generally speaking, the first-named species are less variable than the other three. *V. odorata* is decidedly less variable than *V. hirta*, and, of the allied species, *V. silvestris* is a more stable plant than *V. Riviniana*. This latter view may not be shared by others who have spoken of the difficulty of separating these two species except in ripe fruit. Wood violets do occur that seem to bridge over the gap between these two species, but such forms seem to me but variations of *V. Riviniana*, or of hybrid origin. In a certain locality in Surrey such apparently intermediate forms are plentiful, and, if *V. silvestris* were absent, some of these might be mistaken for it. However, *V. silvestris* is here abundant, and even in tint of colour of flower is readily recognized by any who are acquainted with these species in the field. In the autumn time I have found, in the above locality, excellent examples of the hybrid *V. Riviniana* × *silvestris* with the cleistogamous flowers totally sterile. The difference between the habitats affected by *V. Riviniana* and *V. silvestris* may in part account for the fact that variation is more frequent in one than in the other. The former species shows no decided preference for any particular soil, frequenting heaths, downs, hedge-banks, and copses indifferently; whilst its ally seems more at home on hedge-banks and copses on chalk and limestone soils. In the account of the variability of both these violets the most abundant aberration recorded was the occurrence of distinct sacs at the bases of the petals; 993 per 1000 of the flowers of *V. silvestris* and 890 per 1000 of the flowers of *V. Riviniana* were so characterized. This condition is correlated with the fact that the 5-angled figure formed by the adjacent stamens is most conspicuous in these species. Throughout all species of violets with flowers showing sacs at the petal-bases, these are the more developed in the lower petals, and are opposite the greater developed angles of the cohering stamens.

One reason why few variations are to be found among the flowers of *V. odorata* may be because this species is decidedly a less freely flowering plant than other violets. In the South of England it usually begins to flower about mid-March, and is in full flower before the end of the month. For a period of about four weeks it may be found in flower, but towards the end of April flowers are scarce. *V. hirta* closely follows the sweet violet in the time of opening its first flowers, but here the period of flowering is prolonged into June, though these June-time flowers are much dwarfed. *V. silvestris* lags but very slightly behind these two species. Its period of flowering is less than that of *V. Riviniana*, which flowers later, and remains in bloom much longer. *V. ericetorum* is the latest of the violets under consideration to come into flower.

External conditions no doubt greatly influence the production of aberrations among violet flowers. Such conditions are chiefly light and temperature. As regards light, the effect of an unusual excess of illumination was well seen in the case of *V. silvestris* growing in a copse which had been cut over during the previous winter. In the spring abnormal flowers were abundant. In woods

periodically cut over in the seasons following *V. silvestris* bears flowers with petals much broader and larger than usual.

The great factor, to my mind, in the production of abnormal violet flowers is connected with the existence of two classes of flowers: one class, large-petalled, which usually fail to produce fruit; and a second class, with minute or no petals at all, which are productive of seed. It will be apparent that in the case of flowers well adapted to that end, and regularly cross-pollinated, variations that may occur will tend to be suppressed and merged into the type. On the other hand, variations occurring among the large-petalled violet flowers, which seldom produce seed, may not be suppressed owing to cross-pollination not ensuing. In this latter case the tendency to form flowers deviating from the type will be perpetuated among the offspring arising from the seed produced by the apetalous self-fertile (cleistogamous) flowers. Accordingly, abnormal violet flowers should be plentiful, as, indeed, my experience shows.

Before concluding this paper, I would like to point out the significance of the two types of abnormal flowers which are found throughout the species under consideration. The ordinary violet flower is irregular and specialized for the purpose of cross-pollination by means of insects. The function of these flowers—the production of seed—having more or less been transferred to the cleistogamous flowers, the variations occurring among the floral envelopes will naturally tend towards the formation of a regular flower, as the petals will now tend to conform to the law that organs of a similar origin and nature will be alike in appearance. The two types of abnormal flowers approximate to or foreshadow two types of regular flowers constructed on opposed plans: one, the chief characteristic of which would be that all five petals developed spurs; and the other a simpler flower, in which the petalline spur would be suppressed.

A HERBARIUM OF LIBERATO SABBATI.

By James Britten, F.L.S.

The second of the very interesting and historically valuable "Illustrazione di alcuni Erbarii antichi Romani" which Prof. Pirotta and Signor Chiovenda are publishing in *Malpighia* is devoted to the Herbaria of Liberato Sabbati, who, in the eighteenth century, was curator of the Roman Botanic Garden. A full description is given (*op. cit.* xvi. 49–157 (1902)) of the contents of one of these herbaria, and an account of six others; an eighth is described by Prof. Pirotta in his *Annali de Botanica*, i. 59 (1903): these are all in Italy. It may be of interest to call attention to the existence in the Department of Botany of yet another of these herbaria. This, which is in two folio volumes, in contemporary binding, corresponds in arrangement and general features with those already described; it was purchased with other books at "Lilly's sale" at

Sotheby's on July 4, 1871, and was transferred from the Department of MSS. to that of Botany.

From the title-page of each volume about one-third of the page has been roughly removed; judging from the titles of some of his other herbaria, as printed in *Malpighia*, it would seem that the name of the person for whom it was prepared had been taken out. It runs as follows:—

CATALOGUS
Plantarum juxta methodum Tournefortianam
in
Sceleton Redactarum
Genera complurima, nonnullasque Species
ex
Sexdecim prioribus Classibus depromptas Complectens

[about one-third of sheet cut out]

a
Liberato Sabbati Chirurgie Professore
et
Horti Romani Custode.
Rom: Ann: MDCCLXVIII.

The second volume bears on the page following the title the following dedication:—

"Excellentissime Vir

Habes, Eques Excellme. Tomos duos Simplicium eodem ordine, et eadem methodo, Tournefortiana scilicet, elaboratos, sed unumquemq: diversa genera, diversasq: plantarum species complectentem, quibus si Tertius alterve addatur universe plantarum species, que in Institutionibus R: H: Clarissimi Tournefortii continentur, complecti poterunt. Quanta patientia usus sim in hujus modi plantis exsiccandis, servandis, chartae adaptandis, atq: in congrua Volumina redigendis, tu ipse facile intelligis; diligentia enim, et labor improbus impensam profecto vicerunt; sed utrumque lubentissime amplexus sum, ut voluntati tue inservire, tuumque patrocinium mihi possem comparare: quod ut obtineam, nihil intentatum relinquam, et meos augendo labores, et sollicitudines duplicando, meque tuis jussibus, Amplissime Vir, ex integro devovendo. Datum
Rome Id: Septemb: MDCCLXIX.

Humillimus, Devotissimus,
atque Obsequentissimus Servus
LIBERATUS SABBATI."

Following the title in vol. i. is a list of the principal authors quoted, with the abbreviations employed; this, like the names written under each specimen, is beautifully written in a fairly large hand, all the capitals being in red. The plants follow the classification of Tournefort's *Institutiones*; each volume is arranged independently, beginning with "Classis Prima: de

Herbis et Suffruticibus flore monopetalo campaniformi," and ending with "Classis xvi: de Herbis et Suffruticibus qui floribus carent et semine donantur": the first volume contains 161 pages, the second 158, an index being added to each. The specimens are well chosen and carefully mounted, each, according to the convention of the time, growing out of a funny little painted mound. The nomenclature is that of the authorities quoted; occasionally, *e. g.* for "Quamoclit Americana, foliis cordiformibus, acutis, et leviter angulatis, floribus sanguineus," no citation is given; in this case we find the name published, apparently for the first time, in Bonelli's *Hortus Romanus* (i. 25, t. 86 (1772)), for which Sabbati supplied the descriptions. To some of the names are appended the popular designations, many of them of interest—*e. g. Melilotus alba*, "vulgò Trivolo"; *Narcissus Pseudonarcissus*, "vulgò Trombone"; a double-flowered Yellow Buttercup, "vulgò Boton d'Oro"; a *Delphinium*, "vulgò Sperone di Cavaliero"; *Plumbago europæa*, "vulgò Caprinella"; *Origanum vulgare*, "vulgò Regono e Origano"; *Ajuga Chamæpitys*, "vulgò Ivartetica"; a *Nigella*, "semine flavo odore aromatico, vario," "vulgò tutte Spezie"; a *Helichrysum*, "vulgò Fiori di Paglia, e Perpetuine"; "Reseda odoratissima sive Mionetta" is noteworthy on account of the obscurity which surrounds the origin of our popular name.

I append to this notice a fragment of plant-lore recorded by Sabbati in his *Synopsis Plantarum quæ in solo Romano luxuriantur* (1745), which, so far as I know, has escaped the notice of folklorists. At the end of the Synopsis is given a "piccola agiunta d'alcuni nomi di piante con diversi vocaboli"—an interesting list not, I think, familiar to collectors of popular names—"con due rami incisi al naturale e' sua breve narrazione." The first of the "rami" represents *Eupatorium cannabinum*, of which the following story is told:—

"Nomi della Suddetta Pianta da Latini Eupatorium Vulgare, Vulgare Hepatorium, Eupatorio di Avicenna, Cannabino da alcuni detto, Eupatorio Commune, Antefebrile da altri, *Erba Santa Bibiana* dal Volgo cosi detta per essere una Pianta miracolosamente Nata nella Carcere ove fu Posta la detta Santa per Ordine di Giuliano Apostata Imperatore, Volendo far morire detta *Santa*, di Fame, per suo Martirio, ma il Signore Iddio non volle, per maggior Confusione del Tiranno doppo Molti giorni fu ritrovata la detta *Santa* più florida che pria, che solo si cibò della detta Erba, benche amara al gusto, adessa li era di gratissimo Sapore, come aseriscono Molti Autori, Poscia Sdegnatosi il Preside, la fe Marterizare da altro martirio come si à dalla sua Vita Registrata da diversi Sacri Scrittori.

"L'Uso poi della nomata Erba, si dal' tempo della morte di detta Santa, ogni fedele ne andava Baldanzoso adesso Luogo per bisogni che ne avevano ne loro infermità come anche continovano al presente, si per la divozione che anno come per le sue singolari virtù che in essa possiede, ne continova anascere in un picciolo Orto ove era la detta Carcere oggi contigua alla Chiesa erecta in

onore è Gloria di detta Sauta in Roma posta nella Antica Contrada *ad Ursum Pileatum*, nella Vicinanza del Palazzo Liciniano celebre ne Sagri martirologgi."

ON STELLARIA UMBROSA AND S. NEGLECTA.

By Rev. E. S. Marshall, M.A., F.L.S.

In this Journal for 1902, pp. 214–5, I stated my belief that these two plants were forms of one species, proposing for *S. neglecta* the name of *S. umbrosa* Opiz var. *decipiens*. Mr. Arthur Bennett, to whose kindness in looking up authorities I am greatly indebted, quotes from a letter of Prof. Babington, June 20th, 1860, to Mr. A. G. More: "I think you are correct in joining *Stellaria umbrosa* and *neglecta*"; so that their specific identity was recognized long ago. Last year I had excellent means of verifying the facts, as both plants grow plentifully in my present neighbourhood; my previous opinion has been confirmed, and Mr. H. W. Pugsley recently wrote that his own experience quite tallied. The best-marked differences appear to consist in *umbrosa* having glabrous pedicels and sepals, and acutely tubercled seeds; whereas *neglecta* has the former organs hairy, and seeds with rounded tubercles, its petals are often slightly longer, and there is a difference in habit, not easy to describe on paper, but usually perceptible at a distance of several yards. I have not yet observed any intermediates, but where the two are (rarely) found in company these may be expected to occur. *S. umbrosa* prefers drier, though shaded spots.

S. neglecta was published by Bluff and Fingerhut in *Comp. Fl. Germ.* i. 560 (1825), as follows:—

"Decandra, caulibus procumbentibus dichotomis linea pilosa notatis, foliis ovato-lanceolatis inferioribus petiolatis, calycibus pubescentibus pedunculo sub anthesi longioribus, capsula calycem parum superante, seminibus discoideis margine muricatis.

"Circa Menninghüffen, Princip. Mindensis, ad margines rivulorum. Mai.–Jul. (Similis *St. mediæ*, a qua differt foliis angustioribus et longioribus, pedicellis florum sub anthesi saltem brevioribus, calycis foliolis oblongo-lanceolatis, neque ut in illa ovato-oblongis, petalis calycem plerumque superantibus semper saltem aequantibus, staminibus 10, seminibus majoribus brunneis compresso-disciformibus, disco tuberculatis circa margines muricibus longioribus cinctis, quibus notis accedit magis *St. latifoliae*, sed haec etiam recedit caule ascendente, foliis omnibus basi angustiore sessilibus, adeoque magis ellipticis, neque in superiori caule late sessilibus, tum petalis calyce brevioribus. Hyeme neque floret neque usquam perstat, ut solet *St. media*. Weihe *in litt.*)." In the second edition (1838), p. 107, Bluff, Esenbeck & Schauer reduced it to *S. media β major*. Other early varietal names are:—*S. media β procera* Klett in Rich. *Fl. Leipzig* (1830); b. *neglecta* Mert. & Koch, *Deutschl. Fl.* (1831); and *β major* Koch (*pro parte*), *Syn. Fl. Germ. et Helv.* ed. i. (1835).

The original publication of *S. umbrosa* is more difficult to trace. Opiz's name appears to be first definitely mentioned in Reichenbach's *Fl. Germ. Exsicc.* no. 895, quoted by Koch; which is, presumably, a *nomen nudum*. It is also found as *S. umbrosa* Opiz, *Seznam*, p. 93 (1852); a mere list of Bohemian plants, arranged as an index to a flora. Doubtless Opiz did publish a description; but this I have not been able to discover. *S. media* var. *umbrosa* Ruprecht in *Flora*, xvii. p. 710 (1834), seems to be the oldest *varietal* name; his brief diagnosis runs: "γ. *St. umbrosa* Opiz; subdecandra, caule adscendente vix dichotomo, petalis calyce vix longioribus. Hab. in nemorosis locisque humidis copiosissime circa Pragam. *St. alsinoides* Schleicher?" It is also β *major* Koch (*pro parte*), *l. c.*

S. Elisabethæ F. Schultz in *Archives de Flora*, pp. 302–3 (1861), is, I believe, rightly referred by our two leading text-books to the present plant: "... decandra, caule adscendente unifariam piloso apice dichotomo, foliis caulinis inferioribus cordato-ovatis petiolatis, petiolo folio longiore, vix alato, foliis caulinis superioribus sessilibus cordato- vel oblongo-ovatis, acuminatis, floribus alaribus terminalibusque, pedunculis glaberrimis sub anthesi calyce triplo vel quadruplo longioribus, fructiferis horizontaliter patentibus vel subrefractis, calyce 6–8-plo longioribus, calyce glaberrimo rarius basi verrucoso, sepalis lanceolatis, petalis niveis oblongis obtusiusculis ad basin usque bifidis calycem æquantibus, staminibus constanter 10 niveis, antheris lilacino-purpureis, capsula calycem superante, seminibus discoideis verrucoso-punctatis, marginatis, margine muricatis. (1). Floret Aprili–majo. ...

"Synon. *S. neglecta* var. *longipedunculata* mihi prius.

"Differt a *S. neglecta*, foliis latioribus, inferioribus cordato-ovatis, pedicellis glaberrimis, sub anthesi calyce multo longioribus, calycibus glaberrimis, petalis calycem subæquantibus, nec longioribus, et statione semper sylvatica.

"A *S. media*, foliorum et petiolorum (quæ in S. media latiora et alata sunt) forma, pedunculis glaberrimis, fructiferis multo longioribus, patentibus et non adeo refractis; floribus subduplo majoribus, petalis latioribus, staminibus semper 10 (nunquam 3 vel 5), seminibus discoideis, verrucoso-punctatis, marginatis, margine muricatis (nec globoso-reniformibus, rugulosis), statione semper sylvatica et tempore florendi (a 15ma die aprilis ad 28am maji mensis. Nunquam per totum annum florens nec in cultis reperta est, ut *A. media*" [*sic*].

Babington gave *S. umbrosa* as perennial; and Mr. Townsend (*Fl. Hants*, Appendix C, p. 501), who ranks it as a distinct species or subspecies, says that it is perennial, with numerous barren shoots. I am inclined to think that *umbrosa* and *neglecta* are often only annuals: both are evidently included under Mr. Townsend's definition of *S. umbrosa*. In Wilts it flowers from about mid-April to the first or second week in June.

Until the matter has been further investigated, I suggest that it would be at least premature to depose the name *S. umbrosa* Opiz, even on grounds of priority. But I venture to go still further, and

to risk the displeasure of those who make the strict law of priority a sort of fetish. The plant which has long borne this name is decidedly *the natural type* of the segregate species (or subspecies), being universally acknowledged to be more distinct from *S. media* than is *S. neglecta* Weihe; which, indeed, still figures in the present *London Catalogue*, and in all our recent Floras, under that heading. What is gained by doing violence to Nature, and ousting a well-known appropriate name in favour of one which has for many years been used with quite a different intention? It is a matter of indifference to me whether my proposed designation (*S. umbrosa* var. *decipiens*) be retained or not; nevertheless I believe that only the triumph of sheer pedantry can cause *S. neglecta* Weihe to be accepted as the type, in the teeth of biological facts and of common-sense.

[The vigour of Mr. Marshall's language in his last paragraph, which I have not succeeded in inducing him to modify, reminds me of the well-known advice to one who had a "weak case." But calling those who differ from you names, although it has the support of a distinguished statesman, does not alter facts or modify opinions. The Decandollean law is precise: "Art. 55. In case two or more groups of the same nature are united into one, the name of the oldest is preferred"; and it is difficult to see what other rule could be adopted. A comparison of the dates given above by Mr. Marshall leaves no doubt as to the priority of *S. neglecta* over *S. umbrosa*, and this I pointed out to him when he published his *S. umbrosa* var. *decipiens*. Mr. Marshall's assumption that Nature and biological facts support his view seems to me as baseless as his assertion that "doubtless Opiz did publish a description." When he attempts to claim also the approval of "common sense," I would remind him that the law of priority, in some form, is recognized by all workers, and that its neglect can only result in chaos. But, remembering the failure of Mr. Marshall's previous attempt to induce botanists to abandon *Carex depauperata* in favour of a later name (see Journ. Bot. 1896, 229), I do not doubt their verdict on the present case.—Ed. Journ. Bot.]

BIBLIOGRAPHICAL NOTES.

XXXIII.—Dates of the 'Nova Genera' of Humboldt, Bonpland, and Kunth.

[The following summary is taken from an interesting and exhaustive paper by Mr. J. H. Barnhart, published in the *Bulletin of the Torrey Club* for October, 1902, pp. 585–598. It seems desirable to reprint it here, as it has relation to the paper published in this Journal for 1901, pp. 262–266, which was then the only attempt to give the dates of the volumes issued in connection with the *Voyage aux Régions Equinoxiales*, and corrects the dates therein given, so far as the *Nova Genera* is concerned. The following paragraphs, from the earlier portion of Mr. Barnhart's paper, explain the reason for

his corrections; they are followed by the *résumé* with which his paper concludes.]

Messrs. Sherborn and Woodward seem to have given us an accurate and fairly complete account of the "Plantes équinoxiales," "Melastomes," "Rhexies," "Mimoses," and "Graminées" of the "Voyage" reports, but as much cannot be said of their attempt to elucidate the *Nova Genera*. On one page they give a summary of the seven volumes, showing that these consist of 55, 51, 57, 39, 54, 68, and 66 sheets or signatures respectively; on the following pages they list the fascicles as announced from time to time in the *Bibliographie de la France*, from which it would appear that the volumes contained about 89, 98, 91, 63, 86, 106, and 119 signatures respectively; after which they merely remark, "The sheeting of the French records is a mystery to both of us."

It is well known, or ought to be, that the *Nova Genera* appeared simultaneously in two editions, one of folio size, the other in quarto. It is not so well known, except to those who have tried to verify references in the wrong edition, that the two differ widely in pagination; the only printed mention of this fact which I have seen is a brief note by Dr. Otto Kuntze,* and he does not seem to have had access to a copy of the fourth volume of the folio edition. The matter in the two editions is the same; they were issued in the same number of fascicles (36), and at the same time; and the plates were alike in the two editions, except for the width of the margin; but, the quarto page being much smaller, the text extended over a greater number of pages, so that each quarto fascicle consisted of many more pages than the corresponding folio fascicle, and the quarto volumes are thicker than the folio ones. Messrs. Sherborn and Woodward described the quarto volumes; nearly all of their quotations from the "French records" refer to the folio edition; it was for this reason that they were mystified. The *Bibliographie de la France*, upon which they were obliged to rely almost wholly for the list they give, repeatedly mentions the quarto edition, and in many cases specifies the "sheeting" of the quarto parts; it is difficult to see how they could overlook this fact, although it may well have added to their perplexity.

The folio edition seems to have been prepared so that subscribers to the entire series of "Voyage" reports might have them of uniform size; the quarto edition, that botanists might secure this particular work at a reduced price. The latter, probably because of its cheapness and consequent greater accessibility to the average student, is the one almost invariably cited by botanists; it is the one always referred to by Kunth himself, in his later wotks. While convenient, this practice is not strictly logical; for, as the fascicles were issued without breaking signatures, those numbered correspondingly never contained precisely the same text in the folio and in the quarto form. In many instances, in order to determine with exactness the date of publication of a new genus or species, it would be necessary to find out whether it first appeared in a folio or a quarto fascicle. A table

* Rev. Gen. iii. 1, 156 (1898).

showing the genera and species concerned, with the original place and date of publication, might prove useful in determining some question of priority; but such a list would be of very doubtful value until we are more certain than we can be at present of the exact pagination of every fascicle. It is very important, as mentioned by Sherborn and Woodward, that any one possessing the original fascicles, or any of them, should submit them to some bibliographer who would publish a careful description of them; but it must not be forgotten that *contemporary evidence is the best*, for a fascicle may appear to be in its original form, when actually altered in important particulars.

Résumé.

The following *résumé* is intended merely as an aid to those who may wish to determine quickly the probable date of publication of a given page or plate. Consequently all details of title-pages, repeated plates, etc., are omitted. Data which seem to me certain beyond a reasonable doubt are indicated by an exclamation point (!), while a mark of interrogation (?) accompanies those which are simply guesses. The unmarked data are chiefly strong probabilities.

Fasc.	Vol.	Folio Text. pp.	Quarto Text, pp.	Plates.	Date.	*
1–2	I.	i–xlviii, 1–120.	i–lx, 1–152?	1– 44!	Ja. 1816.	[B. F. 3 F.]
3		121–200.	153–256?	45– 69!	My. ,,	[B. F. 11 My.]
4		201–302.	257–377?	70– 96!	Au. ,,	[B. F. 31 Au.]
5	II.	1– 80!	1– 96.	97–121!	Ap. 1817.	[B. F. 3 My.]
6		81–152.	97–192!	122–146!	D. ,,	[B. F. 13 D.]
7		153–220.	193–280.	147–168!	F. 1818.	[B. F. 28 F.]
8		221–324.	281–406.	169–202!	Je. ,,	[B. F. 6 Je.]
9	III.	1– 72.	1– 96!	203–227!	S. ,,	[B. F. 3 O.]
10		73–148!	97–192.	228–242.	F. 1819.	[B. F. 13 F.]
11		149–224.	193–288.	243–267?	Jl. ,,	[B. F. 17 Jl.]
12		225–296.	289–384.	268–292?	N. ,,	[B. F. 27 N.]
13		297–356.	385–456.	293–300?	Mr. 1820.	[B. F. 11 Mr.]
14	IV.	1– 56.	1– 72.	301–325!	Ap. ,,	[B. F. 15 Ap.
15		57–120.	73–152.	326–349!	My. ,,	[B. F. 27 My.]
16		121–168.	153–224?	350–373!	Jl. ,,	[B. F. 22 Jl.]
17		169–216.	225–288?	374–397!	S. ,,	[B. F. 16 S.]
18		217–247.	289–312.	398–412!	D. ,,	[B. F. 24 D.]
		(Entire folio text of Volume IV. accessible at Paris from 26 O. 1818.)				
19	V.	1– 56.	1– 64.	413–436.	My. 1821.	[B. F. 26 My.]
20		57–112.	65–128.	437–460.	S. ,,	[B. F. 29 S.]
21		113–176.	129–224.	461–480.	F. 1822.	[B. F. 23 F.]
22		177–236.	225–304.	481*a*–498.	Je. ,,	[B. F. 29 Je.]
23		237–338.	305–432.	499*a*–512.	Mr. 1823.	[B. F. 22 Mr.]
24	VI.	1–108.	1– 72.	513–522?	Ap. ,,	[B. F. 19 Ap.]
25		109–176.	73–168.	523–537?	Au. ,,	[B. F. 30 Au.]
26		177–236.	169–240.	538–552?	Ja. 1824.	[B. F. 24 Ja.]
27		237–300.	241–320.	553–569?	Ap. ,,	[B. F. 24 Ap.]
28		301–360.	321–392!	570–585?	Au. ,,	[B. F. 21 Au.]
29		361–420.	393–542.	586–600?	S. ,,	[B. F. 4 S.]
30	VII.	1– 48!	1– 56.	601–615!	N. ,,	[B. F. 13 N.]
31		49–112.	57–144.	616–630!	D. ,,	[B. F. 25 D.]
32		113–176.	145–224.	631–645!	F. 1825.	[B. F. 19 F.]
33		177–236.	225–296.	646–659 *bis*!	My. ,,	[B. F. 14 My.]
34		237–296.	297–376.	660–673!	Je. ,,	[B. F. 18 Je.]
35		297–356.	377–448.	674–690!	Jl. ,,	[B. F. 30 Jl.]
36		357–399.	449–506.	691–700!	N. ,,	[B. F. 3 D.]

* [*Bibliographie de la France.*]

There is little doubt that the first two fascicles were dated "1815," and that fascicle 10 was dated "1818"; and it is not certain that these fascicles were not actually issued before the close of those years. In fact, all of the dates under which notices appeared in the *Bibliographie de la France* may be as much as six or eight weeks later than the actual publication of the fascicles.

PLAGIOTHECIUM PILIFERUM IN BRITAIN.

By D. A. Jones, F.L.S.

In August, 1902, Messrs. Cleminshaw and Duncan and I paid a visit of a fortnight's duration to Ben Lawers, and devoted most of that time to the investigation of the rich moss-flora of its slopes. Last year, in looking over his collection, Mr. Duncan noticed a *Plagiothecium* in fruit which somewhat resembled a small form of *P. denticulatum* in habit. Upon closer inspection, however, it was found to differ considerably from any forms of that species with which we were acquainted. The leaves were smaller, and terminated in a long, flexuose and almost filiform point, and the cells were narrower. The small straight capsule was also very characteristic. It was sent to Professor Barker for his opinion, and he declared it to be *P. piliferum*, which determination was subsequently confirmed by Mr. H. N. Dixon.

The following is for the most part a translation of Schimper's description in the *Bryologia Europæa*, to which the measurements from Limpricht's *Laubmoose Deutschlands*, &c., have been added:—

In wide flattened *tufts*, beautifully green and fruiting freely. *Stems* much branched, prostrate, and sparingly radiculose; *branches* nearly erect or curved. *Leaves* small, crowded, distichous, complanate, widely ovate-lanceolate, 1–1·2 mm. long, and 0·5–0·6 mm. wide, suddenly contracted to a very long, fine, and flexuose acumen, entire, plicate. *Nerve* very short and slender, single or double. *Cells* shorter than in the preceding species, narrow-linear, thin-walled, 10 times as long as broad; basal cells wider, 3–6 times as long as broad; alar cells quadrate, rectangular, hyaline. *Perichætial bracts* thinner, paler, gradually and longly acuminate; the interior ones convolute and sheathing. *Perigonial bracts* widely ovate, acuminate. *Seta* red, 10–15 mm. long. Capsule inclined or almost erect, symmetric or nearly so, wrinkled longitudinally, slightly contracted below the mouth, yellowish green, when old chestnut-brown. *Calyptra* long, narrow, split to the middle. *Lid* conical, shortly apiculate. *Peristome-teeth* distinct, very hygroscopic, 0·45 mm. long, and 0·035 mm. broad, pale, with distant articulations, hyaline bordered, finely papillose; *inner peristome* colourless; *basal membrane* very short, 0·07 mm. high. *Cilia* none or rudimentary. *Spores* yellowish green, 0·010–0·014 mm., smooth. *Monoicous:* male flower near the fertile flower.

Habit. It grows almost exclusively on granite or siliceous rocks, covering their vertical and overhanging faces in wide flattened tufts.

Syn.: *Leskea pilifera* Swartz, Summ. Veget. Scandin. p. 41; Hartm. Skand. Fl. ed. v. p. 335.
Neckera pilifera R. Spruce in Musc. Pyren. No. 66.
Hypnum denticulatum γ *piliferum* Wahlenb. Flora Suec. ii. p. 710.
H. orthocarpum Angstr. Disp. Musc. Scand.
H. trichophorum R. Spruce, Musc. Pyren. *teste* Müller, Synops. ii. p. 252.

Our plant grew in the crevices of one of the boulders which lie at the base of the south-east face of Ben Lawers, and extend as far as the head of Lochan-a'-Chait. Although we spent parts of three days among the boulders, we only met with one tuft.

Its distribution in Europe extends over the Pyrenees, Apennines, and the mountains of Scandinavia, Finland, and Corsica. It also occurs in North America. Its fruit reaches maturity in June.

SHORT NOTE.

Monmouthshire Plants.—We gathered the following, apparently unrecorded for v.-c. 35, near St. Arvans on July 24th, 1903:—*Papaver Argemone* L.; *Sedum Telephium* L. var. *Fabaria* H. C. Wats. (on a stone wall, but remote from houses); *Cnicus acaulis* × *arvensis*; *Euphrasia nemorosa* H. Mart. (*teste* Townsend), accompanied by a glandular eyebright which is perhaps *E. brevipila* × *nemorosa*; and *Anagallis arvensis* L. var. *carnea* (Schrank). Outside Chepstow Castle, growing with its supposed parents, we collected what Mr. Arthur Bennett concurs in naming *Rumex conglomeratus* × *pulcher*; and *Epipactis media* Bab. was found sparingly at Forester's Oaks.—Edward S. Marshall; W. A. Shoolbred.

NOTICE OF BOOK.

Max Fleischer. *Die Musci der Flora von Buitenzorg.* Band I. Leiden: E. J. Brill. 1904. Pp. xxxi, 386; 71 figs. in text. Price 20s.

Dozy and Molkenboer's beautifully illustrated *Bryologica Javanica* (1855–70) has now fallen behind the times, and subsequent papers on the subject are very scattered. The publication of a new monograph is therefore very welcome. Herr Fleischer's new work is on quite modern lines, and adds much to what was known of the mosses of Java. It includes full descriptions of all the Javan species, and introduces many of the species of the Malay Archipelago, Polynesia, Australia, Ceylon, and India, for the sake of a critical comparison. His long residence of five years at Buitenzorg enabled him to make a thorough study of the development and anatomy of the mosses, and especially of the peristome, and to investigate bio-

logical and phylogenetic details—*e. g.* the curious diœcism of *Macromitrium*, the water-sacs of *Cyathophorum taitense*, the formation of gemmæ in an inflorescence or at the foot of a sporogonium, the emission of rhizoids from a seta—and he discovered the sporogonium of the protonematoid *Ephemeropsis*. He is so convinced of the great systematic importance of the characters of the capsule, and especially of its peristome, that he makes these the foundation of his classification, and attaches far less value to such vegetative characters as the acrocarpic or pleurocarpic position of the inflorescence, the distichous or spiral arrangement of the foliage, the areolation of the leaves, etc. The work is entirely in German. The first volume contains the *Sphagnales* and the *Haplolepideæ*, with descriptions of 194 species, many of which are new. The figures, though mere line-process blocks, are wonderfully true to nature. A. Gepp.

BOOK-NOTES, NEWS, &c.

At the meeting of the Linnean Society on April 7th, after the reading of the Minutes of the previous meeting, Mr. George Murray moved that the portion dealing with the election of an Associate be expunged, on the ground that, the President having given a ruling on February 18th, which had been endorsed by the Fellows at the next meeting, it was against order to reopen the case. The President, however, refused to accept the motion, and, after some discussion, the Minutes as a whole were put to the meeting and rejected. Mr. F. Enock then gave an exhibition of natural-colour photography of living insects and flowers, showing a large series of lantern-slides, many of which were strikingly life-like. Mr. C. E. Jones read a paper on the morphology and anatomy of the stem of the genus *Lycopodium*, and demonstrated by aid of lantern-slides the comparative anatomy of the stele in a number of species and forms.

At the meeting on April 21st, after the approval of the Minutes of the previous meeting, the President read an opinion received from Sir Edward Fry, which stated that the action of the officials in connection with the recent declared election of an Associate was merely irregular, not illegal. This opinion was contested by Mr. Henry Groves, but the legal authority carried the greater weight, and on the Minutes of the meeting of March 17th being again put, they were carried. The President then delivered an Address, and the Treasurer made a few crude remarks; after which the ordinary business was resumed. Mr. Clement Reid showed an excellent series of drawings, by Mrs. Reid, of a number of dicotyledonous fruits and seeds of British preglacial and interglacial plants; and Mr. Moreton Middleton made some remarks on a holograph letter from Linnæus to Haller.

The Cambridge University Press has issued a second edition, revised and rearranged in one volume (pp. xii, 670; price 10s. 6d.), of the *Manual and Dictionary of Flowering Plants and Ferns*, by Mr. J. C. Willis. When the first edition appeared in 1897, we expressed

at some length our sense of the excellence and usefulness of this handbook; in its present form it is more convenient for the study, though perhaps not so handy for the pocket, and the revision is by no means merely nominal, as it sometimes is in works of this kind. Probably no one book gives so much general information in so small a compass, and we gladly recommend it both as a text-book for students and as a work of reference. But why is Mr. Willis so unwilling to pay tribute to the British Museum collections? In our former notice the reviewer pointed out that the statement that "most museums in Britain" contained sections of *Sequoia* showing 1335 annular rings was inaccurate, and that the only place in Britain where such a section can be seen is at the Museum in the Cromwell Road. Mr. Willis now substitutes "some" for "most"; can he name any other?

A LARGE number of botanists accepted Professor Marshall Ward's invitation to witness the opening of the new Botanical School at Cambridge by the King on March 1st. The large plain well-lighted building occupies one side of the new quadrangle which has been erected on the south side of Downing Street, opposite the Medical School. It forms an oblong block 200 ft. long by 40 ft. wide, and has been put up at a cost, including fittings, of £25,000. On the ground floor are a large lecture room, with accommodation for two hundred students, the herbarium, and the museum; on the first floor are the library, the morphological and chemical laboratories, the professor's laboratory, the two lecturers' private working rooms, and rooms for research, with a small greenhouse for experimental work in plant diseases. The second floor contains the large laboratory for elementary students, the physiological laboratory, and the private rooms of the Reader and demonstrators. On the flat roof are conveniences for experimental work, and also a well-lighted greenhouse. Professor Ward and his colleagues are to be congratulated on their new botanical home and their long roll of students, which bear testimony to the vigour and progress of the Cambridge School of Botany. (By an oversight this paragraph was omitted from our last number.)

IN *Nature Notes* for April is an article on "The Pollination of the Primrose" by the anonymous author of *The Primrose and Darwinism*, reviewed in this Journal for 1902 (p. 297). The paper is followed by a notice of the author, whose death occurred while it was passing through the press: from this notice we extract the following particulars:—"The Rev. Edward Bell was born at Uppingham, January 26, 1829, and was educated at Uppingham School and Trinity College, Cambridge. He acted as curate of Gainford, Durham, and perpetual curate of Upper Armley, Leeds, and from 1868 to 1890 was vicar of St. John's, Wakefield. Here his health broke down from overwork and he retired, devoting all his time to natural history pursuits, and occasionally contributing to magazines. Having, after a few years' rest, recovered much of his health, he became a great walker, being particularly fond of Surrey commons. He was a keen and accurate observer, specially devoting his attention to flowers and bees, and well earning the title he gave himself of 'A Field Naturalist.'" Mr. Bell's death,

which occurred at Poole on March 5, resulted from severe burns caused by the upsetting of an oil lamp.

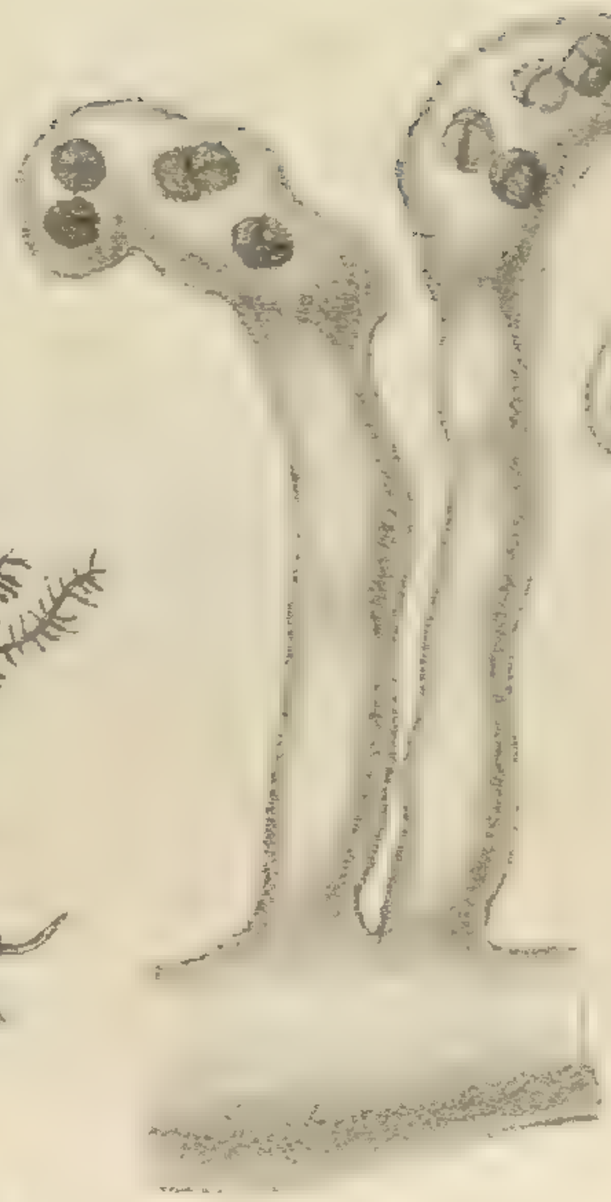
The erratic little *Kew Bulletin* seems to have succumbed to a form of appendicitis. The last issue of the *Bulletin* proper appeared in September, 1901, but the "appendixes" to the non-existent journal continue to appear: the first for "1904" was issued in December, 1903, and contains an exchange list of seeds; the second, which appeared in March, is a catalogue of the additions to the Kew library received in 1903.

The Report for 1903 of the Ashmolean Natural History Society of Oxfordshire contains biographies of William Baxter (1787–1871) and H. W. E. Garnsey (1826–1903) from the pen of Mr. G. C. Druce. Mr. Garnsey, Mr. Druce tells us, has laid "Anglo-Saxon speaking botanists" under no mean debt by his translations of German botanical works; but do any botanists speak Anglo-Saxon?

Dr. Pax's recent study of African species of *Euphorbia* published in the latest issue of the *Botanische Jährbucher* (Mar. 22) is remarkable for the omission of the species described in the Welwitsch Catalogue. Three of these were first described in the Catalogue, which contains critical remarks on other species. It seems strange that so important a contribution to African botany should have been overlooked.

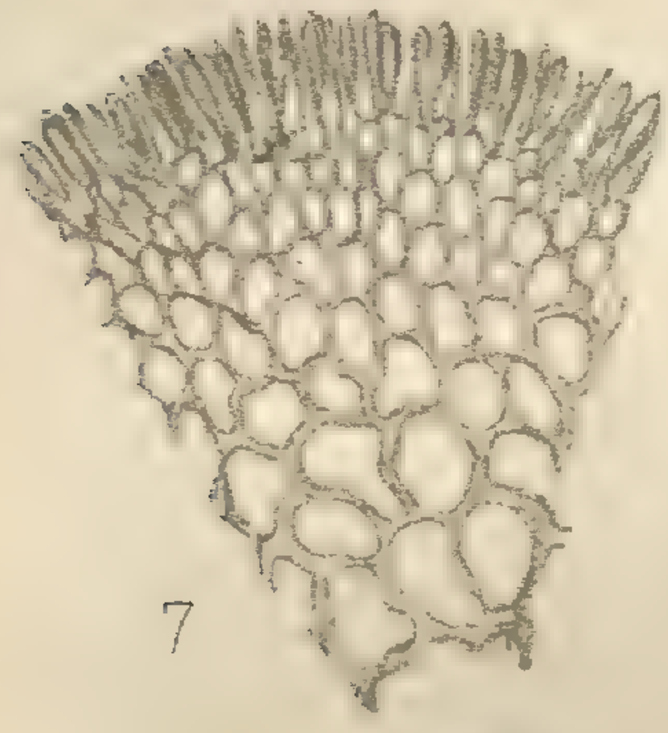
Five years ago we noticed the publication of *Riviera Nature Notes*, a second and enlarged edition of which is now before us. The numerous additional illustrations render the new edition even more attractive than its predecessor. It is an excellent example of the kind of book—chatty, observant, amusing—which can be produced by a man who keeps his eyes open, remembers what he sees, and knows how to write; and is thoroughly readable from cover to cover. Why the author does not put his name to it we cannot imagine: he certainly has nothing to be ashamed of! There are notes by Sir Thomas Hanbury, one of which, stating that *Mandevillea* is "named after Sir John Mandeville, who introduced it into England," is somewhat startling, as the only Sir John Mandeville most of us know about is the mediæval and it is to be feared mythical traveller so called: the plant actually commemorates Henry John Mandeville, who was H.B.M. Minister at Buenos Ayres, where he died in 1861. Should another edition be called for, as seems probable, the author would do well to revise his spelling; *e. g.* "*Athragene*" (p. 208); "*Pelliseri*" (p. 276) for *Pelisseriana*; "Arangeli" (p. 389) for Arcangeli; "*Cymballaria*" (p. 203). We note that the author still clings to his belief that "Bedstraw" should be "Beadstraw," although he defers to our objection that its stalk could not be used as a rosary (Journ. Bot. 1899, 95), he thinks it may "have obtained its name from its likeness to a rosary": unfortunately he makes it clear that he does not know how a rosary is used; he had better apply to his Catholic friends among the peasautry, with whom it is pleasant to note that he is in sympathy, to enlighten him. The anecdote about "Mr. and Mrs. G." is amusing, but a little cruel, as the subjects are not difficult of identification.

1

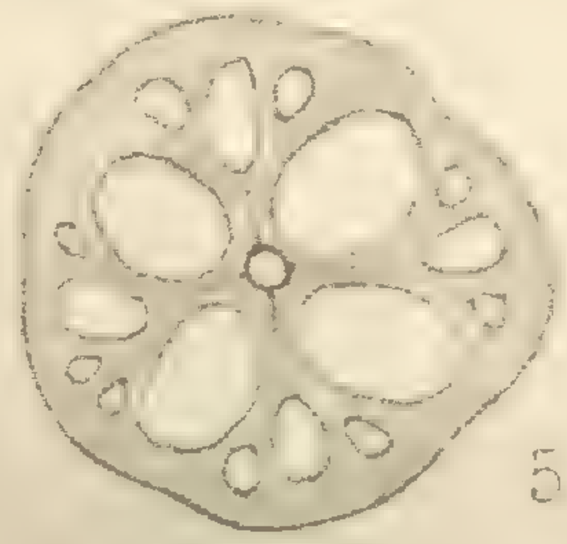


2a

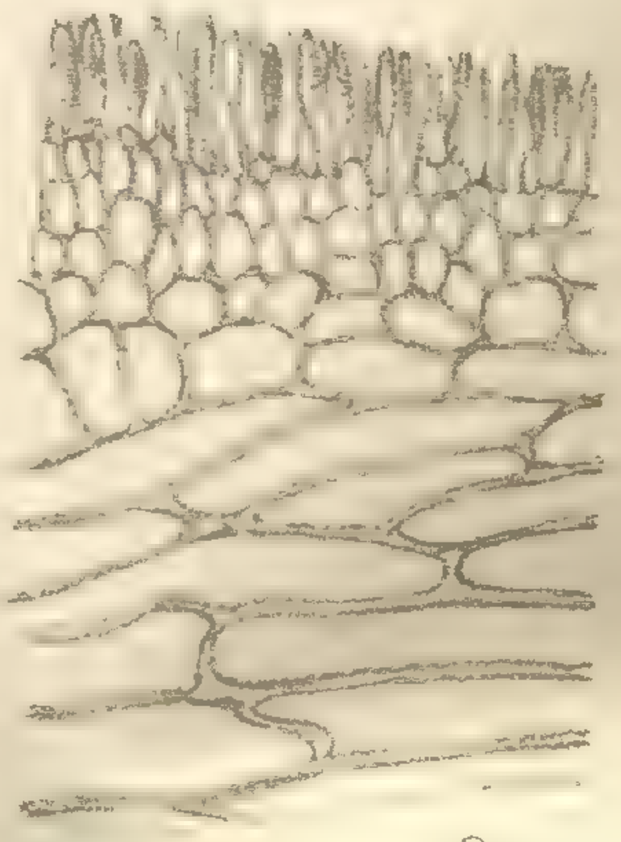
2b



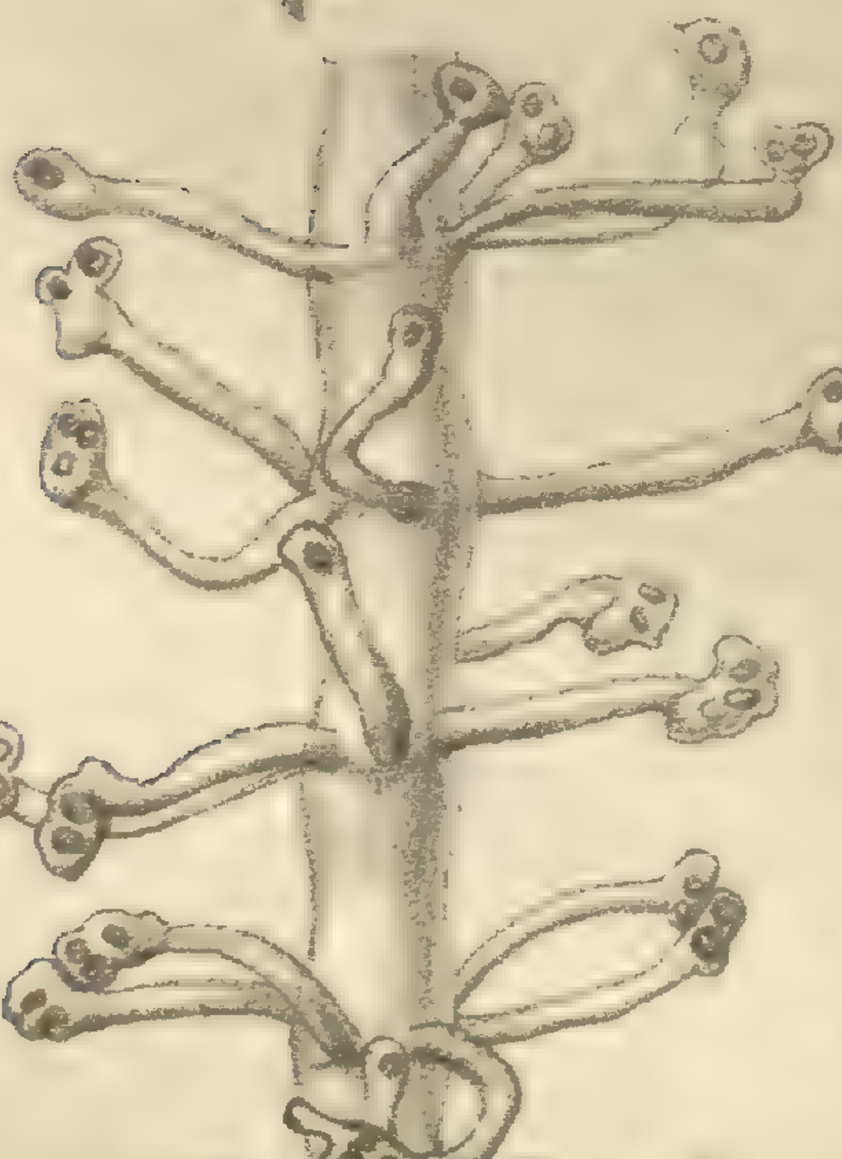
7



5



8



3

6

4a

4b

P. Highley del. et lith

West, Newman imp.

1-3, Ceramium Boydenii *n.sp.* 4-6, Polysiphonia japonica *Harv.*
7, 8, Chordaria firma *n.sp*

CHINESE MARINE ALGÆ.

By Ethel S. Gepp (*née* Barton).

(Plate 460.)

The following short list is founded on two small collections of marine algæ from the coasts of China recently added to the National Herbarium. One was made at Wei-hai-wei by Dr. P. Hamilton Boyden, Surgeon in the Royal Navy, and the other at Swatow by Mr. Edward B. Howell, of the Chinese Maritime Customs Service. Few algæ have been hitherto recorded from China, though the marine flora of Japan has received considerable attention from Japanese and other botanists.

As regards the nature of the coast at Wei-hai-wei, where the larger of the two collections was made, it will be of interest to quote Dr. Boyden's letter:—"The fact which struck me most was the absence of large seaweeds—e.g. *Fucus* and *Laminaria;* possibly this may be due to the sheltered situation of that part of Lin-kung-tao Island, where the seaweed [*Ceramium Boydenii*] was got; but even on the seaweed side of the island there seemed to be very few. This may be due to the coldness of the water from the absence of a warm current, these waters being outside the influence of the Kurosiwo or Japan stream. The specimens were got in pools left by the tide in the rocks, which were for the most part flat. On the seaward side the rocks are very precipitous, shelving down several hundred feet. The rocks are metamorphic, consisting of beds of quartzite, gneiss, crystallite, and limestone cut across by dykes of volcanic rock and granite. Mica abounds everywhere. Where the seaweeds were found the rocks were mainly granite and gneiss."

Of the Swatow algal flora Mr. Howell writes that the seaweeds are few, and there is but little variety.

The most interesting plants in the two collections are a new species of *Ceramium*, *C. Boydenii*, a new *Chordaria*, and *Polysiphonia japonica* Harv., which has been ignored in most systematic books. The special points of interest of these species will be found under their respective names.

As will be seen, nothing remarkable is here added to what is known about the geographical distribution of the species. Of the twenty-six species here recorded, eight are either not named specifically or are named with a query, owing to their imperfect condition. Of the remaining eighteen, two are new, two are cosmopolitan, twelve have been recorded from Japan, and the remaining two from other parts of the North Pacific.

I am much indebted to my husband for assistance and suggestions in the preparation of this list.

1. Rivularia atra Roth. Wei-hai-wei, *Boyden*!

Geogr. Distr. Arctic, Mediterranean, Caspian, North Atlantic, North Pacific, Japan.

2. Ulva Lactuca L. Ma-su, Swatow, *Howell*!
Geogr. Distr. Cosmopolitan.

3. Codium fragile Hariot. Wei-hai-wei, *Boyden*!
Geogr. Distr. Japan.

4. Sargassum Henslowianum Ag. Swatow, after typhoon, *Howell*!

5. Sargassum sp. Wei-hai-wei, *Boyden*!

6. Sargassum sp. Wei-hai-wei, *Boyden*!

7. Cystophyllum Thunbergii J. Ag. Wei-hai-wei, *Boyden*! Swatow, *Howell*!

The Wei-hai-wei plants are young, and show well the short primary branches with their densely congested leaves. The Swatow specimen is a fragment of the upper stem, with branches bearing the short oval vesicles. Both specimens agree well with tab. 133 in Turner's *Fuci* (1809).

Geogr. Distr. China and Japan.

8. C. fusiforme Harv. Wei-hai-wei, *Boyden*!
Geogr. Distr. Japan.

9. Dictyota dichotoma Lam. Wei-hai-wei, *Boyden*! without fruit.
Geogr. Distr. Mediterranean, North and South Atlantic, North Pacific, Indian Ocean, New Zealand, Japan.

10. **Chordaria firma**, n. sp. Fronde coriacea, teretiuscula, lateraliter densius ramosa, ramis prolongatis parce ramosis, 20 cm. alta (incompleta), filis periphericis sporangia unilocularia cingentibus articulatis; intus parum tubulosa, duobus stratubus contexta, stratu interiori e cellulis elongatis latiusculis pachydermaticis, exteriori e cellulis radiatim dispositis brevibus angustioribus lateraliter compressis composito. (Fig. 7, 8.)

Hab. Wei-hai-wei, *Boyden*!

This species is most nearly related to *Chordaria flagelliformis* Ag., but differs from it in being less densely branched, in being more or less distinctly tubular in the mature plant, and in possessing a broad band of short irregular cells between the long central cells and the cortical fringe of paraphyses and sporangia. This subcortical layer is composed of cells which, in a transverse section of the thallus, appear radially elongated and narrower than the central cells. In a longitudinal section they are seen to be short and irregular, and they form a distinct broad sheath enclosing the long internal cells. From this subcortical layer arises the cortical fringe of paraphyses and unilocular sporangia, which are similar to those of *C. flagelliformis*. The long internal cells of the thallus are all of much the same diameter, and a transverse section shows them to be much more regular than those of *C. flagelliformis*. The cell-walls are thick, and show distinct pits. The axial cavity varies slightly in size, but is always small. The whole plant is firm and tough, and does not adhere at all to paper when dried.

M. Ed. Bornet has been so good as to give me his valuable opinion on this plant.

11. Leathesia difformis Aresch. Wei-hai-wei, *Boyden*!
Geogr. Distr. North Europe, North Atlantic, North Pacific, Australia, Cape of Good Hope.

12. Ectocarpus siliculosus Lyngb. Wei-hai-wei, *Boyden*! With uni- and plurilocular sporangia.

Geogr. Distr. Cosmopolitan.

13. Gymnogongrus japonicus Suring.? Swatow, *Howell*! Without fruit.

Geogr. Distr. Japan.

14. Cystoclonium armatum Harv. Wei-hai-wei, *Boyden*!

Geogr. Distr. Japan.

15. Gracilaria confervoides J. Ag. Wei-hai-wei, *Boyden*! With cystocarps and tetraspores.

Geogr. Distr. Mediterranean, North Atlantic, North Pacific, Indian Ocean, Cape of Good Hope, Australia, Philippines, Japan.

16. Champia parvula Harv. Wei-hai-wei, *Boyden*!

Geogr. Distr. Mediterranean, North Atlantic, South Pacific, Indian Ocean, Australia, Japan.

17. Halosaccion microsporum Ruprecht. Wei-hai-wei, *Boyden*! With tetraspores.

This plant is not represented in the British Museum, nor have I seen a specimen of it, but the description and figure in Ruprecht's Tange Ochot. Meer. p. 85 (1850), tab. 15, fig. f., agree with the Wei-hai-wei plant. This specimen is not, however, growing epiphytically on any other alga, but on some sort of sand or stone. The cruciate tetraspores are numerous, and lie immersed in the cortical stratum of the branchlets.

Geogr. Distr. Japan.

18. Laurencia sp. Wei-hai-wei, *Boyden*!

This approaches most nearly to *L. obtusa*, but, like the following specimen, does not lend itself to determination.

19. Laurencia sp. Swatow, *Howell*!

20. Acanthophora orientalis J. Ag. Swatow, *Howell*! With tetraspores.

Geogr. Distr. North and South Pacific, Indian Ocean.

21. Rhodomela subfusca Ag. Wei-hai-wei, *Boyden*!

Geogr. Distr. North Europe, North Atlantic, North Pacific, Cape of Good Hope.

22. Polysiphonia japonica Harv. Wei-hai-wei, *Boyden*!

This species, collected at Hakodadi in 1854 by Morrow, was described by Harvey in Perry's *Narrative of the Expedition of an American Squadron to the China Seas and Japan, 1852–4*, Washington, 1856, vol. ii. p. 331. His diagnosis is not included either in J. G. Agardh's *Species Algarum*, vol. 2, part 3, 1863, or in De Toni's *Sylloge Algarum*, vol. iv. sect. iii. Since the original description is not easy of access, I append it here :—

"*Polysiphonia Japonica* Harv. fronde fruticosa gelatinoso-cartilaginosa badia basi ultra-setacea sursum attenuata decomposite ramosissima, ramis quoqueversum egredientibus alternis vel vagis iterum et iterum divisis, ramulis ultimis brevibus simplicibus furcatis vel dichotomis apice fibrilliferis; articulis inferioribus subcorticatis (cellulis secundariis auctis) superioribus nudis 4-siphoniis

diametro æqualibus vel sesquilongioribus, articulis ramulorum diametro brevioribus."

Dr. E. Perceval Wright has been so kind as to send me a fragment of an authentic specimen collected by C. Wright in the United States North Pacific Exploring Expedition, 1853–6. An examination of a transverse section of this shows four large pericentral cells; and alternating with these are four much smaller subsidiary cells. The cell-walls are thick. In the branches these subsidiary cells do not occur. A section of the Wei-hai-wei plant taken near the base of the stem shows groups of two to four subsidiary cells alternating with the four pericentral cells; but in the upper parts of the plant groups of these subsidiary cells are reduced to a single cell, and in the branches, as in Harvey's specimen, they are altogether wanting. (Fig. 4–6.)

One of the specimens of the Wei-hai-wei gathering is in cystocarpic fruit, and since the cystocarps have not been previously recorded, they are now figured. They are globose-ovate and almost sessile on branchlets arising from all parts of the plant. The specimen bearing cystocarps is more slender than the sterile plants.

Geogr. Distr. Japan.

23. P. URCEOLATA Grev.? Wei-hai-wei, *Boyden* !

These plants have all the appearance of *P. urceolata* Grev., but as they bear neither tetraspores nor cystocarps, it would be unsafe to make of this gathering a new record for the North Pacific in the geographical distribution of the species. They differ from the description of *P. Savatieri* Hariot in their mode of branching, and they are not epiphytic on any other alga.

24. DASYA sp. Near *D. ocellata* Harv. Wei-hai-wei, *Boyden* !

This plant is but a fragment, and bears antheridia only.

25. **Ceramium Boydenii**, n. sp. Fronde tota corticata, ad 5 cm. alta, vage et sparsim dichotome ramosa, ramis plus minus laxe intricatis et inter se hic illic radicellis valde adfixis, ramulis numerosis et ad quemque nodum pro majore parte egredientibus, lateralibus, solitariis vel oppositis vel verticillatis, circa 0·25–1·25 mm. longis, simplicibus aut vage divisis obsita; articulis quam diametro multo brevioribus vel parum longioribus. Ramulorum sporangiferorum apicibus capitatis, sterilium non forcipatis. Tetrasporangiis immersis, vel in ramulorum capitibus sine ordine, vel secus ramuli curvuli marginem convexam serie singula, dispositis, nunc cruciatim, nunc triangule divisis. Cystocarpia ignota. (Fig. 1–3.)

Hab. Wei-hai-wei, *Boyden* ! Yenoshima, Japan, *Petersen* ! Yokohama, Japan, *Kjellman* ! Vega Expedition.

This species is named in honour of the finder, Dr. P. Hamilton Boyden. He was unfortunately only able to procure a small quantity of it, and on subsequent visits to the locality he could find no more. In the collection of slides made by the late Prof. Schmitz, and preserved in the British Museum, there are two preparations of this alga labelled "Ceramium sp. nov.?" One is a fragment of a plant collected at Yokohama by Kjellman during the Vega Expedition, and the other is from Yenoshima, Japan, and was

collected by Petersen in 1881. One of these preparations shows good examples of both tetrasporic and sterile ramuli.

The plants composing the Wei-hai-wei gathering are laxly interwoven and closely connected by rhizoids, which grow out at the points of intersection. This habit would lead one to suspect that the species may have a prostrate habit. The ramuli are arranged mostly in whorls of three or more round the thallus, emerging usually at each node; they are either simple or irregularly branched. In the sterile ramuli, seen only in the Yenoshima plant, the apices, though often slightly curved, are not forcipate like most species of *Ceramium*. The tetraspores are borne in the swollen apices of the ramuli, either in a single series along one margin, or in globose heads with apparently no order, or in some way intermediate between these two extremes. Sometimes a small head containing one tetrasporangium is borne as an offshoot below the apex of a ramulus, the actual apex being sterile. M. Bornet, who has been so kind as to examine my plants, regards them as approaching the end of their vegetative period, and he suggests that at the time of their full growth the fertile ramuli were terminated by longer stichidia with the tetrasporangia slightly protruding along the outer margin. This arrangement of the tetrasporangia is to be seen in several of the specimens, together with examples of the fertile swollen heads, as described above. The tetraspores are divided, sometimes cruciately, sometimes tetrahedrally. The affinity of *C. Boydenii* is somewhat difficult to determine. The distribution of its tetrasporangia would give it a place in Series I. Ectoclinia of J. G. Agardh (*Analecta Algologica Continuatio*, ii. p. 12, 1894), but, inasmuch as *C. Boydenii* is entirely corticated, it cannot be placed in any of the four tribes into which Prof. Agardh has divided Ectoclinia. It therefore requires a new tribe for itself.

I wish to express my indebtedness to Monsieur Bornet and to Major Reinbold for kindly giving me their views on this plant.

26. Grateloupia filicina Ag. Ma-su, Swatow, *Howell*!

Geogr. Distr. Mediterranean, North Atlantic, South Pacific, Indian Ocean, Japan.

Ten gatherings, including plants with cystocarps and tetraspores. A transverse section of the thallus of some of these plants shows that it is often more or less hollow, sometimes even resembling the figure of *Grateloupia porracea* in Kütz, Tab. Phyc. xvii. fig. 25*c*. This figure is quoted by J. G. Agardh in his *Species Algarum*, vol. iii. part i. p. 154, as being probably *G. filicina* Ag. The Swatow plant cannot be referred to *G. divaricata* Okamura (Bot. Mag. Tokyo, ix. Dec. 1895, p. 482), since it differs in its manner of branching and general habit.

27. Corallina sp. Wei-hai-wei, *Boyden*!

Description of Plate 460.

Ceramium Boydenii, n. sp.—1. Plant (Wei-hai-wei), nat. size. 2. Fertile ramuli (Wei-hai-wei); *a*, × 20; *b*, × 50. 3. Sterile ramuli (Yenoshima), × 20.

Polysiphonia japonica Harv.—4. Plant, nat. size; *a*, with cystocarps; *b*, sterile. 5. Transverse section of thallus, × 40. 6. Cystocarp, × 35.

Chordaria firma, n. sp.—7. Transverse section of thallus, × 90. 8. Longitudinal section of thallus, × 90.

WEST WILTS PLANT-NOTES FOR 1903.

By Rev. E. S. Marshall, M.A., F.L.S.

The following localities are additional to *The Flowering Plants of Wiltshire* (referred to below as *Fl. Pl.*), published in 1888 by my old friend and Marlborough master, Rev. T. A. Preston, in which (almost inevitably) his own neighbourhood received fuller treatment than the less accessible parts of the county; I accordingly give stations for many species which, though not rare, are sparingly recorded in his pages. Since this book was issued, a good many discoveries have been made, mainly in the south, Mr. E. J. Tatum being *facile princeps* among the workers; I must ask to be forgiven, if any previous notices are now inadvertently duplicated. Last year was so inclement that excursions planned-out had repeatedly to be abandoned; this must be my apology for the somewhat meagre results obtained. My immediate neighbourhood unfortunately appears to afford a poor hunting-ground, much of it being grass-land on stiff clay. Messrs. W. A. Shoolbred and R. P. Murray gave me the advantage of their company on some of the expeditions; I have also to thank Messrs. Arthur Bennett, E. F. Linton, H. W. Pugsley, W. Moyle Rogers, F. Townsend, and Dr. J. von Sterneck for critical help. Districts 1, 8, 9 are in v.-c. 8, South Wilts; 2, 3 are in v.-c. 7, North Wilts.

Ranunculus circinatus Sibth. 2. Canal, Seend. — *R. trichophyllus* Chaix. 1. Keevil, in several small ponds. — *R. Drouetii* Godr. 1. Bulkington. 2. Roadside pool near Bromham, towards Rowde Hill. — *R. peltatus* Schrank, var. *penicillatus* (Hiern). 8. Plentiful in the river at Boyton.— *R. sceleratus* L. 1. Bulkington; Keevil. 2. Near Bromham; also *R. Flammula* L. — *R. acris* L. The prevailing plant is, I believe, *R. Borœanus* Jord.

[*Eranthis hyemalis* Salisb. is fully naturalized in the parishes of Maddington and Rollestone (Dist. 7), where Rev. C. V. Goddard pointed it out to me in 1896.]

Aquilegia vulgaris L. 1. Beech-wood on Coulston Hill; native.

Berberis vulgaris L, 1. In several hedges at Keevil; apparently a relic of the primeval forest which formerly clothed this tract, now almost devoid of woodland. Polecats figure among the "vermin" for which rewards were paid at the Keevil Easter vestry, less than a century ago, being valued at no more than fourpence a head; foxes (!) fetched two shillings.

Papaver dubium L. 1. Keevil; Erlestoke. 2. Bromham; Ditteridge; Ford.

Fumaria Vaillantii Lois. 1. Wheat-field on the Downs above Bratton, in good quantity; new for Wilts.

Barbarea vulgaris R. Br. 8. Warminster; Boyton; Wylye.

Cardamine flexuosa With. 1. Keevil; Seend. 2. Wootton Bassett; Somerford Common.

Erophila præcox DC. 3. Stony platform, Minety Station, in plenty.—In 1896 I gathered *E. virescens* Jord. sparingly on old mole-hills near Stonehenge, Dist. 7.

Sisymbrium Thalianum J. Gay. 1. Keevil. 2. Ditteridge.

Brassica alba Boiss. 8. Abundant on the chalk about Warminster, Heytesbury, Boyton, Wylye, &c.

Diplotaxis muralis DC. 1. Roadside, Keevil. 8. Waste ground at Warminster and Wylye Stations.

Coronopus Ruellii All. 1. Keevil.

Viola hirta L. Certainly plentiful on chalk and limestone in Dist. 1, 2, 8; also noticed at Queen Street, Dist. 3. — *V. silvestris* Reichb. 1. Hinton; Keevil; Coulston. 2. Conkwell Wood. 8. Warminster. — *V. Riviniana* Reichb. Common wherever the conditions are suitable; var. *nemorosa* Neum., Wahlst., & Murb. occurs in Black Dog Woods, Dist. 1.

Polygala vulgaris L. 1. Downs, from Westbury to Coulston. 2. Between Ford and Colerne.—*P. oxyptera* Reichb. 1. Westbury Downs. 8. Warminster Downs, plentiful; below The Ranche, Great Ridge, about two miles east of Chicklade. — *P. serpyllacea* Weihe. 1. Horningsham. 2. Sandridge.—*P. calcarea* F. Schultz. 1. Abundant on the Downs from Westbury to Coulston.

Silene Cucubalus Wibel, var. *puberula* Syme. 1. Tinhead. 8. Warminster; near Boyton.

Lychnis Githago Scop. 8. Boyton.

Stellaria aquatica Scop. 1. Keevil; Edington. — *S. umbrosa* Opiz. 1. Keevil and Bulkington, locally abundant; Corsley.—Var. *decipiens* E. S. Marshall (*S. neglecta* Weihe). 1. Keevil; Steeple Ashton; Edington; Corsley. 2. Near Ford.

Arenaria trinervia L. 1. Keevil; Bulkington; Erlestoke; Black Dog Woods; Corsley. 2. Bromham.—*A. leptoclados* Guss. Common, especially on limestone walls; *e. g.* 1. Keevil; Corsley; Seend; Bulkington. 2. Box; Colerne; Ford; Bromham. 3. Minety. 8. Warminster; Heytesbury; Boyton; Wylye, &c. I only saw typical *A. serpyllifolia* L. near Steeple Ashton.

Hypericum quadratum Stokes. 1. Limpley Stoke; Black Dog Woods. 2. Bromham. 8. Shere Water. — *H. humifusum* L. 8. Boyton.—*H. pulchrum* L. 1. Chapmanslade.

Malva moschata L. 1. Near Limpley Stoke. 2. Sandridge. 8. Between Chicklade and Wylye.

Geranium pyrenaicum Burm. fil. 2. Roadside, close to Seend Station.—*G. rotundifolium* L. 1. Conkwell. 2. Ditteridge; between Sandridge and Bromham.—*G. lucidum* L. 1. Keevil; Bulkington; Corsley; Horningsham. 2. Abundant on the Bath oolite: Conkwell, Box, Colerne, Ford, &c.

Rhamnus catharticus L. 8. Heytesbury; near Boyton.

Genista tinctoria L. 1. Cow Leaze, Edington; extending over several acres.

Cytisus scoparius L. 1. Horningsham.

Ononis spinosa L. 1. Keevil; scarce. 2. Meadows near Seend Station and south of Sandridge, in abundance.

Trifolium fragiferum L. 1. Roadside, Potterne.—*T. filiforme* L. Bank bordering Black Dog Woods, near Chapmanslade.

Lotus tenuis Waldst. & Kit. 8. Downs near Boyton; one fine plant.

Hippocrepis comosa L. 8. Warminster Downs, in profusion. *Onobrychis* has all the appearance of a true native on the Downs above Edington, Coulston, and Warminster.

Vicia sylvatica L. 1. Coulston Hill, among bushes.—*V. angustifolia* L. 1. Chapmanslade.

Lathyrus sylvestris L. 1. Coulston Hill.

Spiræa Filipendula L. 8. Downs between Great Ridge Wood and Boyton.

Rubus Idæus L. 8. Between Wylye and Chicklade, in several places.—*R. rhamnifolius* Wh. & N.; *R. pulcherrimus* Neum.; *R. Selmeri* Lindeb. 1. Chapmanslade.—*R. villicaulis* Koehl. 2. On the clay, south of Sandridge. "Just the plant of the Corfe Castle neighbourhood, named *villicaulis* by Focke, and *insularis* by Gelert; as to which Focke wrote to me: 'The form called *R. insularis* Aresch. is the true typical! *R. villicaulis*, first discovered from Silesia, E. Germany'" (Rogers *in litt.*). New for Wilts.—*R. leucandrus* Focke. 8. Great Ridge Wood; scarce. "Identical with the Piddle Wood (Dorset) plant named by Focke '*R. leucandrus*, var. foliis subtus mollibus'" (Rogers *in litt.*). New for Wilts.—*R. rusticanus* Merc. Most abundant, often to the complete exclusion of other species. — *R. hirtifolius* Muell. & Wirtg. var. *mollissimus* Rogers. 8. Downs below The Ranche, Great Ridge; a strong form. New for Wilts. — *R. leucostachys* Schleich. 2. Colerne, Ford, &c.; Wootton Bassett. 8. Great Ridge Wood, and between this and Wylye; frequent.— *R. Borreri* Bell-Salt. 8. About halfway between Chicklade and Wylye; "rather weakly developed" (Rogers). — *R. echinatus* Lindley. 1. Chapmanslade. 8. Between Heytesbury and Warminster; between Chicklade and Wylye, frequent.—*R. Griffithianus* Rogers, "var. with subglabrous or glabrescent stems" (Rogers). 8. Downs below The Ranche, Great Ridge; new for Wilts.—*R. foliosus* Wh. & N. 1. Black Dog Woods; apparently new for Wilts. — *R. dumetorum* Wh. & N. 1. Keevil; Erlestoke (*ferox*). 2. Sandridge. 8. Between Chicklade and Wylye.—*R. corylifolius* Sm. 2. Sandridge. 8. Heytesbury; Warminster; Boyton, &c. All, I believe, *sublustris*. — Var. *cyclophyllus* Lindeb. 2. Between Sandridge and Bromham. 8. Heytesbury; between Chicklade and Wylye.—*R. cæsius* L. Abundant on chalk and limestone in Dist. 1, 2, 8.

Geum rivale L. 1. Hinton, towards Semington. 2. Copses near Ford.

Potentilla procumbens Sibth. 1. Chapmanslade.

Rosa tomentosa Sm. 1. Keevil. 2. Sandridge.—Var. *subglobosa* (Sm.). On the clay, below Sandridge. Mr. Rogers concurs in so naming it, but remarks: "with less grey leaves and more glandular petioles than in the normal plant."—*R. micrantha* Sm. 2. On the clay, below Sandridge. 8. Warminster Downs, scarce; between Chicklade and Wylye. — *R. obtusifolia* Desv. 2. Sandridge. 8. Warminster.—*R. canina* L. var. *aspernata* (Déségl.). 2. Sandridge (*teste* Rogers); styles quite woolly.

Pyrus Aria Ehrh. 1. Coulsdon Hill. — *P. Malus* L. a. *acerba* DC. 2. Folly Wood, Wootton Bassett.—b. *mitis* Wallr. 2. Hedge between Seend and Sandridge. 8. Warminster.

Saxifraga tridactylites L. 1. Keevil; Bulkington; Steeple Ashton; Erlestoke. 2. Biddestone; Colerne; Wootton Bassett.

Ribes rubrum L. 2. Copses, Bury Ditches, between Ford and Lucknam Grove; I believe var. *petræum* (Sm.), but am not certain, as no specimen was kept.

[*Sedum album* L. 2. Walls at Wootton Bassett and Colerne; planted.]

Callitriche stagnalis Scop. 1. Keevil; Bulkington; Corsley. 2. Near Bromham. 8. Heytesbury; Shere Water.

Lythrum Salicaria L. 1. Keevil. 2. Ford.

Epilobium angustifolium L. 2. Ford. 8. Great Ridge Wood, and locally abundant between Chicklade and Wylye.—*E. roseum* Schreb. 1. Keevil; Hinton; Seend.—*E. adnatum* Griseb. Far more frequent than the following species, at least on the Oxford and Kimmeridge clay. 1. Abundant between Trowbridge and Steeple Ashton, in roadside ditches; Keevil. 2. Corsham; north of Seend, in plenty.—*E. obscurum* Schreb. 1. Black Dog Woods and Dilton Marsh.—*E. palustre* L. 1. Black Dog Woods. 2. Canal-bank, Seend.

Circæa lutetiana L. 1. Black Dog Woods. 2. Bury Ditches. The Erlestoke Wood station in *Fl. Pl.* should, I believe, be transferred to Dist. 1.

Conium maculatum L. 1. Marston; Keevil; Steeple Ashton; Westbury. 2. Ford; Wootton Bassett.

Sison Amomum L. Abundant on the clay in suitable situations, and frequent on limestone, in Dist. 1, 2. It is difficult to understand why H. C. Watson should have queried this as a native, at least in the south and west of England. *Ægopodium Podagraria* L. is far more doubtful; I have noticed it in several parishes, but always under "suspicious" circumstances.

Œnanthe crocata L. 1. Corsley; Black Dog Woods; Westbury. 2. Colerne; Ford; Bromham.

Caucalis nodosa Scop. 1. Keevil; bank at Bratton village.

Galium erectum Huds. 8. Down above Warminster—*G. saxatile* L. 1. Chapmanslade.—*G. uliginosum* L. 8. Boyton—*G. tricorne* Stokes. 8. Warminster.

Asperula odorata L. 1. About Westbury, Coulston, and Erlestoke. 2. Winsley, Ford, &c.; frequent on the Bath oolite.—*A. cynanchica* L. seems to be everywhere on the unbroken downs.

Valeriana dioica L. 1. Swamp above Bratton.—*V. Mikanii* Syme. 1. Coulston Hill, among bushes. 2. Conkwell Wood; Bury Ditches. 8. Near Great Ridge Wood, towards Boyton—*V. sambucifolia* Willd. 1. Seend; Black Dog Woods.

Valerianella dentata Poll. 8. Between Heytesbury and Warminster.

Solidago Virgaurea L. 8. Great Ridge Wood.

Gnaphalium uliginosum L. 2. North of Seend Station.

Inula Conyza L. 1. Seend.

Pulicaria dysenterica Gaertn. 1. Westbury. 2. South of Sandridge. 8. Heytesbury; Boyton.

Bidens tripartita L. 2. Near Bromham.

Achillea Ptarmica L. 2. Meadows on the clay, south of Sandridge.

Tanacetum vulgare L. 1. Marston; Bulkington; Keevil. Apparently a true native.

Artemisia vulgaris L. 2. Bromham, &c. 8. Boyton, Wylye, &c. The only form observed was var. *coarctata* Forselles.

Senecio erucifolius L. 1. Keevil: Dilton Marsh. 2. On the clay, between Seend and Sandridge. *S. campestris* DC. is more plentiful on Westbury and Warminster Downs than I ever saw it before.

Carlina vulgaris L. 2. Conkwell. 8. Boyton, &c.; frequent on all the downs that I have explored.

Arctium majus Bernh. 1. Roadside near Pentry Bridge, Bulkington. — *A. minus* Bernh. 1. Keevil. 2. Somerford Common; Bromham, &c. 8. Warminster; Heytesbury; Boyton. Doubtless quite common.

Carduus crispus L. 1. Keevil; Steeple Ashton, &c. 2. Winsley; Wootton Bassett; Bromham; Box; Colerne, &c. 8. Heytesbury; Boyton, &c. General on the chalk and limestone.

Cnicus eriophorus Roth. 1. Bratton. 2. Ford.

Serratula tinctoria L. 1. Meadows between Edington and Keevil, scarce; Coulston Hill; Corsley. 2. Meadows north of Seend Station, in great quantity.

Centaurea nigra L. The only form which I observed last year was one with radiant flowers, but the phyllaries of the type (*C. pratensis* Boreau?).

Picris hieracioides L. 8. Warminster; Heytesbury; Boyton, &c. —*P. echioides* L. 1. Keevil; Hilperton, &c. 2. Roadsides, north of Seend Station.

Crepis taraxacifolia Thuill. This species appears to have spread greatly since *Fl. Pl.* was published; it is now locally abundant. 1. Keevil; Bratton; Tinhead. 2. Ditteridge; Colerne. 8. Warminster.

Hieracium maculatum Sm. 1. I saw, but did not gather, a plant which I believe was this, on a wall-top at Erlestoke.—*H. umbellatum* L. 1. Roadside, between Worton and Great Cheverell.

Leontodon hirtus L. 8. Warminster, Boyton, &c.; frequent on the chalk.

Campanula glomerata L. 8. Between Chicklade and Wylye; downs near Boyton.

Specularia hybrida A. DC. 1. Tinhead. 8. Warminster.

Calluna Erica DC. 1. Near Shere Water. 8. Downs between Boyton and Great Ridge Wood, &c.

Erica cinerea L. 9. South of the road, about half-way between Chicklade and Wylye; covering several acres. The district boundary is not easy to make out from the small-scale map in *Fl. Pl.*, but I believe that the station is in Dist. 9 rather than 8.

Lysimachia Nummularia L. 1. Keevil; Black Dog Woods. 2. On the clay, south of Sandridge.—*L. nemorum* L. 1. Black Dog Woods.

[*Vinca major* L. Hedge, Keevil. I have ascertained that some cottages formerly stood there.]

Blackstonia perfoliata Huds. 8. Heytesbury Downs.

Erythræa pulchella Fr. 2. Scarce on the clay, south of Sandridge.

Gentiana lingulata Agardh, var. *præcox* Towns. 1. Westbury Downs, and between Tinhead and Erlestoke. 8. Warminster Downs, abundant. Probably not uncommon, but passed by hitherto as early-flowering *G. Amarella;* the contrast between the two, when growing side by side, is very great. This was doubtless Gerard's "*G. verna*," seen by him on Salisbury Plain. *G. Amarella* L. is frequent all over the grassy chalk downs in Dist. 1 and 8.

Cynoglossum officinale L. 1. Bulkington; Steeple Ashton; Seend. 2. Seend.

Myosotis cespitosa F. Schultz. 2. Sells Green, near Seend.—*M. collina* Hoffm. 1. Keevil. — *M. versicolor* Reichb. 1. Chapmanslade.

Lithospermum officinale L. 2. Conkwell; Ford.—*L. arvense* L. 2. Ditteridge. 8. Boyton, &c.

Verbascum Thapsus L. 1. Steeple Ashton. 8. Between Chicklade and Wylye; also *V. nigrum* L.

Linaria vulgaris L. Generally distributed, I believe, in Dist. 1, 2, 8.

Veronica montana L. 1. Black Dog Woods. — *V. Anagallis-aquatica* L. 1. Bulkington. 2. By the canal, Seend. 8. Heytesbury.

Euphrasia nemorosa H. Mart. 1. Westbury Downs. 8. Downs about Warminster, Heytesbury, Boyton, Chicklade, &c., in great abundance; three separate gatherings were so named by Mr. Townsend. This segregate, though probably the prevailing Wilts plant, does not seem to have been definitely recorded.

Pedicularis sylvatica L. 1. Cow Leaze, near Edington; Horningsham.

Rhinanthus stenophyllus Schur (*Alectorolophus stenophyllus* Stern.). 8. Arn Hill, Warminster; determined by Dr. J. von Sterneck, who remarks that the internodes are remarkably long (often the case in our British form). Not previously observed in Wilts, but it is likely to prove frequent. Typical *R. minor* Ehrh. is common in pastures.

Mentha hirsuta Huds. 1. Keevil; Dilton Marsh, &c. 2. Between Seend Station and Sandridge. 8. Shere Water. Doubtless very common wherever the conditions suit it.—*M. arvensis* × *hirsuta* (*M. sativa* L.). 1. Roadside near Keevil Gate. 8. Heytesbury. *M. arvensis* L. is generally distributed in West Wilts.

Lycopus europæus L. 2. By the canal, Seend.

Calamintha arvensis Lam. 8. Heytesbury.

Scutellaria galericulata L. 2. Canal-bank, Seend.

Stachys Betonica Benth. 1. Black Dog Woods. 2. Somerford Common; Colerne; Ford; Sandridge, &c. — *S. palustris* L. 1. Coulston. 2. Bromham. 8. Heytesbury,

Galeopsis angustifolia Ehrh. 1. Tinhead; Coulston. 8. Heytesbury.

Lamium amplexicaule L. 2. Ditteridge; Ford. 8. Heytesbury.

Ballota nigra L. 1. Keevil. 2. Wootton Bassett. 3. Minety. 8. Boyton; Wylye.

Teucrium Scorodonia L. 1. Horningsham; Chapmanslade. 8. Great Ridge Wood; between Chicklade and Wylye.

Chenopodium album L. var. *viride* Syme. 2. Bromham. 8. Heytesbury; Boyton; Wylye.—Var. *viridescens* St. Am. Heytesbury.—*C. rubrum* L. 1. Worton; Bulkington; Keevil. 2. Rowde Hill.

Polygonum lapathifolium L. 2. Bromham.

Rumex pulcher L. 2. Roadside, Sandridge, sparingly.

Euphorbia amygdaloides L. Too general in the woods of Dist. 1 and 2 to need detailed localities, at least on the limestone and sand.

Humulus Lupulus L. 1. Corsley. 2. Bury Ditches; native.

Urtica dioica L. 1. A peculiar form, with small, oblong-lanceolate, hardly cordate leaves, occurs by a roadside near Keevil. Mr. Bennett says that it does not agree with an authentic specimen of var. *parvifolia* Haussmann, *Fl. Tyrol.*, but can give it no precise name; it may be merely a *state*, though quite a remarkable one.—*U. urens* seems to be rather uncommon; but I may have overlooked it.

Parietaria officinalis L. 1. Seend; Keevil. 2. Bromham; Winsley.

Betula pubescens Ehrh. 1. Black Dog Woods. 8. Great Ridge Wood.

Salix fragilis L. 1. Black Dog Woods. 8. Boyton (probably planted, as is *S. alba* L.).—*S. cinerea* L. Noted from various stations in Dist. 1, 2, 3, 8; by far the most abundant species, I think.—*S. aurita* L. 1. Chapmanslade. 2. Somerford Common, and 3. Queen Street; locally abundant.—*S. Caprea* L. 2. Bury Ditches, &c.

Populus alba L.; *P. tremula* L. 1. Black Dog Woods; the latter looks truly wild. Several trees of *P. canescens* Sm., probably a hybrid between them, were also observed there.

Taxus baccata L. 2. Bury Ditches.

Elodea canadensis Michx. 8. Heytesbury.

Epipactis media Bab. 1. Coulston Hill.

Orchis mascula L. 2. The form with unspotted leaves occurs near Somerford Common; a root which I brought home is constant, so far.—*O. latifolia* L. 1. Keevil; Edington. 2. Ford.

Habenaria viridis L. 8. Downs between Boyton and Great Ridge; between Chicklade and Wylye.—*H. bifolia* R. Br. 1. In plenty on the Downs, above Tinhead and Coulston.—*H. chloroleuca* Ridley. Also occurs in the beech-woods towards Erlestoke.

Iris fœtidissima L. 2. Conkwell Wood, in good quantity.

Polygonatum multiflorum All. 1. Coulston Hill; very fine.—*P. officinale* All. Mr. Bennett writes of specimens from near Ford (where it still grows plentifully):—"The genuine plant, *i. e.* the *P. vulgare* Boreau; not the *P. intermedium* Boreau, which Flower sent Syme from Colerne, Wilts." As both species belong to this neighbourhood, is it not possible that the Colerne plant was a hybrid?

Allium vineale L. 1. Keevil. 2. Winsley. 8. Heytesbury

(all var. *compactum* Thuill.). — *A. ursinum* L. 2. Bury Ditches; abundant.

Ornithogalum pyrenaicum L. 2. Frequent about Winsley. 8. Wood on Warminster Downs; confined to a few square yards.

Colchicum autumnale L. 2. About Colerne and Ford.

Paris quadrifolia L. 2. Ford.

Juncus bufonius L. 1. Keevil.—*J. glaucus* Ehrh. 1. Edington; Steeple Ashton; Dilton Marsh. 2. Wootton Bassett; between Seend and Sandridge. 3. Queen Street; Minety. 8. Warminster; Boyton; Wylye. Generally distributed, I believe, at least on the chalk and clay.—*J. supinus* Moench. 1. Dilton Marsh.—*J. acutiflorus* Ehrh. 2. South of Sandridge. 8. Boyton.

Luzula Forsteri DC. 2. Ford. — *L. erecta* Desv. 1. Chapmanslade.

Typha latifolia L. Westbury.

Sparganium neglectum Beeby. 1, 2. Very characteristic by the canal, Seend.

Potamogeton natans L. 1. Ponds, Longleat; Seend (also in Dist. 2).—*P. perfoliatus* L. 1 and 2. Canal, Seend.

Eleocharis palustris R. Br. 1. Bratton. 8. Boyton.

Carex vulpina L. Abundant on heavy soils in Dist. 1 and 2.—*C. muricata* L. 1. Keevil.—*C. divulsa* L. 1. Horningsham; Corsley; Keevil. — *C. remota* L. 1. Corsley; Chapmanslade; Westbury; Keevil, &c. 2. About Bromham and Seend.—*C. remota* × *vulpina* (*C. axillaris* Good.). 1. With the parents, at Keevil; Cold Harbour; and in a swamp by the railway between Westbury Station and Dilton Marsh. — *C. ovalis* Good. 1. Bulkington. — *C. humilis* Leysser. 8. In great abundance for fully three miles on the downs between Chicklade and Wylye; extending, I think, into Dist. 9. This part of Wilts appears to be its English headquarters.—*C. pilulifera* L. Horningsham; Chapmanslade. — *C. verna* Chaix. 1. Chapmanslade. 8. Shere Water; Warminster.—*C. panicea* L. 1. Bratton. — *C. pendula* Huds. 1. Keevil; Seend; Black Dog Woods. 2. Folly Wood, Wootton Bassett. 3. Queen Street. 8. Shere Water (perhaps only planted). — *C. strigosa* L. 1. Lane near Great Hinton. New for S. Wilts. — *C. sylvatica* Huds. 1. Great Hinton; Erlestoke; Black Dog Woods, &c. 2. Abundant about Box, Corsham, and Ford.—*C. distans* L. 1. Roadside, Cold Harbour; swamp, above Bratton. This is the plant usually called "inland *distans*"; taller and more slender than the coast plant, and quite distinct from the *C. binervis* of our heaths and mountains, which prefers rather *dry* ground. — *C. hirta* L. 1. Erlestoke. 2. Colerne; Ford. I have not yet come across *C. riparia* Curt., though *C. acutiformis* Ehrh. (*paludosa* Good.) is frequent in Dist. 1 and 8.—*C. rostrata* Stokes. 8. Boyton.

Milium effusum L. 1. Lower part of Black Dog Woods, towards Dilton Marsh; in profusion over a considerable area.

Phleum pratense L. var. *nodosum* (L.). 8. Heytesbury.

Agrostis canina L. 8. Boyton.

Calamagrostis epigeios Roth. 8. A large patch on the top of a dry open down by the road from Wylye to Chicklade, about two

miles south-west from the former—an unusual station; I saw some hundreds of flowering-stems.

Aira caryophyllea L. 8. Boyton.—*A. præcox* L. 1. Longleat; Horningsham. 8. Shere Water.

Deschampsia flexuosa L. 1. Longleat; Horningsham.

Holcus mollis L. 1. Chapmanslade; Horningsham. 8. Shere Water.

Avena pratensis L. 1. Downs, Tinhead to Erlestoke. 8. Warminster.—*A. fatua* L. 8. Warminster; Heytesbury; Boyton.

Phragmites communis Trin. 1. Seend; Keevil; Bulkington; Westbury.

Kœleria cristata Pers. var. *gracilis* (Boreau). 8. Sparingly on Arn Hill, Warminster.

Poa nemoralis L. 1. Wall-top, Horningsham.

Glyceria plicata Fr. 1. Dilton Marsh. 8. Boyton. In both these stations *G. fluitans* × *plicata* (*G. pedicellata* Towns.) grew with the parents.

Festuca rigida Kunth. 2. Winsley; Ford; Colerne, &c.—*F. Myuros* L. 1. On a wall at Seend Cleeve; apparently new for S. Wilts. — *F. rubra* L. (*genuina* Hackel). Common.—Var. *fallax* Hackel (*F. fallax* Thuill.). 1. Corsley; Edington; Keevil, &c. 2. Ford; Colerne. Probably frequent in shady lanes, &c. — *F. pratensis* Huds. 8. Warminster. — *F. arundinacea* Schreb. 8. Boyton.

Bromus giganteus L. 1. Keevil; Great Hinton. 2. Sandridge. 8. Heytesbury; Warminster.—*B. erectus* Huds. Abundant on the chalk in Dist. 1, 8; also on the Bath oolite in Dist. 2.—*B. secalinus* L. 8. Warminster.—*B. commutatus* Schrad. 1. Keevil; Edington, &c. 2. Sandridge; Bromham. 8. Warminster; Boyton, &c. Certainly native in many pastures.—*B. interruptus* Druce. 1. Sown grass-field above Bratton. 2. Wall-top, Colerne; new for N. Wilts. Having examined this when growing, I am now of opinion that it has strong claims to specific rank; the habit is peculiar, and the split pale appears to be constantly present.

Brachypodium pinnatum Beauv. 1. Downs above Tinhead and Coulston.

Hordeum secalinum Schreb. 1. Keevil. 2. Between Seend and Sandridge. 8. On an old wall at Heytesbury (an abnormal station). Probably common on clay. — *H. murinum* L. 1. Westbury. 2. Bromham.

Polystrichum lobatum Presl. 1. Corsley. 2. Ford.

Lastræa spinulosa Presl. 1. Black Dog Woods. — *L. dilatata* Presl. 1. Black Dog Woods. 8. Boyton.

Ophioglossum vulgatum L. 1. Bratton.

Equisetum maximum Lam. 1. Seend.

Chara vulgaris L. 2. Pool near Lucknam Grove; the type, I believe.

R. BROWN'S LIST OF MADEIRA PLANTS.

By James Britten, F.L.S.

(Continued from p. 46.)

Jasminum azoricum.

J. odoratissimum. "In rupibus maritimis."

Olea europæa. "Sp. valde similis *Oleæ glabellæ*. Fructus parvi subrotund. Stylo persistente coronali" [coronuti]. [*O. europæa β maderensis* Lowe. *O. glabella* Herb. Banks = *O. erasperata* Jacq., as stated by Lowe in Trans. Camb. Phil. Soc. vi. 537 (1838).]

O. excelsa [*Notelæa excelsa* Webb & Berth. The original description in Ait. Hort. Kew. i. 14, is based on Masson's specimens.]

Sideroxylon Mirmulans. "Inerme, foliis obovato oblongis glabris perennantibus, calycibus tomentosis." [This name must, I think, stand as published, as, although it is clearly derived from the local name of the plant, Brown's MS. shows that he adopted the form printed in Buch. Lowe (Prim. 22) printed it *S. Mermulana*, quoting "*S. Mermulano* Herb. Banks" as a synonym, and it appears as *Mermulana* in DC. Prodr, viii. 181; in Fl. Mad. ii. 18, Lowe alters the spelling to *Marmulano*. This is the form retained in *Index Kewensis*, where it is erroneously cited as of "Banks ex Lowe in Trans. Camb. Phil. Soc. iv. [= Prim.] 22." Mr. Jackson quotes "*S. Marmulana* C. Sm. in Tuckey, Congo, 252 [1818]" as synonymous with this; if this were so it would rank as first publication of the name, though only as a *nomen nudum*; but the plant stands in Tuckey's book as "*S. marmulana?*," and is, according to Lowe (Fl. Mad. ii. 19), identical with *Sapota marginata* Decaisne. Sir Joseph Hooker (Banks's *Journal*, p. 12) says, in a footnote to the word *mirmulano*, "probably *Apollonias canariensis*"; but this of course is an error. In Banks's MS. list the tree appears under the native name adopted as generic by Dr. Heberden, to whom Banks and Solander were under obligations during their visit to Madeira, and to whom—and not, as stated in the *Biographical List of British Botanists*, to his better-known brother William—they dedicated their genus *Heberdenia*. These obligations are thus acknowledged in Banks's *Journal* (Hooker, p. 6):—"While here we were much indebted to Dr. Heberden, the chief physician of the island, and brother to the physician of that name at London. He had for many years been an inhabitant of the Canaries, and of this island, and had made several observations, chiefly philosophical; some, however, were botanical, describing the trees of the island. Of these he immediately gave us a copy, together with such specimens as he had in his possession, and indeed spared no pains to get for us living specimens of such as could be procured in flower." Of this Heberden I have no further knowledge, nor do I know his Christian name; he is occasionally referred to in Solander's MSS. in connection with Madeiran plants.]

Heliotropium europæum. "In ruderatis circa urbem."

Myosotis scorpioides arvensis [*M. arvensis* Lam.]

M. palustris.

ANCHUSA PANICULATA. "In apris." [*A. italica* Retz. *A. paniculata* Ait. Hort. Kew. i. 177, is based on Masson's specimens.]

CYNOGLOSSUM PICTUM.

ECHIUM NERVOSUM (CANDICANS). "In rupibus altis." [The specimen on faith of which this is included in the list was (as is shown by the MS.) that collected by Downe. M. A. de Coincy, who is monographing the genus, and to whom fragments of Downe's specimen have been submitted, considers Brown's identification of the plant with *candicans* inaccurate, and that it belongs "incontestablement à l' *E. nervosum*." It may be worth while to transcribe Brown's MS. description: "*Echium nervosum* caule fruticoso foliis lanceolatis nervosis ramisque sericeis foliolis calycinis linearibus obtusiusculis stylis hirtis racemis ovatis. *Downe*. *E. candicans* Ait. Kew. et Willd. Sp. Pl. In rupibus altis."]

E. THYRSIFLORUM. [This is not the plant named *thyrsiflorum* on pp. 144, 175 of Buch's work, but, according to M. A. de Coincy, who has seen a fragment of Masson's specimen, *E. candicans* L. fil.—a plant originally described from specimens sent by Masson.]

E. VULGARE, "ubique." [Probably *E. violaceum* L.: *E. vulgare* is not known to occur in Madeira.]

E. ORIENTALE [*E. violaceum* L.]

CONVOLVULUS ARVENSIS.

C. RUPESTRIS? "Foliis oblongis, subcordatis acutis, caule frutescenti lævi, pedunculis trifloris, multifloris que Mass. a rupestre differt." [In Brown's MS. the last words stand "Mscr. a C. rupestris differt." *C. saxatilis* Salisb. (*C. Massoni* Dietr.). Although *C. Massoni* is adopted in *Index Kewensis*, by Lowe, and by authors generally, for this plant, it is clear that Salisbury's name, usually regarded as a synonym, must stand: the synonymy is:—

C. SAXATILIS Salisb. Prodr. 124 (1796).

C. Massoni F. G. Dietrich (cited as "A. Dietr." in Index Kewensis), Nachtrag zum Vollsp. Lexikon, ii. 377 (1816), et auct.

C. suffruticosus [Dryand. in] Ait. Hort. Kew. ed. 2, iii. 331 (1810), and in Herb. Banks!; Bot. Reg. t. 133 (1816); non Desf.

C. suberosus Willd. Enum. Hort. Berol. Suppl. 10 (1813), nomen; W. herb. ex Spreng. Syst. i. 597 (1825).

C. Dryaudri Spreng. l. c.

C. rupestris? Br. in Buch Canar. Inseln, 193, n. 201; non Pall. nec Willd.

C. ? solanifolius Lowe, Prim. 22 (1831).

C. fruticosus Herb. Banks! ex Lowe, Fl. Mad. ii. 60 (1872).

C. depilis Herb. Banks! ex Lowe, l. c.

The earlier *C. saxatilis* Vahl (Symb. iii. 333, 1794) is referred to *C. lanuginosus* Desv. (1789).]

C. FLEXUOSUS. "Foliis cordatis, palmato-lobatis, glabris, lobis repandis, pedunculis unifloris, caule volubili." [*C. althæoides* β *virescens* Lowe, Fl. Mad. ii. 59. Solander suspected the identity of this *C. flexuosus* (a name given by Banks in the earliest list, but not entered for this plant in *Index Kewensis*): he says in his MSS.,

"Habitat in cultis Madeiræ, with *C. althæoides*. Differt a *Convolvulo althæoide* Linn. glabritie et magnitudine, forsitan ergo ejus varietas solo et cultura mutata." Besides the drawing of the plant by Sidney Parkinson, we have one by George Forster, who collected it in Madeira in 1772.]

C. ALTHÆOIDES.

C. SICULUS.

DATURA STRAMONIUM.

HYOSCYAMUS ALBUS.

PHYSALIS PUBESCENS. "Ramosissima, foliis viscoso villosis, floribus pendulis." [*P. peruviana* L.]

SOLANUM PSEUDOCAPSICUM.

S. NIGRUM.

VERONICA AGRESTIS.

V. ANAGALLIS.

V. ARVENSIS.

DISANDRA PROCUMBENS. [A misprint for *prostrata*. *Sibthorpia peregrina* L.]

BARTSIA VISCOSA. "In montosis humidis. Var. foliis angust. obtusis laciniisque calycis." [To this Brown adds in his MS., "forte nov. sp." *B. scordifolia* Steud. (*Euphrasia Holliana* Lowe.)]

ANTIRRHINUM CORDATUM. [Two plants are included in this name, which is represented in Masson's MS. list by two entries, *A. cordatum* and *A. cordatum* var., which also appear in Solander's MSS. The former, the plant collected by Banks and Solander, is a form of *Linaria spuria* Mill, agreeing exactly with specimens collected by Lowe and identified with it by him on his ticket; he did not publish his *Scrophulariaceæ:* it is also the plant figured by Sydney Parkinson, and engraved by Banks.* The latter, collected by Masson, is correctly referred by Bentham (DC. Prodr. x. 268), on the authority of Masson's specimen (Banks's specimens were not at that time in the Herbarium), to *L. lanigera* Desf. It may perhaps be worth while to print Solander's description of the two plants:—

"*Antirrhinum cordatum* caulibus procumbentibus, foliis omnibus alternis subrotundis cordatis. *Orelha de Pato*, Maderensibus. Fig. pict. Habitat in arvis Insulæ Madeiræ copiosissime, medio Septembri. ⊙ Planta in omnibus *Antirrh. spurio* Linn. convenit excepta foliorum figura: folia enim omnia et majora et tenella cordata, valde lata ut fere subrotunda, cum parvo acumine, brevissime petiolata, diametro longitudinali vix unciali. Tota planta villoso-viscosa.

"*Var.* foliis inferne angulo præditis (non vero hastatus) a Dno. Masson lecta."

The two species are very closely allied, although extreme forms are readily distinguishable.]

A. ORONTIUM.

SCROPHULARIA SCORODONIA.

S. ARGUTA.

---

* On p. 3 this is erroneously named "*Linaria laniflora* Desf."

DIGITALIS PURPUREA.

D. COMOSA. SCEPTRUM [*Isoplexis Sceptrum* Steud. *Comosa*, which does not appear in Ind. Kew., was Brown's MS. name; its appearance in print seems due to the accident of its not having been erased when "*Sceptrum*" was added.]

VERBASCUM HÆMORRHOIDALE. [Ait. Hort. Kew. i. 236, based upon Masson's plant: *V. pulverulentum* Vill.]

OROBANCHE MAIOR. "In pascuis altis." [I have not found the specimens of this.]

GLOBULARIA LONGIFOLIA.

SALVIA OFFICINALIS.

S. VERBENACA and S. PYRENAICA [*S. clandestina* L. Brown's MS. shows that these should not have been entered as separate plants: he merely identified the *S. pyrenaica* of the Masson list with his *S. Verbenaca*, indicating a doubt as to its being the true *S. pyrenaica*.]

ROSMARINUS OFFICINALIS.

TEUCRIUM SCORODONIA.

T. UMBROSUM [*T. abutiloides* L'Hérit.]

T. CANESCENS [*T. betonicum* L'Hérit.]

T. ERUBESCENS [*T. heterophyllum* L'Hérit.]

These three species were established by L'Héritier upon the specimens collected by Banks and Solander and Masson.

SATUREIA THYMOIDES. [Taken up by Lowe, Prim. 19, as of "Sol. MSS. et Herb. Banks." = *Micromeria varia* Benth.]

LAVANDULA PINNATA.

L. DENTATA.

L. STŒCHAS. "Albiflora juxta Camiso. cinerea in decliv. juxta Machico." [In Brown's MS. these stand as three entries:—*L. Stœchas* and two varieties, *albiflora* and *cinerea*, all collected by Masson. The first (also collected by Downe, as noted by Brown) is *L. pedunculata* Cav.; the second is the type of *L. viridis* (Ait. Hort. Kew. ii. 288, and L'Hérit. Sert. Angl. t. 21); the third is *L. Stœchas* L.]

SIDERITIS CANDICANS. [The first published description of this plant (Ait. Hort. Kew. ii. 289) is apparently based on a cultivated specimen in Herb. Banks, inscribed "Hort. Kew. e Madeira. Masson." Reference to Solander's MSS. shows, however, that it was drawn up from wild plants collected in Madeira by Downe and Masson, the latter of which bears the name in the Herbarium; it is followed (in the MSS.) by a long description of the plant which was grown at Kew in 1778. Bentham (Lab. 573 and DC. Prodr. xii. 437) describes two species—*S. Massoniana* and *S. candicans*: the former name he applies to Masson's wild plant, the latter he restricts to a plant collected in Teneriffe by Christian Smith, which Webb & Berthelot (Phyt. Canar. iii. 100) and Lowe (Appendix xi.) say is not found in Madeira. It seems clear, however, that the Aiton plant was Madeiran, and I think there can be little doubt that all the Madeiran specimens which have been called either *candicans* or *Massoniana* belong to *S. candicans* Ait. The cultivated specimen written up by Dryander as *candicans* appears at first sight

very different from Masson's wild specimens, its raceme being simple, not paniculate; but the plant which is commonly called *Massoniana* is, as Lowe says, "excessively polymorphous," and this garden specimen (with which an old specimen from Chelsea Garden exactly corresponds), from a young plant in early flower, may well be placed under it. The aggregate species will of course stand as *S. candicans* Ait., unless Bentham's identification of it with *S. cretica* L. be established. There is in Herb. Banks a young specimen collected by Banks and Solander in 1768 on which the following note appears in Solander's MSS.: "Plantæ tantummodo juniores a nobis in Madera lectæ erant, non adhuc florentes; eorum folia multo majora quam in speciminibus a Downes missis, multoque flaccidiora."]

MENTHA VIRIDIS.

M. ROTUNDIFOLIA.

M. SISYMBRIUM [*M. piperita* L.]

[*M. Pulegium* is in Brown's MS. list, and seems to have been omitted by accident.]

M. CORYMBOSA [*Bystropogon punctatus* L'Hérit.]

STACHYS HIRTA.

S. ARVENSIS.

BALLOTA NIGRA.

MARRUBIUM VULGARE.

CLINOPODIUM VULGARE.

ORIGANUM VULGARE and O. CRETICUM [*O. virens* Hoffm. & Link.]

THYMUS MICANS [*T. angustifolius* Pers.]

MELISSA ROTUNDIFOLIA [*Calamintha officinalis* Moench.]

DRACOCEPHALUM CANARIENSE [*Cedronella triphylla* Moench.]

PRUNELLA VULGARIS.

PRASIUM MAIUS.

PLANTAGO MAJOR.

P. MEDIA [*P. major* L.]

P. LANCEOLATA [*P. leiopetala* Lowe; probably a form of *P. lanceolata*, but retained as distinct in *Index Kewensis*.]

P. LUSITANICA. "Fol. late lanceol. 3 nerv. subdent. subpilos. Scapo angulato. Spicis oblongis hirsutis." [*P. Lagopus* L.]

P. CORONOPUS.

P. CYNOPS [*P. maderensis* Decaisne, which Dr. Harms, I think rightly, regards as a variety of *P. arborescens* Poir.]

ILLECEBRUM VERTICILLATUM M. "In sylvaticis versus Ribeira fria." ["M." is the usual indication of Masson, here transcribed by accident, in Brown's MS.]

I. CYMOSUM and I. PARONYCHIA [*Paronychia echinata* Lam.]

POLYCARPUM TETRAPHYLLUM.

AMARANTHUS BLITUM.

A. HYBRIDUS.

ACHYRANTHES ASPERA. "Fol. obovatis acutiusculis, basi attenuatis, calyc. reflexis. Spicis adpressis." [*A. argentea* Lam.]

SALSOLA KALI.

S. FRUTICOSA [*Suæda fruticosa* Forsk.]

BETA PATULA.

Chenopodium album.
C. murale.
C. ambrosioides.
Atriplex portulacoides Mass. [See note under *Illecebrum*, p. 179. *A. parvifolia* Lowe.]
Phytolacca decandra.
Rumex aquaticus [*R. conglomeratus* Murr.]
R. scutatus [*R. maderensis* Lowe.]
R. Acetosella.
Polygonum Hydropiper.
P. barbatum [*P. Hydropiper* L.]
P. maritimum.
P. aviculare.
P. Persicaria.
Aristolochia longa.
Laurus nobilis [*L. canariensis* Webb & Berth.]
L. nitida vel Barbusano [*Apollonias canariensis* Nees. The geographical distribution of this Canarian plant is erroneously given in Ind. Kew. as "Ind. Or."]
L. indica [*Persea indica* Spr.]
L. fœtens [*Ocotea fœtens* Benth. & Hook. f.]
Euphorbia mauritanica [*E. piscatoria* Ait.]
E. piscatoria [*E. mellifera* Ait.]
[A correlation of the Herbarium, the MS. lists, and the *Hortus Kewensis* shows that in the printed list these two names are misapplied as now indicated. In Masson's list there is a note on *E. piscatoria* Ait. (which, like *E. mellifera*, was established on Masson's specimens):—"In rupibus maritimis: folia æstate decidua. *Figuiero de Inverno*. Used for catching fish, by putting a large quantity into a pond, whereby all the fishes become drunk, and are easily catched."]
E. Peplis.
E. juncea. "Porto Santo." [*E. Terracina* L. This is *E. juncea* Ait. Hort. Kew. ii. 142 (1789)—a name which does not appear in Boissier's "Index Nominum" in DC. Prodr. In *Index Kewensis* it is referred to *E. aleppica* L., apparently through confusion with the later *E. juncea* Jacq. (Hort. Schoenbr. t. 107 (1797), which Boissier rightly places under *aleppica*.]
E. Peplus.
E. exigua.
E. Lathyris.
E. Paralias. "In Porto Santo."
E. segetalis.
E. verrucosa. [This seems identical with a plant entered in Masson's list as "*E. portlandica ?*," to which Solander has appended the note, "Not sent or in the Herbarium." It must therefore remain doubtful.]
Mercurialis ambigua [*M. annua* L.]
Parietaria officinalis.
Urtica urens.
U. elevata [*U. morifolia* β *elevata* Wedd.; *U. elevata* Herb. Banks ex Lowe, Primit. 15.]

MORUS NIGRA.

MYRICA FAYA.

QUERCUS MITIS. [Published by Lowe (Primit. 15) as *Q. mitis* Herb. Banks, but subsequently (Novit. 532) reduced by him to *Q. suber* L.]

JUGLANS REGIA.

CASTANEA VESCA.

SALIX PURPUREA. [The fragmentary specimens under this name, which appears in the original Banks & Solander list, are insufficient for determination. The Portuguese Madeiran name is given as "Vime."]

S. HELIX [*S. canariensis* Ch. Sm.]

POPULUS ALBA.

EPHEDRA DISTACHYA. [I cannot find Masson's specimen (localized in his list "locis saxosis, Ponta de Crux"), but the plant was no doubt the Madeiran form of *E. fragilis*, which Dr. Stapf names in the herbarium "*E. fragilis* Desf. var. *Desfontanii* subvar. *dissoluta*."]

PINUS PINEA.

TAXUS BACCATA. "In sylvis montosis."

JUNIPERUS OXYCEDRUS. "In sylvis montosis, Riv. di Cedro."

ORCHIS FOLIOSA. [This name stands in Ind. Kew. (where the species is retained) as "Soland. ex Lowe in Trans. Camb. Phil. Soc. iv. (1831) 13." The plant is generally regarded as a form of *O. latifolia*.]

O. IMBECILLA. [This name, taken up by Brown from Solander in Herb. Banks, is not in *Index Kewensis*. It is applied to a specimen of *Habenaria intacta* Benth. collected by Masson in 1777.]

SATYRIUM BIFOLIUM [*Habenaria cordata* Lindl.]

GLADIOLUS COMMUNIS [*G. segetum* Gawl., who when establishing the species (Bot. Mag. t. 719) refers to the specimen collected in Madeira by Banks, but erroneously attributes it to Masson.]

IRIS BIFLORA. "In rupibus." [I cannot find this in the Herbarium; it was collected by Masson; the name *biflora* was given by Brown, who in his MS. list has a short description of the plant. Probably *I. fœtidissima* L.]

I. PSEUDACORUS L.

AGAVE AMERICANA.

TAMUS COMMUNIS [*T. edulis* Lowe.]

ALOE PERFOLIATA. [This stands in Brown's MS. as "*Aloe perfoliata vera*." I find no specimen, but it was probably the *A. vera* L., a Canarian plant, perhaps an introduction.]

LILIUM CANDIDUM.

ORNITHOGALUM ARABICUM.

SCILLA HYACINTHOIDES [*S. hæmorrhidalis* Webb & Berth.; *S. hyacinthoides* Ait. Hort. Kew. i. 445! non L.—a name to be added to the *Index Kewensis*.]

DRACÆNA DRACO.

ASPARAGUS OFFICINALIS. [This is most probably *A. scoparius* Lowe, but I have been unable to find Masson's specimens.]

RUSCUS ACULEATUS.

R. HYPOPHYLLUM.

R. ANDROGYNUS [*Semele androgyna* Kunth.]

Smilax aspera [*S. aspera* ε *mauritanica* A. DC. Mon. Phan. i. 166, where it is entered as "Madera (specimen h. Banks, nunc in h. vind. forsan originis non certiss.)." The plant was included in Brown's list on the authority of Masson's specimens in Herb. Banks.]

S. Pseudochina. [Masson's specimen, on which this entry is based, is referred doubtfully in the Herbarium to *S. canariensis* Willd. The material is insufficient for positive determination, consisting as it does of part of a branch bearing three large leaves.]

S. latifolia [*S. pendulina* Lowe.]

Juncus acutus.

J. tenax [*J. glaucus* Sibth.; see Journ. Bot. 1900, 82.]

J. effusus.

J. articulatus.

J. bufonius.

Luzula pilosa. [I find no Madeira specimen representing this, which appears in Brown's MS. as from Masson.]

(To be concluded.)

MYCOLOGICAL NOTES.

By Ernest S. Salmon, F.L.S.

I. Formation of Ascospores in Erysiphe Graminis.

It is a fact of some interest to find that *E. Graminis* is able, under favourable circumstances, to produce, as soon as the perithecium is formed, ascospores which are capable of at once infecting the host-plant. Perithecia of *E. Graminis* were found last year at the beginning of July on *Secale cereale*, *Hordeum murinum*, *Bromus commutatus* and *B. sterilis*. Leaves of these species bearing perithecia were placed on wet filter-paper at the bottom of a Petri dish. The protoplasm of the asci at once began to form ascospores, and in about ten days the perithecia opened with a more or less regular circumscissile dehiscence,* and the asci threw up ripe ascospores, which after a few hours germinated freely in the drops of condensed water on the lid of the Petri dish. On *Agropyron repens* a general formation of perithecia had taken place as early as the beginning of June. On June 8th some of these perithecia were placed on wet filter-paper, and by June 18th most of the asci had developed four to eight young ascospores.

Three experiments were carried out, which prove that the ascospores formed at this time of year are able to infect at once their host-plants. In the first experiment, perithecia which had just been formed on leaves of *Triticum vulgare* were placed, on July 14th, on wet filter-paper in a Petri dish. By July 24th many of the peri-

---

* I have fully described the manner of this spontaneous dehiscence of the perithecium in this Journal for 1903, p. 161.

thecia had opened spontaneously, and the asci of these had ejected their spores to the top of the Petri dish, where they were germinating vigorously in the little drops of condensed water on the lid. At this date some of the unopened perithecia were crushed in a drop of water, so that the ascospores were liberated. The ascospores thus obtained were sown on two leaves of *T. vulgare*. On Aug. 5th one of the inoculated leaves bore powdery *Oidium*-patches, while all the control leaves were free.

In the second experiment, perithecia (just formed) were gathered on wheat on July 30th. The leaves were placed on wet blotting-paper, and glass slides with "hanging drops" were suspended over them. On Aug. 5th these drops contained a number of ascospores discharged from the dehisced perithecia, and were placed on three leaves of seedling wheat-plants growing in a pot. The plants were kept under a bell-jar until Aug. 16th, when two of the inoculated leaves were found to bear small powdery *Oidium*-patches at the marked place where the ascospores had been sown; the control leaves (nine) were all free.

In the third experiment, perithecia (just formed) were gathered on wheat on July 31st. They were placed on wet blotting-paper, and the same method employed to catch the ascospores as in the second experiment. Ascospores were obtained on Aug. 11th, and two leaves were inoculated. On Aug. 18th one leaf bore five small patches of mycelium with young conidiophores, and the second leaf bore one similar patch; all the control leaves remained free.

It is quite likely therefore that under favourable circumstances the species *E. Graminis* may pass through its life-cycle more than once in the course of a year.

With regard to the other species of the *Erysiphaceæ*, however, it is possible that the ascospores may require a definite period of rest before they can germinate.

The fact that the asci of *E. Graminis* do not as a rule produce ascospores on the living host-plant, but remain full of living protoplasm which is able to form ascospores at the advent of favourable circumstances, places *E. Graminis* in a somewhat isolated position.

An observation respecting the occurrence in mid-winter of the conidial (*Oidium*) stage of *E. Graminis* may be recorded here. At the end of the summer of 1902 plants of *Poa pratensis* growing in the Cambridge Botanic Garden, which were covered with large vigorous patches of the *Oidium* of *E. Graminis*, were dug up and transferred to a garden at Reigate, Surrey, where they were planted in pots, and stood in the open. No formation of perithecia was observed on the leaves, and all the leaves in a few weeks died away. On Dec. 27th some fresh green leaves from a stolon appeared in one of the pots, and on one of these leaves a large well-grown patch of mycelium, bearing a large number of closely clustered conidiophores with long chains of conidia, was visible. This occurred in a spell of exceptionally mild weather, after some weeks of cold frosty weather. Mr. R. H. Biffen, of the Cambridge University Agricultural Department, informs me that he noticed in the neighbourhood of Cambridge, during the first week of December, 1902, large

patches—thirty or forty yards square—of young plants of *Trifolium pratense*, on which an *Oidium* was so plentiful that the plants looked as though covered with hoar-frost. Mr. Biffen also reports that in the middle of January of the following year several wild plants of *Bromus sterilis* were observed bearing patches of *Oidium*. Instances of the production in winter of spores normally restricted to the summer months have been recently recorded in the case of *Puccinia dispersa* Erikss., one of the *Uredineæ* (see Marshall Ward in Annal. Mycolog. i. p. 132 (1903)).

II. Mycophagous Larvæ feeding on Conidia of Erysiphaceæ.

As the result of numerous observations carried out in the field during last summer, I have ascertained the very frequent association of a mycophagous larva with the conidial (*Oidium*) stage of several species of the *Erysiphaceæ*. These larvæ were seen, often in considerable numbers, associated with the *Oidium*, and feeding on the conidia, on the following plants: with the *Oidium* of *E. Graminis* on *Poa pratensis*, *Avena sativa*, *Lolium italicum*, *Bromus sterilis*, *B. commutatus*, *B. arduennensis*, *B. interruptus*, *B. hordeaceus*, *Festuca elatior* var. *pratensis*, *Milium effusum*, and *Agropyron repens*; with the *Oidium* of *E. Cichoracearum* on *Plantago major*, *Sonchus asper*, and *Arctium intermedium*; with the *Oidium* of *E. Polygoni* on *Anthriscus sylvestris*, *Heracleum Sphondylium*, *Trifolium procumbens*, *T. pratense*, *T. incarnatum*, *Ranunculus repens*, *Sisymbrium officinale*, and *Onobrychis sativa*; with the *Oidium* of *E. Galeopsidis* on *Lamium album*, *Stachys silvatica*, *Ballota nigra*, and *Marrubium Kotschyi*; with the *Oidium* of *Sphærotheca Humuli* on *Humulus Lupulus* and *Potentilla reptans*, and with the *Oidium* of *S. Humuli* var. *fuliginea* on *Leontodon Taraxacum* and *Plantago lanceolata*; with the *Oidium* of *S. mors-uvæ* on *Ribes Grossularia*; with the *Oidium* of *S. pannosa* on cultivated roses; with the *Oidium* of *Uncinula Aceris* on *Acer campestre*; and with the *Oidium* of some undetermined species on *Pyrus Malus*, *Cnicus lanceolatus*, *Myosotis arvensis*, *Scabiosa arvensis*, *Verbascum Thapsus*, *Geranium molle*, and *Calendula* sp.

In some cases the larvæ were extremely numerous on the mildewed parts of the plants, and as throughout the larval condition they never cease feeding voraciously on the conidia, they must in some measure tend to decrease the rate at which the fungus normally spreads, by hindering the production of powdery masses of conidia. In all the cases kept under observation, however, the fungus itself on the plant proved able to continue its growth apparently unchecked. As instances of the prevalence of these larvæ in some districts, I may mention the two following cases. Ten pieces of shoots of the gooseberry, about 6 in. long, severely attacked by *Sphærotheca mors-uvæ*, were picked at random from a garden in Ireland, and sent to me at Kew by post. When these shoots were examined, over seventy larvæ were found feeding on the conidia. On two little mildewed apple-twigs, about 5 in. long, and each bearing about six leaves, also picked at random in Ireland, and sent through the post, no less than thirty-one of these larvæ were found feeding on the fungus when it arrived at Kew.

During the summer I reared examples of these larvæ feeding on the *Oidium* of the following species:—*E. Cichoracearum* on *Plantago major*, *E. Galeopsidis* on *Stachys sylvatica*, *E. Polygoni* on *Heracleum Sphondylium*, *E. Graminis* on *Avena sterilis*, *Sphærotheca pannosa* on roses, *S. mors-uvæ* on *Ribes Grossularia*, *S. Humuli* on *Potentilla reptans*, and an *Oidium* on *Verbascum* sp. The larvæ descended into the earth to pupate, and the flies appeared fourteen to eighteen days afterwards. These flies proved to belong to the dipterous order *Cecidomyidæ*, and have been submitted to Abbé Kieffer, who has monographed (2) the order. The specific determinations have not yet been made, but Abbé Kieffer informs me that the flies belong to two or three closely allied species of the genus *Mycodiplosis* Rubs.* The occurrence of these larvæ feeding on the *Erysiphaceæ* appears to have been recorded first by Rubsaamen (3) in 1889, who reared "*Diplosis Erysiphes*" from larvæ feeding on "*Erysiphe lamprocarpa* Link" on *Hieracium murorum*, and "*Diplosis Sphærothecæ*" from larvæ feeding on "*Sphærotheca Castagnei* Lév." on hop. Kieffer (2) and Lindroth (4) also have recorded larvæ of the *Cecidomyidæ* on undetermined species of the *Erysiphaceæ*. Similar larvæ have been known for a long time, feeding on the uredo- teleuto- and æcidiospores of the *Uredineæ*, on which they were first observed in 1853 by Winnertz (5) in Germany, and more recently by Patouillard (6) in France, Trelease (7) in America, Cobb and Olliff (8) in Australia, Mattirolo (9) in Italy, and Lindroth (4) in Finland. The last-named author has observed the occurrence of these larvæ on no less than sixty-one species of the *Uredineæ*, and records a case where nearly sixty larvæ were found feeding on the spores of one æcidium of *Phragmidium subcorticium*. The larvæ have also been observed on *Apiosporium* (*Perisporieæ*) by Löw (10), and on species of the *Peronosporaceæ* (see Kieffer (2) and Lindroth (4)).

I give below a bibliography for those specially interested in the present subject.

Bibliography.

1. Salmon, E. S.: On Specialization of Parasitism in the *Erysiphaceæ* (Beihefte z. Botan. Centralbl., xiv., 261–315 (1903)).

2. Kieffer, J. J.: Monographie des Cécidomyides d'Europe et d'Algérie (Annal. Soc. Entomol. France, lxix., 346 (1900)).

3. Rubsaamen, E. H.: Ueber Gallmücken aus mykophagen Larven (Entomolog. Nachrichten (Berlin), xv., 377–382 (1889)).

4. Lindroth, J. I.: Cecidomyia-larver, som äta rostsporer (Medd. Soc. Fauna Fl. Fenn. xxvi., 25–29 (1900)).

5. Winnertz: in Linnæa Entomologica, viii., 154 (1853).

6. Patouillard, N.: in Bull. Soc. Bot. France, xxvii., 162 (1880).

7. Trelease, W.: Notes on the Relations of two Cecidomyians to Fungi (Psyche, iv., 195–200 (1884)).

---

* It is probable that the fly belonging to *Agromyza*, or a closely related genus, which I reared last year (see i. p. 266) from mildewed leaves of *Pisum sativum*, proceeded from a leaf-mining larva in the leaves, and not from the mycophagous larvæ.

8. Cobb, N. A., and Olliff, A. S.: Insect Larvæ (*Cecidomyia* sp.) eating Rust on Wheat and Flax (Agric. Gazette N.S. Wales, ii., 67–70 (1891)).

9. Mattirolo, O.: Sopra alcune Larve micophage (Bull. Soc. Bot. Ital., 1896, 180 (1896)).

10. Löw, H.: in Verh. Zool. Bot. Ges. Wien, xxxviii., 246 (1888).

SHORT NOTES.

Fumaria capreolata L. in Orkney.—In *Journ. Bot.* for 1901, p. 267, I recorded this (as *F. pallidiflora* Jord.) from two localities in Mainland; but the name was corrected in 1903, pp. 25–6, to *F. purpurea* Pugsley. The following extract from a recent letter from Mr. Pugsley is, therefore, noteworthy:—"Since looking through your collection of Fumitories some time ago, I have seen many other specimens of your gathering in other herbaria, and have noticed in one or two instances that yonr 2412 contains plants of both *F. purpurea* and coloured *F. capreolata*. The latter were very small specimens invariably; and, as these plants were gathered quite early, before fruit was formed to any extent, it was no doubt extremely easy to confuse the two plants. I believe your own sheet contained *purpurea* only." It happened to be the case that the first fruiting-specimen which I examined *in situ* had the strongly recurved pedicels of *F. capreolata* (*pallidiflora*), and apparently *was* that segregate; *F. purpurea* had not then been described, and I had no reason, at the time, to suspect that two distinct forms were present. The Orkney (v.-c. 109) Capreolate Fumitories will accordingly stand as follows:—*F. capreolata* L., *F. purpurea* Pugsley, *F. Boræi* Jord., and *F. confusa* Jord.—Edward S. Marshall.

Viola calcarea Gregory (p. 67).—Since writing my paper on *Viola calcarea* I have examined again Babington's specimens at Cambridge. I find, as I had expected, that the type-specimens are mixed, on the same sheet, with what we now call small *hirta* (really, I believe, the *Foudrasi* of Jordan). When I studied the violets in the same herbarium nearly seven years ago, I acccpted the names there given; but, as I became better acquainted with my plant, the idea gradually dawned on me that the Cambridge specimens were not all true *calcarea*. In addition to specimens from the Gogmagogs, I find in Babington's herbarium two plants of my *calcarea* from Portland, thus verifying Mr. Linton's record on p. 119; four plants from Copley Hill, Cambridge; one sheet (of one plant only) from Kenley, Surrey (Groves); and one plant from Blandford (Newbould). In Borrer's herbarium at Kew I find four plants of true *calcarea* from Box Hill, Surrey; and four others contributed by Mr. Woods. In Watson's collection, at Kew, are two plants (contributed by Babington) from the Gogmagogs. There is a plant of *V. hirta*, also in Watson's herbarium, labelled "*Viola calcarea* Bab. Garden seedling. The original root (from the Cambridge garden) thus named. H. C. Watson." I think this is small *hirta* improved by cultivation. The general herbarium at Kew contains four specimens of

calcarea, from Barton, Beds (Saunders), and four very typical plants from Beachy Head (Roper). Mr. Hunnybun, who has made a capital drawing of *calcarea*, finds the plant on the Devil's Dyke, Cambridgeshire.—E. S. Gregory.

A Correction.—Many thanks for the kind review of our Lexicon generum in the Journal of Botany 1904 p. 58–59. Allow us only to correct a mistake: *Clarkeifedia* O K. 1903 is established for *Monandropatrinia* being a nomen sesquipedale (see § 9^{e} of the Codex brevis maturus) with 7 syllables and not for *Monopatrinia*, as you wrote it, being a allowed name with 6 syllables if it had the priority. There is indeed no sensitiveness in our Lexicon, only aim at correctness and execution of rules. The vowel "i" and the consonant "j" is always well separated in our Lexicon, according to § 19^{i} of the Codex, and wrong former writings are always corrected in this line, but as Italians use still "i" and "j" in quite another manner (see Commentaries 39, 49 & § 12$^{h\,3}$, 12$^{l\,9}$) and equal words with only that difference should be stay side by side for the first purpose of a Lexicon: clear arrangement to find at once equal names, we put "i" and "j" always together. You will find for instance 28 names twice with I and J in the same alphabetical order in our Lexicon, whereagainst in Mr. Jackson works they are put under 2 heads but not corrected as to vowels and consonants; he is quite right to call that intermingling a "relic of barbarism," but he did not leave it.—Otto Kuntze; Tom von Post.

NOTICES OF BOOKS.

Plant-Geography upon a Physical Basis. By Dr. A. F. W. Schimper. The authorized English translation by William R. Fisher, B.A.; revised and edited by Percy Groom, M.A., &c., and Isaac Bayley Balfour, F.R.S., &c. With a photogravure portrait, 5 collotypes, 4 maps, and 497 other illustrations. 8vo, half-bound, pp. xxx, 839. Price 42s. net. Clarendon Press.

This beautifully printed and admirably illustrated volume marks an important advance in the study of plant-geography, and we fully accept the view of the editors that it will prove hardly less epoch-making among English students of plant-life than was the translation of Sachs's *Textbook of Botany*, published nearly thirty years ago. At present the name œcology—which made its first appearance in English, according to Dr. Murray's great *Dictionary*, in the translation of Haeckel's *History of Creation*, published in 1873—has hardly come into common use among British botanists; Mr. Lloyd Praeger and others have, however, done much to make it understood, and it is clear that in the correlation of organisms existing together in the same locality, their adaptations and modifications, a new and wide field of interest is open to the observer, even though he be restricted to a limited district.

In the extremely interesting "appreciation" with which Dr.

Groom prefaces the volume, he points out the difference between the methods of Schimper and the speculations and methods which at one time did duty for scientific investigation—speculations of which the late Grant Allen was perhaps the most popular exponent. "The methods pursued in the solution of œcological problems were singularly inadequate, and often utterly unscientific. To observe a plant with a spotted snake-like stem, or a seed that somewhat resembled an insect, was enough to call into existence theories of mimicry as applied to plants; to note the air-spaces in aquatic plants was to assume that they were flotation-devices. The subject therefore attracted but few botanists." Nothing could well be more different from these fanciful speculations than the careful investigation of facts and accumulation of evidence upon which Schimper based his conclusions—it is the difference between imagination and science, between those who are too often and too readily accepted as followers of Darwin and the great naturalist himself.

It would be impossible in the space at our disposal to give anything like an adequate notice of this important volume, of which the mere summary of contents occupies ten closely printed pages of small type. We must content ourselves with directing attention to its interest and importance, and to commending the care and research to which it is literally true to say that every page bears evidence, and of which the bibliography appended to each chapter is only one indication.

The Genus Diospyros in Ceylon: its Morphology, Anatomy, and Taxonomy. Part I. By HERBERT WRIGHT. Pp. 106.

THIS paper is reprinted from *Annals of the Royal Botanic Gardens, Peradeniya*, vol. ii. part i. January, 1904; it records the results of three years' investigations both in the forests of the island and in the laboratory. This first part contains a general statement and discussion on the ebony trees, under the following heads:—1. History. 2. Distribution in Ceylon. 3. Vegetative characters. 4. Anatomy: timber properties, &c. 5. Seedlings. 6. Reproductive organs. 7. Affinity.

The indigenous trees are considered to belong to twenty species, namely, *Diospyros Ebenum* Koen., *D. quæsita* Thw., *D. oocarpa* Thw., *D. affinis* Thw., *D. montana* Roxb., *D. Embryopteris* Pers., *D. Moonii* Thw., *D. attenuata* Thw., *D. pruriens* Dalz., *D. acuta* Thw., *D. hirsuta* L. f., *D. Thwaitesii* Bedd., *D. crumenata* Thw., *D. sylvatica* Roxb., *D. Gardneri* Thw., *D. oppositifolia* Thw., *D. melanoxylon* Roxb., *D. ovalifolia* Wight, *D. Toposia* Hamilt., and *D. insignis* Thw. No reference is made to *D. opaca* C. B. Clarke in Hook. f. Fl. Brit. Ind. iii. p. 567 (1882), which was founded on a Ceylon specimen collected by Thwaites. Seven of the species inhabit the dry zone, where the annual rainfall ranges from 35 to 70 inches; and the remaining thirteen species occur in the wet zone, where the annual rainfall is never less than 80 inches, and in places often exceeds 300 inches; in the intermediate zone, where the annual rainfall varies from 70 to 80 inches, the whole of

the dry zone species except *D. melanoxylon* occur, and of the wet zone species only two, *D. Gardneri* and *D. sylvatica*, have been observed.

Twelve out of the twenty species are endemic, and several of them are rare; *D. Ebenum* is the chief source of ebony in Ceylon, and the best ebony is produced by the trees growing on rocky and well-drained soil. All the species assume an arborescent habit; among the trees which attain the smallest maximum size is *D. pruriens*, which rarely exceeds 30 feet in height; and among the most lofty is *D. Embryopteris*, which reaches 130 feet.

In the leaves the lateral and reticulate bundles are stated invariably to be pellucid; sometimes this character is not very conspicuous, as in *D. affinis;* in some other species, particularly in *D. Embryopteris*, *D. Ebenum*, and *D. Toposia*, the translucent character of the small bundles is the most striking feature of the foliage. Heterophylly occurs in a marked degree in *D. Gardneri*, *D. oppositifolia*, and *D. sylvatica*. The species generally belong to the evergreen type, but the twigs of *D. montana* and *D. ovalifolia* become partially leafless every year in the dry northern districts.

The anatomy of the secondary xylem is of the ordinary dicotyledonous type. The differentiation of the tracheal elements and fibres is remarkably uniform, but the parenchymatous tissues exhibit sufficient variation to allow the species to be grouped under different types.

Numerical tables are given, exhibiting, for each species, the dimensions of the vessels of the tracheal elements in the twigs and sapwood respectively, their radial diameter, their tangential diameter and length; also the radial diameter and length of the parenchymatous elements in the sapwood; the radial diameter of the fibres in the heartwood and sapwood respectively; the radial diameter, tangential diameter, and vertical length of the vertical medullary ray cells and of the horizontal medullary ray cells respectively; and the percentage composition of the secondary xylem apportioned among the tracheal elements, the fibres, the wood parenchyma, and the medullary rays.

According to previous authorities the genus is characterized usually by diœcious flowers, and only rarely a polygamous or monœcious condition has been recognized; but Mr. Wright has recently made careful examination of fresh material in the forest, and has proved that there is a departure from the diœcious state in ten out of the twenty species in Ceylon. Speaking generally, he says that the sex appears to be very unstable, diœcious, monœcious, polygamous and hermaphrodite conditions having been found. The occurrence of hermaphodite flowers resulting in a polygamous condition is so frequent that there is every reason to doubt their non-existence in any of the Ceylon species, provided that sufficient material can be examined outside the herbarium. Ten species are found to be diœcious only, namely, *D. attenuata*, *D. crumenata*, *D. melanoxylon*, *D. montana*, *D. Moonii*, *D. oocarpa*, *D. ovalifolia*, *D. pruriens*, *D. quæsita*, and *D. Toposia;* two species, *D. acuta* and *D. oppositifolia*, are monœcious only; five species—

D. affinis, *D. Embryopteris*, *D. Gardneri*, *D. insignis*, and *D. sylvatica* —are dicœcious and polygamous; and three—*D. Ebenum*, *D. hirsuta*, and *D. Thwaitesii*—are dicœcious, monœcious and polygamous.

Dealing with the affinities of the *Ebenaceæ*, Mr. Wright recites the various opinions expressed by his predecessors, without offering any original views of his own; under the circumstances he is content to point out the main facts as supplemented in his present paper, and leaves the question of affinity until detailed information for the remaining species occurring in other parts of the world comes to hand.

Mr. Wright's valuable paper is an important addition to our knowledge of the genus, and when it is completed in the second part, which will contain specific descriptions and illustrations, and which is promised soon to be published, the genus *Diospyros* will be among the best elaborated of the larger genera in the Ceylon flora.

W. P. Hiern.

Vorlesungen über Pflanzenphysiologie. Von Dr. Ludwig Jost, a. o. Professor an der Universität Strassburg. Large 8vo, pp. xii, 695, tt. 172. Jena: Fischer. 1904. Price 13 Marks.

Dr. Jost divides the subject-matter of his book into three parts, under the headings respectively of Matter, Form, and Energy. Under the first heading are three sections—(1) the material composition of the plant, including the structure and chemistry of the cell, protoplasm, &c.; (2) the assumption of matter in general, osmosis, &c.; (3) assumption and assimilation of matter under the three headings, water, ash constituents, and carbon and nitrogen. The second part, the study of Form, comprises four sections. The first—problems of the physiology of development—contains a discussion on development in general; the second deals with growth and form under constant external conditions; the third, with the influence of external factors—whether inorganic, such as temperature, light, gravity, and mechanical and chemical factors; or organic, including plant and animal parasites, and the problems of symbiosis, or the relation between the various parts of the individual plant. The fourth section is entitled "Development of the plant under the influence of internal and external causes," and includes discussions on periodicity of growth, reproduction, and variation. In the last part the author discusses the dissipation of energy in movements of various kinds, both autonomic and induced.

The book is a useful general presentation of the facts of plant-physiology, and the theories which are at present in vogue as to their meaning and explanation.

A. B. R.

The Old Riddle and the Newest Answer. By John Gerard, S.J., F.L.S. 8vo, pp. x, 293. Longmans. Price 5s. net.

The principal object of this book is to examine, entirely from the scientific side, the pretensions of such systems as those of Prof. Haeckel, which assume that modern research has supplied us with a purely materialistic explanation of the universe—its creation and

development; the author contending, on the contrary, that, far from dissipating such mysteries, the progress of science has but made their solution more hopeless by any such means as are within her scope. Incidentally he is led to consider the question of Organic Evolution generally, and Darwinism in particular, for, though he acknowledges that the acceptance of these notions affects the fundamental problem with which he is concerned, he believes at the same time that the habit of basing large and far-reaching theories upon inadequate foundations of fact, is in great measure responsible for the extravagances in which would-be cosmogonists are apt to indulge.

In support of his contention that the evidence for Darwinism and the theory of genetic evolution itself *is* inadequate, he relies very specially upon that furnished by fossil botany as being, at least according to present knowledge, altogether adverse to the idea that the development of ascending types, which has undoubtedly occurred, has been wrought by the gradual accumulation of minute differences. On the contrary, by the testimony of such authorities as Carruthers, W. C. Williamson, and others, totally new types are found to make their appearance at certain epochs, suddenly, and fully developed; while, moreover, widely different types, which should theoretically have been slowly evolved one from the other, come on the scene simultaneously. Thus, in the Devonian strata, the three great groups of Vascular Cryptogams, Ferns, Horsetails, and Club-mosses, are found together, and with them the phanerogamous Gymnosperm. Similarly, in the Carboniferous formations, which follow, the Monocotyledons enter with equal abruptness, and when, in the Upper Chalk, Dicotyledons appear, it is in full force—*Apetalæ*, *Polypetalæ*, and *Sympetalæ* being all represented; while in the long interval between them and the Monotyledons there is no trace of intermediate forms.

Another point upon which stress is laid is the evidence of specific stability afforded by such a plant as *Salix polaris*, which, belonging to a tribe as prone to variation as any in the vegetable kingdom, has preserved its identity amid exceptional stress of circumstances through the glacial epoch and down to our day.

In view of such facts as these, Father Gerard insists that it is at least premature to speak of any theory of genetic evolution as being scientifically established.

BOOK-NOTES, NEWS, &c.

At the Anniversary Meeting of the Linnean Society on May 24, Prof. Herdman was elected President for the coming year in succession to Prof. Vines. The retiring President took as the subject of his address the work of Linnæus, pointing out its limitations in the direction of structural, physiological, and microscopic work, the influence of his systematic work on the progress of botany, and emphasizing the fact, often lost sight of, that in the *Fragmenta* of

Linnæus we find the germ of the natural system. The presentation of the Linnean medal to Dr. Günther met with a very hearty reception on the part of the Fellows. A feature of the meeting was the reading of the new Charter by the Treasurer, who has generously borne the trouble and expense of procuring the document. The chief points in which the new Charter differs from the old are, the recognition of the right of women to become Fellows, and an increase in the numbers of the Council, which henceforth will consist of twenty members, five of whom retire annually.

Dr. Schönland has published in the *Records of ths Albany Museum* (March, 1904) a notice of Mrs. F. W. Barber (*née* Mary Elizabeth Bowker), whose name appears in the Second Supplement to the *Biographical Index of British Botanists;* and this enables us to supply the definite dates which we were not previously able to ascertain. She was born about 1820, just before the family left England to settle near Port Alfred, at the Cape, and died at Pietermaritzburg in 1899. In the references already given (Journ. Bot. 1903, 344) will be found evidence of her enthusiasm for collecting plants, and of Harvey's appreciation of her help, which he acknowledged by dedicating to her the genus *Barberetta.* Mrs. Barber was well versed in natural history generally, and devoted much attention to Lepidoptera; Dr. Schönland appends to his notice a list of her published papers and drawings, the latter of which, with her herbarium and collection of butterflies, are in the Albany Museum.

The second of the *Contribuciones al conocimiento de la Flora Ecuatoriana,* by the Rev. L. Sodiro, S.J. (Quito, 1903), is devoted to the genus *Anthurium.* There are full descriptions of 163 species, a large proportion of which are new; the monograph is illustrated by twenty-eight plates.

The Report of the Botanical Exchange Club for 1903, of which Mr. Druce is editor, appears with commendable promptitude, having been issued on March 28. We hope to give extracts from the more interesting notes in an early issue.

The Flora of the Parish of Halifax, by Messrs. W. B. Crump and C. Crossland, which has appeared in instalments in the *Halifax Naturalist* for 1896–1904, has now been issued in volume form by the Halifax Scientific Society. The first volume of Dr. Rendle's *Classification of Flowering Plants*, including the Gymnosperms and Monocotyledons, has been published by the Cambridge University Press. We hope to notice these books in our next number.

Among recent continuations of works bearing upon the European Flora may be mentioned the *Flora Analitica d'Italia*, vol. iii. part 2, dealing with the *Compositæ*, and the *Prodromus Floræ Batavæ*, vol. i. part 3, including *Corollifloræ* and *Monochlamydeæ*. Dr. F. Buchenau has published (Engelmann, Leipzig) a "Kritische Nachträge" to his *Flora der Nordwestdeutschen Tiefebene.*

The second volume of the Catalogue of the Library of the British Museum (Natural History), containing letters E—K, has been published by the Trustees.

P. Highley del. et lith. West, Newman imp. London

1-3, Sporangia of Halimeda gracilis. 4-8, H Tuna.

THE SPORANGIA OF HALIMEDA.

By Ethel S. Gepp.

(Plate 461.)

Among some marine algæ sent me by Dr. Herdman in 1903 from the Gulf of Manaar were some specimens of *Halimeda gracilis* Harv. bearing sporangia, and, as these had never been previously recorded for this species, I published a note on the subject, together with a list of the remaining algæ, in Dr. Herdman's Report on the Pearl-Oyster Fisheries (Roy. Soc. 1903, Suppl. Report, ii. pp. 163–167). Comparisons were there drawn between the sporangia of *H. gracilis* and those of *H. Tuna*, as described and figured by Derbès & Solier (*Comptes Rendus*, Suppl. p. 46, tt. 11, 12 (1856)). Fruiting specimens of *H. Tuna* are very rare in herbaria, and, as I had never had an opportunity of examining one, it was impossible to clear up several doubtful points, or to make a complete comparison between the sporangia of the two species. However, thanks to the kindness of Mons. Ed. Bornet, who has lately sent me a portion of the identical specimen of *H. Tuna* described by Derbès & Solier (*l. c.*), it is possible to add some information regarding some of the obscure points.

Description of Thallus.—Before proceeding to describe and compare the fruiting joints of *H. Tuna* and *H. gracilis*, it will be as well to recapitulate the description of the internal structure of the thallus of *Halimeda*.

It may be remembered that the thallus of *Halimeda* is composed of unicellular branching filaments, which form three distinct layers in each joint: 1. A strand of filaments which runs up the axis of the plant from the root to the apex. 2. A network of branched filaments, the subcortical layer, derived from the side branches of the central strand by repeated divisions; this layer forms the main substance of the joint. 3. A single layer of "peripheral cells" so called (the "Rindenschläuche" of the Germans), which are, however, merely the terminations of the filaments of the second layer. These, from being closely pressed together, show a more or less hexagonal form, when seen in surface view. The first of these three layers, the central strand, is the core on which the rest of the plant is built up by an elaboration of the branches which it gives off. The central filaments branch trichotomously as a rule, the middle branch of the three continuing its course as a portion of the central strand. Whenever the filaments of the central strand have produced a certain length of internode they cease growing, and form the resting apex of the joint. At this point they are found in close contact, while in the rest of the joint below they always remain quite free from one another. At the apex communication is established between the filaments in one of three ways:—

1. In some species, as was shown by Prof. Askenasy (*Forschungsreise*, S.M.S. 'Gazelle,' Th. iv. Bot. Algen (1888)), openings or pits are formed in the adjacent walls of all the filaments, and

thus free communication is established throughout the central strand. The pits are very large and numerous, so that little remains of the actual walls, except on the boundary of the strand, where of course the pits are entirely absent. Thus all the filaments of the strand become welded at this spot into one connected mass. On renewal of growth, however, each filament begins again its separate individual course, continues this course unbranched while traversing the node, and then, branching trichotomously, begins the formation of the subcortical and peripheral layers of a new internode (joint). This is characteristic of *H. macroloba* and *H. incrassata*.

2. In other species there is no general formation of pits, but communication is effected by fusion of the filaments in groups of two or three. The separate identity of the fusing filaments is completely lost, and at the end of the resting period, which follows the formation of a joint, the fused portion continues its growth as a single filament for some little distance to form the node; ultimately the filaments branch di- or trichotomously, and begin the formation of the new joint. This occurs in *H. Tuna*, *H. gracilis*, and two other species.

3. The third method of communication resembles the second in so far as it is limited to adjacent filaments. But in this case the number of fusing filaments is always two, and their identity is not completely lost, for immediately after the junction they appear again as separate filaments. This method of communication forms the distinguishing and unmistakeable characteristic of *H. Opuntia*, and, as it is found in no other species, it forms a valuable mark of recognition throughout the many varieties of *H. Opuntia*.

All the known species of *Halimeda* show methods of communication between the central filaments belonging to one of these three types, and this character serves as a convenient basis for a systematic arrangement of the species. This arrangement does not run counter to the old lines of classification, but it serves to show that several species formerly regarded as independent, on the ground of variety in external characters, are really nothing but forms of one or another variable species. This classification is worked out fully in my paper on "The Genus *Halimeda*" (*Siboga Expeditie*, Monographe lx. Leiden, 1901).

Sporangia of H. gracilis.

The connection in *Halimeda* between the central strand of filaments and the sporangia is very close, since the sporangiophores are a continuation of central filaments which after fusion emerge from a joint, and bear sporangia instead of forming a new joint. The exact position therefore of the sporangiophores on a joint must depend on the course followed by the central filaments inside a joint, and this course varies in different species. In *H. gracilis* the filaments of the central strand are chiefly confined to the main axis which runs directly through a joint to the next joint above, and to the two lateral branches of that main axis, each leading to an upper angle of the joint. The fruiting filaments therefore of *H. gracilis*

grow out in small *isolated tufts* at these angles, in the place where new joints might otherwise be produced (figs. 1, 2).

According to the system of classification of species described above, the distinguishing feature of *H. gracilis* lies in the complete fusion of the filaments of the central strand in pairs at the apex of a joint; the fused portion is prolonged, and then branches trichotomously in the next joint. When the fused portion is destined, however, to produce sporangia, it lengthens out, and branches dichotomously to form two sporangiophores, from which the sporangia emerge all round, and form a kind of loose raceme. In the material from the pearl-banks of the Gulf of Manaar most of the sporangia are empty, but it has been possible to find specimens in which the protoplasm still fills the sporangia and the apex of the sporangiophore. The protoplasm is studded with small black dots, and the condition is probably one shortly preceding the escape of the zoospores.

Sporangia of H. Tuna.

In *H. Tuna* the filaments of a joint do not, as in *H. gracilis*, form three conspicuous ribs; but, on the contrary, numerous solitary strand-filaments radiate flabellately from the base of a joint, and run out to the margin, where in a purely vegetative joint they remain without further development. (Besides these radiating filaments there is of course a main strand, which is rather indistinct, forming the axis of the joint, and continuing its course into and through the joint above.) In a fertile joint these solitary filaments radiating from the central strand fuse in pairs at the margin, and emerge to bear sporangia. Thus in *H. Tuna* the fruiting filaments are found emerging along the margin of a joint, and forming a continuous fringe. This is figured by Derbès & Solier (*l. c.* tab. xi. fig. 23). In order to see the radiating filaments in the thallus it is necessary to remove any possible traces of calcification by immersing a joint in Perenyi's fluid, and then either boiling it gently in lactic acid or treating it with *eau de Javelle*.

The mode of communication between the fusing filaments of the central strand of *H. Tuna* takes place in the manner described above on p. 194. Two, sometimes three, filaments fusing together form a single filament, but, whereas in the case of the main strand, which has a purely vegetative function, the single filament resulting from the fusion continues its course into the next joint before branching, in the case of the sporangiophores the filament resulting from the fusion is often very short, and divides immediately to form two long branches. These branch dichotomously at the top, and each short branch bears sporangia similar in form to those of *H. gracilis*.

The differences between the fruits of *H. gracilis* and *H. Tuna* may therefore be summarized as follows:—In *H. gracilis* the sporangiophores arise in isolated tufts from the angles of a joint; in *H. Tuna* they form a continuous fringe along the margin of a joint. In *H. gracilis* the filament resulting from the fusion of two filaments of the central strand grows out as a single long filament

until it branches into two sporangiophores at its summit; in *H. Tuna* the filament resulting from the fusion branches immediately into two, and each of these long branches again subdivides after a time into two sporangiophores. Thus from the fusion of two filaments in *H. gracilis*, *two* sporangiophores are produced; while from the fusion of two filaments in *H. Tuna*, *four* sporangiophores are produced (see figs. 3, 6, 8).

As regards the sporangia of either species, I am unable to give details of their development, or describe the escape of the zoospores from personal observation. But MM. Derbès & Solier (*l. c.* p. 47) describe the zoospores after their escape as follows:—"There is always a posterior portion, rounded off, of a green colour, and an anterior, conical, hyaline portion. The rostrum has sometimes appeared to us to increase in length to a very considerable extent relatively. We have noticed several times, very distinctly, two flabelliform appendices arising from the summit of the rostrum, and another attached to the posterior part; at other times this latter was wanting. In other cases, again, there appeared to be only one at the summit of the rostrum, and very often we have not been able to see any at all, either in front or behind. As to the movements, these zoospores are entirely comparable with others. We have not been able to obtain either resting-spores or germinations."

So far as I can ascertain, the fruiting season of *H. Tuna*, the only Mediterranean species, is in August. Any investigations on living material made on the spot—for instance, at the Naples station—might furnish interesting results as to the development of the sporangia and the germination of the zoospores.

In this study of the vegetative and reproductive parts of *Halimeda*, it is seen that all fresh growth is preceded by a fusion of filaments of the central strand. The meaning of this fusion is at present not quite clear. It may, indeed, be suggested that we have here a reduced reproductive process analogous to that of certain fungi, where a fusion of two filaments precedes the formation of spores; but in *Halimeda* we are met by the difficulty that such a fusion is not confined to filaments destined to bear sporangia, but, as is mentioned above, is equally characteristic of filaments which are purely vegetative. For each filament of the strand which issues from the apex or angles of a joint to form a new joint is the product of a fusion of two or three filaments just within the periphery of the old joint. Inasmuch as these fusions are found to precede the formation of new joints on the one hand, and of sporangiophores on the other, the obvious inference is that the fusions provide a powerful stimulus for further growth, whether vegetative or reproductive. They form new and vigorous growing points. But what the factor may be which determines whether sporangia or whether a new joint shall result from the fusion is veiled in obscurity.

Of the material of *H. Tuna* in fruit, so kindly sent me by Mons. Bornet, slides showing sporangia have been deposited in the British Museum; and a herbarium specimen showing the marginal fringe of fruiting filaments has been mounted in the Herbarium of the Royal Gardens, Kew. I am much indebted to my husband for criticism and suggestions.

EXPLANATION OF PLATE 461.

Figs. 1–3. *Halimeda gracilis*.—1. Joints bearing sporangia. Nat. size. 2. Single joint, showing ridges of central strand and lateral tufts of fruiting filaments. × 3. 3. Filament, showing fusion of two filaments of central strand below, and dichotomous branching above to form sporangiophores. × 41.

Figs. 4–7. *H. Tuna*.—4. Portion of fruiting plant. Nat. size. 5. Fertile joint, showing filaments radiating flabellately from base of central strand. × 4. 6. Fruiting filaments. Two of the radiating filaments are seen branching trichotomously. The central branch of the upper one fuses with the left-hand branch of the lower one. Two filaments result from the fusion, and each branches above to form two sporangia. × 50. 7. The same, seen from the other side. × 80. 8. Young fruiting filaments (after Derbès & Solier). × 52.

R. BROWN'S LIST OF MADEIRA PLANTS.

By JAMES BRITTEN, F.L.S.

(Concluded from p. 182.)

ARUM COLACASIA. "Hort."

A. PICTUM [*Caladium picturatum* C. Koch & Bouché.]

A. SAGITTÆFOLIUM [*A. canariense* Webb (*A. italicum β canariense* Engl.).]

LEMNA MINOR.

POTAMOGETON NATANS. [I cannot find the specimens of this: Mr. Arthur Bennett has no note of true *natans* from Madeira, and suggests that the *fluitans* form collected there by Lowe and others is the plant intended by Brown.]

P. COMPRESSUM. [Besides his specimens sent to Banks, we have a sheet written up by Masson himself, and bearing in his own hand a MS. name which corresponds with that in Dryander's transcript of his list. This is interesting as showing that the MS. names of novelties in that list are to be ascribed to Masson, except where otherwise indicated. The specimens are *P. pusillus* L., to which, according to a note in the Herbarium, they were referred by Sir J. E. Smith.]

CAREX MURICATA. [Brown in his MS. list has added "vix *muricata*": the plant seems to be *C. divulsa* Good., which many botanists regard as a variety of *muricata*.]

SCIRPUS SETACEUS [*S. cernuus* Vahl.]

CYPERUS ESCULENTUS.

C. ROTUNDUS M. "Culmo triquetro subnudo, umbellis decompositis, spicis alternis linearibus. H. K." ["M." means that the plant was collected by Masson; "H. K." is a mistranscription for "Fl. Zeyl."]

C. FLAVESCENS.

ARISTIDA GIGANTEA [*A. adscensionis* L.]

PHALARIS CANARIENSIS. [I suspect this was *P. brachystachys* Link, but I have not found the Banksian specimen on which Brown's entry is based.]

P. BULBOSA [*P. cærulescens* Desf.]

PANICUM GLAUCUM [*Setaria glauca* Beauv.]

P. VIRIDE [*Setaria verticillata* Beauv.]

P. COLONUM Lin.

P. SANGUINEUM [a misprint for *sanguinale*: *Digitaria sanguinalis* Scop.]

P. JUNCEUM. "Masson duas habet varietates *P. Junc.* quarum altera foliis complicatis, altera foliis planiusculis, quæ ab Anglis Maderiensib. Guinea Grass Jamaicensium audet." [*P. repens* Lam. There is a description of *P. junceum* (of which the name only was published)—*P. junceum* Nees and *P. junceum* Trin. are different species—in Solander's MS. Flora of Madeira, p. 2: the name appears in Banks and Solander's MS. list. We have Madeira specimens from Banks, Masson, and Brown, as well as from later collectors.]

GASTRIDIUM AUSTRALE.

MILIUM MULTIFLORUM [*Oryzopsis miliacea* K. Richter, Pl. Europ. i. 33 (1890).]

AGROSTIS ALBA.

CYNODON LINEARE, DACTYLON. "(Panic. Dact. L.)"

AIRA CARYOPHYLLEA.

POA PRATENSIS.

P. ANNUA.

P. ERAGROSTIS. [No doubt *Eragrostis pœoides* Beauv., but I have not found the Masson and Downe specimens indicated by Brown.]

P. RIGIDA [*Festuca rigida* Kunth.]

BRIZA MINOR.

B. MAXIMA.

DACTYLIS GLOMERATA.

CYNOSURUS ECHINATUS.

C. INDICUS [*Eleusine indica* L.]

C. AUREUS [*Lamarckia aurea* Moench.]

FESTUCA BROMOIDES.

F. DECUMBENS [*Triodia decumbens* Beauv.]

F. FLUITANS [*Glyceria fluitans* Br.]

BROMUS MOLLIS.

B. STERILIS and B. GENICULATUS [*B. madritensis* L.]

B. DISTACHYOS [*Brachypodium sylvaticum* Beauv.]

AVENA ELATIOR and A. NODOSA [*Arrhenatherum avenaceum* Beauv.]

A. FATUA [*A. hirsuta* Roth.]

A. FLAVESCENS [*Deschampsia argentea* Lowe. Although entered in his list as *A. flavescens*, this is noted as "nov. sp." by Brown in Herb. Banks.]

LAGURUS OVATUS.

COIX LACHRYMA IOBI.

LOLIUM PERENNE.

L. TEMULENTUM.

HORDEUM MURINUM. [This is followed by an entry "[H.] a *murino* divers." A reference to Brown's MS. list shows that a "?" should follow "divers.," and that the specimens referred to are those which he himself collected, and which do not appear to differ from *H. murinum*.]

TRITICUM REPENS.

ANDROPOGON HIRTUS.

SORGHUM HALEPENSE.

HOLCUS MOLLIS.

CENCHRUS CILIARIS [*Pennisetum cenchroides* Rich.]

Cryptogams.

For the naming of the Cryptogams I am mainly indebted to my colleague Mr. Antony Gepp. Unfortunately, with the exception of the Ferns (and even of these some cannot be traced), most of the specimens cannot be found in the Herbarium. It seems desirable to complete the list by including the names as they stand therein, but in the absence of specimens it does not appear advisable to add the modern synonymy. I have therefore simply printed the list as it stands, adding synonyms in the case of the few of which we have been able to find specimens.

Osmunda spicata [*Spicant*]. "In montosis." [*Lomaria Spicant* Desv.]

Acrostichum squamosum.

A. Maranthæ [*Nothochlæna Marantæ* R. Br.]

A. velleum [*Nothochlæna lanuginosa* Desv.]

A. pilosum [*Gymnogramma Loveii* Hook. & Grev. = *G. Totta* Schlecht.] One of the very few references in print to Masson's MS. list occurs in connection with this fern. In their *Icones Filicum*, t. 89, Hooker & Greville say: "Mr. Lowe suggests that it may probably be the *Acrostichum pilosum* of Von Buch's List of Plants of the Canary Isles; and that the same name (but equally without description or character) likewise exists in a manuscript Catalogue of Madeira Plants, which he has seen in the island, purporting to be taken from the Banksian Library, and probably left there by Masson."]

Pteris arguta.

P. aquilina. "In rupib. altis. Pabulum præbet vaccis per hiemem."

Woodwardia radicans.

Scolopendrium vulgare.

Asplenium Hemionitis.

A. Ceterach.

A. monanthemum.

A. Trichomanes.

A. anceps. [Name taken up by Lowe (Primit. 8).]

A. marinum.

A. compactum. [Name apparently unpublished elsewhere; specimen not found.]

A. leptophyllum [*Gymnogramme leptophylla* Desv.]

A. Adianthum-nigrum. [The form *acutum*—*A. productum* Lowe.]

A. dentex [*A. furcatum* Thunb., but no specimens found from Banks or Masson.]

Polypodium vulgare. "Var. pinnis latioribus, profundius serratis."

Aspidium auriculatum [*A. falcinellum* Sw. Specimen referred to by Lowe, Primit. 5.]

A. adultum [*Nephrodium molle* Desv.]

A. falcatum. [Name apparently unpublished elsewhere; specimen not found.]

A. elongatum [*Nephrodium elongatum* Hook. & Grev.]

A. Filix-fœmina.

A. RHÆTICUM and A. FRAGILE [*Cystopteris fragilis* Bernh.]

A. FRAGRANS [*Cheilanthes maderensis* Lowe = *C. fragrans* Webb & Berth.]

A. AXILLARE and A. UMBROSUM [*Asplenium umbrosum* Sm.]

A. ÆMULUM [*Nephrodium fœnisecii* Lowe—an earlier name under the genus than the usually employed *N. æmulum* Baker.]

A. FRONDOSUM. [Name taken up by Lowe from Solander's MS. name *Polypodium frondosum*.]

ADIANTHUM RENIFORME.

A. TENERUM [*A. Capillus-Veneris* L.]

TRICHOMANES ALATUM [*T. speciosum* Willd.]

HYMENOPHYLLUM TUNBRIDGENSE. "In sylvis."

DICKSONIA CULCITA.

DAVALLIA CANARIENSIS. "In rupibus et truncis arborum."

EQUISETUM ARVENSE.

LYCOPODIUM SELAGO [*L. suberectum* Lowe = *L. Selago* var.]

L. PLUMOSUM. "Ribeira Buena Ventura in sylvis." [The herbarium shows this to be synonymous with *Selaginella Kraussiana* A. Br., but we do not find specimens from the locality cited.]

L. DENTICULATUM. [Probably *S. denticulata* Link, but specimen not found.]

MUSCI. — Splachnum vasculosum [*Enthosthodon Templetoni* Schwaegr.], Funaria hygrometrica, Polytrichum nanum [*Pogonatum aloides* Brid.], P. undulatum, Mnyum serpyllifolium, Tortula tortuosa, Dicranum viridulum, Trichostomum lanuginosum, Bryum cæspititium, B. fontanum [*Philonotis fontana* Brid.], Fissidens bryoides, var. gigantea [*F. serrulatus* Brid.], Neckeria lucens, N. crispa [*N. intermedia* Brid.], Hypnum cupressiforme, H. alopecurum [*Thamnium alopecurum*], H. riparium, H. velutinum [*Raphidostegium Welwitschii* Jaeg. & Sauerb.], H. casurum [caturum, *Sciaromium prolixum* Jaeg. & Sauerb., and *Echinodium spinosum* Jaeg. & Sauerb.], H. pilaceum [julaceum, *Astrodontium Trelcasei* Cardot], Leskea sericea.

HEPATICÆ.—Jungermannia Trichomanes, J. bidentata, J. resupinata, J. trilobata, J. complanata, J. dilatata [probably *Frullania tamarisci*, but specimen uncertain], J. Tamarisci [*F. polysticta* Lindenb.], J. platyphylla [*Madotheca lævigata* Dumort.], Marchantia conica, M. polymorpha.

LICHENES. — Lecidea geographica, Lecanora subfusca, Sticta pulmonaria, Borrera leucomelas, Ramalina fastigiata calycaris [*R. calicaris* Fr.], Evernia prunastri, Cenomyce digitata, C. damicornis, C. uncialis, C. cornuta, C. rangiferina, Parmelia perlata, Sphærophoron globiferum [*S. coralloides* Pers.], Stereocaulon paschale, Rocella tinctoria [*Roccella fuciformis* Ach., and *R. tinctoria* Ach.], Cetraria vulpina, Usnea articulata [Hoffm.].

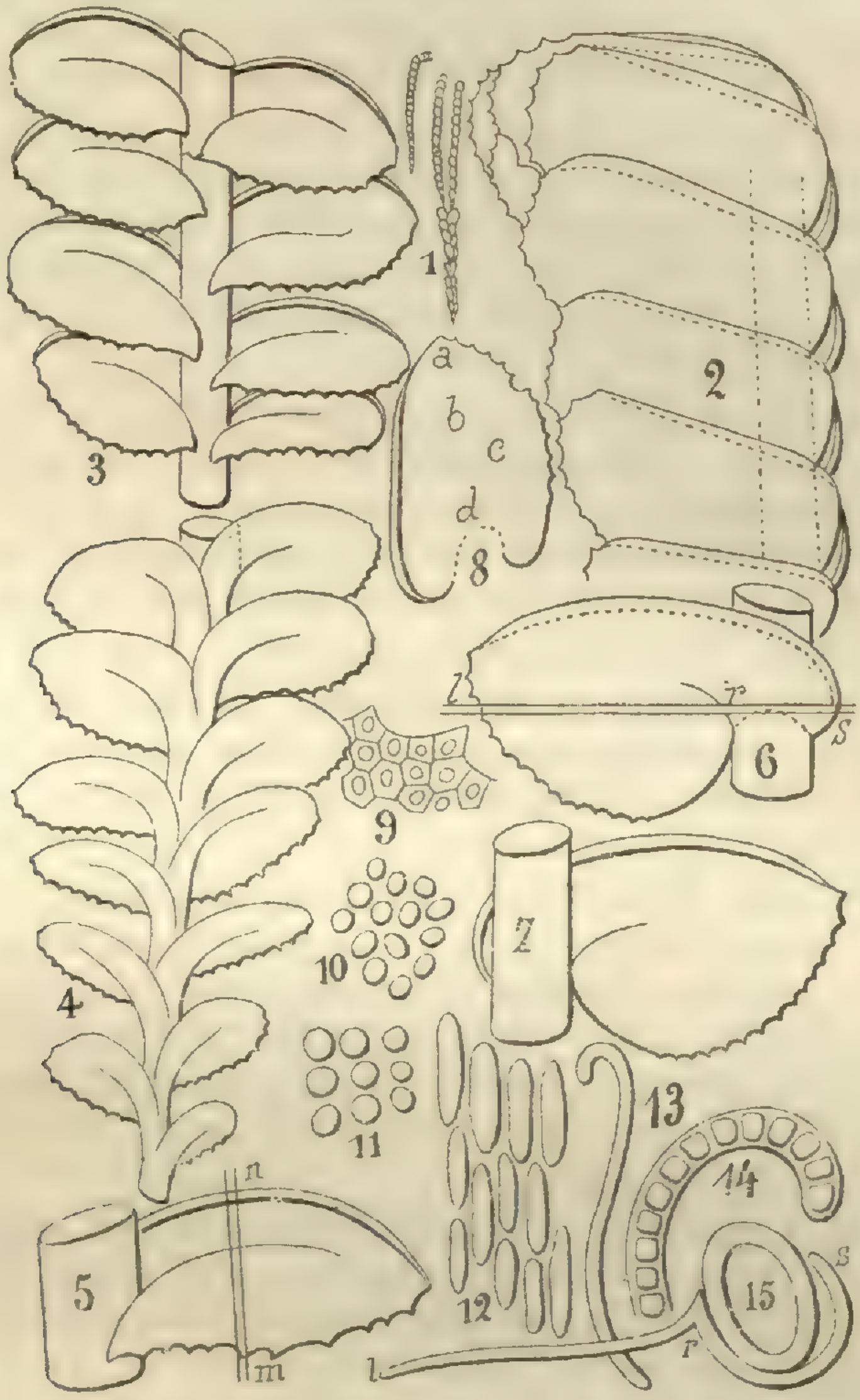
ALGÆ.—Fucus elongatus [*Himanthalia lorea* Lyngb.: specimen not found], F. natans [*Sargassum bacciferum* Ag.], F. capreolatus [Name unpublished elsewhere; specimen not found], Ulva umbilicalis [*Porphyra laciniata* Ag.: specimen not found], Conferva scoparia [*Stypocaulon scoparium* Kuetz.]

FUNGI.—Byssus aurea [This is the protonema of a moss], Agaricus alneus, Boletus, Peziza Auricula.

A NEW HEPATIC.

By H. W. Lett, M.A.

During a short visit in June, 1903, to the Island of Achill, Co. Mayo, I found a hepatic which was quite new to me, and I sent it to Professor Douin, of Chartres, who described it in the *Revue*



1, plant, natural size; 2, end of a branch, side view (normal form); 3, thinner part of branch seen from above; 4, the same seen from below, with the lower leaves much smaller; 5, a leaf taken from No. 3, and seen from above; 6, a leaf from No. 2, side view, from below; 7, the same seen from above; 8, a leaf removed from the stem, and seen from above; 9, cells of leaf No. 8 taken from the point *a*; 10, cells of the same leaf taken at *b*; 11, cells of the same leaf taken at *c*; 12, cells of the same leaf taken at *d*; 14, section of upper part of fig. 13 showing the involute margin; 13, transverse section of above through *m n* (fig. 5); 15, transverse section of the stem and a leaf through *l r s* (fig. 6). (Figs. 2–8, × 18; figs. 9–12, 14, × 100; figs. 13, 15, × 36).

Bryologique for May, 1904. The following is a translation of this description :—

Adelanthus dugortiensis Douin & H. W. Lett, sp. nov. Plant dioicous (?), of a brownish-yellow colour. Stem 10–50 mm. long,

branched (fig. 1); branches rising laterally before the stem, which also lengthens at the extremity; the tops of the branches when dry are incurved like a crozier; the same is sometimes the case when the plant is in a moist condition. In transverse section the stem is elliptic (fig. 15), having a distinct border of three to five rows of coloured cells with thick walls, the cells of the centre being hyaline and thin-walled.

Leaves elliptic in shape, 1·1–0·75 mm. long at the end of the chief branches, much smaller towards the base of the shoot (fig. 4).

In the normal form (fig. 2), the leaves are arranged erect on either side against the stem, which thus lies between them, as in *Alicularia compressa* and *Jamesoniella Carringtoni*, their ends being turned forwards to the front [they are homomallous, H. W. L.]

In the topmost leaves the back margin is entire and strongly reflexed above (fig. 3, 5, and 7) to its insertion (fig. 2) in the stem, where it very distinctly embraces the stem (fig. 15).

In the leaves on the lower part the back margin is much less distinctly involute. The end and front margin are flat and toothed (except near the insertion, where the margin is entire); these teeth are small, and consist each of one projecting cell. The cells of the margin of the leaf have most distinct walls (fig. 9), and are clearly marked by lines into polygonal shapes; they are 16–30 μ in diameter. With regard to the other cells (fig. 10, 11, and 12), their walls are indistinct where they touch each other, and there remains little but the inside shape showing that they were wider and separated by very thick walls. At the base and in the middle part of the leaf (fig. 12) the cells are much elongated, 15–20 μ wide and 40–75 μ long. The surface of the cells is smooth.

When the surface of a leaf is viewed from above, there is seen from the anterior to the posterior margin (fig. 5, 13, and 14), first an anterior even margin, then a convex surface, next a concave surface, and then the posterior margin involute.

There are no under leaves.

Antheridia, archegonia, and fructification are all as yet unknown.

On shady rocks amongst *Scapania gracilis*, *Hymenophyllum tunbridgense*, &c., at 2000 ft. above the village of Dugort, Achill Island, Co. Mayo, Ireland, 24 June, 1903. Colld. H. W. L.

Observations.—In the genus *Adelanthus* the female flowers are found on very short branches at the base of the stem. I have in vain searched for them on the little specimen which has been sent to me. . . .

Herr F. Stephani, the distinguished hepaticologist, to whom I submitted it, writes:—"The plant which you have sent me is an *Adelanthus*, unknown till now; *it is the most interesting discovery which we have received for a long time:* the plant is very close to *A. unciformis* (Tayl.) Spr., which is found at the Cape of Good Hope, in Madagascar, and at Cape Horn. Ireland, as doubtless you are aware, is a country classic for an ancient flora still preserved there, though lost in the neighbouring countries. Your new plant belongs to a small group of rare species which have the characteristics of the hepatics of hot climates. A great many of

these 'plantæ relictæ' of Ireland are known only in a barren condition."

The back margin of the leaves, which is curiously incurved, easily distinguishes this new hepatic from all the other European species. This characteristic, however, is less noticeable than in *A. fuciformis*, which is quite different in the large teeth of its leaves. It is very near to it, if it is not indeed the same species.

I have no doubt that Mr. Lett in further researches will succeed in finding a plant with flowers. I have complied with his wish that the name of the village near which it was discovered should be given to the plant.

[Through the kindness of Professor Douin, and the generosity of Herr Stephani, I have been able to compare a specimen of *Adelanthus unciformis* Tayl. from Terra del Fuego with the plant from Co. Mayo. The size, colour, and general appearance are much the same. But the leaves of *unciformis* are larger, much closer, more square in outline with a more acute point, more homomallous, the teeth of margin stronger, and the areolæ smaller than in *dugortiensis*. These points of difference are very distinct when stems of both plants are examined side by side on the same slide with a 2 in. or 1 in. object-glass.—H. W. L.]

THE MOSSES OF CHESHIRE.

By J. A. Wheldon, F.L.S.

When the list of Cheshire mosses, which appeared in this Journal for 1898 (pp. 302–311), was prepared, I did not intend to undertake the collection of any further notes on the bryology of this interesting county. Although possessed by a strong desire to visit some of its classical localities, rendered famous by the discoveries of Wilson, Hunt, Holt, and Whitehead, other districts had prior claims on my limited leisure. The following notes therefore consist in the main of records supplied by a few correspondents; a large proportion from the herbarium of Mr. G. A. Holt, who sent me a list some years ago. But for an undertaking then given to publish Mr. Holt's list, these notes would not have been written. I am also indebted for information or specimens to Miss Armitage, Miss Wood, Dr. Ellis, Mr. E. C. Horrell, F.L.S., Mr. D. A. Jones, F.L.S., and the late Mr. R. de G. Benson.

I have made some attempt to trace (hitherto without success) the herbarium of the late Miss Bowman, of Chester, which, I am informed by Mr. Bagnall, contained a large number of mosses collected in the vicinity of that city.

No localities which appeared in the list of 1898 are repeated below, except where some emendation is necessary; and additional species now included are indicated by an asterisk. My own work in the county has been almost limited to the Wirral peninsula, a district long ago explored by Liverpool bryologists. Last year I

was surprised to find a good quantity of *Bryum calophyllum*, and some of its usual associates, near Wallasey. I think they must be of comparatively recent introduction here. I have searched for them on many occasions before, and it seems hardly possible they would have remained overlooked in a locality that has been frequently visited by good bryologists. As a general rule, the Cheshire sandhills are too dry for the subaquatic Brya of this group. I therefore hazard the conjecture that railway-works have resulted in the formation of the hollow in which the plants grow, within very recent times. In this depression the sand is generally damp, and sometimes even covered with a slight depth of water, for weeks together. The light spores of the Brya may have been blown across the Mersey during high gales, and, alighting on this congenial spot, have duly germinated. Many spores doubtless lie buried in the drier shifting sands, ready to grow, should their vitality remain unimpaired, when the conditions become more favourable. Anyone who has encountered a sandstorm on this coast during high winds, when the flying sand cuts the face and is carried far inland, can imagine the possibility, or even probability, of the much lighter moss-spores being transported still greater distances by this means.

For the sake of completeness, a few very old and probably well-known records are included which were overlooked in preparing the list of 1898.

Sphagnum fimbriatum Wils. Castle Mill; Carrington Moss; Mottram; Brookhouse Bog; Abbotts Moss, *Holt*.—*Var. *tenue* Grav. Wybunbury Bog, *D. A. Jones*.—*S. rubellum* Wils. Wybunbury Bog, *W. Wilson*.—*Var. *versicolor* Russ. Wybunbury Bog, *D. A. Jones*.—*S. *subnitens* R. & W. var. *virescens* Warnst. Hatchmere, *Holt*.—*S. *Warnstorfii* Russ. var. *purpurascens* Russ. Wybunbury Bog, *D. A. Jones*.—Var. *viride* Russ. Wybunbury Bog, *D. A. Jones*.—*S. *squarrosum* Pers. var. *subsquarrosum* Russ. Flaxmere.—Var. *spectabile* Russ. Wybunbury Bog, *D. A. Jones*.—*Var. *imbricatum* Schimp. Flaxpool, *Holt*.—*S. teres* Angstr. *var. *squarrosulum* Warnst. Knutsford Moor, *W. Wilson*.—*Var. *imbricatum* Warnst. Wybunbury Bog, *D. A. Jones*.—*S. cuspidatum* R. & W. *var. *majus* Warnst. Oakmere and Abbotts Moss, *Holt*.—Var. *plumosum* N. & H. Flaxpool and Hatchmere, *Holt*.—*Var. *submersum* Schimp. Oakmere; Heswall Heath.—*F. *serrulata* Schlieph. (= *S. trinitense* C. Müll.). Very fine and characteristic on Heswall Heath in a pool near Mere Lane.—*Var. *falcatum* Russ. Oakmere and Flaxpool, *Holt*.—*S. pulchrum* Warnst. Oakmere, *Holt*; Wybunbury Bog, *D. A. Jones*.—*S. recurvum* R. & W. *var. *amblyphyllum* W. Delamere Forest and Tatton Park, Knutsford.—*Var. *mucronatum* W. Wybunbury Bog, *W. Wilson*; Oakmere, *Wilson & Hunt*. This latter is No. 49 in Braithw. *Sphagn. Brit. Exsicc.*, labelled *S. intermedium* var. *riparium*. Mr. Horrell informs me that it is only a rather robust form of *S. recurvum* var. *mucronatum*. Mr. Holt sent me a still handsomer form from Abbotts Moss labelled *S. intermedium* var. *riparioides* Warnst. Mr. Horrell kindly examined this, and supplied the following reference and translation, which may be of interest to students of the genus, as

the form mentioned is not described in "The European Sphagnaceæ." Extract from *Die Cuspidatum Gruppe*, Warnstorf in *Verh. Bot. Brandenburg*, xxxii. 1890, p. 218, sub *S. recurvum* var. *mucronatum*:—"One of the most robust forms I have yet seen is the f. *riparioides*, mihi. This grows with the upper half above the water, and is almost equally stately with *S. riparium*. The stem is thick, and the 2–3-layered cortex is in part distinctly differentiated from the wood cylinder. The spreading branches are thick, long, and densely or loosely leaved, with large, and especially in the capitulum, strongly undulated leaves, in which the pore formation agrees exactly with the *recurvum*-type, excepting that the apical pores on the outer surface of the leaf in the basal half towards the lateral margins are generally not much larger than the others. In the rather large, shortly isosceles triangular stem-leaves there is generally no trace of fibrils, only rarely towards the apex there are rudiments of fibrils. I have received this from Holt from England (Abbotts Moss, Cheshire)." — *S. molluscum* Bruch. Wybunbury Bog, *J. Whitehead*. — **S. compactum* DC. var. *squarrosum* Russ. Oakmere, *Holt*.—Var. *imbricatum* Warnst. Oakmere, *W. Wilson*.—**S. rufescens* Warnst. Oakmere, *W. Wilson*; Fishpool, Delamere, *J. Whitehead*. Sparingly on Thurstaston Hill.—**S. crassicladum* Warnst. Abbotts Moss, *Holt*. — **S. obesum* Wils. Delamere; Hatchmere; Oakmere; and Hale Moss, *Holt*; Lindon Common, *Whitehead*.—**S. degenerans* Warnst. Carrington Moss, *Holt*.—**S. turfaceum* Warnst. Carrington Moss, *Holt*; Flaxmere.—*S. cymbifolium* Warnst. Abbotts Moss and Carrington Moss, *Holt*.—*Var. *glaucescens* Warnst. Wybunbury Bog, *D. A. Jones*. — *Var. *flavoglaucescens* Russ. Oakmere, *W. Wilson*. — *Var. *glauco-pallens* Warnst. Wybunbury Bog, *D. A. Jones*. — **S. papillosum* Lindb. Abbotts Moss; Hatchmere; and Oakmere, *Holt*.— *Var. *normale* Warnst. Wybunbury Bog, *D. A. Jones*; Flaxmere; Heswall, very sparingly.—*Var. *sublæve* Limpr. Wybunbury Bog, *D. A. Jones*.

Polytrichum formosum Hedw. Dunham Park, *Hunt*; Delamere, *Holt*; Thurstaston Hill, and in Tatton Park, near Knutsford.

Pleuridium subulatum Rab. Ashley; Mere; Castle Mill; and Delamere, *Holt*. In the park behind Eastham Wood.—*P. alternifolium* Rab. Styal, *Capt. Cuncliffe*.

**Cynodontium Bruntoni* B. & S. Alderley, *Hunt*.

Dicranella crispa Schimp. Castle Mill, *Holt*; *D. varia* var. *callistoma* Schimp. Sea-bank near Caldy, Wirral. — *D. secunda* Lindb. Over, *W. Wilson*. — *D. Schreberi* Schimp. In abundant fruit, Ashley Mill, *Holt*. — *D. heteromalla* Schimp. var. *interrupta* B. & S. Rocks near Frodsham, *D. A. Jones*.

Campylopus fragilis B. & S. Hale Moss, *Holt*. — *C. pyriformis* Brid. Thurstaston Common: Heswall.

Dicranum Bonjeanii De Not. Hale Moss, *Hunt*; Marple, *Holt*. —*D. scoparium* Hedw. var. *orthophyllum* Brid. Thurstaston Hill.—*D. Bergeri* Bland. *First* reported from the Oakmere locality by W. Wilson, not Hunt, as given in my first list, although I have specimens collected there by the last-named. It still occurs on Wybunbury Bog (*teste* D. A. Jones).

Fissidens viridulus Wahl. *var. *Lylei* Wils. Near Raby Mere.

Grimmia apocarpa Hedw. Eastham and near Thurstaston.—*G. Doniana* Sm. On several occasions I have looked in vain for this in the locality indicated by Marrat near Eastham.

Hedwigia ciliata Ehrh. Walls near Storeton, *Marrat.*

Rhacomitrium lanuginosum Brid. Sparingly and very stunted in growth on a wall near Bebington, and on stones by the Ship Canal near Hooton Park.—*R. fasciculare* Brid. and **R. heterostichum* Brid. Gayton, *Dr. Ellis.*

Ptychomitrium polyphyllum Fürnr. Gayton, *Dr. Ellis.* In small quantity on sandstone rocks on Thurstaston Hill, associated with *Pertusaria dealbata* and *Parmelia fuliginosa*, two lichens not included in Marrat's list of the species of this district.

Phascum cuspidatum Schreb. Bowdon, *Hunt*; Ashley, *Holt*; Gayton and Barnston, *Dr. Ellis*; near Eastham and Burton.

Pottia lanceolata C. M. Bredbury, *J. Sidebotham.*—*P. minutula* Fürnr. Banks of the Dee near Thurstaston.—*P. intermedia* Fürnr. Raby Mere and Prenton, *Miss Wood.*

Weisia rostellata C. M. Near Frodsham, *Hunt.*

Barbula tophacea Mitt. Banks of the Dee above West Kirby, and sparingly on Hilbre Island.—*B. revoluta* Brid. Alderley, *Holt.* —*B. cylindrica* Schimp. Near Farndon, *R. de G. Benson*; near Caldy.

Tortula aloides De Not. Gayton, *Dr. Ellis.*—*T. muralis* Hedw. var. *æstiva* Brid. Bowdon, *J. Whitehead.*—*T. mutica* Ldb. By the stream in Bromboro Wood, *Marrat.*

Eucalypta streptocarpa Hedw. Walls near Storeton Quarry.

Physcomitrium pyriforme Brid. Damp ground by the roadside near Ireby, *c. frt.*

Ephemerum serratum Hpe. Near the footpath from Eastham to Bebington, associated with *Fossombronia cæspitiformis*; the latter new to the Liverpool district.

Aulacomnium androgynum Schwgr. Heswall Heath.

Bartramia pomiformis Hedw. Altrincham, *Hunt*; Delamere, *Holt*; near Prenton, *Miss Wood*; hedge-cops near Leasowe, *c. fr.*

Leptobryum pyriforme L. Bowdon, Rostherne, and Alderley, *Hunt*; near Knutsford, *Holt*; very fine, and fruiting on the side of the sandstone-cutting through Thurstaston Hill.

Webera annotina Schwgr. Marple, *Holt*; Heswall.—*W. carnea* Schimp. Ashley and Castle Mills, *Holt.*

Bryum inclinatum Bland. Thurstaston Hill, *c. frt.*—*B. pendulum* Schimp. Sandy ground on Storeton Heath, *c. frt.*—**B. Warneum* Bland. On wet sand near the railway at Wallasey, associated with *B. lacustre* Brid., **B. calophyllum* R. Br., and *B. pallens* Milde. These are all much more local on the Cheshire than on the Lancashire coast, but are abundant in the locality indicated.—*B. argenteum* L. *var. *lanatum* B. & S. Near Bromborough, *Dr. Ellis.* —*B. bimum* Schreb. Ashley and Marple, *Hunt*; Lindow Common, *Holt*; Flaxmere.—*B. turbinatum* Schwgr. First found at Marple by Holt (not Whitehead).—*B. intermedium* Brid. On rocks in the cutting through Thurstaston Hill, *c. fr.*—*B. roseum* Schreb. Alderley Edge, *Whitehead.*

**Fontinalis squamosa* L. Hollingworth, 1869, *Whitehead* (in herb. E. Armitage).

Homalia trichomanoides Brid. Near Cotterill Wood, *J. Percival*; Bollin Valley, *Holt*.

Pterygophyllum lucens Brid. Marple, *J. Sidebotham* (not Scholefield); near Cotterill, *Holt*.

Leskea polycarpa Ehrh. Jackson's Boat and Cotterill, *Hunt*; Mere, *Wild*; Ashley Mill, *Holt*; by the stream from Raby Mere, in plenty.

**Brachythecium Mildeanum* Schimp. Knutsford Bog, *Holt*.

Eurynchium murale Milde. Bidston, *Dr. Ellis*.—**E. Teesdalei* Schimp. Ashley Mill, *Hunt*; near Lymm, *Holt*. — *E. pumilum* Schimp. Storeton Quarry.—**E. hians* Hedw. Cotterill Wood, *Hunt*.

Plagiothecium sylvaticum B. & S. *var. *succulentum* Wils. Near Over, Cheshire, *W. Wilson*.—*P. denticulatum* B. & S. *var. *aptychus* Spruce. Frodsham, *W. Wilson*.—*P. undulatum* B. & S. Dunham Park, *Holt*.—**P. latebricola* Wils. Paper Mill Wood, Over, 1828, *W. Wilson*; Hazel Grove, *Holt*; Hattersley, *Whitehead*.

**Amblystegium varium* Lindb. Ashley, *Hunt*; Marple, *Holt & Whitehead*. Mr. G. A. Holt informs me that the "*A. radicale*" of Whitehead's *Mosses of Ashton-under-Lyne and District*, quoted in brackets in my first list, belongs to this species. —*A. irriguum* B. & S. Ashley Mill, *Hunt*; Hazel Grove, *Holt*; Bromboro Wood, *Marrat*.

Hypnum aduncum Hedw. *f. *diversifolia* Ren. West Kirby.—*Var. *intermedium* Schimp. Hale Moss and Brookhouse Bog, *Holt*; Birkenhead and Bidston.—*F. *laxifolia* Ren. Hale Moss, *Holt*.—*Var. *pungens* H. Mull. Knutsford, *Holt*.—*Var. *polycarpon* Bland. Birkenhead (*teste* Mons. F. Renauld).—Var. *paternum* Sanio. A somewhat untypical form in a ditch near Gresford, *Dr. Ellis*.—*H. Sendtneri* Schimp. Hale Moss, *W. Wilson* (Braith. *Br. M. Flora*). A plant I have from this locality, labelled "*H. Sendtneri* Leg., G. E. Hunt," is referred by Mons. Renauld to *H. intermedium*.—*H. fluitans* Linn. *var. *Jeanbernati* Ren. Abbotts Moss, *Holt*; Hale Moss, *Whitehead* (sub nom. var. *paludosum* Sanio).—*Var. *gracile* Boul. Very fine on Thurstaston Hill; Heswall Heath, in fruit.—Forma *laxifolia* Ren. (= *H. Kneiffii* var. *pseudofontanum* Sanio). Oakmere, *Holt*.—Var. *falcatum* Schimp. Heswall Heath, amongst *Sphagnum*.—*Var. *anglicum* forma *Holtii* Sanio. Abbotts Moss, *Holt*.—*H. exannulatum* Gumb. *var. *pinnatum* Boul. Hale Moss, *Whitehead*.—*F. *gracilescens* Ren. Abbotts Moss, *J. Cash*.—*F. *montana* Ren. Walton Bog, *W. Wilson* (ex herb. E. C. Horrell); Hale Moss. *Cook & Whitehead*.—*Var. *purpurascens* Schimp. Fish Pool, *Holt*.—*Var. *falcifolium* Ren. Hale Moss, *W. Wilson*.—*Var. *brachydictyon* Ren. Morley Common and Oakmere, *W. Wilson* (ex herb. E. C. Horrell); Flaxmere. — *H. revolvens* Swartz. Wybunbury Bog, *W. Wilson*. — *Var. *intermedium* (Lindb.) Ren. Hale Moss and Brookhouse Bog, *Holt*; Wybunbury Bog, *D. A. Jones*.—*Var. *Cossoni* Ren. Hale Moss, *Hunt*.—*H. palustre* L. *var. *subsphæricarpon* B. & S. Marple, *Hunt*. — *H. ochraceum* Turn. *var.

flaccidum Milde. Crowden, *Whitehead* (in herb. E. Armitage).—*H. stramineum* Dicks. Abbotts Moss, *c. frt.*, *Holt*; Hale Moss, *Hunt & Whitehead*; Flaxmere.—*H. cordifolium* Hedw. Flaxmere, *c. frt.*—*H. giganteum* Schimp. Flaxmere.

**Hylocomium brevirostre* B. & S. Bredbury Wood, *Sidebotham*.

SHORT NOTES.

Stellaria umbrosa and S. neglecta (p. 151). — Without discussing Mr. Marshall's view of the standing of *S. umbrosa* Opiz as a species, or his desire to transfer to it the var. *major* of *S. media*—matters which seem to need more investigation—I wish to point out that the best-marked difference between *neglecta* and *umbrosa* should not be stated to consist in the glabrous pedicels and sepals of the latter, because in fact those organs are often hairy. This was long ago noticed by Briggs (*Fl. Plymouth*, 50), who likewise drew attention to the descriptions by Boreau and Boswell, which imply that those authors were aware of the occasional pubescence of the plant. The hairy form of *umbrosa* is frequent in North Somerset. In Dec. 1887, I forwarded to the Botanical Exchange Club specimens of each of these forms, with a note mentioning that no other difference could be discovered between them, the seeds of both being furnished with the long acute tubercles characteristic of *umbrosa*. This note was afterwards reproduced in this Journal for 1889 (p. 52). Jas. W. White.

Barbarea intermedia Boreau. — Although widely distributed in Britain as a casual or colonist, this plant seems to occur but rarely, and in small quantity, although doubtless it must be sometimes overlooked. I have only lately become aware of its presence near Bristol, but now have it from quarry refuse at Fishponds, West Gloucester; and from Portishead (one very large plant) and Nailsea Moor, both in North Somerset. The small deep yellow flowers and adpressed pods are quite distinctive. In other respects the plant is, as stated by the author, exactly intermediate between *B. vulgaris* and *præcox*.—Jas. W. White.

Sclerochloa loliacea Woods in West Gloucester.—My friend Mr. Wall brought a specimen from New Passage, on the Severn, seven miles or so above its confluence with the Bristol Avon, and more than twenty from the nearest known station for this grass in Somerset. I then found it there in fair quantity on sea-banks, where the salt spray must often reach it at high tide.—Jas. W. White.

Scapania compacta (Roth) Dum.—In my *Hepaticæ of the British Isles* I describe this species as being unique amongst the British *Scapaniæ* in being paroicous; C. Mueller and Massalongo describe it as dioicous. Mr. Macvicar, in his review of Canon Lett's book (Journ. Bot. 1902, 423), was the first to describe it as heteroicous. So far as I remember, when I drew up my description of the species all the specimens I examined were paroicous, but, since I have had

the opportunity of examining specimens collected by Mr. Mavicar in Scotland and Mr. F. Cavers in Devonshire, I have also paid a special visit to Dolgelly this year, where I collected the species in great abundance and in good fruiting condition, and am able to confirm the accurate determination of Mr. Macvicar; some of the plants are dioicous, others monoicous, and others paroicous.—W. H. Pearson.

Bromus interruptus (p. 67).—I cannot agree that a description such as that given by Mr. H. C. Watson in the *Phytologist*, omitting as it does any character by which this can be distinguished from *B. mollis*, constitutes a valid publication. Mr. Watson endeavours to show that Miss Barnard's plant is only a form of *B. mollis* unworthy of characterization. The claim that a valid publication was made by Miss Barnard sending numbered specimens to the Botanical Society of London is also, in my opinion, untenable. The case is absolutely different from sets of plants duly numbered, such as Schultz's *Herbarium Normale*, which are publicly issued for sale; nor do they come under numbered sets of identical plants, such as those issued by Hooker and Thomson, &c. The Botanical Society of London was only a private society; the plants which were sent out year by year were only sent to a portion of the members, and were never available to the outside world. The number 1356*c* shows that Miss Barnard meant it to be considered as a variety only of *B. mollis*, since the Catalogue of British Plants then current gives 1356 *B. mollis*, and 1356*b* as var. *racemosus*. If this were allowed, some 300 or 400 names which appear in the desiderata list of the Botanical Exchange Club would have to be cited as species, since they, too, although only varieties, are written in the same way as *B. pseudo-velutinus*. Mr. Daydon Jackson writes: "I should maintain that the proper name for your plant is still *Bromus interruptus*, for the recently revived name *pseudo-velutinus* seems a mere chance shot, was not characterized by its author, was not fully and sufficiently diagnosed by Watson, and was not issued as a public set of exsiccata of identic specimens. The parcels of the Botanical Society were put up by a man who was no botanist, and could not run down a plant by published description (*fide* Watson), and were not on sale to the public, so even on the broadest basis of publication they seem to be unable to support the case." I am now able to put the occurrence of *B. interruptus* in Herts beyond question, as I found it abundantly between Aldbury and Tring recently. Mr. Hilton has found it in Sussex.—G. Claridge Druce.

[I think Mr. Druce is right in objecting to the number in question as equivalent to publication. I cannot recognize that there is any parity between the position of the *nomina nuda* in a list of desiderata and that of *B. pseudo-velutinus;* but Mr. Druce is anxious that his opinion should be printed. Against Mr. Jackson's opinion must be set that of Mr. Hiern and the Messrs. Groves, who think that *pseudo-velutinus* should be maintained. How the ignorance or knowledge of the man who "put up the parcels" can affect the specimens and their tickets, or Watson's published note, I am not able to imagine.—James Britten.]

NOTICES OF BOOKS.

Physiologische Pflanzenanatomie. By Dr. G. Haberlandt. Dritte Auflage. Leipzig: Engelmann.

Histological features of plants may be dealt with merely as structural details that are to be faithfully described regardless of their ultimate significance. The subject of histology, treated in this manner, remains a descriptive art with a slight leaven of inductive science; to the student it is a severe catalogue of facts, and to the investigator a useful encyclopædia. But histology regarded either from a phylogenetic or a physiological standpoint, or from both, becomes one of the most stimulating and important branches of botany. It is, however, not always possible to decide whether the significance of definite histological details be phylogenetic or physiological; consequently, histological text-books written from either of these points of view are necessarily more or less narrow and incomplete. For instance, in Professor Haberlandt's book we neither expect nor do we receive an adequate account of modern investigations on the stelar structure of stems. What we do anticipate is a sufficient presentation of a thoroughly modern account of the relations between the structure and functions of the vegetative tissues of plants, and this we do receive.

The present edition of this well-known text-book shows the widest difference from the preceding edition in the chapters on motor and irritable mechanisms, upon which the author is entitled to write with the high authority of a pioneer. The chapter on motile organs is enriched by an account of motor mechanisms whose action is determined by the cohesive force of water contained in cell-lumina, as distinguished from lifeless mechanisms whose movements are due to the hygroscopic properties of cell-walls. Additional information is also given concerning the structure of living motile organs, the motility of which is directly determined by protoplasmic activity. The chapter on the organs of special sense deals successively with tactile organs (tactile pits, papillæ, and hairs), organs (with statocysts and statoliths) capable of perceiving gravitational stimuli, and, finally, organs for the perception of light. In the chapter on the arrangements for the transmission of stimuli, the author first deals with protoplasmic transmission, and discusses the supposed differentiation of protoplasmic fibrillæ for this purpose; and, secondly, he selects *Mimosa pudica* as a type to illustrate, what we may term the hydrodynamic propagation of impulses.

Additions to the body of the text, and to the notes accompanying the citation of literature, have also been made throughout the book. That all these should be complete is too much to expect, when we consider the vast field covered. The short account of mycorhiza, for instance, is neither up to date nor is it sufficiently critical. Nor can it be said that the author has always escaped one of the prominent perils of physiological anatomy—that of premature special pleading. His account of the structure and functions of the laticiferous system is hardly a judicial survey of the available

information. It is quite possible that Professor Haberlandt's contention that laticiferous tubes serve primarily as food-conducting organs may eventually prove to be correct; but the evidence in favour of this view, or other views, is so meagre and equivocal that the question of the functions of laticiferous tissue has not emerged from the region of mere surmise.

But it is more pleasant and easy to note the merits of this work than to find demerits, and Professor Haberlandt's new edition of his work will receive a deservedly assured welcome at the hands of botanical students.

PERCY GROOM.

Prantl's Lehrbuch der Botanik. Edited and revised by Dr. FERDINAND PAX, Professor of Botany and Director of the Botanic Garden, Breslau. Twelfth enlarged and improved edition. Large 8vo. Pp. viii, 478, tt. 439. Engelmann: Leipzig. 1904. Price 6 Marks.

ONE of the most useful and generally used of elementary modern text-books was that prepared thirty years ago by Professor Prantl. It aimed at doing for the elementary student what Sachs's larger *Lehrbuch* did for the advanced, and was drawn up on the lines of the larger work. It had reached the third edition in 1880, when it was translated into English and edited by Professor Vines. Its success in this country is measured by the fact that in 1883 the third English edition appeared. It has since developed on diverging lines, and now survives in our own language in Vines's *Elementary Text-book* (see Journ. Bot., 1899, p. 41), and as the Prantl-Pax *Lehrbuch* in Germany. The volume now under review bears testimony to one of two things: the greater enterprise of the German publisher, or the wider diffusion of the teaching of botany on the Continent, as compared with methods in vogue in our own country, where it seems impossible to produce good and well-illustrated text-books at the low price at which they are published in Germany. Dr. Pax's book is well supplied with excellent figures, large, clear, and helpful. We have seen them all, with one or two exceptions, before; many are from the original Sachs's *Lehrbuch*; but the selection, which was made from very various sources, is good.

The arrangement follows the same lines as in the original volume, the subject-matter being divided into parts dealing respectively with Morphology, Anatomy, Physiology, and Systematic Botany. A comparison with the original volume will give some idea of the advance made in the science during the last thirty years. The third portion comprises three-fifths of the whole. The subdivision of the plant-world entails twelve sections, a wide departure from the original four or five. The difference is due partly to the breaking up of the Algæ, which now appear as Zygophyceæ, Chlorophyceæ, Charales, Phæophyceæ, and Rhodophyceæ. These are preceded by the Myxothallophyta, Schizophyta, Flagellatæ, and Dinoflagellatæ. The Fungi appear as Phycomycetes, Ascomycetes, and Basidiomycetes, with an appendix—Lichenes. Bryophyta and

Pteridophyta are included under the head Archegoniatæ, and the Phanerogams under Embryophyta Siphonogama. The arrangement of the Angiosperms follows that of Engler's *Syllabus*. The book concludes with a short review of the drugs of the German Pharmacopœa.

A. B. R.

Vegetative Life of Cereal Rusts.

Ueber das vegetative Leben der Getraderostpilze. Kgl. Svenska Vet. Akad. Handl. xxxvii. (1904) pp. 1–19 (3 pls.).

Herr Jacob Eriksson has again taken up the vexed question of Mycoplasma, and, in conjunction with Herr G. Tischler, he has made a special research on the uredo form of *Puccinia glumarum*. After explaining methods of work, staining, &c., they discuss the possibility of the uredospores surviving through the winter, and being able to germinate and infect the new growth of host-plants in the spring. The leaves of the growing crop were examined microscopically, and no infection or mycelium in the tissues, neither of the autumn nor of the spring cereals, were detected. It was only towards the end of June that the first uredo-pustules appeared, after which the rust spread with great rapidity.

While examining the plants in early spring, the authors claim to have found, filling certain cells, an abnormal condition of the protoplasm. These plasma-filled cells formed the bulk of the leaf-tissue where they occurred, and their contents are considered to be a mixture of fungal protoplasm with the normal protoplasm of the cell. No mycelium was present at any stage, until within a few days of the formation of the pustules. The authors found creeping strands of plasma in the intercellular spaces, which had no cell-membrane nor recognizable nucleus, though numerous small nucleoli-like grains were present. At a later stage the nuclei were plainly visible in the plasma, each with a central nucleolus surrounded by a clear space. This stage of development they designate as *protomycelium*. And close on this stage the formation of haustoria begins, the protomycelium becomes septate, a pseudoparenchyma is built up, and spore formation follows. The paper is illustrated by three good coloured plates.

This publication has been reviewed by Klebahn, who (Ber. Deutsch. Bot. Ges. xxii. pp. 255–61 (1904) still refuses to consider the question as settled, and makes some very pertinent observations on the work. For instance, how is it possible, he asks, to recognize the exact spot in the host where mycelium is to be found, where there is no visible sign of pustule formation? Again, we have no instance in biology of nucleus formation except by division of previously existing nuclei; there is no spontaneous generation. Klebahn describes some abnormal rust hyphæ he met with in his research on *Puccinia glumarum* some years ago, which very much resemble Eriksson's intercellular mycoplasma.

A. L. S.

BOOK-NOTES, NEWS, &c.

At the meeting of the Linnean Society on June 2nd, the chair was taken by the new President, Prof. A. W. Herdman, F.R.S., who briefly thanked the Society for his election, and mentioned that the Linnean Society was the first scientific society he joined, early in life. A paper, "On the Species of *Impatiens* in the Wallichian Herbarium of the Linnean Society," by Sir Joseph Hooker, was presented to the Society by Mr. C. B. Clarke. The introduction described the material in question, consisting of 48 ticketed specimens, out of 200 known species of the genus; though few in number, these specimens foreshadow the remarkable segregation of the species in the several phyto-geographical regions of India, which has no parallel in any other large genus known to the author. The examination of the material, naturally difficult, was enhanced by the confusion of species on the same sheet, and several numbers for the same species; in the sheets exhibited the confusion can only be accounted for on the supposition that the plants, after having been laid out to be glued down, must, by some accident, have been thrown down or swept off the table, and then gathered together and mounted by an ignorant preparer. The second part of the paper consists of a detailed review of each sheet of the collection, with a critical determination of the specimens. There is one previously undescribed species, which, collected by Wallich in 1821, was found by Sir J. D. Hooker in a bundle of plants remaining (after the great distribution of 1831) in the rooms of the Society, for which the name *Impatiens prætermissa* is proposed.

The draft of the revised Bye-Laws of the Linnean Society was read from the Chair at the meetings of June 2 and 16, and will come up for discussion and approval by the Fellows at the first meeting of the Society in November. The principal alteration is in the provision for the admission of women as Fellows and Associates: this is conveyed in a brief "chapter" headed "Interpretation," which runs: "In the construction of these Bye-Laws words denoting the singular number only shall include the plural number also and *vice versâ*, and words denoting the masculine gender only shall include the feminine gender also." We note that the rule as to the admission of Associates, as to the interpretation of which, as was lately manifest, considerable difference of opinion existed, is no longer ambiguous; it is now definitely stated that their election is to be "in all respects" on the same lines as that of Fellows. Mr. William Watson has therefore the unique distinction of being the only Associate who ever has been, or ever will be, elected by a bare majority.

At the latter meeting, Dr. A. D. Waller gave an abstract of his paper "On Blaze Currents of Vegetable Tissues," showing that these currents were symptomatic of the living tissue, and were not shown by dead organisms. In experimenting upon peas (*Pisum sativum*), the author mentioned the need of access to a garden, in

order that the material might be gathered in proper condition, for certain experiences showed that garden produce obtained in the ordinary course from a market had suffered so much from bruising as to be worthless in these experiments. A paper by Mr. P. Olsson Seffer, "On the Place of Linnæus in the History of Botany," which was communicated by Mr. B. Daydon Jackson, will shortly be published in this Journal.

At the same meeting, Dr. Rendle, on behalf of Mr. W. Fawcett and himself, gave a short account of the Jamaican species of *Lepanthes*, a genus of orchids nearly allied to *Pleurothallis*, and, like the latter, widely distributed on the mountains of equatorial America. The mountains of Jamaica and Cuba mark the limit of the range of the genus northwards. Grisebach, in his *Flora of the British West Indies*, enumerates six species, whereas the collections made by Mr. Fawcett and his assistants, notably Mr. W. Harris, bring the number up to twelve. The plants are small, often minute herbs, rarely more than a few inches in height. They grow on the stems of the tree-ferns and other trees by which the Blue Mountains are clothed to the summits. The tree-stems are covered with mosses and liverworts, amongst which grow species of ferns, together with *Pleurothallis* and *Lepanthes*, the roots of the orchids ramifying through the water-saturated moss-growth. The numerous slender stems bear a single leaf just beneath the apex which subtends the solitary or often fascicled racemes. The flowers are very small, and closely resemble those of *Pleurothallis*, from which they differ in having the petals several times broader than long, and in the close connection between the lip and column. The minute petals and lip show remarkable variations in structure, which are of value in the systematic arrangement of the species.

The facsimile reprint of Parkinson's *Paradisus*, announced a year ago by Messrs. Methuen, has been issued, and is in every way an attractive and delightful volume which cannot fail to meet with a favourable reception in these days of gardens and gardening books. The *Paradisus* has long been scarce, and could only be obtained at a high price, while its value as an important contribution to the history of English gardening, and also for the literary charm attaching to its descriptions, has rendered it a coveted possession. The work is carefully reproduced, page by page, in type resembling that of the original, while the plates are in absolute facsimile. The price of the volume is two guineas, which is by no means high in relation to its value and interest. The edition is, we believe, limited, and those who desire to obtain a copy should do so at once.

It is possible that the very childish talk—an aggravated example of that employed by lady editors of "children's columns" in their converse with their "chicks"—in which Miss Ellen Thomson, "joint principal of Kensington Gardens School," discourses about plants (*Botany Rambles; Summer;* H. Marshall, 1s.), may have its value when delivered by the living voice; but we imagine that any children old enough to read it in print will resent it as insulting to their

intelligence. Only an extract can do justice to Miss Thomson's style:—"The hawthorn branch is not very comfortable to pick, because we get our fingers so scratched by it. This is just what pleases Mr. Hawthorn, I am afraid. I am not surprised that he is angry with us for picking him, because we do not help him to make seeds; but at any rate we do not eat him as the horses and cows do, and I think he minds them more than he does us, and is not at all sorry when his sharp points stab their soft mouths. But he has so many blossoms that I think he will forgive us for taking a few, don't you? Still, when we can enjoy the flowers by going out and looking at them, instead of gathering them, I think it is kinder, and besides, we leave them for other people to look at, too, after we have admired them ourselves." Morbid sentiment pervades the little book; a sensitive infant might be reduced to tears by the description of "the poor tired pea stem" dragged up to the stick by "the poor brave hook" (*i. e.* tendril); although comfort is supplied by the reflection—"How glad the long stem must be to have something to hold on to!" Among the rather feeble illustrations we note (p. 213) *Trifolium hybridum* masquerading as "white clover," while "the daisy" on p. 230, whatever else it may be, is not the plant usually known by that name; she thinks *Convallaria* "might well be called whitebells" (p. 129), and proceeds to call them so:—"I never can make up my mind whether I like whitebells or bluebells best." "Do you know the pretty little blue scylla?" she asks (p. 130). We do not; but the word suggests to us that in avoiding the Scylla of technicalities Miss Thomson has fallen into the Charybdis of nonsense.

The annual volume (1903) of the *Transactions of the British Mycological Society*, recently issued, compares favourably with its predecessors in the variety and interest of its contents. The President, the Rev. W. L. W. Eyre, took as the subject of his presidential address the value of mycology as an instrument of recreation, and warmly recommended the study to dwellers in the country who have the materials for observation always within reach. An account is given of the annual foray held last autumn at Savernake Forest, where some 450 species were collected. The usual list of new species added to the British flora during the year is also published. This list alone would make the *Transactions* a necessity to working fungologists. Papers by Arthur Lister, A. Lorrain Smith, and Carleton Rea complete the number. There are three beautifully-printed coloured plates from drawings by Mrs. Carleton Rea.

Mr. Edward Step's very pretty and handy little book on *Wayside and Woodland Trees* (F. Warne & Co., 6s.) is noteworthy especially on account of the numerous and excellent illustrations—127 in number, from photographs—which adorn its pages. These show the same tree in summer and in winter, and also, in many cases, the bole on a somewhat large scale, and leave nothing to be desired: there are also numerous useful figures in the text. "Trees of foreign origin, some of them introduced so long ago that they are commonly regarded as native by those who are not botanists," are included in

the work. The letterpress is popular in style and in the main accurate; the author, however, is not always happy in his explanation of popular names—*e. g.* the name "Whip-crop" for *Viburnum Lantana* hardly "indicates the supple and elastic character of the branches," but refers to the use of the long, straight, tough shoots for whip-handles. The local names, we note, are mainly taken from the *Dictionary of English Plant-names*—a fact which should, we think, have been acknowledged in the preface. The fruit of *Cornus* is not a "berry," but a drupe.

Mr. F. Cavers, who has lately published some important studies on the morphology of the Hepaticæ, has issued a pamphlet of forty-eight pages, entitled "Contributions to the Biology of the Hepaticæ. Part I. *Targionia, Reboulia, Preissia, Monoclea*" (printed for the author by Chorley and Pickersgill, Leeds and London, March, 1904), in which he treats of plants which he has cultivated and kept under observation during the past three years. As a result, he is able to throw light upon various points previously overlooked or incompletely elucidated. This is especially the case with *Monoclea;* and he has now given us the most thorough account of this plant that has yet been published, having obtained abundant fresh material for his research from a nursery-garden in York. He describes for each of the four genera the external characters of the thallus, the rhizoids, ventral scales, epidermis, pores, air-chambers, the receptacles, antheridia, archegonia, sporangium, capsule, spores and elaters, and the development and life-history generally, illustrating his account of the various details with numerous figures in the text. It is an important and capable piece of work, full of interest for all who are concerned with the study of the Hepaticæ, and supplementing the systematic treatment of these genera by Mr. Pearson and others.

Mrs. Percy Sladen, to perpetuate the memory of her husband, sometime zoological secretary of the Linnean Society, proposes to devote the sum of £20,000 to scientific research. This sum will be assigned, under the name of the Percy Sladen Memorial Fund, to trustees who will employ the income arising therefrom, in their uncontrolled discretion, to "any research or investigation in natural science, more especially in the sciences of zoology, geology, and anthropology." The collection made in Matto Grosso and Northern Paraguay in 1902–3 by M. A. Robert at Mrs. Sladen's expense, and presented by her to the National Herbarium, makes it clear that botany will not be overlooked. Some of the novelties of this expedition have already been described in the February and April numbers of this year's Journal.

We have received, too late for notice in this number, the new edition of Messrs. Dixon and Jameson's *Student's Handbook of British Mosses*. It is a handsome volume of 48+586 pages, with 65 plates. The London publishers are John Wheldon & Co., 38, Great Queen Street; the price is 18s. 6d. net.

A x 2

About 4/5 nat size.

B x 2

H.W. Pugsley del
S.C. Hendrey lith

West, Newman imp. London

Fumaria occidentalis *Pugsley (rampant form).*

A NEW FUMARIA.

By H. W. Pugsley, B.A.

(Plate 462.)

That a new *Fumaria*—one of the most conspicuous in the whole genus—should be discovered at the present day in Great Britain may seem extraordinary; but when it is recollected that the existence of Haussknecht's monograph of 1873 has been ignored in all of our Floras published since that year, and that a species so widely distributed in these islands as *F. confusa* altogether escaped the notice of Syme, the complete neglect of the genus by British botanists during the latter part of the nineteenth century will be realized, and the publication of a new species at this late date will become less inexplicable.

My first suspicion of the existence of a new British fumitory occurred towards the end of the spring of 1902, when, in looking over the specimens in the collection of Mr. A. O. Hume, C.B., I remarked, under *F. pallidiflora*, a form from Newquay, Cornwall, which I could not assign to any recognized British species; and very shortly afterwards the Rev. H. J. Riddelsdell sent me a similar plant from Helston. Both of these plants were noticeable for their handsome flowers and large, rugose fruits; and I saw that, although they resembled *F. capreolata* in the colour of the corolla, in respect of the rugosity of the fruits *F. confusa* was their nearest British ally.

In the following June, without attempting to work out these specimens or compare them with named continental forms, I went to West Cornwall for a short holiday, and while at Penzance in quest of *F. speciosa*, I met with a splendid patch of rampant fumitory, which I immediately saw was quite new to me, and identical with the plants gathered by Mr. Hume and Mr. Riddelsdell.

A cursory examination of these living examples sufficed to show that they were clearly different from *F. confusa*, and, indeed, from every other British species, and were rather allies or forms of the Spanish species, *F. agraria* Lag. A few days after the discovery of the plant at Penzance, I again found it, in the same rampant form, in two separate spots at Helston, and since that date have seen specimens collected by various botanists at Newquay, where it is said to be of frequent occurrence.

After thus seeing the plant in the living state, I fully expected to be able to identify it with *F. agraria* or *F. major* Badarro, both natives of South Europe, and, having seen no specimens except of very recent date, I suspected it to be an introduction in Cornwall, where so many aliens have become established.

In this connection it may be of interest to note that *F. agraria* Lag. was published as a British plant so long ago as 1848, when Mr. Mitten recorded it in the *London Journal of Botany*, p. 556; the plant described by him was at that time in Borrer's herbarium, and had been collected at Tintagel, Cornwall. In the following year, Babington, writing in the *Botanical Gazette*, p. 61, reported the same form from North Wales. In 1851, however, in the third

edition of the *Manual*, *F. agraria* Bab. was made a synonym of *F. capreolata* L. var. γ *media*, which soon afterwards was identified with *F. confusa* Jordan. Borrer's plant is no longer in his herbarium at Kew, and it is impossible to determine positively from Mr. Mitten's description whether he was right or not in referring it to *F. agraria;* but its subsequent identification with *F. confusa* was more probably correct, although a future investigation of the fumitories about Tintagel may show it to have belonged to the larger-flowered form now found further to the west.

Upon careful comparison of the new Cornish plant with the specimens at the British Museum and at Kew, and with the descriptions in the monographs of the genus, I find that, though resembling *F. agraria* and *F. major*, it presents essential points of difference from each of them, and indeed from every other described form, and thus would appear to be an undoubted native, constituting a second endemic species for Britain. In its extremely restricted range, confined, as it would seem to be, to West Cornwall, it forms a marked contrast to the other endemic British species, *F. purpurea*, which occurs here and there from Penzance to Orkney, as well as in Ireland; but outside Britain other species have been described from a single locality, and while a few members of the genus possess a very wide range, a considerable proportion of the total number of known species are distinctly local.

Fumaria occidentalis, sp. nov. Robusta, caule ramoso, suberecto vel scandente. Folia 2–3 pinnatisecta, laciniis planis, oblongo-lanceolatis, obtuso-mucronatis vel acutis; petioli secundarii in formis scandentibus sæpe cirrhoso-convoluti. Racemi sub-20-flori, laxiusculi tandem elongati, pedunculis nunc racemos subæquantibus nunc paulo superantibus. Bracteæ lanceolatæ, acuminatæ, sæpissime pedicellos fructiferos subæquantes, raro multo breviores. *Pedicelli fructiferi* apice dilatati *in exemplis arvalibus erecto-patentes rectique, in scandentibus patenti-recurvi. Flores magni*, 12–14 mm. longi, *roseo-albidi: petalo superiore* latiusculo, carinato, subacuto, *alis* latis reflexis apicem attingentibus, *externe margine albida atropurpureis;* petalo inferiore carina viridi marginibus albidis, latiusculis, planis vel paulo deflexis apicem attingentibus; petalis interioribus sursum curvatis, obtusis, apiculatis, apice atropurpureis. *Sepala* 4–5½ mm. longa, 2–3 mm. lata, *ovata*, acuminata, infra medium crebre inæqualiter inciso-dentata, *corollæ tubum latitudine saltem æquantia*, præter nervum dorsalem viridiusculum albida. *Fructus magni*, subglobosi, in vivo *subacuti*, læves, stipite obscuro quam pedicelli apex paulo angustiore, siccitate *tuberculato-rugosi*, bifoveolati, insigniter *apice emarginato carinato-compressi.*

A plant of more robust habit than any other British fumitory, short, suberect and branchy when growing in open fields, or with long, trailing stems on walls and hedgebanks. Leaves 2–3 pinnatisect; with flat, incised leaflets and oblong-lanceolate lobes, obtuse-mucronate or acute, usually a little narrower than those of *F. capreolata*. Petioles often cirrhose in rampant examples. Racemes up to 20-flowered, rather lax and lengthening in fruit; peduncles about as long as the racemes, the lower sometimes longer. Bracts

lanceolate-acuminate, usually nearly as long as the fruiting pedicels, but occasionally much shorter. Pedicels much thickened at the tip, straight and suberect in fruit in open field forms, or arcuate and slightly decurved in rampant plants. Flowers larger and more handsome than in any other British form, 12–14 mm. long, rosy-white; upper petal rather broad, keeled, subacute, with broad wings reflexed upwards and reaching its apex, the wings externally dark purple below, with well-marked whitish margins before fertilization; lower petal with green keel and broad, whitish, spreading or slightly deflexed wings, which extend to its apex; inner petals curved upwards, obtuse, apiculate, tipped with dark purple. Sepals 4–5½ mm. long and 2–3 mm. broad, ovate, acuminate, frequently irregularly incise-dentate towards the base, white, with greenish dorsal nerve, at least as broad as the corolla-tube. Fruits large, subrotund, smooth and pointed when fresh, with an inconspicuous neck slightly narrower than the tip of the pedicel; when dry, coarsely but not deeply tubercular-rugose and distinctly keeled-compressed, with two shallow apical pits, and the keel drawn into a very short, blunt beak, which is notched at maturity.

F. occidentalis is most nearly allied to *F. agraria* Lag., and may be considered somewhat intermediate between that species and *F. flabellata* Gasp. From *F. agraria* it is distinguished chiefly by its much larger sepals, which, instead of being lanceolate, are ovate, and fully as broad as the corolla-tube. The upper petal of *F. agraria* also differs in being more obtuse and rounded, and in the absence of the dark purple colour on the outside of the wings which characterizes the other. The fruits of the two species are very similar, those of *F. occidentalis* appearing, on the average, a little more compressed and a little less strongly beaked than those of *F. agraria*, while in both the degree of rugosity seems somewhat variable. Moreover, while in rampant forms of *F. occidentalis* the fruiting pedicels become curved and slightly deflexed, in *F. agraria*, so far as I am aware, they are invariably straight.

From *F. flabellata* Gasp., which has the aspect of a fine *F. capreolata*, with broadly winged outer petals and fruits rugose when dry, the present species may be separated by several well-marked differences. Its peduncles are clearly shorter, though a trifle longer than in *F. agraria*, and the fruiting pedicels are always less recurved. Its flowers are still larger, and appear lighter in colour, owing to the upper as well as the inner petals of *F. flabellata* being entirely tipped with dark purple, while in *F. occidentalis* a purple spot only is seen on the upper petal. The sepals of the two exhibit some degree of resemblance, but are thinner, more toothed, and more acuminate in *F. occidentalis*. In respect of fruit, the two species are widely different, that of *F. flabellata* being much smaller and more obtuse, its profile resembling that of *F. capreolata*, and quite lacking the conspicuous keel and broad notched beak which mark the relationship between *F. occidentalis* and *F. agraria*.

The other species with which *F. occidentalis* is most likely to be confused are *F. major* Badarro, *F. spectabilis* Bischoff, which Haussknecht considers a doubtful plant and places under *major*, and

F. atlantica Cosson & Dur. To each of these it presents a strong contrast in its much larger sepals, and from the first two may be further distinguished by its pale flowers, those of *F. major* and *F. spectabilis* being pink, with the tip entirely purple, much as in *F. Boræi* Jord. Further than this, their fruits also are less strongly keeled, and, wanting the notched beak, present a more rounded-obtuse outline, crowned with a distinct apiculus. Of *F. atlantica* I have been unable to examine satisfactory specimens, but it would appear to differ sufficiently not only in its much smaller sepals, which do not exceed 3 mm. in length, but in the coloration of the corolla, which simulates that of *F. agraria*.

So far as British plants are concerned, *F. occidentalis* can hardly be mistaken for any other species, at least in the herbarium, its large, coarsely rugose fruits being quite distinct. When growing, it is perhaps liable to be confounded with *F. confusa*, or, more probably, in the rampant state, with *F. capreolata*, whose aspect it then assumes to some extent, owing to the pale and recurving flowers. It may be distinguished from *F. confusa*, in addition to the larger and pointed fruits, by the size of its flowers, with white-edged purple on the upper petal, and proportionally larger sepals and longer bracts. The rampant forms are best separated from *F. capreolata* by the same fruit characters, and by the shape of the corolla; the broad and broadly winged upper petal and spreading margins of the lower one, characteristic of the *Agrariæ*, contrasting sharply with the narrow, pointed petals, the upper little winged, and the lower with erect, almost obsolete margins, which are found in *F. capreolata*.

The addition of this new species to the British list completes the representation here of the six sections of the genus, as defined by Haussknecht. Among the *Angustisectæ*, or small-flowered species with finely cut foliage, we have *F. officinalis* L. representing the *Officinales*; *F. parviflora* Lam. and *F. Vaillantii* Lois. the *Parvifloræ*; and *F. densiflora* DC. the *Latisepalæ*. Of the *Latisectæ*, or larger-flowered species with broader leaf-segments, *F. confusa* Jord., *F. Boræi* Jord., and *F. muralis* Sonder, stand for the *Murales*; *F. capreolata* L. and my *F. purpurea* for the *Capreolatæ*; and, finally, *F. occidentalis* for the *Agrariæ*.

It is almost certain that this new species will be met with in fresh localities in the west of Cornwall, and not at all improbable that it may be found to extend into the neighbouring vice-county, or even into other parts of these islands. When growing, it is a singularly beautiful plant, probably inferior to no other in the whole genus; and it is sincerely to be hoped that the attention now directed to it will not result in its being largely gathered as a valuable rarity, and its continued existence with us consequently endangered.

Description of Plate 462.

Fumaria occidentalis Pugsley, about four-fifths natural size.—Detached flower and fruits showing profile and rugosity as seen when dry, about twice natural size.

THE FLORA OF BRITISH INDIA.

By Sir Joseph Dalton Hooker.

(with portrait.)

[The following summary of the Flora of British India forms the introductory portion of the very important and interesting "sketch" of the Flora which forms a chapter in the descriptive volume of "The Indian Empire," to be published with the forthcoming new edition of the *Imperial Gazetteer of India*. This chapter has been "issued, in an advanced form (subject to revision), with the authority of the Secretary of State, and in response to representations from distinguished botanists in Europe and India, in order that, with as little delay as possible, it may be in the hands not only of Indian botanists and foresters, but of all who take an interest in the vegetable productions of our vast Imperial possessions in the East."

The summary gives so admirable an idea cf the constituents of the Flora that we have obtained Sir Joseph's permission to reprint it in these pages, believing that it cannot fail to interest many of our readers, especially those whe pay attention to matters connected with distribution. For the details of distribution in the various provinces, reference must be made to the sketch itself. We are fortunate in being able to reproduce the excellent portrait of the distinguished author, who celebrated his eighty-seventh birthday on the 30th of last month. For this we are indebted to the courtesy of Mr. Alexander Somerville, B. Sc., F.L.S., President of the Natural History Society of Glasgow, in whose *Transactions* it appeared. The portrait was taken in 1895.—Ed. Journ. Bot.]

The term British India, as employed in this chapter, embraces, over and above the vast territory controlled by the Government of India, some wholly independent countries, of which Nepal, and the Himalaya east of Sikkim, are the chief; together with Ceylon and the Malayan Peninsula, which are in great part under the Colonial Government.

The term flora applies in this sketch to native flowering plants, ferns, and their allies. Collected materials do not exist for discussing the distribution of mosses, hepaticæ, lichens, and fungi, which abound in most parts of India, or of the algæ in its seas and fresh waters. On the other hand, such extensive herbaria of the higher orders of plants have, during the last century especially, been made over most parts of British India, that the study of their contents may be assumed to provide sufficient materials for a review of its flora.

The flora of British India is more varied than that of any other country of equal area in the Eastern Hemisphere, if not in the globe. This is due to its geographical extension, embracing so many degrees of latitude, temperate and tropical; to its surface rising from the level of the sea to heights above the limits of vegetation; to its climates varying from torrid to arctic, and from almost absolute aridity to a maximum of humidity; and to the immigration of

plants from widely different bordering countries, notably of Chinese and Malayan on the east and south; of Oriental,* European, and African on the west; and of Tibetan and Siberian on the north. Whether India is richer in number of genera and species than any other area on the globe of equal dimensions is doubtful; it is certainly far poorer in endemic genera and species than many others, especially China, Australia, and South Africa.

Of the elements of the Indian flora the Malayan is the dominant, but, until the floras of Sumatra, Tonkin, and South China are better known, it is not possible to estimate its comparative strength. The Oriental and European elements can be approximately estimated. About 570 European genera and 760 species are indigenous in India, of which about 430 genera and over 400 species are British; and if the Oriental genera and species be added to the European, these figures would probably be doubled. The African element, which includes the Arabian, is third in amount, and it will no doubt be augmented as the flora of Equatorial Africa becomes better known. The Tibetan and Siberian elements, which include an arctic, are all but confined to the alpine regions of the Himalaya. Lastly, the Chinese and Japanese floras are strongly represented throughout the temperate Himalaya, and in Burma.

Of the natural orders of flowering plants, ferns, and their allies comprised in the flora of British India, not one is peculiar to it; and if the genera common to it and to one or more of the adjacent countries be excluded, few endemic genera remain, and such of them as are endemic are local, and, with few exceptions, are restricted to one or few species.† It may hence be affirmed that in a large sense there is no Indian flora proper.‡

The British Indian flora, though so various as to its elements, presents few anomalies in a phytogeographic point of view. The most remarkable instances of such anomalies are the presence in it of one or a few species of what are very large and all but endemic genera in Australia—namely, *Bæckia*, *Leptospermum*, *Melaleuca*, *Leucopogon*, *Stylidium*, *Helicia*, and *Casuarina*. Others are *Oxybaphus himalaicus*, the solitary extra-American species of the genus; *Pyrularia edulis*, the only congeners of which are a Javan and a

---

* The term "Oriental" is unfortunately used in a very different sense by botanists and zoologists. In 1755 it was adopted by Gronovius as the title *Flora Orientalis* of his work on the plants of the Levant and Mesopotamia; and it is the title of Boissier's great Flora of the East, from Greece to Afghanistan inclusive. This meaning has long been accepted by botanists. In zoological literature, "Oriental" is more synonymous with Eastern India.

† Of these exceptions, perhaps the most notable one is that of two genera of *Dipterocarpeæ*—*Doona* with eleven species, and *Stemonoporus* with fifteen—which are both confined to Ceylon.

‡ Mr. C. B. Clarke, in a most instructive essay, "On the Botanical Subareas of British India," has speculated on the successive periods at which the component elements of the flora were introduced, and has arrived at the following division:—(1) The Deccan or Indo-African; (2) the Malayan; (3) the Central Asian; (4) the European. Mr. Clarke's sub-areas approximately correspond with the provinces of this sketch. See *Journal of the Linnean Society*, Botany, vol. xxxiv. (1898), p. 142.

North American; and *Vogelia*, which is limited to three species, an Indian, South African, and Socotran. Of absentee natural orders of the Old World, the most notable are *Myoporineæ*, which, though mainly Australian, has Chinese, Japanese, and Mascarene species; *Empetraceæ*, one species of which girdles the globe in the north temperate hemisphere and reappears in Chili (the rarity of bog-land in the Himalaya must be the cause of its absence); and *Cistineæ*, an order containing upwards of one hundred European and Oriental species, of which one only (a Persian) reaches independent Baluchistan. The absence of any indigenous lime (*Tilia*) or beech (*Fagus*) or chestnut (*Castanea*) in the temperate Himalaya is remarkable, all three being European, Oriental, and Japanese genera. The chestnut, which has been introduced into N.W. India from Europe, ripens its fruit there.

With the exception of the rhododendron belt in the high Eastern Himalaya, there are in India few assemblages of species of peculiar or conspicuous plants giving a character to the landscape over wide areas, as do the heaths in Britain, the heaths and succulent plants in South Africa, the *Eucalypti*, *Epacrideæ*, and *Proteaceæ* in Australia, the *Cacti* in America, or the great aloes and euphorbias in East Tropical and South Africa; nor are there representatives of the pampas, catingas, savannas, or prairie vegetation of America. The coniferous forests of the Himalaya resemble those of other northern countries, and the great teak forests have no peculiar features.* The wood-oil trees (*Dipterocarpi*) in Burma form an exception, towering over the forests of Arakan and Tenasserim. Of gregarious trees, some of the most conspicuous are the sal (*Shorea robusta*), eng (*Dipterocarpus turbinatus*), sissoo (*Dalbergia Sissoo*), khair (*Acacia Catechu*), and babul (*A. arabica*).

Indigenous palms are few compared with many regions in Tropical America, and are comparatively unobtrusive. The Talipot palms (species of *Corypha*) are the most majestic palms in India, in stature, foliage, and inflorescence; but they are exceedingly rare and local. The Indian date (*Phœnix sylvestris*), the fan-palm or palmyra (*Borassus flabellifer*), and the coco-nut near the sea, are the only palms that may be said to be conspicuous in the landscape of the plains of India. On the other hand, graceful, erect or climbing palms with pinnate or fan-shaped leaves frequent the humid evergreen forests, where the rattans (*Calami*) ascend the trees by their hooked spines, and expose their feathery crowns to the light. Bamboos, of which there are more than 120 kinds in India, are, as elsewhere in the tropics, important features, whether as clumps growing in the open, or forming in association all but impenetrable jungles; the taller kinds monopolize large areas in the hot lower regions, and the smaller clothe mountain-slopes up to 10,000 ft. in the Himalaya. Tree-ferns, of which there are about twenty (?)

* For an account of the Indian forests, reference must be made to the chapter on Forestry in this Gazetteer, and for details to Gamble's *Manual of Indian Timbers* (London, 1902). In the latter invaluable work, 4749 woody plants are recorded for British India (exclusive of those of the Malayan Peninsula), and, of these, 2513 are trees, 1429 shrubs, and 807 climbers.

species, frequent the deepest forests of the Eastern Himalaya, Burma, Malabar, the Malay Peninsula, and Ceylon.

Of shrubs that form a feature in the landscape from their gregarious habits, the most conspicuous examples are the rhododendrons of the temperate regions of the Himalaya, and the genus *Strobilanthes* in the western hills of the peninsula; many species of the latter genus do not flower till they have arrived at a certain period of growth, and then, after simultaneously flowering, seed profusely and die. Some bamboos, also gregarious, display the same habit, which they retain under cultivation in Europe. Three local, all but stemless palms are eminently gregarious—*Phœnix farinifera* of the Coromandel coast, *Nannorhops Ritchieana* of extreme North-West India, and *Nipa fruticans* of the Sundarbans. Amongst the herbaceous plants, the beautiful genus *Impatiens* takes the first place, from abounding in all humid districts except the Malay Peninsula, and from its numerous species being (with hardly an exception) endemic; added to which is the fact that, though profuse in individuals, the species are remarkably local; those of the Eastern Himalaya differing from those of the Western, these again from the Burmese, and all from those of the Western Peninsula and Ceylon; and most of these last from one another.

Of fresh-water flowering plants, floating or wholly or partially submerged, there are many kinds in India. They include the beautiful white, red, and blue *Nymphæas*, *Nelumbium speciosum*, and *Euryale ferox*, the latter a near ally of the *Victoria Regina* of South American waters; also many carnivorous bladder-worts (*Utricularia*) and the curious *Aldrovandra* with leaves like those of the venus fly-trap, a South European plant, hitherto found nowhere in India except in some saline ponds near Calcutta. The most remarkable among the Indian fresh-water plants are the podostemonads, which clothe rocks and stones in rapid streams with submerged spreading fronds, resembling green lichens more than flowering plants. They are most common in Malabar and Ceylon, and are never found in rivers that have glacial sources. Marine flowering plants are few indeed, and are mostly of wide oceanic distribution. Of peculiar littoral sand-hill plants there are few, the most notable being the above-mentioned *Phœnix farinifera*, *Ipomæa biloba*, and a curious grass, *Spinifex*, of Australian affinity. The esturial plants will be enumerated when describing the tidal flora of the Sundarbans.

The number of recorded species of flowering plants, in India, approaches 17,000,* under 176 natural orders;† and there are probably 600 species of ferns and their allies.

---

* In the *Flora of British India* (1872–1897) about 15,900 species of flowering plants are described. But since the publication of the first volumes of that work the greater part of Burma has fallen under British rule, and large accessions have been made to the Indian flora from that and other quarters, especially from the Malay Peninsula.

† In the *Genera Plantarum* (by G. Bentham and J. D. H., 1862–1883), 200 natural orders of flowering plants are described. Some of these have been rightly subdivided by earlier or later authors.

The largest order of flowering plants in all India is *Orchideæ*, of which more than 1600 species are recorded, and additions are constantly being discovered. The greater number of these are tropical and epiphytic, and with comparatively few exceptions all are endemic. Ten are European, and they are British.* It is only in the Eastern Himalaya, Burma, and the Malay Peninsula that the order predominates; in other parts of India, *Leguminosæ*, *Gramineæ*, and *Euphorbiaceæ* outnumber them.

The ten dominant orders of flowering plants in all British India are in numerical sequence:—

1. *Orchideæ.*
2. *Leguminosæ.*
3. *Gramineæ.*
4. *Rubiaceæ.*
5. *Euphorbiaceæ.*
6. *Acanthaceæ.*
7. *Compositæ.*
8. *Cyperaceæ.*
9. *Labiatæ.*
10. *Urticaceæ.*

Of these, all but *Labiatæ* and *Compositæ* are more tropical than temperate. *Compositæ* take a very low place, and would, but for the temperate and alpine Himalayan species, take a very much lower. In this respect India shares, with the whole Malayan Archipelago, an exceptional poverty in what is not only the largest of all the orders of flowering plants in the world, but the one that heads the list in most other parts of the globe.

The following data,† deduced from the whole Indian flora, are of use for comparison with those of its several botanical provinces. The proportion of monocotyledons to dicotyledons is approximately as 1 to 2·3; of genera to species as about 1 to 7. Of palms there are more than 220 recorded species; of bamboos, 120; of conifers, only 22; of *Cycadeæ*, 5. Of genera with 100 or more species there are 10, of which 4 are orchids, headed by 200 of *Dendrobium*; the others are *Impatiens*, *Eugenia*, *Pedicularis*, *Strobilanthes*, *Ficus*, *Bulbophyllum*, *Eria*, *Habenaria*, and *Carex*.

British India is primarily divisible into three botanical areas or regions—a Himalayan, an eastern, and a western. The two latter are roughly limited by a line drawn meridionally from the Himalaya to the Bay of Bengal. The prominent characters of the three are that the Himalayan presents a rich, tropical, temperate, and alpine flora, with forests of conifers, many oaks, and a profusion of orchids; the eastern has no alpine flora, a very restricted temperate one, few conifers, many oaks and palms, and a great preponderance of orchids; the western has only one (very local) conifer, no oaks, few palms, and comparatively few orchids. Further, the Himalayan flora abounds in European genera; the eastern in Chinese and Malayan; the western in European, Oriental, and African. These three botanical regions or areas are divisible into nine botanical

---

* *Corallorhiza innata*, *Goodyera repens*, *Spiranthes autumnalis*, *Listera ovata* and *cordata*, *Epipogum aphyllum*, *Cephalanthera ensifolia*, *Epipactis latifolia*, *Orchis latifolia*, *Habenaria viridis*, *Herminium Monorchis*. All these are temperate Western Himalayan; a few are also eastern.

† It need hardly be pointed out that throughout this sketch numbers are approximate only, and are liable to revision.

provinces, for the determination of which I have, after long deliberation, resorted to the number of species of the ten largest natural orders in each province as the leading exponent of their botanical differences. The nine provinces are :—

i. The Eastern Himalaya, extending from Sikkim to the Mishmi mountains in Upper Assam.

ii. The Western Himalaya,* extending from Kumaun to Chitral.

iii. The Indus Plain, including the Punjab, Sind, and Rajputana west of the Aravalli range and Jumna river, Cutch and Gujarat.

iv. The Gangetic Plain from the Aravalli hills and Jumna river to Bengal, the Sundarbans, the plain of Assam, and the low country of Orissa north of the Mahanadi river. This province is divisible into three subprovinces—an upper dry, lower humid, and the Sundarbans.

v. Malabar in a very extended sense—the humid belt of hilly or mountainous country extending along the western side of the western peninsula, from the mouth of the Tapti river to Cape Comorin. It includes the Konkan, Kanara, Malabar proper, Cochin, Travancore, and the Laccadive Islands.

vi. The Deccan in a very broad sense—that is, the whole comparatively dry elevated table-land of India east of Malabar and south of the Gangetic and Indus plains, together with, as a subprovince, the low-lying strip of coast land extending from Orissa to Tinnevelly, known as the Coromandel coast.

vii. Ceylon and the Maldive Islands.

viii. Burma, bounded on the N. and N.E. by the flanking mountains on the south of the Assam valley and China, on the east by China and Siam, on the west by Bengal and the Indian Ocean, and on the south by the State of Keda in the Malay Peninsula. The Andaman Islands, and possibly the Nicobar, belong to the Burmese province.

ix. The Malay Peninsula, from Keda to Singapore, including the British protected States in this peninsula. The British provinces proper are Wellesley, the island of Penang, Malacca, and Singapore. The Nicobar Islands may belong to this province.

A glance at the map of India shows that, in this attempt to delimit these botanical provinces geographically, large areas are in some cases difficult to apportion, as, for example, Gujarat, of which the N.W. half is probably referable botanically to Sind, the S.E. to the Konkan. The eastern limit of the Malabar province is undefinable, because of the number of spurs and valleys from its hills which project far into the Deccan province, sometimes almost crossing it, carrying with them types of the Malabar flora. The flora of the trans-Indus mountains bounding the Indus Plain

---

* The independent kingdom of Nepal, extending for five hundred miles between the Eastern and Western Himalaya, is here left out of account, from ignorance of its flora. Except a very limited collection made in the valley of Khatmandu by Wallich in 1821, the flora of Nepal is all but unknown. Great as are the differences between the floras of Sikkim and Kumaun, the two meet in Nepal, as indicated by Wallich's collections, which further contain a considerable number of endemic species.

province on the west, of which the eastern flanks are British Indian, is known botanically in one valley only—the Kuram. To have referred this either to the West Himalaya province or to Afghanistan would have been premature. The flora of British Baluchistan differs considerably from that of any other botanical province of India.

BOTANICAL NOMENCLATURE.

I.—Proposals of some English Botanists.

[THE suggestions that have been made by the botanists of various countries for consideration at the Congress to be held in Vienna next June have been published in various periodicals; and it may be of interest to British botanists to read those which have been sent from this country. They have at any rate the merit of brevity; it was felt by those who formulated them that the Paris Code as it stands is in the main satisfactory, and that only those matters were worth putting forward which were either ambiguous or on other grounds open to discussion. This is not the view of the American botanists who represent what is known as the "Rochester School." These excellent and energetic folk, who, since the publication of the *Preliminary Catalogue* in 1888, have never hesitated to change their minds as to practice, if not principles, and have thus encumbered nomenclature with a host of useless synonyms, have at last arrived at the conviction, expressed with characteristic modesty, that nothing less than "the abandonment of all the articles" of the Paris Code, and "the substitution" of their very latest conclusions—which, it may be noted, have been "rearranged and modified" even since their own Commission in 1903!—will satisfy them. They print their new code in the *Bulletin of the Torrey Botanical Club* for May, and it is some satisfaction to know that they can hardly issue another until after the Congress. It is right to say that the code is very carefully drawn up, and is made extremely clear by means of examples. It embodies the retention of the oldest trivial name, and the—as it has always seemed to us—ridiculous principle of "priority in place"; the whole section dealing with "types" seems to us open to discussion, and even to serious objection. The Code is signed by Dr. Britton, Prof. Coulter, Mr. Trelease, Prof. Arthur, and numerous others.

The "botanists of the Gray Herbarium" and their associates are less insistent; they content themselves with amendments to four of the Paris articles and the addition of two new ones—one of them, we regret to see, endorsing "priority of place," which the Belgian and Swiss botanists in their *Propositions* say, "nous ne pouvons à aucun degré accepter." With their suggestions the signatories of the English *Amendments* find themselves largely in accord. The Gray Herbarium memorandum is signed by Prof. Farlow, Prof. Robinson, Prof. Goodale, and others.

The British Museum botanists were moved to take action by

the reflection that England was not represented at Paris in 1867, and it seemed highly desirable that a similar attitude of "stand-offishness" should not be assumed at the coming Congress. No attempt has been made to obtain numerous signatures; but the Museum botanists are glad that their views claim the support of Prof. Daniel Oliver, Messrs. Daydon Jackson, Hiern, and Spencer Moore.

For the benefit of our readers who may not have access to the documents, we have added in their places the text of the "Amendments" of the Gray Herbarium botanists referred to in the British Museum document. The English Amendments are drawn up in the form prescribed by the Congress as obligatory.

We do not know whether it would be possible to lay down any rule as to the place of publication of new names, but it is certainly desirable that the matter should be taken into consideration. That some limit is recognized is obvious—a monographer would hardly be expected to hunt through a file of the *Times* or the volumes of *Punch* to ascertain whether a name had been transferred by some contributor desirous of attaching his own name to the new combination; yet something very like this has taken place. Mr. Druce has contributed to the *Pharmaceutical Journal* a gossiping account of his visit to Sicily, in the course of which, naturally enough, he mentions the plants he saw. Among them we suddenly come upon "*Brassica pubescens* mihi (*Sinapis pubescens* L.)." Is a name published under such circumstances and in such surroundings entitled to recognition? It seems to us that it is not, but the matter is doubtless open to discussion. It will be remembered that Mr. Druce dates the publication of his *Bromus interruptus* from a Supplement to the *Pharmaceutical Journal* which, as we pointed out in this Journal for 1903, p. 220), is no part of the magazine and is not always bound up with it, contains market report and odds and ends, is separately paged in roman numerals, and is not included in the index to the volume! The new names which Mr. Druce in his *Flora of Berkshire* has given to plants of most casual occurrence are at least published in a botanical work, although consideration for others would suggest that they should not be given to the world in a book ostensibly dealing with the botany of a small English county; but it seems preposterous to publish such names in the account of a pleasure trip, and it is difficult to see that science is in any way the gainer by such publication. If some rule could be made which would prevent the recognition of such names, they would probably cease to be published, even to the very limited extent in which so pernicious a practice at present exists.—Ed. Journ. Bot.]

Introductory.

The following suggested amendments and additions to the Paris Code of Botanical Nomenclature have reference only to Phanerogams. We associate ourselves with those botanists who consider that the nomenclature of Cryptogams is a matter for special treatment.

We think our suggestions are self-explanatory, and therefore a very brief introduction will suffice.

Art. 16*bis*.—As an example of the practical inconvenience resulting from the adoption of the principle of priority of place, it may be noted that this would involve the transference of the species of so well-known a genus as *Prunus* to *Amygdalus*, which is by general consent united with it, as *Amygdalus* precedes *Prunus* by a page (Sp. Pl. i. 472–3). We concur on this point with the expression of the Belgian and the Swiss botanists (' Propositions de Changements,' p. 34).

Art. 37.—We think the trinomial and quadrinomial system which has lately been introduced by some American botanists is an undesirable innovation.

Art. 57.—We find ourselves in agreement with the elaboration of this point (except as to the footnote) in the Amendments suggested by the botanists of the Gray Herbarium, pp. 3–6.

["During the last fifteen years several efforts have been made to unify botanical nomenclature and render it consistent with itself. In the course of these as yet unsuccessful reforms it has become evident to those botanists to whom nomenclature is a means to an end rather than an independent science, that a strict and consistent application of priority from 1753 would bring about an amount of change quite beyond that which would be convenient or practical in a science which must always rest largely upon the works of the past century. The inconvenience of the reforms has come chiefly from the enormous number of new binomial and trinomial combinations which have been created. A very considerable part of these state no new classificatory facts. They have been framed to replace existing names on the ground that the latter had not been formed in accordance with certain laws. In order that the resulting nomenclature might have greater definiteness many new rules have been proposed, several of these being of an arbitrary character, and introducing practices wholly unknown to even the most critical among the writers of past generations. With each alteration of old rules or addition of new ones, the reformers have felt justified in making the new combinations required. These changes have become very annoying to the investigating botanist, and it is more and more apparent that the rules, notwithstanding the conscientious intent of their authors, have proved an excuse for change rather than a means of stability; for even a slight alteration of rules will often necessitate hundreds of changes of binomial and trinomial combinations, adding greatly to an already enormous and burdensome synonymy.

"In great part these changes result from a theory that a combination as such has no validity. The undersigned believe that this is a mistaken view, and that no principle would conduce more to stability and convenience in the nomenclature of the spermatophytes than the recognition of the inviolability of a combination when once made. The isolated specific or varietal name is relatively meaningless. It is only when combined with its proper generic name that it becomes suitable for use as a plant-designation in

floristic or monographic work. The combination, being therefore the only really adequate and expressive form of plant-name for species, varieties, etc., should be carefully guarded from needless change.

"The arguments usually advanced *in opposition* to the validity of the earliest generically correct binomial in relation to the first specific name, are:—(1) Such a ruling would permit a sort of "piracy" by enabling an author either through carelessness or intention to rename species whenever transferring them from genus to genus, thereby causing great confusion. (2) The original author of a species has in describing it performed a service superior to that of any subsequent writer in transferring it to another genus; therefore the original specific name should be maintained as a matter of justice. (3) In cases of differing opinion as to the proper genus, it is a matter of great convenience to have the specific names the same under whatever genus the plant is placed. (4) The custom of re-establishing a neglected specific name, even if it necessitates the formation of a new combination, is a practice so general and so fixed in cryptogamic botany and zoology that any departure from that rule by phanerogamists is undesirable as destroying uniformity of biological usage.

"In reply to these objections, the importance of which is at once admitted, it may nevertheless be said:—(1) In general, it has been the *intention* of authors to perpetuate the first specific name when forming the first binomial under the correct genus. This has been accomplished in the majority of cases. When it has not happened, the fault has quite as often been with the author of the original specific name, which through incomplete characterization or inaccurate classification has been overlooked, as on the part of the more scholarly writer who has first placed the species in its proper genus. Even in the case of such authors as Salisbury, who have freely changed the names employed by their predecessors, the intention has rarely, if ever, been that of piracy, but rather a conscientious, even if ill-judged, wish to improve upon faulty or inappropriate designations given by earlier writers. (2) The description of a supposed new species is by no means a difficult matter, but the proper generic affinities of the plant in question are often to be determined only by the most critical and discriminating investigation. It thus happens in many cases that the service of the original describer, far from being greater, is decidedly less than that of the author of the first correct combination. At all events, it would be unwise to sacrifice to a sense of justice so sentimental any provision which is likely to conduce to stability and simplicity. (3) In a comparatively small number of cases a diverse interpretation of generic names and limits would doubtless lead to the simultaneous use of different specific names for the same plant. It is believed, however, that this danger has been considerably over-estimated by those who have advanced the objection. *Maianthemum Convallaria* and its synonyms have been several times used as a drastic example of the baleful effects of the rule under consideration; but a very obvious answer to objections of this kind is, that under a properly

drawn code it should be impossible for four or five different generic names to be simultaneously current for the same genus, and that, as the possibilities of the present widely different use of generic names are diminished by the more detailed codification of nomenclature, any annoyance from differing specific names for the same plant under different genera will of necessity be much decreased. (4) As already mentioned, the historical development of classificatory nomenclature in phanerogamic botany has differed considerably from that of cryptogamic botany; and both have long had a wholly independent development from the nomenclature of zoology, habits convenient to the particular subject having been formed by investigators in each of these fields. Under these circumstances it seems highly inexpedient to make in any one of these subjects any important sacrifice to secure a superficial and relatively unimportant agreement of method. Surely any investigator with a capacity so great as to work successfully in more than one of these wide disciplines, should be able to grasp and apply without particular difficulty two or three slightly different systems of nomenclature.

"The chief reasons for maintaining the first binomial in dealing with the nomenclature of the spermatophytes are: (1) The earliest binomial for a given species under its proper genus is, in reality its first usable name. (2) As soon as such a designation has been created, showing at once the specific status and the correct generic affinity of the plant in question, there seems no adequate reason for making other binomial combinations for the same plant. Indeed, such later combinations, even if framed with the purpose of reinstating a neglected specific name, are of no practical importance, and do far more to encumber than to clarify nomenclature. (3) The legalization of the first generically correct binomial has the great advantage that *it founds nomenclature primarily upon the works of authors who have rightly understood the affinities of the plants with which they have been dealing.* It at once cuts out from competition a vast quantity of species which have been ill-defined and wrongly placed. It thus acts as a useful check upon the vague tendencies of any more unlimited form of priority. In this connection it may be pointed out that any such provision as the fifty year limit, proposed by the distinguished Berlin botanists to simplify nomenclature by eliminating certain vague and obsolete generic names, becomes an expedient of doubtful value, if at the same time all the numerous specific names published under these genera must still be maintained as valid. It is believed that this problem, however, can be logically and effectively settled by supplementing a generic restriction by the rule of *priority under the genus.* (4) The legalization of the first binomial obviates particular legislation regarding such tasteless and objectionable names as *Catalpa Catalpa*, *Opuntia Opuntia*, *Cerastium cerastioides*, etc., these having arisen, almost without exception, as later combinations. (5) The rule of priority under the genus is easy to apply. In general it is a relatively simple matter to determine the earliest name applied to a given species under its proper genus. On the other hand, it is often a matter of

extreme difficulty to be certain that no earlier specific name has been used for the same plant under some remote genus. (6) Priority under the genus is not an untried theory. It has been amply tested by application in works of great importance and exceptional lucidity by such masters of botanical taxonomy as Bentham, Hooker f., and Asa Gray.

"NOTE.—The rigid enforcement of any rule of priority is sure to cause, at least during the transition period, a certain inconvenience. Should it be thought that a consistent application of priority under the genus would bring about too great change, the undersigned would approve the appointment of a committee by the International Botanical Congress, to draw up a list to include not over 400 to 500 well-known and widely distributed species, such as *Ipomoea Pes-eapræ*, *Abutilon Avicennæ*, etc., the current names of which, although not in accord with priority under the genus, might by special agreement be allowed to stand."]

Art. 59.—On this point also we agree with the botanists of the Gray Herbarium, Amendments, p. 7.

["It is obvious that the later of two homonyms should be promptly abandoned in case the earlier one is a valid name. If, on the other hand, the earlier of two homonyms is universally regarded as invalid, its existence in synonymy forms no adequate reason for disturbing the second. When, however, in the course of investigation the earlier homonym is revived as a valid name, the later one must give place, and the second plant or group of plants must be renamed. A valid name is one in use. It is a mistake to regard as valid a vague or poorly characterized name merely because in it cannot be definitely entered in synonomy. For instance, there is no reason to abandon *Setaria* of Beauvois because of *Setaria* of Acharius, the latter being a name never now employed by lichenologists, although not with much definiteness placed in synonomy. On the other hand, the serious revival of the earlier of two homonyms in any monograph or flora is, it is believed, a sufficient ground for changing the other."]

PROPOSED CHANGES IN THE LAW OF NOMENCLATURE AS REGARDS PHANEROGAMS.

Art. 16 *bis*.—When two or more names which signify the same thing (genus or species) have been published at the same time in the same work, the author who first unites them determines which of the two names shall be retained.

Art. 17 *bis*.—Generic and specific names date from the publication of Linnæus's *Species Plantarum* in 1753.

Art. 37.—Names of subspecies and varieties, *which must be preceded by the term subsp. or var.*, are formed in the same way as specific names, and follow them in order, beginning with that of the higher rank.

Instead of Art. 42.—A name is published when it has been printed and distributed with a description, or with a plate, or with reference to a previously published description or plate.

Instead of Art. 57.—The name of a species is that under which it was first placed in its accepted genus. In the transfer of a species from one genus to another, the original trivial name should be retained unless the resulting binomial is already in use; but this rule cannot be made retrospective.

Art. 59.—No one is authorized to change a name on the pretext that it is ill-chosen, disagreeable, that another is preferable or better known, that it is not of sufficiently pure latinity, *or because there is an earlier homonym which everybody regards as invalid*, or for any other motive contestable or of little value.

Instead of Art. 66.—The original spelling of a name must be kept, except in the case of a typographical or grammatical error.

William Carruthers, former Keeper of the Department of Botany, British Museum.

George Murray, Keeper of the Department of Botany, British Museum.

James Britten, Editor, Journal of Botany; Assistant, Department of Botany, British Museum.

Antony Gepp, E. G. Baker, A. B. Rendle, Assistants, Department of Botany, British Museum.

B. Daydon Jackson, Secretary of the Linnean Society.

W. P. Hiern, F.R.S.

Spencer le M. Moore.

Daniel Oliver, former Keeper of the Kew Herbarium.

II.—Addenda to the Paris Code of 1867, proposed by some Italian Botanists.*

Art. 60 (text). In the following cases a name should not be recognized:—

1. When this name is applied in Systematic Botany to a group already provided with a valid name.

Art. 60, 1 (addendum).

The Restoration of old Generic Names; False Priority.

A. A generic name can only displace a more recent synonym provided that the older genus has been clearly characterized by its

---

* [Translated from the Italian text, at the request of Dr. E. Levier, of Florence, by Mr. F. N. Williams, F.L.S., and printed in this Journal in accordance with the wish of the signatories.—Ed. Journ. Bot.].

author, and that as defined the characters do not require to be amended (*Art.* 15, *Priority*).

B. When, however, an older genus, hitherto neglected or disregarded, is essentially faulty in definition, *e. g.* when no generic character is indicated (*Aytonia* Forst., 1776; *Albugo* Pers., as a section of Ustilago, 1801), or founded on a character false as regards all the species of the genus (*Porella* L., 1753, ex Dill.), or such as includes the species of one or more other genera (*Riccardius*, *Martinellius* S. F. Gray, 1821; *Sphærella* Sommerf., 1826), then such priority, being purely chronological and bibliograpical, confers no right on the older generic name (false priority, pseudo-priority).

Commentary.—Many classical genera, imperfectly defined at first, have been amended, modified, and subdivided since 1753, the starting-point for binary nomenclature. This slow process of development of generic concepts, inseparable from the names themselves, has not diminished but rather enhanced their claims of citizenship, since, according to Art. 46 of the Code of 1867, every botanical name is nothing but a symbolic abridgment of the "renseignements littéraires," *i. e.* of the written account or the description. The insufficient definition of many of these genera in the first instance, afterwards more clearly characterized and in more precise terms, is no pretext for promptly substituting, on the score of priority, the names of other genera, no less ambiguous or imperfectly defined, which require explanatory parentheses or some other factitious device for citing a reference to the genus which it is proposed to displace. In fact, without such a reference, the identity of a genus, afterwards modified by a broader study of its constituent species, would be obscured in the meaning attached to the name of the exhumed genus of earlier date.

For one name to displace another, it is not sufficient that it be earlier in point of date; it is also necessary that it be a valid one. The Code (Art. 60, 1) explicitly requires these two conditions. It clearly lays down that "priority *alone* cannot confer validity on a name which is not valid."

Nothing has so profoundly disturbed the stability of nomenclature than the unearthing of a legion of old genera, ill-defined or not defined at all (*nomina semi-nuda*), which the advocates of mere priority of date have tried to restore during the last ten or fifteen years, without taking any account of descriptions, and even deliberately ignoring them. It seems clear, without adducing any statistical proof, that an adjustment of conflicting claims in priority strictly in accordance with the fundamental rules of the Paris Code such as here proposed, would annul an enormous number of the 30,000 or 40,000 changes of name, often useless and unjustifiable, and only of late years put forward; and that it would establish a more solid basis for the nomenclature hitherto in use by the large majority of botanists.

Addendum to Art. 66.

Generic names of the same etymology, differing only by a single letter (sometimes by two), are considered as homonyms; that is,

they cannot be kept up at the same time in systematic lists, except in the following cases:—when the two genera in competition are in two different divisions, or in two different classes of the Vegetal Kingdom, or even in two families so far removed from one another as to avoid all danger of confusion.

Examples.—*Radulum* Fries, 1825 (Fungi), does not necessarily annul *Radula** Dumort., 1831 (Hepaticæ). *Pigafettia* Becc.,† 1877 (Palmaceæ) runs also little risk of being confused with *Pigafettoa* Massalongo, 1885 (Hepaticæ), so also we have *Hookera* Salisb.,‡ 1808 (Liliaceæ), and *Hookeria* Smith, 1808 (Musci). In the same way *Anisomeris* Presl, § 1833 (Rubiaceæ), can be kept up without inconvenience with *Anisomeria* D. Don, 1832 (Phytolaccaceæ). Lastly, *Rubus* L. has never shut out *Rubia* L., although the etymology of both these names is undoubtedly the same (*ruber* = red).

Commentary.—The twenty-six signatories, Swiss and Belgian, to the *Propositions de changements aux lois de la nomenclature botanique de* 1867 (1904), rely mainly on the statistics of Dr. Kuntze (in *Rev. Gen. Plant.* iii, 1893, pp. 349–352) in declaring themselves opposed, without any exception, to the admission of two generic names formed from the same root, differing only by one or two letters, seeing that the non-observance of this rule would at once entail changing the names of 77 genera and of 1524 species. But if the 77 examples given by Dr. Kuntze are checked one by one, in keeping up the year 1753 as the starting-point and in adopting the exception here proposed, the possible changes (not all indispensable) are reduced to 19 genera with somewhere about 180 species. It is a modest list, in comparison with the thousands of changes of name which would follow from the unconditional acceptance of Dr. Kuntze's rule as to *para-homonyms*, with all the new para-homonyms invented by him (*Rubina* for *Rubia* L., *Cesiusa* for *Cesius* S. F. Gray, etc., etc.). In the calculation just given no account is taken of variations due to errors of spelling in the names of persons, of which Art. 66, sect. 1, permits correction, placing them in the same category with typographical errors, and which, moreover, Messrs. Post and Kuntze have meanwhile rectified in their *Lexicon Generum Phanerogamarum* (January, 1904), which includes all generic names published up to the end of March, 1903.

The end aimed at, in the exception here proposed as regards homonyms (and para-homonyms), is not to make retroactive the

---

* Engler and Prantl have substituted *Stephanina* for the name of this genus.

† The Italian text gives us the authority "*Pigafettæa*, Mart., 1837." This, however, is incorrect, as Martius describes it as a section of the genus *Metroxylon*.

‡ As only a single species of *Hookera* has been described, botanists have generally agreed to adopt the later name of *Brodiæa* Smith (1811), under which many species have been described.

§ The Italian botanists have, however, overlooked the fact that *Anisomeris* Presl, is antedated by *Chomelia* Jacq. (1760), under which name the species are enumerated in all systematic works; and further, that *Anisomeria* D. Don, which includes only two species. is antedated by *Pircunia* Bert. (1829), under which generic name several species are described.—[TRANSLATOR].

discardure of names long ago substituted for such para-homonyms (and sometimes to be preferred to the latter for other reasons), but to prevent in future useless changes of name in cases where no confusion is possible.

(*Signed*) G. Arcangeli, A. Bottini, E. Levier, C. Massalongo, P. A. Saccardo, S. Sommier.

Florence: 23rd June, 1904.

DORSET PLANTS.

By the Rev. E. F. Linton, M.A.

The following list of plants and localities was put together some time ago for the most part, and consists of such as have come under my observation during several years past in parts of Dorset outside the range of the *Flora of Bournemouth*. This short paper is almost devoid of county records, or items of special interest, which have usually been published in this Journal on their occurrence, but is intended to supplement the second edition of the *Flora of Dorset*, and especially to add localities for districts that were weakly represented. For this purpose the letters distinguishing the districts of the Flora are introduced; F, for instance, standing for the Stour watershed below Shillingtone, and E for the part above. The Isle of Purbeck is denoted by G. The nomenclature is that of the *London Catalogue*, ed. ix. The Twiford, Compton Abbas, and East and West Orchard named are those near Shaftesbury.

Thalictrum flavum L. C. Wool.

Ranunculus arvensis L. E. Twiford.

Helleborus fœtidus L. F. Ranston Wood; near a gamekeeper's cottage, and not certainly native.

Aquilegia vulgaris L. F. Hod Hill; Okeford Hill.

Papaver dubium L. var. *Lecoqii* (Lamotte). E. Twiford. F. Iwerne Minster.

Chelidonium majus L. E. On a wall, Compton Abbas; a very hispid form, perhaps due to situation.

Cheiranthus Cheiri L. C. Dorchester.

Arabis hirsuta Scop. E. Compton Abbas. F. Hod Hill.

Brassica oleracea L. C. Arish Mill. G. Worbarrow Bay, abundant.—*B. sinapioides* Roth. E. By R. Stour, Shillingtone.

Viola hirta × *odorata*. F. At two spots near Sutton Waldron. E. Near Fontmell.—*V. calcarea* Gregory. F. Near Iwerne Minster, in Stubhampton Bottom.—*V. sylvestris* Reich. is the commoner species on the chalk and London clay, and flowers two or three weeks earlier; *V. Riviniana* Reich. being more plentiful on the Tertiaries, where the other is, in my experience, absent.—*V. ericetorum* × *Riviniana*. F. Railway-bank near Dagham's Road.

Saponaria Vaccaria L. E. In some quantity in a chalky fodder-field, Melbury Abbas.—*S. officinalis* L. E. Strongly established along a hedge-bank between Compton Abbas and Fontmell.

Silene Cucubalus Wibel var. *puberula* Syme. E & F. Not uncommon on the chalk, Shillingtone; N. and S.W. of Blandford.

Cerastium arvense L. F. Alderholt.

Geranium striatum L. D. Roadside, out of Bere Regis. — *G. pyrenaicum* L. E. Compton Abbas.

Ononis spinosa L. E. East Orchard; rare in the county, except perhaps in the N.W.

Anthyllis Vulneraria L. E. Compton Abbas; rare away from the coast.

Lathyrus Aphaca L. E. Melbury Hill. — *L. Nissolia* L. E. East Orchard.

Rubus suberectus Anders. F. Alderholt.—*R. sulcatus* Vest. F. Alderholt.—*R. integribasis* P. J. Muell. C. Wool. D. Bere Regis. —*R. affinis* W. & N. C. Wool. F. Alderholt. — *R. macrophyllus* W. & N. F. Alderholt. — *R. leucostachys* Schleich. E. Compton Abbas, with white flowers, on chalk.—*R. radula* Weihe var. *anglicanus* Rogers. E. Compton Abbas.—*R. Bloxamii* Nees. E. Alderholt, and common near Verwood.

Geum rivale L.; locally, "wild columbine." F. Alderholt; Edmondsham.

Potentilla argentea L. C. North of Wool Bridge.

Alchemilla vulgaris L. The Dorset specimens I have seen all proved to be the segregate *filicaulis* (Buser); *viz.* C. Evershot, in plenty near the school, *hb. W. M. Rogers;* Rampisham to Wraxall, *hb. J. C. Mansel-Pleydell.* F. Filgroves, *hb. J. C. Mansell-Pleydell.*

Pyrus torminalis Ehrh. E. Piddle Wood, near Sturminster Newton.

Saxifraga granulata L. F. Near Cranborne; rare.

Smyrnium Olusatrum L. E. Manston, roadside banks in plenty.

Carum segetum Benth. & Hook. fil. E. Hinton St. Mary; Manston. F. Shillingtone to Durweston. C. West Lulworth.

Caucalis arvensis Huds. E. Compton Abbas.

Sambucus Ebulus L. E. Plentiful in a hedgerow far from buildings, Hinton St. Mary.

Galium erectum Huds. F. About Blandford; Spettisbury.—*G. tricorne* Stokes. E. Twiford.

Valeriana Mikanii Syme. E. Melbury Hill; Ashmore. F. Cranborne.

Centranthus ruber DC. C. Walls, Preston.

Valerianella dentata Poll. var. *mixta* Desfr. G. Small stout plants, 3–4 in. high, occurred on a broken grassy slope at Seacombe, 1902, very unlike the usual field plant in habit. The seed may have been washed over from an arable field just above the slope; otherwise it seemed a native station. The variety does not appear in *Fl. Dorset.*

Inula Helenium L. E. By Piddle Wood; East and West Orchard, where formerly cultivated.

Tanacetum vulgare L. F. Childe Okeford.

Senecio campestris L. E. Compton Abbas.

Arctium majus Bernh. E. Shillingtone. F. Stepleton.

Carduus crispus × *nutans*. F. Sutton Waldron.

Picris hieracioides L. F. Spettisbury; Iwerne Minster. C. West Lulworth.

Crepis taraxacifolia Th. E. Compton Abbas.

Hieracium umbellatum L. E. Piddle Wood. F. Cranborne.

Taraxacum officinale Web. A form which appears to be var. *corniculatum* DC., and does not agree with any other of our varieties, occurs on downs, *e. g.* F. S. of Shillingtone; 1½ mile E. of Blandford; Badbury. G. Near Swanage.

Campanula glomerata L. E. Melbury Hill. F. Iwerne Minster. —*C. Trachelium* L. E. Compton Abbas; Ashmore Bottom.—*C. rapunculoides* L. Borders of E & F. Rabbit-warren, east of Sutton Waldron, far from houses.

Specularia hybrida A. DC. E. Compton Abbas.

Vinca major L. E. Fontmell.—*V. minor* L. Screech Hill, near Cranborne.

Gentiana Pneumonanthe L. F. Dagham's Road to Verwood.

Hyoscyamus niger L. E. Base of Okeford Hill.

Verbascum Lychnitis L. F. St. Giles, on the Cranborne side of the Park.—*V. Blattaria* L. D. Winterborne Zelstone.

Mimulus Laygsdorffi Donn. C. Steepleton, Dorchester, *Mr. L. V. Lester*. F. Edmondsham.

Orobanche elatior Sutton. E. Fontmell. F. St. Giles to Edmondsham.

Polygonum minus Huds. C. Wool. D. S. of Bere Regis.—*P. mite* Schrank. C. Wool. F. By the Stour, Shillingtone.

Viscum album L. E. Ashmore Bottom. F. Very local, but abundant in Edmondsham and St. Giles.

Buxus sempervirens L. E. Near Fontmell; and F. Near Pimperne, but no doubt introduced in both places.

Carpinus Betulus L. D. Chamberlayn's, Bere Regis, and N.W. of Wareham. E. Sturminster Newton. F. Hod Hill. Decidedly local in the county.

Salix Hoffmanniana Smith. E. Compton Abbas; East Orchard. F. Alderholt; Iwerne Minster; Wimborne. — *S. aurita* L. Very local. E. Compton Abbas; East Orchard. F. Verwood to Edmondsham. G. Littlesea.—*S. ambigua* Ehrh. G. Littlesea.

Juniperus communis L. E. Melbury Hill.

Taxus baccata L. F. Frequent and native about St. Giles and Edmondsham.

Orchis pyramidalis L. E. Fontmell. F. Cranborne.—*O. ustulata* L. F. Stourpaine.—*O. ericetorum* Linton. F. Goatham and Edmondsham; Verwood; West Moors, abundant.

Ophrys muscifera Huds. F. East end of Okeford Hill. G. Creech Grange.

Habenaria conopsea Benth. E. Compton Abbas and Melbury Hill.

Allium oleraceum L. E. Compton Abbas.

Gagea fascicularis Salisb. E. In a wood, Hinton St. Mary, *Rev. E. Acton.*

Colchicum autumnale L. E. Near Fontmell.

Paris quadrifolia L. F. Okeford Fitzpaine, to the south.

Sparganium ramosum Huds. var. *microcarpum* Neum. C. Bere Regis.—*S. neglectum* Beeby. C. Wool.

Sagittaria sagittifolia L. F. Childe Okeford.

Potamogeton alpinus Balb. D. Near Trigon Farm, Wareham.—*P. obtusifolius* M. & K. F. "Pulteney records it in Dorsetshire, in the river Stour and ditches communicating with it" (Townsend, *Fl. Hants*, p. 331).

Carex disticha Huds. E or F. Shillingtone.—*C. remota* L. E. East and West Orchard; Piddle Wood. F. Edmondsham; Verwood.—*C. acuta* × *Goodenowii* (*Fl. Bournemouth*, p. 238, as *C. acuta* × *vulgaris*). I have now grown this for three years, and proved it sterile. I may add to the localities F, near Poole.—*C. humilis* Leysser. E. Melbury Hill. F. Okeford Hill; Stourpaine, near Durweston Bridge.—*C. pallescens* L. E. Piddle Wood. F. Alderholt; Verwood to Edmondsham.—*C. pendula* Huds. E. St. Margaret's Marsh.—*C. lævigata* Sm. F. Abundant in copses at Alderholt and Edmondsham.

Milium effusum L. Not unfrequent on the chalk and Oolite, but absent from the Tertiaries.

Avena pubescens Huds. E. Compton Abbas. F. Shillingtone; Spettisbury. — *A. pratensis* L. E. Melbury Hill. F. Hambledon Hill.

Kœleria cristata Pers. E. Melbury Hill.

Poa nemoralis L. E. Sturminster Newton to Piddle Wood. F. Under Hod Hill, by the Stour.

Festuca Myurus L. C. On a wall, Osmington.—*F. arundinacea* Schreb. C. By the shore, Osmington.

Bromus erectus, Huds. F. Screech Hill, Cranborne; Edmondsham.

Hordeum secalinum Schreb. D. Bere Regis. E. Manston; Margaret Marsh.

Asplenium Trichomanes L. Rare in East Dorset. F. Churchyard wall, Gussage All Saints.

Lastrea spinulosa Presl. F. Alderholt.

Chara vulgaris L. F. In a brickyard, Okeford Fitzpaine.—Var. *papillata* Wallr. E. West Orchard.

SHORT NOTES.

Hieracium crebridens in Devon.—On Sheepwash Hill, in the parishes of Mollaud and Twitchen, N. Devon, Mr. W. P. Hiern, on July 2nd of the present summer, found an unfamiliar hawkweed in plentiful profusion at 150 to 220 metres above the coast-level. Specimens were sent for examination, and proved to be *Hieracium crebridens*. It is quite possible that this plant is to be found over a wider area on the western side of England than its records show; as, though it is known in herbaria, it has only recently been described (*Prodr. Fl. Britannicæ*, p. 144). The Devon specimens are not individually and exactly similar to those previously found

in Yorkshire and Brecknock, from which the description referred to was drawn up, but agree rather with a more luxuriant state represented among Dahlstedt's *exsiccatæ*, and duly ticketed "*H. crebridens*." In these Scandinavian examples, which conform exactly with the Devon plant, there are twice as many heads of flowers—about a dozen—as in the state more usually met with; and the solitary cauline leaf subtending the ramification at its junction with the cladophore is much broader, as might be expected from the increased vegetative growth necessary for producing a larger number of heads of flowers.—Frederic N. Williams.

Galium sylvestre in Worcestershire.—Early in June I found *Galium sylvestre* Poll., hitherto unrecorded for Worcestershire, in considerable plenty in a grass-field within about three-quarters of a mile east of the village of Tredington, Worcestershire. This same neighbourhood affords other interesting plants, such as *G. erectum*, *Carex distans* L. (non *C. neglecta* Degl.), *Samolus Valerandi*, *Crepis taraxacifolia*, &c.; and, about a mile away, in company with *Carex distans*, *Juncus compressus* Jacq. occurs, but on the east side of the river Stour, therefore in Warwickshire. Since the publication of Watson's *Topographical Botany*, ed. 2, by J. G. Baker and W. W. Newbould, 1883, *Galium sylvestre* has been recorded for the following additional counties, from which specimens are preserved in the herbarium of the British Museum:—Cornwall, *Moyle Rogers*; Worcestershire, *Fredk. Townsend*; Surrey, *H. W. Pugsley*; Buckinghamshire, *G. C. Druce*; Oxfordshire, *G. L. Bruce*; Lanarkshire, *McNab*; Sutherland, *E. S. Marshall*.—Fredk. Townsend.

Salvia verticillata L.—A specimen of this has been sent to the National Herbarium from a pasture on sandy soil near Thorley, Bishop's Stortford.

NOTICES OF BOOKS.

Harriman Alaska Expedition. Vol. V. Cryptogamic Botany. By William Trelease and others. New York. 1904. 424 pp. 44 plates; 1 text-figure.

In this volume is brought together all the information obtainable about the cryptogamic flora of Alaska, based principally upon the material collected by the Harriman Expedition in 1899, and worked up by or with the help of specialists. Prof. Trelease has written an introduction descriptive of the luxuriant cryptogamic flora of the damp forests, prairies, etc., and of the economic uses to which certain of these plants are put by the natives. The Indians of the coast prepare a few of the algæ, especially *Rhodymenia palmata*, for food; and *Porphyra perforata*, pressed into cakes and dried, is stored as a remedy for colds and as an occasional condiment. The Russians esteem *Agaricus mutabilis* as a great luxury when pickled. The women of a Sitka tribe protect themselves from sunburn by rubbing their faces with charred fragments of the fungus *Fomes tinctorius*. One lichen at least, *Evernia vulpina*, is used for dyeing basket-work.

Sphagnum furnishes lamp-wicks, and stuffing for infants' cradles and domestic uses are found for some of the ferns.

A total of 1616 cryptogamic species is now recorded for Alaska, and is composed of 240 fungi, 459 algæ, 400 lichens, 460 bryophytes, and 58 pteridophytes. The special sections on Algæ, Mosses, and Hepaticæ, originally published in the Proc. Washington Acad. Sci., are reprinted here from stereotype plates, with a new consecutive pagination alongside that of the original sheets. The other sections appear in their present form for the first time.

The Fungi were determined by Saccardo, Peck, and others, and yielded 46 novelties. A useful index to host genera is appended. Six plates illustrate this section; five of them are printed in colours.

Miss Clara E. Cummings, in working up the section on Lichens, has performed her task with care and thoroughness. She describes two new species, and adds three to the American flora and eighty-four to that of Alaska. A useful key is given under each genus, and the new species are figured on two plates.

Prof. De Alton Saunders, who treats of the Algæ, was one of the collectors of the expedition. With the help of other phycologists, he has named the 340 species here recorded, of which nine are new to science, and 240 are new to Alaska. The list includes fresh-water as well as marine species. Prof. Saunders makes some interesting remarks on the geographical distribution of algæ on the Pacific Coast of North America, which he divides into three regions —a southern, a Californian, and a northern. The southern region extends from Point Conception southward to the equator, and is characterized by *Nereocystis giganteus*, *Sargassum Agardhianum*, *Tænia Lennebackeræ*, and other tropical species. The Californian region extends from Point Conception on the south to Puget Sound on the north, and is characterized by forms like *Dictyoneuron*, *Postelsia*, etc. The northern region begins at Puget Sound, and extends northwards to and includes the Bering Sea. The common species in that region are *Polysiphonia bipinnata*, *Euthora cristata*, *Rhodymenia pertusa*, and many others.

The distribution of each Alaskan species along the Pacific Coast is indicated in a table, and it is interesting to compare this table with the collection of algæ made by J. Macoun on the Pacific Coast of North America, and preserved in the British Museum. The list is illustrated by twenty plates, which often give figures of structure, most useful in determination.

The Mosses, exclusive of Sphagna, were worked out by J. Cardot and I. Thériot, and the list of them here published is augmented by the inclusion of records made by previous collectors. The number of mosses enumerated in the present paper is 280, of which 124 are new to Alaska, and 46 are new to science. Twenty-nine new species and seventeen new varieties are here described. At the end of this paper is a postscript alluding to a catalogue of the bryophytes of the Yukon, by Mr. R. S. Williams, published in the *Bulletin of the New York Botanical Garden*. This catalogue comprises 24 hepatics, 7 sphagna, and 222 mosses; but among the mosses recorded by Messrs. Cardot and Thériot from Alaska are 50 species not

found in Mr. Williams's catalogue. Eleven plates illustrate this section.

Dr. Trelease's list of Sphagna, determined by Dr. Warnstorf, includes material other than that collected on the Harriman Expedition, and gives a total of 22 species and 19 varieties, two species being new to Alaska.

Mr. A. W. Evans, who worked up the Hepaticæ, gives a list of 82 species, 38 of which were added by the Expedition. None of these are new; but valuable descriptive notes are added in several cases, and a brief survey of the work of previous writers is given. Three plates illustrate this section.

Dr. Trelease gives a list of 58 species and 16 varieties of Pteridophyta, illustrated by one plate and a text-figure.

Neither trouble nor expense have been spared in the preparation of this important contribution to the Alaskan flora, and great credit is due to all who have taken part in its production.

A. & E. S. Gepp.

The Flora of the Parish of Halifax. By B. Crump, M.A., & Charles Crossland, F.L.S. 8vo, pp. lxxv + 316. Halifax Science Society. 1904. Price 10s. 6d.

This is the longest and fullest parochial flora we have met with. If lists of species make a good flora, this is one of the very best; from phænogams to fungi 2636 are here recorded. We congratulate the writers and their numerous helpers on their industry in seeking out "fresh things," and thus adding to our knowledge of local botany. In this department their work is above criticism. The get up of the *Flora* leaves nothing to be desired, except a really good map. We find, with the one-inch Drift Survey lying before us, half the information of this book is rendered useless to outsiders, who do not know the surface geology or topography of the parish. When such a full list was being produced, would it not have been possible to have given a drift-map, on the two-inch scale at least, with the spots referred to in the flora marked, and the altitude lines for every fifty or hundred feet indicated?

We suppose we have no right to complain of the need of better methods, or to expect any improvement in the production of floras. The men who hunt eagerly for species for their lists, especially anything new and undescribed, cannot be supposed to know plants fully from their environment point of view. Some little fresh information might be expected from each new work. Altitude in Halifax parish, we are informed—and we can well believe it—is the chief cause of change in the flora. Why, then, has such a good chance been lost of doing original work, by specializing this question for every common and uncommon species?

A step in the right direction is taken in the introductory chapter on plant-distribution and associations, based on the lines laid down by the late Robert Smith; but it tends to show the slight value of hurried work. It seems futile to seek to describe the relations of species *inter se* till we have fully mastered the simple biological

requirements of species as individual aggregates. Are we for ever to be content with the dry dusty facts of the past? Who really cares to know, or what advantage is there in knowing, who first recorded *Cytisus scoparius* for Halifax parish? Instead of reprinting Bolton's and other notes on this and scores of other common species, would it not have been better to have worked out their soil and altitude range in this limited area—in a word, to have done some original work? It is a simple matter to hunt up old records or specimens, but it requires the clearest and most patient thought, observation, and experience to detect unnoticed relationships. Messrs. Crump & Crossland have the required faculties, and as they have tracked their parish over and over, it should have been a fairly simple matter to record soil, distribution, altitude, frequency, and (when all the other facts were known) association. Though they record the facts, the point is apparently missed in treating a species as common as *Anthriscus sylvestris*. It is one of several species which, to the environment student, serves as a test on many soils. It is a shade species, found on hedge-banks, ditch-sides, open woods, and scattered more or less over meadows, but is *never* found in pastures properly stocked with cattle and sheep. The hedge on the meadow side of a fence may be perfectly white with it in the first week in June, while in the well-sheltered pasture *not* a single specimen can be found, even at the hedge-roots. For the student of environment nothing is simpler, if he knows his plants thoroughly, than to tell something of the past history of a grass-field, or of woodland or of moor. A farm-foreman was once lost in admiration at the comments of a botanist in mid-winter, when the fields were empty, on the late stocking of pasture and meadow. The student, discovering the position of affairs, and fully enjoying the mystery he was causing, on passing a farm where not a pig was showing, remarked, "What a lot of pigs your neighbour runs here in this paddock!" Astonished out of his usual reticence, the rustic exclaimed, "Dang it, sir, how can you tell, who've never been here before, that this is the biggest pig-grower in the county?" "Do you see those bunches of grass three feet high? It is called cocks-foot," replied the botanist; "pigs never touch it except as a medicine; it gives them diarrhœa if they do. Where they feed and nothing else, it grows up like that, and tells a tale anyone may read." "Aye, I've seen it all my life, and never thought on it," was the truthful reply.

Such facts lie all round us; they only want noting. One "spring-pond," supplied by the chalk or limestone, too deep for ordinary plant-life, is accumulating a bed of shell-marl, to be a geological puzzle like that of Sedge Fen, Huntingdonshire, lying, as they frequently do, in the midst of peat-bogs. The flora consists of one plant only—*Chara hispida*. It is capable of living at a depth of five feet, and of subtracting lime from the highly charged water, while the shallower ponds, which have the very same origin, on the chalky boulder-clay near at hand, have the ordinary shallow still-water flora of the neighbourhood—an assortment which is perfectly natural according to the configuration, depth, and water flow. The

observations on this one point—limestone water and plant-life—may extend indefinitely. The hills in the distance, the gathering ground of the springs below, are supplying water continually. In one spot, masses of wall-like tufa are being built up by the aid of plant and bacterial life and surface evaporation. More wonderful still, the sands exhaling moisture constantly, during hot days or warm nights, according to their flora, are accumulating thin bands of flaky tufa just within the turf-soil, or thick bands of pan-iron lower down.

We look in vain, in the Halifax Flora, for such speaking facts or fresh observations in environment. The growth of the peat-bog, the heather-moor, the sphagna of the hollows, the mosses and lichens of the highest rocks, the many-hued fungi of all localities, have an environment history at Halifax worthy of the greatest acumen and critical observation.

E. A. Woodruffe-Peacock.

It may be well to add to Mr. Woodruffe-Peacock's interesting and suggestive review a few details as to the *Flora* itself. A bibliographical note facing the title shows that it was issued in instalments with the *Halifax Naturalist* between 1896 and 1904, but pp. 1–120 were "revised and reprinted in 1900," which practically brings the work up to that date. The chapter on "plant distribution and associations," although doubtless capable of extension, as Mr. Woodruffe-Peacock suggests, strikes us as being carefully done, and as an advance upon the treatment of these subjects even in recent floras. There is an excellent bibliography: the "historical and biographical sketch" is also extremely good; the biographies are not unduly drawn out, and are rightly confined to those of local workers, the principal of whom were James Bolton (fl. 1758–1795), Robert Leyland (1784–1847), Samuel Gibson (1789-1849), Samuel King (1810–1888), John Nowell (1802–1867), and Abraham Stansfield (1802–1880). The authors mention the interesting collection of "Fifty Flowers drawn from Nature," by Bolton in 1785–7, preserved in the Department of Botany, British Museum: it would have added to the interest of their note had they reproduced the preface (dated April 5, 1788) prefixed by Bolton to his work. The original drawings for the *History of Ferns* are not always exactly reproduced in the published volume; Bolton was his own engraver, and altered the drawings when he thought this desirable.

Messrs. Crump & Crossland print an interesting letter from Bolton, which is preserved in the copy presented by him to Dickson, now in the Todmorden Free Library; another letter, still unpublished, is in the autograph collection of the Department of Botany. It might have been mentioned that a German translation of Bolton's *Fungusses*, edited by Willdenow, was published in Berlin, 1795–1820; and that L'Héritier dedicated to him his genus *Boltonia*.

The Flora itself is sensible and straightforward; the casuals, apart from those in the *London Catalogue*, occupy little space, being relegated to an appendix; and there is a gratifying absence of the disquisitions on nomenclature and other irrelevancies which sometimes add to the bulk, though not to the usefulness, of books of this

kind. There is an interesting note (p. 308) on the accidental establishment of *Galium Cruciata* by the throwing away of the contents of a vasculum, among which was this plant. *Viola Reichenbachiana* appears to be absent; there are not many Rubi; and the representation of *Hieracium* by *H. Pilosella*, *H. vulgatum*, and *H. boreale* reminds one of the good old orthodox times, before the days of the hieraciarchs. The Cryptogams receive close attention, mosses, hepatics, lichens, algæ, and fungi each being elaborated at some length; for this part of the work Mr. Crossland is responsible: "the list of fungi" includes 1105 species; we note that Bolton's unpublished drawings in the Department of Botany are referred to. Taken as a whole, then, the *Flora of Halifax* is a worthy addition to the list ofBritish floras.

ED. JOURN. BOT.

The Classification of Flowering Plants. Vol. I. Gymnosperms and Monocotyledons. By A. B. RENDLE, M.A., D.Sc., F.L.S. pp. 385. 187 Illustrations. Cambridge University Press. 1904. Price 10s. 6d.

IN these days, when translations from the German (generally appearing five years too late), and text-books written by examiners for examinees, represent almost the whole output in text-books of British botany, it is pleasant to welcome a work of first-rate importance which belongs to neither of these classes. It may be at once said that Dr. Rendle's volume is indispensable as a work of reference, especially to every teacher of advanced botany. The title scarcely gives a fair idea of the contents. After an historical introduction, in which the evolution of a definite system is shortly traced from William Turner to Adolf Engler, Dr. Rendle proceeds to the description of the different classes of the Gymnosperms. An account of the Angiosperms, including morphology, anatomy, pollination, fertilization, and embryology, is followed by the descriptions of the various monocotyledonous orders. Finally, there is a general review of affinities, with a genealogical tree.

Particularly useful are the accounts of Cordaitales, Cycadales, Ginkgoales, and Gnetales, in which much recent work on anatomy, morphology, fertilization, and embryology will be found in a convenient form for reference. There is no other book in English, so far as known to the writer, which gives these details, which appear to have been collected with great care. As regards the orders themselves, Dr. Rendle's plan involves a full account of all ordinal characters, whether derived from anatomical, biological, or systematic considerations. The plan of treatment reminds one of that followed in the *Naturlichen Pflanzenfamilien*, though, of course, it is not so ambitious. The generic characters are sometimes given in sufficient detail for distinguishing the genera, but in other cases, and especially in *Orchidaceæ*, this is not the case. The descriptions of germination are generally excellent, but other points, such as geographical distribution, biology, and economic uses, are a little unequal. Of course, to give an adequate account of any one of these, even of the economic uses of monocotyledons, a whole

volume would be necessary, yet when Dr. Rendle does give the uses of *Palmaceæ* in full, one is led to expect more than is allowed in the case of other natural orders.

The abstracts given of controversial questions, such as the cone-scale of *Coniferæ*, the grass-cotyledon, and the fertilization, embryology, and parthenogenesis of angiosperms, have been prepared with great care. They are as nearly up to date as anybody has a right to expect, in questions which are still under consideration and on which so much is almost daily appearing. These questions are of general interest at present, and this account of them is exceedingly useful.

The preceding remarks will be sufficient to show the value and general usefulness of Dr. Rendle's work, but there are certain points in which it lends itself to criticism. The figures are decidedly disappointing. In many cases they are so reduced in size as to be obscure and even deceptive. That of *Arrhenatherum avenaceum* (Fig. 107) "from Ward, after Kent," almost amounts to a libel on the exquisite plate in the *Natural History of Plants*, and in too many cases the figures seem to have been taken from almost any source—who, for instance, would recognize *Carex glauca* in Fig. 117? We have been unfortunately spoilt by Kerner and Schimper as regards illustrations, and look nowadays for a higher standard than that which formerly satisfied us.

Another grave defect is in the literature cited. It is scarcely possible to discover why some authorities are included and others omitted altogether. There is no mention of Mr. Baker under *Liliaceæ*, *Amaryllidaceæ*, or *Iridaceæ*; Bonnier's *Cours de Botanique* contains much French work on the development of the ovule and pollen-grain, which would greatly simplify the account given here. In this respect Dr. Rendle seems to have followed too closely Dr. Engler and the Berlin school. In some places also the treatment is unequal; the inflorescence, distribution of fruit and seed, classification of fruits, and some other parts of Chapter IV. are scarcely up to the standard of the rest of the book. The term pseudocarp can scarcely be said to include the sorosis of the mulberry, nor is the definition of a schizocarp quite that which is usual in elementary botany—it would include a lomentum, for instance. It would have been more satisfactory if the importance of *Pinus* and other *Coniferæ* as dominant members of associations in the north temperate zone and in mountains had been pointed out. So also with regard to *Zostera* and *Ruppia*; the rhizome is described, but no hint is given of the important work which these plants perform in fixing mudbanks. The distribution of *Triglochin* by animals, and of *Cyperaceæ* by water, is not mentioned; nor is there any mention of the contractile roots which play so great a part in the distribution of many *Liliaceæ*.

There are, of course, many points in which one is inclined to differ from the author. The wide distribution of *Narthecium* and *Tofieldia*, for instance, is surely only a special example of the wide distribution of almost all marsh plants. The fact that *Eriocaulon septangulare* occurs in Skye and the West of Ireland, and that *Naias flexilis* and *Sisyrinchium angustifolium* are also found in Europe, does

not necessarily indicate a former closer relationship between the north temperate floras on the two sides of the Atlantic. It is quite probable that their seeds have been transferred on driftwood, or by the agency of birds.

The historical introduction begins also in 1551, and this is a little unfair to Ibn-Sinâ, Theophrastus, and the unknown Egyptian and Assyrian botanists who described, and in some cases figured, plants in quite a scientific way. Of course their work is of no use to us, but the way in which it was lost by too esoteric a terminology points a very valuable moral. Then, again, many will be inclined to doubt the derivation of the *Farinosæ* from *Cyperaceæ*, as suggested in the genealogical tree; neither the water-habitat nor the wide distribution of *Cyperaceæ* are very convincing on this point, as set against the apparently highly specialized character of the order. The volume, as a whole, however, is an important addition to our handbooks of systematic botany.

G. F. Scott Elliot.

BOOK-NOTES, NEWS, &c.

We are glad to announce that the new edition of Babington's *Manual*, on which the Messrs. Groves have been so long occupied, has been published. Pressure on our space compels us to defer a notice of it until our next issue.

We learn with regret that the reprehensible practice of collecting wholesale rare British plants, to which we have on more than one occasion adverted, is not yet extinct. Both the Lizard and Teesdale have, we learn, lately been visited by a collector of this kind. We trust that botanists will discountenance in every way possible a practice as mischievous as it is unscientific.

The third and concluding part of the Australian portion of the *Illustrations of the Botany* of Cook's First Voyage, which Mr. Britten has been preparing for the Trustees of the British Museum, will be issued shortly. The Trustees will also publish at an early date a history of the collections in the Natural History Museum, including a full account of the Herbarium and of the MSS. and drawings in the Department of Botany.

The Fifteenth Annual Report of the Missouri Botanical Garden is perhaps less interesting to the botanist than some of its predecessors. The principal paper is "an ecological comparison of some typical swamp areas," by Mr. S. M. Coulter; this is illustrated by twenty-four excellent plates: Mr. Trelease's paper of two pages on "aberrant veil remnants in some edible agarics" has ten plates devoted to it. We in this country can hardly help envying the copious financial resources which the Missouri Garden evidently has at its disposal.

The fourth part (vol. ii. part 1) of Dr. Theodore Cooke's well-printed and carefully executed *Flora of the Presidency of Bombay* carries the work almost through the *Boraginaceæ*. The bibliography

given for each species is full and useful, and the author's notes on the plants are often exceedingly instructive. Dr. Cooke seems to have overlooked a paper on *Hoya* published in this Journal for 1898 (pp. 413–418), which would, we think, have induced him to vary his nomenclature of the species, in which he follows the *Flora of British India*.

Dr. John W. Jordan, Librarian of the Historical Society of Pennsylvania, reports that there has been added to the library of the Society the microscope and seventy volumes from the library of John Bartram, the botanist, presented by William Middleton Bartram.

The fourth part of Mr. J. H. Maiden's *Critical Revision of Eucalyptus* is mainly devoted to *E. incrassata* Labill., under which he places eighteen species of various authors, grouped under six varieties. Nine good plates illustrate the species in the very large sense in which Mr. Maiden understands it; it seems difficult to understand how they can be placed together, but Mr. Maiden knows the living plants, and his opinion is entitled to every respect. We wish, however, that the letterpress were more satisfactory; the descriptions are mostly mere transcriptions. Mr. Maiden does not even give a description from his own pen of *E. incrassata* as he understands it, but contents himself with copying Labillardière's original diagnosis: the botanical value of his work is thus less apparent than it should be, and the arrangement of the material leaves much to be desired. The only other species described and figured in this part is *E. fœcunda* Schauer.

Mr. Maiden also sends us part i. of his *Flora of Norfolk Island*, reprinted from the Proceedings of the Linnean Society of New South Wales for 1903. It contains much of interest, and, if space will allow, we propose to return to it later.

Mr. J. Medley Wood has published the concluding part of vol. ii. of his *Natal Plants*, thus completing the volume devoted to the grasses. The figures (by Miss Lauth) are very faintly printed, but are otherwise fairly satisfactory; among them are many of the new species described by Dr. Stapf in the *Flora Capensis*. The preface is not dated, and the date on the title-page of the volume—1904—is misleading; the preceding parts were published respectively in 1899, 1900, and 1903, and this should have been indicated on the back of the title-page.

We are glad to see that the young men at Stonyhurst are carrying on the investigations into the flora of the district which Father Gerard set on foot some years ago. The note on the subject in the last issue of the *Stonyhurst Magazine* seems to have been printed off without being "read"; hardly a name is correctly printed, and the correction—"of course the spelling *Chichonium Intybus* was a misspelling for *Chiconium intybus*"—hardly improves matters.

The Rev. E. A. Woodruffe-Peacock has published in his "Rural Studies Series" an interesting and suggestive paper entitled *How to make Notes for a Rock-Soil Flora* (Goulding, Louth; 1s.). We hope to make extracts from it in an early issue.

4

6

5

7

10

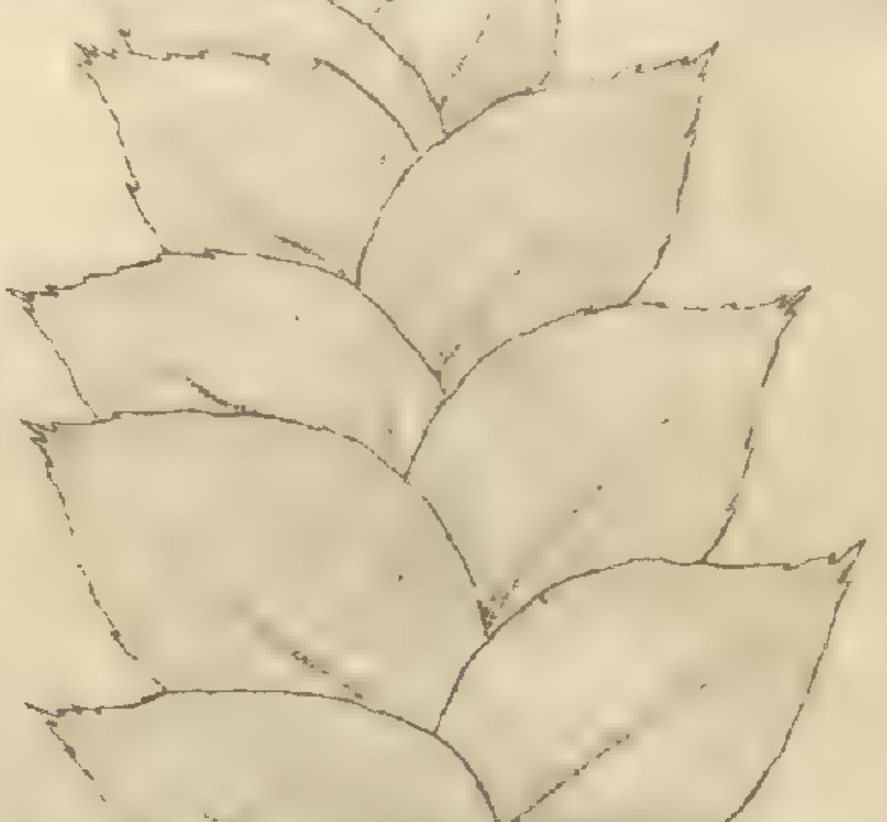
1

8

11

2

9



3

W N. Allen del.
S C Hendrey lith

West, Newman imp. London.

Hypopterygium immigrans *Lett.*

NOTES ON HYPOPTERYGIUM.

By Canon H. W. Lett, M.A., M.R.I.A.

(Plate 463.)

The genus *Hypopterygium* differs from other Musci in having the branch-leaves arranged in three rows, after the manner of many Hepaticæ, and in the leaves of the third row being smaller, of a different shape from the others, and attached (generally very closely pressed) to the back part or under side of the stem, precisely as the under leaf (or stipule, or amphigastrium) of Hepaticæ. The form of the plant is dendroid, and all the species are stoloniferous; the leaves are margined with rows of longitudinal cells, and the leaves of the front rows are more or less dimidiate. All the species are natives of warm countries, such as New Zealand, Australia, Tasmania, Brazil, Jamaica, Tibet, and Japan. My attention was drawn to these most curious mosses by the discovery in 1887 of a colony of a species growing in a cold fern-house at Easton Lodge, Monkstown, Co. Dublin, the residence of Greenwood Pim, Esq., F.L.S. I received several plants from Mr. Pim in 1899, which are growing and looking quite healthy under glass in a cold pit devoted to the cultivation of Hepaticæ in my garden; and it is still flourishing and occasionally fruiting in Mr. Pim's house, where of course it is an alien, having been introduced probably on the roots of a tree-fern. I have submitted specimens to several authorities, including the British Museum and Kew, and Messrs. Mitten and Binstead, and it has not been identified with any known species. I therefore submit the following description:—

Hypopterygium immigrans, sp. n. 25–35 mm. high. Stem leafy above, reddish brown below, rising from a very long wiry black-brown stolon; the lower half and the stolon thickly clothed with reddish tomentum. Branches 1–2-furcate, erect. Front leaves 1·0 × ·58 mm., patent, slightly convex, directed upwards, oblong-oval-acute, overlapping. Margin toothed near apex, ending in a stout mucro. Nerved for two-thirds. Under leaf ·6 × ·38 mm., orbicular, suddenly acuminate, base wavy cordate, nerved to near apex, ending in a stout mucro ·2 mm. long, toothed near apex. Cells very small, round, "dotted." Cap. pale red, oblong pyriform, on a short red wavy cernuous seta. Female flowers often as many as six on the same shoot.

Hab. On surface of earth in pots and rock-work in cold fern-house, Monkstown, Co. Dublin, *Greenwood Pim*, 1887.

Mr. W. N. Allen, of Dublin, has kindly made the accurate and beautiful drawing that accompanies this paper.

In the Herbarium of Trinity College, Dublin, there is a collection of some species of *Hypopterygium*, of which, by the courtesy of Dr. E. P. Wright, formerly Professor of Botany in the University of Dublin, and now Keeper of the Herbarium, I was recently permitted to make an examination, of which the following notes may serve for a comparison of the new species:—

H. Novæ-Seelandiæ C. Muell. Tasmania, *J. D. Hooker*.

25 mm. high. Stem sulcate, leafy, brownish black, tomentose at base. Branches curved downwards, bipinnate, 6 mm. long. Front leaves 1·0 × ·54 mm., slightly convex, oval-acute, margin sharply toothed, strongly nerved to near apex, ending in a strong mucro. Under leaf ·72 × ·42 mm., oval-orbicular, suddenly acuminate; nerve strong, excurrent in a mucro; margin toothed. Cells very small, round, "dotted."

H. Muelleri Hampe in *Linnæa*, 1856, p. 215. Sydney and Newcastle, New South Wales, May, June, 1855, *W. H. Harvey*.

There is another specimen labelled "Australia, Buchan River."

25 mm. high. Stem pale green, tomentose at base and for one-half. Branches twisted when dry, 1·5 × ·58 mm., margin finely toothed; weakly nerved for more than one-half. Under leaf ·65 × ·53 mm., orbicular, suddenly acuminate, cordate at base, nerved for two-thirds, ending in a strong mucro. Seta cernuous. This resembles *H. immigrans*, but is much smaller, and has much closer convex leaves.

H. tenellum C. Mueller. Ceylon, *Thwaites*.

20 mm. high. Stem tomentose at base. Branches numerous at apex, curved downwards. Front leaves 1·15 × ·65 mm., ovate-acute, convex, nerved for two-thirds, ending in a strong mucro, sharply toothed near apex, twisted when dry. Under leaf ·58 × ·43, orbicular, nerved for one-half, ending in a long stout mucro. Cells rhomboidal, filled with chlorophyll, walls thin. Cap. wide. Resembling *H. immigrans*, but that has the branches directed upwards, and has a rounder under leaf, with a longer mucro.

H. filiculæforme Brid. From Mr. Ward. *Hookeria filiculæforme* Hedw. [New Zealand.]

120 mm. high. Stem leafless, thick and firm, sulcate, sparingly tomentose at base. Branches 20–25 mm. long, tripinnate, directed forwards. Front leaves ·5 × ·2 mm., ovate-acute, margin distantly toothed in upper half, slightly convex, weakly nerved for two-thirds, overlapping, directed upwards. Under leaf ·2 × ·12 mm., orbicular, suddenly acuminate, nerve strong, excurrent in a long stout mucro, margin with a few large distant teeth near apex. Cells oval rounded, small, filled with chlorophyll, walls thick.

H. laricinum Brid. *Hookeria laricina* Hook. Cape of Good Hope.

20 mm. high. Stem pale, sulcate, leafy, leaves large, tomentose at base and for one-half. Branches bifurcate. Front leaves 1·4 × ·72, complanate, slightly convex, ovate-acute, directed upwards, strongly nerved for two-thirds, ending in a mucro, weakly toothed near apex, somewhat twisted when dry. Under leaf 1·2 × ·8, oval, suddenly acuminate, nerve excurrent in strong mucro. Seta cernuous. Cells small, indistinctly rhomboid, walls thick.

H. flavo-limbatum C. Muell. *Hypnum rotulatum* [Nepal]. *W. Griffith.*

20 mm. high. Stem smooth, pale, leafless, tomentose only at base. Branched for upper half; branches furcate, 6 mm. long, directed upwards. Front leaves ·92 × ·62 mm., ovate-acute, nerved for more than one-half, margin toothed near apex, close and over-

lapping. Under leaf ·62 × 48 mm., orbicular, nerve strongly excurrent in a stout mucro, which is ·2 mm. long, or one-third the whole length of the under leaf. Cells hexagonal, densely chlorophyllose, walls thick. The leaves are shorter, blunter, and more toothed than in *H. immigrans*, to which it approaches in size and form.

H. GLAUCUM Sull. *H. Smithianum* var. *β*. New Zealand, Antarctic Exp. 1839–1843. *J. D. Hooker.*

Small, about 6 mm. high. Tomentose at base. Branches 3 mm. long. Front leaves ·8 × ·48 mm., very close, much overlapping, convex, directed upwards, ovate-acute, nerved for two-thirds, toothed near apex, ending in stout mucro. Under leaf ·4 × ·35 mm., concave, oval-acute, nerve excurrent in strong mucro. Cells oval, chlorophyllose, walls thick. Texture soft, rather thin. Cap. small, on long cernuous seta.

H. CONCINNUM Brid. Lord Auckland's Islands, Antarctic Exp. 1839–1843. *J. D. Hooker.*

38 mm. high. Stem sulcate, nearly black, tomentose at base, leafy for 25 mm. up from base. Branches bifurcate, decreasing in size upwards. Front leaves 2·4 × ·44 mm., lanceolate, directed upwards, close, overlapping, slightly convex; nerve strong, prominent at back, excurrent in small mucro; margin strongly toothed for one-third next apex. Under leaf 1·4 × ·44 mm., resembling front leaves, except in size. Cells very small, round, densely chlorophyllose, walls very thin.

H. PALLENS Hook. f. & Wils. *H. Struthiopteris* Mitt. in Hook. Handb. p. 489. New Zealand, Antarctic Exp. 1839–1843. *J. D. Hooker.*

25–38 mm. high. Stem nearly black, sulcate, tomentose at base, leafy. Branches on upper three-fourths, furcate, directed upwards. Front leaves 1·28 × ·52 mm., broadly lanceolate, convex, margin finely toothed near apex; nerve strong, prominent at back, excurrent in mucro. Under leaf ·8 × ·5 mm., rounded at base, ovate, suddenly acuminate; nerve strong, toothed at back, excurrent in a strong mucro, which is ·6 mm. long. Cells irregularly rounded, very small, full of chlorophyll, walls thin; faintly striate, with 5–6 lines in each. Seta short, cernuous.

H. FLAVESCENS Hampe. Organ Mountain, *G. Gardner.*

38 mm. high. Stem leafy, tomentose at base and for one-half upwards. Branches 13 mm. long, furcate, directed upwards. Front leaves 1·0 × ·58 mm., convex, ovate-acute, spreading, nerved for two-thirds, margin strongly toothed, ending in small mucro, scarcely altered when dry. Under leaf ·45 × ·30 mm., orbicular, suddenly acuminate; nerve faint, excurrent in large mucro, margin entire. Cells hexagonal, densely chlorophyllose, grains large, walls thin. Seta short, cernuous. This has smaller leaves than *H. immigrans*, with which Mr. Mitten thinks it most nearly agrees.

H. CILIATUM Brid. New Zealand, *T. Kirk.*

Small, about 6 mm. high. Stem tomentose at base and for one-half upwards. Branches furcate, 3 mm. long, directed upwards, slightly thickened at their ends. Leaves scarcely altered when dry,

nerveless, margins fringed with hairs ·2 mm. long. Front leaves ·52 × ·4 mm., convex, very close, overlapping, ovate-acute, apex ending in a long hair. Under leaf reniform, bluntly pointed, swollen at base, wider than its length, ·52 × ·85 mm. Cells small, rhomboid, chlorophyllose. Female flowers numerous, often as many as nineteen being on a fertile branch. Cap. on short seta, erect.

H. COMMUTATUM C. Muell. *H. tamarisci* Sull. New Zealand, *T. Kirk.* [And, N. Z., Christchurch, 1884, *Mary Archer Fforde. Herb. H. W. L.*]

50 mm. high. Stem black, sulcate, leafy, tomentose at base. Branches bifurcate, 10 mm. long, in spreading tufts on apex of stem. Front leaves 1·25 × ·7 mm., close, overlapping, directed upwards, ovate-acute, convex, margin with many strong teeth, nerved for two-thirds, ending in a strong mucro. Under leaf ·7 × ·38 mm., cordate at base, lanceolate-acuminate, margin closely and strongly toothed, nerve weak, excurrent in strong mucro. This plant is peculiar in having below the middle of the base of each front leaf a strong spine equal in length to the nerve; it resembles a seta, and might be mistaken for a leaf-nerve from which the blade had been abraded; these spines are more acutely directed upwards than the leaves. Cells very small, hexagonal, densely chlorophyllose, walls thick, texture firm.

H. DISCOLOR Mitt. *Hookeria rotulata.* Van Diemen's Land.

20 mm. high. Stem stout, pale green, leafy, tomentose at base. Branches 8 mm. long, mostly at apex, pinnate, curved downwards, twisted when dry. Front leaves divaricate, ovate-acute, nerved for two-thirds, convex, margin entire, ending in a small mucro, twisted when dry. Under leaf ·6 × ·55 mm., ovate-acute, somewhat squarrose, margin entire, nerved for two-thirds, ending in a strong mucro. Cells small, hexagonal, full of chlorophyll, walls thin, texture thick and firm. The portion that I moistened for examination gave a faint greenish yellow colour to the water, as the Hepatic *Radula* does under like conditions.

From Mr. Mitten I have received another species, which I add here:—

H. VIRIDULUM Mitt. New Zealand.

25 mm. high. Stem leafy, tomentose at base. Branches furcate, straight, directed upwards. Front leaves ·92 × ·6 mm., ovate-acute, complanate, convex, spreading upwards, close, overlapping; margin slightly toothed next apex, which ends in a small mucro; faintly nerved for two-thirds. Under leaf ·6 × ·41 mm., cordate at base, orbicular, suddenly acute, margin entire, nerve faint, excurrent in strong mucro, ·2 mm. long, close and overlapping, Cells oval-hexagonal, walls thin, texture delicate, almost translucent.

EXPLANATION OF PLATE 463.

Hypopterygium immigrans H. W. Lett.—1. Under side of stem, with under leaves and archegonia, × 20. 2. Under side of apex of stem, with under leaves, × 20. 3. Front of apex of stem, × 20. 4. Under leaf, × 100. 5. A front leaf, × 50. 6. Mucro of under leaf, × 250. 7. Female inflorescence and bracts × 40. 8. Archegones, × 40. 9. Capsule and seta, × 25. 10. Teeth from peristome, × 120. 11. Plant with stolon, nat. size.

VERONICA BUXBAUMII AS A BRITISH COLONIST.

By Frederic N. Williams, F.L.S.

This plant has been a colonist since 1825, according to Watson, and is now generally distributed throughout Britain, from the Channel Islands to Caithness. In the last edition of the *London Catalogue*, and in the second edition of *Cybele Hibernica*, the name of *Veronica Tournefortii* has been adopted for it. The object of the present note is to show that the two are quite different plants. By tracing back the history of *Veronica Buxbaumii*, the cause of the confusion can be readily ascertained. The following list of citations, quoted at the outset, will supply the threads of the tangle to be unravelled :—

1.—V. Allionii var. Tournefortii Vill., Prosp. Hist. Pl. Dauph. p. 20 (1779); Hist. Pl. Dauph. ii. p. 9 (1787) : = V. officinalis var. Tournefortii Schrad., Fl. Germanica, i. p. 32 (1806).

2.—V. Allionii F. W. Schmidt, Fl. Boëm. i. p. 6 (1793), non Vill. l. c. : = V. officinalis Linn., Sp. Plant. p. 11 (1753).

3.—V. Buxbaumii F. W. Schmidt, in Mayer, Samml. Phys. Aufs. i. p. 187 (1791): = V. pectinata Linn., Mant. Plant. i. p. 24 (1767).

4.—V. Buxbaumii Tenore, Fl. Napol. i. p. 7, t. 1 (1811) :—the plant under discussion.

5.—V. filiformis Smith, in Trans. Linn. Soc. i. p. 195 (1791).

6.—V. persica Poiret, Encycl. Meth. viii. p. 542 (1808) : = no. 5.

7.—V. Tournefortii C. C. Gmel., Fl. Badens. i. p. 39 (1806): = no. 5.

"*V. Tournefortii* Vill." of *Index Kewensis*, ii. p. 1192, is an error; as it is the plant referred to in no. 1, described as a variety by Villars. The error arises from its being indexed as a species at the end of Villars' work.

Nos. 4 to 7 include two species, first defined by Buxbaum, and figured together on the same plate. No. 4 was founded by Tenore on Buxbaum, *Cent. Plant.* i. p. 26, t. 40, f. 2 (1728). Tenore's fine plate well represents the English plant. In the Kew copy of Tenore's work, someone has written in pencil on the plate "V. filiformis," evidently misunderstanding the Italian context, which states that a figure of a half-opened bud of *V. filiformis* has been added for comparison, but that the latter plant is "affatto diversa." No. 5 was founded by Smith on Buxbaum, *Cent. Plant.* i. p. 25, t. 40, f. 1, and described from Tournefort's dried specimens, which were shrivelled up and damaged. Smith had evidently neither seen nor examined living specimens. No. 7 was founded by Gmelin on the same figure; he further quotes as a synonym Smith's plant, but apparently disapproves of the name. Gmelin describes the plant from authentic living specimens, and his description is more accurate and clear than the sketchy and careless description of Smith. Smith was misled, moreover, by Buxbaum's error in

transcription from Tournefort; for in the diagnostic phrase Buxbaum wrote "flore albo" instead of "flore magno." Both Gmelin and Smith likewise refer to the same plant mentioned in Tournefort's *Corollarium*, p. 7. Lastly, *V. persica* was described by Poiret from specimens of Persian origin cultivated in the artificial soil of the Jardin des Plantes, at Paris. The description tallies as nearly as possible with that of *V. Tournefortii*. Boissier (*Fl. Orientalis*, iv. p. 466) keeps up *V. Buxbaumii* and *V. filiformis*, and notes their differential characters, but wrongly adduces *V. Tournefortii* as a synonym of the former, thus again causing confusion. Syme also remarks (*Engl. Bot.* vi. p. 153) that the description of *V. persica* will not cover the plant now known so well in this country.

Its first definite record as a British colonist is by Rev. H. Kirby, in 1825, under the name of "Veronica filiformis," who found it at Brimpton, in Berkshire; the specimens are in the Oxford Herbarium. In Ireland, where also it is now generally distributed, it was first found near Cork, about 1845, from which locality there are specimens in Herb. Brit. Mus., dated 1848 (I. Carroll). The earliest published record of its occurrence, as a British colonist, is in Johnston's *Fl. of Berwick-upon-Tweed* (1829), in which a coloured figure of the plant is inserted as a frontispiece to the volume. The locality given is Whiterig, in Berwickshire; and there are authentic specimens so labelled by Johnston in Herb. Brit. The author states that he has compared these Berwickshire specimens with authentic specimens of *V. Buxbaumii*, especially sent for examination to Winch by Tenore himself. Borrer had previously found the same plant near Henfield, in Sussex, about 1820 (specimens in his herbarium at Kew); he submitted examples to Smith, who, however, attached no importance to them, or else overlooked them, as no mention is made of the plant in his *English Flora* (1828). There are also examples in Herb. Brit. Mus. from Helensburgh, in Dumbartonshire (1834), and from Brimpton, in Berkshire (Rev. H. Kirby, 1835). The vertical range of *V. Buxbaumii* is from sea-level to 300 metres near St. John's, Weardale, in Durham (J. G. Baker), and to 285 metres in Dublin (N. Colgan). According to Mr. R. Ll. Praeger (*Irish Topographical Botany*, 1900), the plant is now distributed through every one of the Irish counties. In Britain, as Mr. Arthur Bennett has been kind enough to point out, there are now only five counties in which there is not any record of its occurrence up to the present, *viz.* Huntingdonshire, Nottinghamshire, Kirkcudbrightshire, Selkirkshire, and West Lothian.

It may be mentioned that in Smith's Herbarium are the two specimens on which he founded *V. filiformis*, one collected by Tournefort and the other by Steven.

WEST LANCASHIRE LICHENS.

By J. A. Wheldon, F.L.S., & Albert Wilson, F.L.S.

This preliminary account of the lichens of West Lancashire is published with a double object, *viz.* to place on record such species as have hitherto been detected, and to invite the aid of other botanists in determining what further species the district yields, and ascertaining how they are distributed in the vice-county.

We have divided West Lancashire, for the purpose of our projected flora, into three principal divisions. A condensed description of these will be found in this Journal for the year 1899, p. 465. It will suffice here to state that the numbers 1, 2, and 3 refer to the north, east, and west portions of the vice-county respectively.

Except where a collector's name is quoted, all the species enumerated have been found by the authors, either jointly or individually. The only published notes we have been able to find are a few incidental references to West Lancashire localities in Mr. Martindale's papers on Westmorland Lichens, which appeared in the *Naturalist*, 1886, p. 317; and one or two old records given in Leighton's *Lichen Flora*, ed. iii.

The lichens in a large part of West Lancashire present some difficulty to the student, as many of them (especially corticolous species) are poorly developed, and frequently do not exhibit well their characteristic features. In the more favoured localities of the north and east, where they are least subject to the adverse influence of smoke, they attain greater luxuriance, and even fruit freely. As with the mosses, the rupestral species are better represented than those which grow on trees. The Scar-limestone yields a number of *Collemacei* and *Peridei*, and the *Lecanorei* here find their best development. A few interesting forms appear to be restricted to the Silurian strata of the north-east. The grit and Yoredale formations of the fell districts abound in *Lecideinei*, and a few *Gyrophorei* also occur, but mostly barren and smaller than in Westmorland and Teesdale. On the peaty slopes of the fells *Cladodei* occur in profusion, and in endless variety.

We are much indebted to Mr. J. A. Martindale for useful hints, and also for confirming or naming doubtful gatherings for us. Without the advantage of his intimate and critical knowledge of this difficult group of plants, our list would have been deprived of some of its most interesting items.

The order followed is that of Crombie's *British Lichens* as far as *Urceolaria*. From thence the arrangement of Leighton's *Lichen Flora of Great Britain* is adhered to.

Collema furvum Ach. 1. Silverdale.—*C. flaccidum* Ach. 1. On mossy tree near Henridden.—*C. pulposum* Ach. 1. Banks near Yealand.—*C. granuliferum* Nyl. 1. Silverdale; Trowbarrow; Easegill Kirk.—*C. melænum* Ach. f. *marginale* Ach. 1. Yealand and Dalton Crag, near Henridden.—*C. multipartitum* Sm. 1. Silver-

dale. 2. Near Whitewell.—*C. isidioides* Nyl. 1. On Warton Crag, *J. A. Martindale.*

Collemodium plicatile Nyl. 2. In the Hodder Valley below Whitewell. — *C. fluviatile* Nyl. ? 2. Stones in the river above Hodder Bridge.—*C. Schraderi* Nyl. 1. Dalton Crag, near Henridden.

Leptogium lacerum Gray. 1. Silverdale; Dalton Crag, near Henridden, on mossy limestone rocks. — *L. pulvinatum* Nyl. 1. Rocks and walls near Dalton Crag; Whittington and Over Kellet.

Calicium hyperellum Ach. 1. On oaks between Hornby and Melling, and near Wennington. Other species of *Calicium* are believed to occur, but we have not succeeded in detecting apothecia on them yet.

Trachylia tympanella Fr. 2. Crag Wood, and near Greystoneley, on old palings.

Sphærophorus compressus Ach. 2. Gavell's Clough and Clougha Pike, barren. — *S. coralloides* Pers. 1. Near summit of Greygarth Fell. 2. Clougha, Gavell's Clough, and Black Clough.—*S. fragilis* Ach. 2. Gavell's Clough, Deer Clough, Botton Head Fell, and Wolfhole Crag.

Bæomyces rufus DC. 1. Near Gressingham, *c. frt.*; Middlegill, Hindburn, *c. frt.*—*B. æruginosus* DC. 1. Near Dalton Crag.

Stereocaulon coralloides L. 1. Leck Fell and Greygarth Fell summit.—*S. evolutum* Graewe. 2. Clougha and Deer Clough.—*S. denudatum* Flörke. 1. Greygarth Fell at 2050 ft. 2. At the head of Great Clough, Tarnbrook Fell.—*S. condensatum* Hoffm. 2. Wolfhole Crag.

Cladonia pyxidata Fr. 1. Easegill and Leck. 2. Hindburn; Wyresdale; and near Whitewell. 3. Near Fleetwood. — Var. *pocillum* Fr. 2. Spreet Clough and near Dolphinholme. 3. St. Annes. — Var. *chlorophæa* Flörke. 2. Tatham Moor. — *C. pityrea* Flörke. 2. Gully near Lea Fell. — *C. fimbriata* Fr. 1. Silverdale and Borwick. 2. Parlick, Bleasdale, and near Whitewell. — Var. *conista* Nyl. 1. Thrang End.—Var. *radiata* Nyl. 2. Near Dolphinholme. — *C. cervicornis* Schaer. 1. Greygarth Fell and Leck Fell. 2. Clougha; on the S.W. side of Wardstone, and Long Crag above Tarnbrook. — *C. lepidota* Nyl. 1. Lower Easegill, not quite typical.—*C. furcata* Hoffm. 1. Trowbarrow and Eaves Wood. 2. Clougha; Gavell's Clough and Tarnbrook Fell; near Whitewell, and in Dewhurst Clough. 3. St. Annes. — *C. pungens* Flörke. 1. Near Haweswater.— *C. furcatiformis* Nyl. ?. 1. Heysham Moss.—*C. squamosa* Hoff. 1. Greygarth Fell and Easegill. 2. Clougha. —*C. cæspititia* Flörke. 1. Easegill. 2. Black Clough and Whitewell.—*C. coccifera* Schaer. 1. Greygarth Fell, Dalton Crag, and Heysham Moss. 2. Clougha: Lower Emmetts; Deer Clough; Parlick; Whitestone and Dewhurst Cloughs.—Forma *cornucopioides* Fr. 2. Long Crag and near Haylot. On Clougha and in Whitestone Clough a form with short, almost obsolete podetia and no scyphi occurs, which may be var. *incrassata* Fr.—*C. digitata* Hoffm. 1. Dalton Crag and Heysham Moss. 2. Grizedale and Clougha.—*C. macilenta* Hoffm. Common. Districts 1, 2, and 3. It is very

variable, and forms resembling *coronata* Nyl. and *ostreata* Nyl. occur.—*C. bacillaris* Nyl. 2. Middlegill, Hindburn, and Grizedale. —*C. Floerkeana* Fr. form *trachypoda* Nyl. 2. Grizedale Head and Tarnbrook Fell.

Cladina rungiferina Nyl. 1. Greygarth Fell, sparingly. This appears to be extremely rare with us.—*C. sylvatica* Nyl. Districts 1, 2, 3, ascending to 2050 ft. on Greygarth Fell. Forma *tenuis* Lamy occurs occasionally (Clougha; Wolfhole Crag), and var. *alpestris* Nyl. on Wardstone Breast. A large form, doubtfully referred to var. *grandis* Cromb., was collected on Greygarth Fell and Marshaw Fell.—*C. uncialis* Nyl. 1. Dalton Crag and Easegill. 2. Clougha; Black and White sides of Tarnbrook Fell; Wardstone; Marshaw Fell; Dewhurst Clough. A large form (f. *aduncа* Cromb.) occurs near the summit of Greygarth Fell.

Ramalina farinacea Ach. 1. Trees about Leck, Ireby, Burrow, and Whittington; near Silverdale. — *R. fraxinea* Ach. 1. Tree near Burrow.—*R. fastigiata* Ach. 1. Lower Easegill; by the Lune near Kirkby Lonsdale; and near Whittington and Burrow.—*R. polymorpha* Ach. 1. Coast rocks near Heysham. — *R. scopulorum* Ach. 1. Maritime rocks near Lower Heysham, where also occurs a deformed tuberculose form which is very near, if not identical with, var. *incrassata* Nyl.—*R. cuspidata* Nyl. and forma *minor* Nyl. 1. Maritime rocks near Heysham and Middleton.

Usnea hirta Hoff. 1. Near Leck Hall, and between Kirkby Lonsdale and Burrow. 2. Trough of Bowland, and below Whitewell.—*U. dasypoga* Nyl. var. *plicata* Nyl. 2. Near Lower Emmetts. —*U. ceratina* Ach. var. *scabrosa* Ach. 1. Growing erect on grit rocks, Lower Easegill. 2. In similar situations, Clougha.

Alectoria jubata Nyl. var. *lanestris* Ach. On Scotch firs on Marshaw Fell. — *A. bicolor* Nyl. 2. On grit rocks, Windy Clough, Clougha.

Cetraria islandica Ach. subsp. *crispa* Nyl. 1. Summit of Greygarth Fell at about 2050 ft. The type does not appear to occur with us. Mr. H. Fisher informs us that he also has seen this species on Greygarth Fell.—*C. aculeata* Fr. 1. Easegill and Greygarth Fell; near Silverdale. 2. Tatham Moor; Wolf Fell; Tarnbrook Fell; Clougha; Whitestone Clough.—f. *hispida* Cromb. 1. Greygarth Fell at 2050 ft. 2. Tatham Moor; Marshaw Fell; Gavell's Clough; Long Crag; Deer Clough; Mallowdale Fell; Wolf Fell. 3. Lytham.—f. *acanthella* Nyl. 2. Deer Clough.

Platysma glaucum Nyl. Very common on the hills of 1 and 2, both on rocks and trees.—Var. *tenuisectum* Cromb. 2. Clougha! *J. A. Martindale;* Marshaw Fell; Hell Crag and Long Crag; N.W. side of Wardstone; Deer Clough.

Evernia prunastri Ach. 1. Very frequent on trees; with well-developed apothecia near Kirkby Lonsdale, on trees by the Lune. 2. Whitewell; Dolphinholme, and between Caton and Halton. The f. *sorediata* Ach. occurs. — *E. furfuracea* Fr. 1 & 2. Common on trees, walls, and rocks, but always infertile.

Parmelia perlata Ach. 1. Lower Easegill, and below Kirkby Lonsdale.—*P. cetrarioides* Nyl. 2. Rocks near Clougha, and on

tree-trunk at Chaigley. Perhaps overlooked elsewhere for *Platysma glauca*, which it closely resembles in habit and chemical reaction.—*P. lævigata* Ach. 2. Wood below Whitewell.—*P. saxatilis* Ach. 1. Greygarth Fell. 2. Great Clough; Lower Emmetts; Wolfhole Crag; Mallowdale Fell; Dolphinholme; and near Garstang.—f. *furfuracea* Schaer. 2. Long Crag; Mallowdale Fell, and near Whitewell. — *P. sulcata* Tayl. 1. Easegill, Silverdale, and Heysham. 2. Chaigley and Clougha. 3. Near Garstang. — Var. *lævis* Nyl.? Tree near Heysham Moss. Resembles a small form of *P. sulcata* without soredia.—*P. omphaloides* Ach. 1 & 2. Frequent on rocks and walls.—Var. *panniformis* Nyl. 2. Clougha and Great Clough of Tarnbrook Fell, on millstone-grit rocks. — *P. Borreri* Turn. 1. Below Kirkby Lonsdale and near Aughton, on tree-trunks. 2. Middlegill, Hindburn.—*P. caperata* Ach. 1. Very fine in the east of this district, becoming rarer and smaller towards the coast. 2. Between Caton and Halton, and Damas Gill, sparingly.—*P. conspersa* Ach. 1. On Silurian rocks, Easegill, and on Silurian boulders in walls near Cowan Bridge. 2. Millstone-grit rocks in Damas Gill. — *P. exasperata* Nyl. 1. On trees, sparingly, near Melling, Aughton, and Over Kellet. 2. Near Clougha and Dolphinholme. — *P. subaurifera* Nyl. 1. Near Kirkby Lonsdale. 2. Near Whitewell.—*P. fuliginosa* Nyl. 1. Walls near Ireby, Burrow, and Leck. 2. Frequent on grit rocks and walls in the fell districts. —Var. *læte-virens* Nyl. 1. Trees near Wennington, and below Kirkby Lonsdale; Lower Easegill; Dalton Crag; Heysham Moss. 2. Clougha and Over Wyresdale.—*P. lunata* Wallr. 2. Hell Crag. —*P. tristis* Nyl. 2. Hell Crag and Long Crag. — *P. physodes* Ach. 1. Greygarth Fell. 2. Tarnbrook Fell; near Whitewell; Kemple End.—f. *platyphylla*. 1 & 2. Occasional.—f. *labrosa* Ach. Districts 1, 2, 3. Very common.—f. *tubulosa* Mudd. 3. Lytham.

Stictei. None of this section have yet been noticed.

Peltidea aphthosa Ach. 1. Silverdale. 2. Middlegill, Hindburn.

Solorina saccata Ach. 1. Near Easegill Kirk; Dalton Crag; near Henridden; several localities about Silverdale.

Peltigera canina Hoff. 1 & 2. Frequent.—*P. rufescens* Hoff. 1. Upper Easegill. 2. Spreet Clough and Deer Clough.—*P. polydactyla* Hoff. 2. Near Lower Salter. — *P. horizontalis* Hoff. 1. Near Henridden. 2. Mallowdale Fell Gully, and Gorge of the Hodder below Whitewell.

Physcia parietina De Not. Common on walls and roofs, rare on trees. We have noticed that this plant grows luxuriantly near cow-byres, and about gateways into pastures. Long distances of wall-bordered roads may be traversed without seeing the plant, but as soon as a cow-byre is reached it appears in abundance about the walls and buildings. Its predilection for such localities can hardly be due to the spores being carried by the cow's hair, and then rubbed against the walls, because it often grows on the tiles and other parts out of reach. The ammoniacal exhalations in such situations probably supply some plant-food on which this species thrives. — f. *cinerascens* Leight. 1. Near Over Kellet. — *P. lychnea* Nyl. 2. Near Whitewell.—*P. ciliaris* DC. Apparently very rare.

2. Trees near Aughton. — *P. pulverulenta* Nyl. 1. Trees about Silverdale, Carnforth, Over Kellet, and Henridden.—*P. pityrea* Nyl. 1. Silverdale, and between Carnforth and Over Kellet.—*P. stellaris* Nyl. var. *leptalea* Nyl. 1. Between Carnforth and Over Kellet, and near Eaves Wood, Silverdale; near Henridden.— *P. tenella* Nyl. 1 & 2. Frequent on trees and old walls.—*P. aipolia* Nyl. 1. Tree-trunk near Gressingham.—*P. erosa* Leight. 1. Near Henridden.

Gyrophora erosa Ach.? Rocks near the summit, N.W. shoulder of Wardstone; in small quantity and ill-developed, therefore doubtful.—*G. torrefacta* Cromb. 2. Hell Crag, Long Crag, N.W. Wardstone, Great Clough of Tarnbrook Fell, and Botton Head Fell.—*G. hyperborea* Ach. Clougha, *Mr. Jacob* (in Leight. Lich. Flora). We have looked for this without success, but on each occasion the weather conditions precluded a very thorough search.—*G. polyphylla* Turn. & Borr. 1. On the county boundary wall at the top of High Park, Lower Easegill. 2. Foxdale Head, N.W. Wardstone; Great Clough and Long Crag, Tarnbrook Fell; Grizedale Head.—*G. flocculosa* T. & B. 2. Great Clough and Gavell's Clough.

Pannaria brunnea Nyl. 1. Lower Easegill.

Pannularia nigra Nyl. 1. Leck; near Cowan Bridge; Dalton Crag; Over Kellet; Warton Crag; Silverdale. 2. Thornley; Greystoneley; by the Hodder below Whitewell.

Coccocarpia plumbea Nyl. 2. Trees by the Lune near Aughton.

Leproloma lanuginosa Nyl. 1. Lower Easegill.

Squamaria crassa Ach. 1. Silverdale Cove, Eaves Wood, Trowbarrow, and Haweswater; near Borwick. — *S. saxicola* Ach. 1. Silverdale, Melling, and Borwick. 2. Wood by the Hodder below Whitewell.

Lecanora tegularis Nyl. 1. Silverdale. 2. Lower Emmetts.—*L. sympagea* Nyl. 1. Easegill, Dalton Crag, Hornby, Borwick, and Silverdale. — *L. lobulata* Somm. 1. Near Silverdale Cove. — *L. xantholyta* Nyl. 1. Easegill Kirk; Silverdale and Over Kellet, on limestone rocks.—*L. laciniosa* Nyl. 1. Between Carnforth and Over Kellet.—*L. vitellina* Ach. 1. Easegill, Hornby, Borwick, and Aughton. 2. Chipping, Hodder Bridge, and Chaigley.—*L. erythrella* Nyl. 1. Easegill.—*L. ferruginea* Nyl. var. *festiva* Nyl. 1. Silurian rocks in Lower Easegill. — *L. irrubata* Nyl. 1. Silverdale. — Var. *calva* Nyl. Silverdale and Dalton. — *L. galactina* Ach. 2. Crook of Lune. — *L. subfusca* Nyl. 1. Near Hornby. — *L. allophana* Nyl. Wood by the Lune below Kirkby Lonsdale; Wash Dub Wood. 2. Near Abbeystead. — *L. epibryon* Ach.? 1. On moss near Wennington. Resembling *L. subfusca*, but with larger apothecia.—*L. rugosa* Nyl. On trees between Silverdale and Yealand.—*L. chlarona* Nyl. f. *pinastri* Cromb. Abbeystead and Marshaw Fell. — *L. coilocarpa* Nyl. 1. Lower Easegill. — *L. glaucoma* Ach. 1. Easegill.—*L. varia* Ach. 2. Wood below Whitewell.—*L. conizæa* Nyl. 2. Whitewell; Barnacre; Chaigley.—*L. conizæoides* Nyl. 1. Silverdale. 2. Whitewell and Brock Valley.—*L. intricata* Nyl. 1. Lower Easegill.—*L. expallens* Ach. var. *lutescens* Nyl. 1. Trees by the Lune below Kirkby Lonsdale. — *L. atra* Ach. 1. Easegill. — *L. badia* Ach. 1. Lower Easegill, and near Leck. — *L. ventosa*

Ach. 1. Very fine, and fruiting well on Silurian rocks in Lower Easegill.—*L. tartarea* Ach. Frequent on rocks and tree-trunks in 1 & 2. — *L. subtartarea* Nyl. 1. Trees near Burrow. — *L. parella* Ach. 1. Frequent on rocks and tree-trunks. 2. Higher Hodder Bridge, and near Caton. — f. *porinoides* Cromb. 1. Lower Easegill. — *L. pallescens* Nyl. 1. Trees near Dalton Hall. — *L. calcarea* Somm. f. *contorta* Nyl. 1. Silverdale. — *L. pruinosa* Nyl. 1. On a mortared wall near Wennington.

Pertusaria globulifera Nyl. 2. Tree by the Crook of Lune.—*P. amara* Nyl. Very common on trees in the hilly districts.—*P. communis* DC. By the Lune near Kirkby Lonsdale; Docker. 2. Hindburn; Crook of Lune.—*P. lactea* Nyl. 1. Hornby, and near Cowan Bridge. 2. Caton.—*P. dealbata* Nyl. 2. Middlegill, Hindburn; and about the head of Wyresdale; Clougha. — *P. Wulfenii* DC. 2. Middlegill and Wolfhole Crag, on trees.—Var. *glabrescens* Nyl. 2. Whitewell.

Phlyctis agelæa Koerb. 1. On trees near Wennington.

Thelotrema lepadinum Ach. 2. Near Whitewell.

Urceolaria scruposa Ach. 1. Between Leck and Burrow, and on Dalton Crag. 2. Clougha and Whitestone Clough. — *U. bryophila* Nyl. 2. On *Cladonia pyxidata* and mosses in Whitestone Clough.

Lecidea lurida (Swartz). 1. Dalton Crag.—*L. crustulata* (Ach.). 1. On an erratic boulder, Dalton Crag. 2. Clougha Pike; Deer Clough; Dalegill, Hindburn. — *L. lucida* Ach. 1. Near Cowan Bridge.—*L. decolorans* Flk. 2. Summit of Wardstone; Clougha.—*L. enteroleuca* Ach. 1. Easegill. — *L. parasema* (Ach.). 1. Trees between Silverdale and Yealand; Dalton Crag; and in Wash Dub Wood. 2. Spreet Clough.—Var. *tabescens* Leight. 1. Trees near Haweswater.—*L. uliginosa* (Schrad.). 1. Leck Fell. 2. Wardstone Breast.—*L. neglecta* Nyl. 1. A lichen collected at Borwick, and seen elsewhere in Dist. 1, is referred by Mr. Martindale to *Lepraria lobiferare* Nyl., the imperfect state of some lichen generally regarded as *L. neglecta* Nyl.—*L. coarctata* (Sm.). 2. Hindburn.—*L. lactea* (Flk.). 1. A cinerascent form on Silurian rocks, Easegill.—*L. plana* Lahm. 1. Easegill. 2. Clougha. In both instances on gritstone. — *L. fusco-atra* Ach. forma *fumosa* Ach. 1. Lower Easegill.—*L. contigua* Fr. 1 & 2. Common on grit-rocks amongst the hills. — f. *limitata* Leight. 2. Clougha. — f. *steriza* Ach. 1. Near Easegill Kirk. — f. *platycarpa* Fr. 2. Clougha and Gavell's Clough, on water-washed rocks.—f. *leprosa* Leight. 1. Near Gressingham. — *L. confluens* (Webr.). 1. Summit wall of Greygarth Fell.—*L. calcivora* (Ehrh.). 1. Silverdale and Dalton Crag.—*L. canescens* (Dicks.). 1. Heysham; Silverdale; Thrang End; Borwick. On trees and walls.—*L. myriocarpa* (DC.). 1. Wennington and Melling; between Carnforth and Over Kellet. 2. Near Caton. We have only found *corticolar* forms as yet.—*L. hyperiza* Stirt. (?). 1. Trees by the Lune below Kirkby Lonsdale. We have not seen a specimen of Dr. Stirton's plant, therefore this must be regarded as requiring confirmation.—*L. cæruleo-nigricans* (Lightf.). 1. Leck; Dalton Crag; Yealand; Eaves Wood; Silverdale Station and

Cove.—*L. lenticularis* Ach. 1. Silverdale.—*L. alboatra* (Hoffm.). 2. Oaks near Barnacre, Garstang.—*L. aromatica* (Sm.). 1. Silverdale and Warton Crag. — *L. exanthematica* (Sm.). 1. Limestone rocks near Haweswater; Silverdale Cove; and Dalton Crag.—*L. umbrina* Ach. 1. Lower Easegill. — *L. sabuletorum* Flk. 1. On decaying moss near Wennington and Dalton Crag. — *L. endoleuca* Nyl. 1. Trees by the Lune below Kirkby Lonsdale.—*L. muscorum* (Sw.). 1. Lower Easegill. — *L. geographica* (L.). 1. Very fine on Silurian rocks in Easegill; near Cantsfield. 2. Occasionally on grit-rocks, as on Clougha, Parlick, Great Clough, &c., but much poorer on these rocks.—*L. concentrica* (Dav.). 1. Wennington and Cantsfield, 2. Gavell's Clough and Whitewell. — Var. *impressula* Leight. 2. On walls near Quernmore. — *L. rimosa* (Dicks.). 1. Greygarth Fell. — *L. cupularis* (Ehrh.). 1. Several places in Easegill, and near Haweswater. — *L. parasitica* (Flk.). 1. On the thallus of *Lecanora parella*, Easegill.

Opegrapha herpetica Ach. 2. Near Abbeystead. — *O. atra* Pers. 2. Trees near Dolphinholme. — *O. saxicola* Ach. var. *Chevallieri* Leight. 1. Silverdale Cove.—*O. varia* Pers. f. *pulicaris* Lightf. 1. Silverdale. 2. Foxdale. — f. *notha* Ach. 2. Oak-trees, Barnacre, Garstang. — *O. vulgata* Ach. 1. Near Haweswater; trees by the Lune below Kirkby Lonsdale. 2. Abbeystead, and in the Hodder Valley below Whitewell.

Arthonia Swartziana Ach. 1. Wash Dub Wood. — *A. pruinosa* Ach. 2. Near Abbeystead.

Graphis elegans (Sm.). On oak, birch, and holly. 1. Wennington, and near Dalton. 2. Foxdale; Roeburndale; Hindburn; over Wyresdale; near Abbeystead; Clougha. — *G. scripta* Ach. Frequent and variable. 1. Silverdale; Dalton Crag; Gorge of the Greeta. 2. Roeburndale; Abbeystead. — *G. sophistica* Nyl. 1. Easegill; Silverdale; Whitewell.

Endocarpon miniatum (L.). 1. Silverdale; Easegill Kirk, very fine; near Borwick. 2. Rocks by the Hodder below Whi' well.—Var. *complicatum* (Sw.). 1. Easegill; Leck Fell; Over Kellet; and Haweswater. — *E. rufescens* Ach. 1. Haweswater; Warton Crag; Over Kellet; Dalton Crag.

Verrucaria Dufourei DC. 1. Easegill and Silverdale. — *V. margacea* Whlnb. var. *Æthiobola* Whlnb. 1. On stones submerged in Wash Dub Brook. 2. In the bed of the stream from Windy Clough, Clougha Pike. — *V. maura* Whlnb. 1. Rocks south of Heysham.—*V. mauroides* Schaer. 1. Lower Easegill.—*V. nigrescens* (Pers.). 1. Eaves Wood, near Silverdale. — *V. rupestris* Schrad. 1. Easegill.—*V. calciseda* DC. 1. Easegill; Dalton Crag Silverdale. 2. Near Whitewell.—*V. conoidea* Fries. 1. Easegill; Over Kellet; Silverdale.—*V. immersa* Leight. 1. Easegill.—*V. gemmata* Ach. 1. Oak-tree near Whittington. — *V. chlorotica* (Ach.). 1. Silverdale.—*V. nitida* (Weig.). 1. Silverdale and Whitewell.

THE PLACE OF LINNÆUS IN THE HISTORY OF BOTANY.

By Pehr Olsson-Seffer.

There appeared recently in Stockholm an extensive biography of Linnæus by Prof. Th. M. Fries,* who has devoted many years to a careful and impartial study of the literature and documents relating to the life of that great naturalist of two centuries ago. Certain German botanists have taken the opportunity of reviewing this work to attempt to deprive Linnæus of almost every vestige of importance as a botanist. It is especially Professors S. Kalischer and A. Hansen who have sallied forth to the task, and, although these writers have confined themselves to the columns of the daily press, it seems necessary to draw the attention of natural scientists to the many misrepresentations of Linnæus which now and then appear. At the present date, when the two hundredth anniversary of Linnæus's birth is not very distant, and we are likely to see opinions expressed in print on his importance in the history of botanical science, it may be proper to point out that the adverse criticisms of Linnæus which lately have been published are nothing but reiterations of what Prof. Sachs wrote many years ago in his *History of Botany*.

This work of Sachs is still, at the present day, the only general history of botany available, and it is only quite natural that most readers, not having had the opportunity themselves of making a study of the sources, should accept the statements of a recognized authority such as this author.

It can, however, hardly escape remark, even on superficial perusal of the said work, that Sachs employs a very bitter, hostile tone whenever he mentions Linnæus. The present writer has often wondered why so long a time has been allowed to elapse since the appearance of this work without a vigorous protest having been made against the manner in which this prominent author has treated the memory of Linnæus, and his influence on botanical science.† Perhaps the reason has been that everybody felt that no harm could be done to the reputation of Linnæus, either in the minds of scientists or in the opinion of the general public, even by a writer of such a marked eminence as the late Prof. Sachs.

Space forbids our entering into detailed discussion of the statements made by Sachs, even though we might not hesitate to argue against the opinions, although their author is no longer able to defend his position. A brief review of Sachs's estimate of Linnæus, illustrated by a few quotations from Sachs's work, will suffice to show the reader the tendency of his criticism.

[* *Linné: Lefnadsteckning*, af Th. M. Fries. Stockholm [1904]. 2 Bd. (vi + 364, Bilag. i–xvii. pp. 1–48: 444, Bilag. xviii–xxiii. pp. 1–46). With numerous text-cuts and portraits.]

† The only protest known to the writer is contained in J. G. Agardh's paper, "Ueber die Bedeutung Linne's in der *Geschichte der Botanik*." Ein Blatt zur Linne-Feier in Lund am 10 Jan. 1878. Lunds Universitets Arsskrift, T. xiv.

With a fervour and, one would almost say, enthusiasm worthy of a better cause, Sachs has endeavoured to show that Linnæus was far from being the great man we always have been accustomed to consider him; and, although he is obliged now and then to say a few words in favour of Linnæus, the general opinion expressed is that the fame attached for nearly two centuries to the name of Linnæus is not deserved, but is only a kind of popular fallacy.

According to Sachs, Linnæus was not the founder of systematic botany. He may only be regarded "as having built up and completed the edifice of doctrine founded by Cesalpino";* or "he so far marks rather the close of a previous condition of the science than the beginning of modern botany" (p. 41); and again (p. 85): "We might point to the fact that Linnæus never made a single important discovery throwing light on the nature of the vegetable world." No, of this Linnæus "knew nothing more than he gathered from the investigations and reflections of his predecessors" (p. 98). According to Sachs (p. 101), "the knowledge of the plants was rather hindered than advanced by him."

It must strike the reader that while Sachs has only praise for the work of Jung and other "German fathers of botany," he ridicules almost everything in Linnæus as "mediæval," "unscientific," &c. Bachmann, Camerarius, Ray, "and in part also Morison and Tournefort," were "genuine investigators of nature" (p. 101), but Linnæus "might almost be said to have been a classifying, co-ordinating, and subordinating machine" (p. 90). "Linnæus had not the remotest conception of the way in which the truth of a hypothetical fact is proved on the principles of strict inductive investigation," and "scholastic sophistry is all that his argumentation amounts to" (p. 89).

Prof. Sachs's severe criticism of Linnæus is unfortunately not supported by any quotations from the writings of the latter, and it is evident that he had read only those works of Linnæus most commonly known. In fact, he admits once (p. 104) that his authority for the contents of two of Linnæus's dissertations, upon which he has based some of his reasoning, is Wigand.†

Sachs repeatedly says that another conception than his of Linnæus's historical position "can only be entertained by one who is not acquainted with the works of Cesalpino, Jung, Ray, and Bachmann, or who disregards the numerous quotations from them in Linnæus's writings" (p. 80). After careful comparison of the principal works of Linnæus's predecessors and contemporaries—among them Brunfels, Fuchs, Boch, Dodoens, Cesalpino, Camerarius, Jung, Bachmann, Ray, Morison, Tournefort, Malpighi, Grew, Leibnitz, Burckhard, Vaillant, and Boerhaave, with Linnæus's own writings—we have entirely failed to find any evidence on which such a categorical judgment as that of Sachs could be based. Be it true that Linnæus often drew from previous writers, yet he was

---

* P. 37, J. Sachs: *History of Botany*, in English edition, by Garnsey & Balfour. Oxford, 1890.

† *Kritik und Geschichte der Metamorphose*, 1846.

also accustomed to acknowledge this. He, of course, did not mention his sources in cases where he was speaking of facts and theories which were well known, and, so to say, common property, just as little as any writer does nowadays. When Sachs (p. 37) insinuates that "no one can read both authors (Cesalpino and Linnæus) without lighting not unfrequently upon passages in Linnæus's *Fundamenta*, or in his *Philosophia Botanica*, which remind him of Cesalpino, and even upon sentences borrowed from him," he does not even give any instances where this pretended "borrowing" has taken place. Speaking of Robert Morison, and the fact that this author was "reproached by his contemporaries and successors with having borrowed without acknowledgment from Cesalpino," Sachs finds the following excuse: "This was an exaggeration." But no such defence is allowed in favour of Linnæus! Yet one might more easily detect a closer relationship between the works of Morison and Cesalpino than between Linnæus and the latter.

Sachs correctly says (p. 84): "It is only fulfilling the duty of an historian to study the source from which Linnæus drew, but it would be a misapprehension to see in this any depreciation of a great man"; but this last admission sounds rather strange from a writer who a few pages later (p. 89) states that "Linnæus was a dangerous guide for weak minds, for his curious logic, among the worst to be met with in these scholastic writers, was combined with the most brilliant powers of description." On the same page Sachs continues: "It was not Linnæus's habit to occupy himself with what we should call 'an inquiry'; whatever escaped the first critical glance he left quite alone; it did not occur to him to examine into the cause of the phenomena that interested him. He classified them, and had done with them." Nothing shows better than this last sentence how little Sachs, in fact, was acquainted with the works and thoughts of Linnæus. Whatever may be said in favour of Sachs's *History of Botany*—and that work has certainly many merits—the treatment of Linnæus's influence on the development of botanical science is unjust. Sachs, who in most of his works combined conscientiousness with German thoroughness, has, in regard to Linnæus, unfortunately been led astray, and he has not taken the trouble to study the most prominent figure in the history of the science which he has undertaken to describe.

With reference to Linnæus's *Philosophia Botanica*, Sachs says, for instance, on p. 94: "The parts in the individual plant which the beginner must distinguish are three—the root, the herb, and the parts of fructification—in which enumeration Linnæus departs from his predecessors, by whom the fructification and the herb together are opposed to the root. In the central part of the plant is the pith enclosed by the wood formed from the bast; the bast is distinguished from the rind, which again is covered by the epidermis; these anatomical facts are from Malpighi; the statement that the pith grows by extending itself and its envelopes is borrowed from Mariotte. Cesalpino's view of the formation of the bud is expressed by Linnæus in the statement that the end of a thread of

the pith passing through the rind is resolved into a bud," &c. "Neither Hugo Mohl nor Wigand nor most of Linnæus's biographers seemed to know that his theories are all to be traced to Cesalpino" (p. 105). And, again: "It is as important to know that Linnæus's terminology is formed on Jung, as it is to learn that his most general philosophical propositions on botanical subjects are to be traced to Cesalpino." In his attempt to show that Linnæus had borrowed his terminology from Joachim Jung, Sachs says (p. 80): "Since the matter of the *Isagoge* (Jung's most important work) is produced in Ray's *Historia Plantarum* in italics, with special mention of the source from which it is derived, it cannot be doubted that Linnæus had made acquaintance with the teaching of Jung as a young man, in any case before 1738." On p. 81 Sachs emphatically declares: "As regards the terminology of the parts of plants, which was all that the morphology of the day attempted, Linnæus simply adopted all that was contained in the *Isagoge* of Jung." "His doctrine of metamorphosis is entirely based on the views of Cesalpino" (p. 102). "He reduced to practical shape the suggestion which Bachmann had left to his successors, and so must be regarded, if not as the inventor, at least as the real founder of the binary nomenclature of organisms" (p. 83).

With regard to the doctrine of sexuality, "his knowledge of that subject was derived from Rudolf Jacob Camerarius" (p. 80), and to this theory Linnæus added nothing new, though he contributed essentially to its recognition" (p. 81).

"It is manifestly the fifth chapter of the *Philosophia Botanica*, together with the treatise, *Sponsalia Plantarum*, which led the adherents of Linnæus, who were ignorant of the older literature of the subject, and were much impressed by his scholastic dexterity, to celebrate him as the founder of the sexual theory of plants; whereas a more careful study of history shows incontrovertibly that Linnæus helped in this way to disseminate the doctrine, but did absolutely nothing to establish it" (p. 98).

Sachs finds it proper, however, "to defend Linnæus from the charge repeatedly brought against him by his contemporaries that he was indebted to Leibnitz & Burckhard for the idea of his sexual system" (p. 83). Sachs also awards some praise, although this is somewhat sarcastic: "Linnæus could not only recognize what was good in his predecessors, and occasionally make use of it, but he imparted life and fruitfulness to the thoughts of others by applying them as he applied his own, thus bringing out whatever theoretical value they possessed. It is evidently this freshness of life that often misled his successors into believing that Linnæus thought out and discovered everything for himself" (p. 84). It is hardly historically correct to imply that Linnæus's successors believed that he had thought out all his teachings himself. Indeed, Linnæus would not have been the genius he was if he had not taken notice of what others had done before him, and, moreover, frankly admitted that he used the thoughts and the experience of his predecessors. But we must remember that he spent the earliest part of his life far away from the great centres of learning, and the resources of litera-

ture to which he had access were meagre. And it was in his youth that most of the great thoughts he later proclaimed were suggested to him from observations, and perhaps, as Sachs wants to have it, from scholastic deductions.

Fortunately we know, both from Linnæus's own notes and journals, and from other authentic records, the names of those botanical works with which he had made acquaintance up to the time of his foreign travels. Thus it is known* that he had not read what Camerarius, Ray, Grew, Bradley, and others had written on the doctrine of sexuality when he wrote his first essay on this question. His attention was drawn to the matter through a review in *Acta Eruditorum* anno mdccxix publicata (Lipsiæ), p. 130, of the address, with which Sebastian Vaillant opened his lectures at the Royal Gardens at Paris on June 10th, 1717.

Referring to this address of Vaillant, Sachs wrote (p. 398): "De Candolle, who assigns to him an important share in developing the sexual theory, says that in this address he propounded the sexuality of plants most expressly, and as an acknowledged fact, and that he described very graphically the way in which the anthers fertilize the pistil, into which description little that was correct probably found its way, since it required Koelreuter, Sprengel, and the botanists of quite modern times to clear up this point. Vaillant therefore can only have the credit of an eloquent description of what was then accepted. However, De Candolle goes on to say what Vaillant's discoveries were, and on the following page (*Physiologie végétale*, ii. 503) we read that Linnæus confirmed these discoveries in the year 1736 in his *Fundamenta Botanica*, and made skilful use of them in the year 1735 in laying the foundations of his sexual system." Sachs considers this opinion of De Candolle and other similar statements as a result of ignorance and confusion of ideas.

Linnæus tells us in his notes how he was influenced by the ideas expressed by Vaillant, and how he began to observe the structure of flowers, but he did not make his views known before at the end of 1729, when there appeared in Upsala a thesis called *γάμος φυτῶν* sive Nuptiæ arborum by a certain Petrus Ugla. The ideas advanced in this publication were so absurd, that Linnæus was tempted to express his opinion on the subject, and consequently he wrote an essay, which he presented to his benefactor, Dr. Olof Celsius the elder, one of the greatest men of that time in Sweden.

The title of this essay was "Caroli Linnæi Medic. et Botaniæ, Cult. Stipend. Reg. PRELUDIA SPONSALIORUM PLANTARUM, in quibus Physiologia earum explicatur, Sexus demonstratur, Modus generationis detegitur, nec non summa plantarum cum animalibus analogia concluditur. Upsal. 1729." The original manuscript is still preserved in the library of Upsala University. Having been several times rewritten, this essay was finally published in 1746 as a thesis, under the title *Sponsalia Plantarum*. In this treatise

---

* T. Fries: *Bidrag till en lefnadsteckning öfver Carl von Linné*. Upsala, 1894, p. 82.

Linnæus for the first time made his views on the doctrines of sexuality known to the public, but the manuscript from 1729, mentioned above, contained already the principal features of the theory as advanced in 1746.

Although Linnæus thus did not "invent" the theory, the essential part of it was a result of his own observations, led in this direction by the words of Vaillant. Linnæus's studies of the flowers resulted soon in his observing the inadequacy of the system of Tournefort, and already, in 1730, he used a system of his own in writing a catalogue of the plants in Botanic Gardens of Upsala, which list he used for his lectures. This system was subsequently improved upon, and used in his *Hortus Uplandicus*, and in 1735, in the first edition of *Systema Naturæ*.

With regard to Sachs's statement, already referred to, that Linnæus received his idea of a binary nomenclature from Bachmann, there is no evidence to show that this really was the case. Sachs says (p. 75) that Bachmann "lays down with respect to generic and specific names the principles which Linnæus afterwards consistently applied, whereas Bachmann himself did not follow his own precepts, but injured his reputation as a botanist by a tasteless nomenclature." The fact is, that Bachmann, in his *Introductio universalis in rem herbarium*, published 1690, in a few words gives some vague hints about naming of plants, but it is not known if Linnæus even had seen this work before his binominal system was a completed fact.

At all events, Linnæus always considered himself as the originator of the binary nomenclature, and there is no reason why we should disbelieve his words in this respect, even in order to restore the reputation of a Bachmann. Linnæus often mentions this method of naming as his "inventum," and was always very proud of it. "Nomina trivialia," he says, "woro förut ohörde. Linnæus införde dem öfverallt. Det war detsamma som att sätta kläpp i klocka. Två namn kunna lätt minnas, lätt nämnas och skrifvas, långt bättre än som förut skedde, långa definitioner."*

Prof. Fries, the most recent and best informed of Linnæus's biographers, mentions† that during Linnæus's lectures in the Botanic Gardens of Upsala, in 1730, the students, who were unable to find their way in the prevailing labyrinth of botanical nomenclature, asked Linnæus to give them directions, and it can be proved that it was during this work of preparing a guide to his students that Linnæus found the necessity of improved and stable principles for the naming, although he did not proclaim binary names as the only legitimate ones before the year 1753.

---

* The literal translation would be: Nomina trivialia were before unheard of. Linnæus introduced them everywhere. It was like putting a clapper in a bell. Two names are easy to remember, easy to pronounce and write, much better than as was done before—long definitions. These words are from Linnæus's notes about himself, which explains the apparent elision of one or more words for the sake of briefness. [See note at end of this paper.]

† Th. Fries: Caroli Linnæi Hortus Uplandicus med inledning och förklaringar. Uppsala Universitets Arsskrift, 1899. Program i. p. 3.

Much could be said with regard to the influence of Cesalpino on Linnæus's doctrine of metamorphosis, but space forbids our entering upon that question. Sachs's estimate of the value of this theory may be obtained from following passage on p. 112 :—" The chief hindrance to the advance of systematic botany lay in the defective morphology enshrined in Linnæus's terminology, and in his doctrine of metamorphosis."

The language and style of Linnæus is usually considered to be remarkably good from its incisiveness and clearness, as well as its brevity, and is often held as a model for botanical expression, but not even this found favour with Sachs. " He dealt with everything about which he wrote in the way in which he dealt with objects of natural history " (p. 90). " In this manner Linnæus treats every subject of which he has to speak, and wherever he can in short, numbered sentences, which look like descriptions of genera and species. His mind and character were fully formed in 1736 when he wrote his *Fundamenta*, and he preserved his peculiarities of style from that time forward " (p. 91). " Where these peculiarities of manner and expression are suitable, they make a favourable impression on the reader, as, for instance, in the short account he gives of the various systems in the *Classes Plantarum*. This manner is strictly adhered to in the *Philosophia* also, and it has certainly helped not a little to withdraw the attention of his reader from his many fallacies in argument, especially his oft-recurring reasonings in a circle " (p. 91). " This remarkable combination of an unscientific philosophy with mastery over the classification of things and conceptions, this mixture of consistency in carrying out his scholastic principles with gross inaccuracies of thought, impart to his style an originality which is rendered still more striking by the native freshness and directness, and not unfrequently by the poetic feeling, which animates his periods " (p. 91).

With these passages from Sachs's *History* we hope to have shown the origin of the not unfrequent attacks on the memory of Linnæus. It is of some interest to note that some of these recent writers do not even attempt to present their statements in their own words, but simply use those of Sachs.

Kalischer and Hansen claimed a few months ago in favour of the poet Goethe the entire merit of the doctrine of metamorphosis, although Goethe himself, in his *Versuch der Metamorphose der Pflanzen zu erklären*," Gotha, 1790, quotes Linnæus's *Prolepsis Plantarum*, where the doctrine is discussed, and confesses to having a good knowledge of Linnæus's works. Not even Sachs considers Goethe's views on this question as being of any great consequence.

It was shown by Prof. L. Celakowsky, in 1885,* to what extent Linnæus had influenced the development of this doctrine, and, still ignoring Celakowsky's opinions which are based on thorough investigations, the writers referred to give sweeping, general statements, for which they have no other foundation than Chauvinism.

---

* L. Celakowsky: " Linnés Anteil an der Lehre von der Metamorphose der Pflanze." Engler's *Botanische Jahrbucher*, Bd. vi. 1885. 146–186.

The following extract from Prof. Hansen's arguments will show the character of his writings on this matter:—"Linné der den meisten Laien als grösster, vielfach als einziger Botaniker bekannt ist, kann von unseren heutigen Standpunkte kaum mehr als Botaniker bezeichnet werden. Er hat unsere Kenntnis vom Wesen der Pflanze so gut wie gar nicht vermehrt,* er hinterliess keine einzige grundlegende Untersuchung. Zwar nennt man sein System Sexualsystem. Das klingt wissenschaftlich, ist aber nur ein leerer Klang, von Linné's Nachfolgern fast als Reklamewort benutzt. Linné's System hat mit der Sexualität der Pflanzen so wenig zu thun, wie die Statistik über die Augenfarbe bei Schulkindern mit der physiologischen Optik."

Prof. Dr. N. Wille, of Christiania, replied to both these writers,† and this able botanist remarks that the ignorance and lack of comprehension of everything connected with vegetable morphology and systematic botany, which shows itself in these words, are, indeed, surprising for a professor of botany. In his reply, Wille criticizes in detail some of the most erroneous conceptions of Hansen, and he very appropriately exclaims:—"Was it the fault of Linnæus that his successors did not understand the ideas which he indicated within the domains of phytogeography and ecology? It was first in the latter part of the last century these ideas were developed, and then it was overlooked that they were already presented *in nuce* in the works of Linnæus."

In this connection we may point out that Linnæus, in his *Oratio de telluris habitabilis incremento* (1743) mentions most of the points in regard to dispersal of plants, which Darwin more than one hundred years later renewed, and only recently have been treated from an empirical and experimental side by Sernander.

Wille concludes his articles above referred to with the following words:—"Being a Norwegian, I have no national interest in stepping forward as a defendant of Sweden's great naturalist against the injudicious attacks of certain German naturalists of more or less fame. But I have had occasion to occupy myself with Linnæus's works, and the more I have endeavoured to penetrate into these the higher my admiration has risen for this powerful, comprehensive genius, which is as conspicuous in the biological sciences during the eighteenth century as a Darwin during the nineteenth."

[The first application of the "nomina trivialia"—that is, specific names in the modern sense—will be found in the *Pan suecus*, first published at Upsala in 1749, and reprinted in the *Amœnitates Academicæ*, vol. ii. pp. 225, *seqq*. On this point see Alphonse De Candolle, *La Phytographie*, p. 89, 343–344, and on the larger question of Linnæus's influence on natural science, consult the same volume, p. 5.—B. Daydon Jackson.]

---

* Compare with this sentence that of Sachs, p. 85, quoted above.

† N. Wille: "Goethe eller Linné." Et svar til "Vossische Zeitung," i Berlin. Aftenposten, Nos. 644 & 645. Christiania, 1903.

THE BRITISH ASSOCIATION.

A LARGE and representative gathering of botanists met at Cambridge during the British Association week. Among the number were some well-known foreign botanists, including Professors Engler, Klebs, Reinke, Czapek, Chodat and Bertrand, Drs. Eriksson, Lotsy and Peirce, and the Japanese botanists Fujii and Miyake. The President, Mr. Francis Darwin, took as the subject of his address, "The Perception of the Force of Gravity by Plants." The address was an exposition and defence of the statolithic theory, which claims that the origin of the stimulus, in response to which geotropic curvatures take place, lies in the impact of the starch-grains on the cell-walls as a result of the alteration in position of the organ. Assuming, as follows from Andrew Knight's original experiment, that weight of some kind supplies the stimulus, we may seek its origin with Pfeffer and Czapek in the hydrostatic pressure of the cell-contents on the wall, or with Noll in the impact of imperceptible particles, or with Haberlandt and Němec in the falling starch-grains or statoliths. Mr. Darwin considered the hydrostatic pressure theory inadequate, and that of Noll impracticable, while the statolithic theory not only affords a practicable solution of the problem, but is supported by a considerable weight of experimental evidence. There is a striking parallel between the distribution of the falling starch-grains, on the one hand, and those organs and tissues, on the other, in which geotropic curvatures are possible; such occur, for instance, in the root-cap, the endodermis, and the growing-point of the stem of the onion—that is to say, in those parts which are recognized as essentially gravisensitive cells—but not elsewhere in the plant. The experimental evidence, if not absolutely convincing, has not revealed any absolute bar to a belief in the statolith theory, and has brought to light a number of facts which harmonize with it in a remarkable manner.

Among the numerous papers and addresses were several involving questions of general interest. The existence of a nucleus in the *Cyanophyceæ* was contested by Professors Chodat and Zacharias, on the one hand, and Mr. Wager, on the other. The two former deny that the central matter bears any relation to the nucleus as we understand it in the higher plants; the latter insists on the presence of a sort of primitive simple nucleus. Prof. Eriksson gave an account of his mycoplasma theory of the origin of rust in corn and other grasses; he traces the disease to the presence of protoplasmic matter which persists in the plant, and may be transmitted in the seed, thus carrying on the disease to the next generation; this matter—the mycoplasm—is often indistinguishable from the cell-protoplasm. On this view, the disease springs from a germ residing in the plant. Prof. Marshall Ward challenged this statement, maintaining that the disease is always the result of infection by a spore from outside; the spore germinates, the germ-hypha enters through a stoma, and then, if the host-plant is a favourable one, proceeds to infect the surrounding tissue. The general opinion seemed to be

that Prof. Eriksson's case was not fully proven. Prof. Bertrand showed an admirable and extensive set of lantern-slides illustrating the anatomy of the leaf-stalk in fossil ferns; Dr. Lotsy also gave an interesting lantern lecture on the virgin woods of Java. Some excellent photographic reproductions were shown by Mr. Woodhead in illustration of a paper on the ecology of a small district in Yorkshire—a good example of a kind of field-work which, while full of interest to the worker, may also yield results of a wider importance. It is impossible to do justice or even refer to the numerous papers which were before the section. They were indeed too numerous, the result being that very little time was allowed for discussion; and sometimes—as in the case of a paper by Prof. Engler on the flora of the mountains of tropical Africa, and its relation to north temperate floras—there was no time for discussion.

There are, doubtless, different views as to the objects of the British Association. Perhaps the most important end is the bringing together from all parts of the world of workers in the very various branches of the science. But it would seem advisable to make the best use of the people whom we have got together; and this purpose would, we think, be best served by the selection of papers of general interest for reading and discussion. Or it might be possible, as was suggested by a member, to take papers of general interest first, and then divide into subsections, where papers of more special interest should be considered.

A. B. Rendle.

NOTICES OF BOOKS.

Manual of British Botany. By the late Charles Cardale Babington. Ninth Edition, enlarged from the Author's manuscripts and other sources. Edited by Henry and James Groves. Pp. lii, 580, 8vo. London: Gurney and Jackson. Price 9*s*.

"It was Mrs. Babington's particular wish that the text as amended by the author should not be interfered with. Owing to this limitation, we have been unable to make alterations in the treatment of some of the critical genera which might perhaps have been desirable" (*Editors' Preface*).

With the issue of the eighth edition of the *Manual* in 1881, an era in British botany was closed. The sorting of labels, the fixing of British plants on their appointed pegs, the perennial disregard for the comprehensive investigations and researches of continental workers in systematic botany, the dogmatic opposition to the application of the theory of descent to plants in general and to British plants in particular, the suspicious attitude adopted towards broader views of species, the affinities of groups as the basis of genera, and the grouping of genera themselves along lines of least resistance divergent from a common type—all these tendencies unprogressive and reactionary were incarnate in this last edition. For it must be admitted that though Babington states that

he consulted continental floras on the shelves of his library, the evidence of their application to the comparison of continental plants with those of British species is not very pronounced—with the important exception of Genevier's parcel of dried brambles. Babington remained a provincial all his life, and never visited the Continent, where he could have seen for himself how little real difference there is between the constituent elements of the alpine flora of Switzerland and Austria and that of Scotland.

The Editors have loyally observed the literary traditions of the *Manual*, though it must have been with occasional misgivings as to the wisdom of keeping so strictly to the beaten track. It may be a matter for regret on the part of British botanists that Messrs. Groves, who are experienced workers and have an excellent critical knowledge in all its bearings on the study of living British plants, should not have produced a flora off their own bat, so to speak, instead of polishing up and trimming a Manual which marks a closed chapter in British botany. Their serious and painstaking work in various critical groups of British plants renders them thoroughly competent to undertake a general review of our flora on modern lines, and based on recent researches. May they yet find time to give us such a handbook! The best points in their new edition are where they have independently run counter to the spirit of the former issues.

Of *Rubus* Babington remarked, "When the continental plants are better known, it is feared that considerable changes of nomenclature will be necessary." As a constituted authority on the genus, why did he not take the simple steps for making himself acquainted with them? Specimens in the living state (or nearly fresh) are readily procurable, and have been for very many years, through the medium of international Botanical Exchange Clubs; and if that were a cumbrous process for securing them, they exist in plentiful profusion in the Herbaria of the British Museum and of Kew and have accumulated there for years, awaiting examination and comparison on the part of enthusiastic investigators.

Babington's Glossary might well have been omitted in the new edition; it affords, however, a little light reading. To be told that *awned* means having awns, that *clawed* means having claws, that *boat-shaped* means that it resembles a boat, that the meaning of *oval* is elliptical, that *wedge-shaped* is like a wedge, may be axiomatic in definition, but at the same time occupies useful space —in the present instance, a line each. To define *epidermis* as the skin is anatomically incorrect. The meaning of *spath* is obscure, and would not satisfy the student of *Araceæ*. *Clavate* is defined as club-shaped; but this does not seem sufficient, as the latter word is itself defined at some length lower down.

To take a few points here and there. On p. 218, an earlier name for *Serratula tinctoria* var. *monticola* is *S. tinctoria* var. *alpina* Gren. & Godr.; on p. 220, the specific name of *Onopordum acanthium* should have a small initial, as Linnæus so wrote it, making it adjectival; on p. 307, the foxglove should be considered a triennial rather than a perennial. The names of the wild form and the

cultivated variety of teasel (p. 192) are used in the reverse sense; the var. α of Linnæus' *Dipsacus fullonum* is actually the wild form of teasel; he considered the form with hooked segments to be the cultivated variety, and he never used the name of "sylvestris" for either form. Linnæus is right in his definitions, but Hudson wrongly takes up the Linnæan name and applies it to var. β (the cultivated variety); and Hudson has been blindly followed since, owing to his copyists not verifying his references. The authority for *Valerianella* (p. 191) should be Pollich (1776), not Miller (1768), as the name does not occur in the *Gardeners' Dictionary*, ed. viii. As to *Taraxacum officinale* var. *udum* (p. 228), the plant affords no distinctive characters, and is now considered to be a hybrid between the type and var. *palustre*. *Mulgedium* is not considered a satisfactory genus, and *M. alpinum* (p. 229) is now referred to *Lactuca*. *Sherardia* is now by general consent sunk in *Asperula*, and *S. arvensis* (p. 185) becomes *Asperula Sherardi* Höck.

The section on *Hieracium* is disappointing, and it is unfortunate that the editors did not undertake the revision of the species themselves. The hoary errors of the old text-books are perpetuated once more. The present writer has been at some pains to show that *H. murorum* L. and *H. cæsium* Fries have no right to appear in English plant-lists, and a comparison of continental specimens bears out the facts. In the present instance, ninety-seven species are enumerated, which is far too many. After going through some 1600 sheets, *singulatim et separatim*, of Dahlstedt's carefully prepared exsiccatæ, side by side with British specimens, and destroying a whole set of Messrs. Linton's fasciculi in the course of the job, it was evident that there were many errors in matching. *H. duplicatum*, *H. Adlerzii*, and *H. dissimile* have no claims to appear among British hawkweeds; the specimens so named by no means match authentic Scandinavian types issued by Dahlstedt, and even belong to other sections of the genus. *H. cæsio-murorum* was issued as a hybrid by Lindeberg himself, as the printed label clearly shows. *H. atratum* (auctt. angl.) is identical with *H. chrysanthum* var. *microcephalum* Backh.; and *H. gracilentum* Backh. is rightly reduced in Hooker's *Student's Flora* to a form of *H. nigrescens* Willd. In the description of *H. crocatum* and *H. maritimum* (on p. 267), scarcely a character is adduced to distinguish the two "species." The leaves in the first are stated to have a "broad base falsely three-veined semi-amplexicaul, ... lower leaves often narrowed very gradually downwards but slightly enlarged again at the base," whilst in the second the leaves are "fleshy, upper sessile sometimes a little clasping, the lowest narrowing into short petiole." The only real difference alleged is the thicker texture of the leaves, which one might expect to find when the plant is growing near the sea. Otherwise, the words of the description in each are all but identical, the economic use of commas somewhat obscuring the sense.

In the arrangement of families and genera the new edition deviates in nowise from the rigid orthodoxy of its predecessor. When De Candolle was asked if he had any reason for beginning with

Ranunculaceæ, he replied that he had none: he remarked, however, that the members of the family were generally distributed throughout Europe, that they were fairly common plants, and being generally known and recognized by non-scientific people, it was desirable, in order to popularize a new systematic arrangement which should take the place of the very artificial Linnean one, to lead off with a well-known group of plants. It is a pity in a country which duly recognizes the undeniable merits of Robert Brown—"botanicorum facile princeps" as Humboldt called him—that his epoch-making discovery, nearly a hundred years ago, of the essential division of flowering plants into Angiosperms and Gymnosperms, should still be ignored in British Floras and plant-lists. In the present instance, Gymnosperms are placed as a division of Dicotyledons, equated in grade with Monochlamydeæ, a group that has disappeared from all systematic classifications. Russian Floras are probably the only ones which have kept up this pious superstition of the unimportant rank of the Gymnosperms. Again, the Ferns and the Lycopods are given as orders of Cryptogams, whereas they are classes to be equated in grade with Monocotyledons and Dicotyledons. The Babington cult of British Botany exemplifies in a marked manner the hidebound conservatism of insular mediocrity, and the unwillingness to break away from the illusory traditions of the past.

The Editors have been reasonably justified in their restoration of certain generic names in accordance with sound principles of nomenclature. One can only wonder at the slipshod methods of compilers in neglecting such methods hitherto. They have amended the short list of British species placed under *Alsine*, in accordance with the suggestions of Mr. W. P. Hiern in this Journal for 1899, pp. 317–322. Much ink has been spilt in discussing the respective claims to recognition of *Spergularia*, *Lepigonum*, *Buda*, *Tissa*, *Corion*, *Delia*, *Alsinella*, and other generic synonyms; also of *Cherleria*, *Minuartia*, and *Honkenya*. Dr. N. L. Britton and the school of American botanists who follow him apply the generic name of *Alsine* (with some plausibility) to the plants which European botanists have always included in *Stellaria*. Wahlenberg failed to understand the *Alsine* of Linnæus, and was implicitly followed by others. *Alsine media*, as a coincidental binominal, dates from very early times, and was the name given to the common European plant now known as *Stellaria media* Vill. by Clusius in 1560, in his French version of Dodoens. *Alsine salina* Groves is a new combination (= *Buda marina* Dumort, of Lond. Cat. ed. ix.) in lieu of *A. media* Crantz, adopted in a restricted sense by Mr. Hiern. An interesting restoration also is *Capnoides* Tournef., sunk in *Fumaria* by Linnæus, but always kept separate by Miller, even in the first edition of his Dictionary (1731), and maintained in all succeeding editions; this precludes discussion of the respective claims of *Corydalis* Cand. and *Neckeria* Scop. It is curious to note that the misprint of "Knapwell" for Knawel as the English equivalent of *Scleranthus*, which appeared in the fifth and all subsequent editions of the *Manual*, still remains uncorrected. In some instances the ordinary

descriptive terms need modification. For instance, *Scabiosa columbaria* is scarcely typically perennial,—"biennis vel perennans, vix perennis" would be the correct Latin character. Are not the anthers lilac rather than yellow? On p. 226, *Tragopogon*, like *Leontodon* which precedes it, should be masculine, not neuter. Is *T. minor* sufficiently distinct to be considered specifically separable from *T. pratensis*; it is so difficult to draw any line between the forms with florets of varying length. In specimens of the same age, the anthers in the two forms do not seem to be different in colour; they are here given respectively as yellow and dark brown.

When Linnæus sat down to write *Species Plantarum* he still had unsettled convictions on details of form in nomenclature, and had not altogether freed himself from the archaisms of his predecessors in systematic botany. Anyone who examines the earlier pages of the work will find more slips, verbal incongruities, philological errors, geographical inaccuracies (insufficient reference to the mass of books he had piled up round him), than are to be found throughout the rest of it. As he became more apt in the process of verifying and codifying his references, his methodical and mechanical mode of working insured a minimum of subsequent errors. He took the earliest opportunity of correcting these in his next work, the second edition of *Fl. Suecica* (1755), in which, moreover, we find an absence of trinominal odditities, false concords, and bilingual barbarisms. In the first large genus which was worked out, *Veronica*, we find evidence of these emendations which Linnæus certainly intended should be adopted in future systematic works, though subsequent authors have not noted them, and though Richter's interjected comments (*Codex Linnæanus*) have drawn attention to them; *V. tryphyllos*, *hederæfolia*, and *Anagallis-aquatica* become respectively *V. triphylla*, *hederifolia*, and *Anagallis*; also *Callitriche palustris* L. (1753) becomes *C. autumnalis* L., Fl. Suecica (1755). While on the subject of *Veronica*, it may be mentioned that *V. serpyllifolia* var. *humifusa* Dicks. (sp.) is antedated by *V. serpyllifolia* var. *tenella* All. (sp., 1785), and that *V. arvensis* var. *eximia* Towns. (on p. 320) is antedated by *V. arvensis* var. *nana* Poiret, Encycl. Meth. Bot. viii. p. 541 (1808), as the present writer has verified from specimens in Herb. Kew.

The late W. W. Newbould, to whom Babington was deeply indebted for valuable portions of the critical material in the successive issues of his *Manual*, used to declare that every single line of Pfeiffer's *Nomenclator Botanicus* focussed a monograph in miniature; so do the apposite remarks of Messrs. Groves on every page of the new Babington indicate the possibilities of industrious research in field-botany. It is only the inelastic framework in which the material is set, the legacy of that incubus which Sir James Smith imposed with such a heavy hand upon British Botany, which at times obscures the affinities of natural groups of plants, and which of itself may hinder the progress of that fascinating study, the association of living plants among themselves and in mutual relation to one another. Not that we have at present any cogent evi-

dence of the connection between the phenomena of plant-affinities and plant-associations, between mutual relationships and ecological conditions; but there is forced upon the observer the correlation of parallel processes, in the modification of the plant-type inherent in itself and the inconstant conditions of environment.

The old order of immutability of species and permanent fixity of type is passing away, superseded by the new order based on the Theory of Descent, not indeed in an unbroken succession of forms, for many groups lie quite off the line of normal development, but evolving with ever-varying modification from within, and with ever-widening adaptation from without.

FREDERIC N. WILLIAMS.

The Student's Handbook of British Mosses. By H. N. DIXON, M.A., F.L.S.; with illustrations and keys to the Genera and Species by H. G. JAMESON, M.A. Second Edition, revised and enlarged. 1904. Pp. 635; plates 65. London: Wheldon, Great Queen Street. 18s. 6d. net.

IN this volume the student has within his reach, at a price less than half that of Wilson's *Bryologia Britannica*, a work as able in its descriptions and as faithful in its illustrations as even that notable manual. The influence of the first edition was so far reaching, that new moss students sprang up in every part of the United Kingdom; thus our knowledge of the distribution of these plants has widely increased, and so many new species and varieties have been added to our flora, that a new edition has been called for in less than eight years. The great success of the work is due to the fact that the author has the power of expressing in simple language all he has to tell us about these plants. The explanatory notes (in the style of those in Wilson's classical *Bryologia*) given with every species, the fulness of the descriptions, together with the printing in different type the more special characters of each species or variety, are great helps to the student. To the beginner the numerous illustrations will specially appeal; these, if used with the keys to the genera and species, will be found of greatest value.

The work opens with an introduction, in which we have a very able and lucid account of the general characteristics of mosses, their vegetative and reproductive organs; this is illustrated by five plates with more than a hundred figures, showing the differences in mode of growth, in stem, leaf, and cell structure; the forms of the fruit, with its appendages, of the peristome, and the inflorescence; and the student who has studied the introduction, which is written in an interesting style, will find himself in a position to begin the serious study of mosses. This is followed by a glossary of some eight pages, in which the terms used in the work are fully explained. Then comes an able dichotomous key to the genera, similar in arrangement to that given by Bentham in his *Handbook*, and quite as helpful; this, if carefully used, will enable the veriest tyro to find out the genus of any plant he studies. Having worked out the genus, he will find in the keys to the species still further help to

the identification of his plant. The excellent illustrations by Mr. Jameson give magnified representations, not only of the leaf, but also of the leaf apex and leaf cells; and, as all these are drawn to one scale, the student is able at a glance to see both size, shape, margination, and cell-form, and to grasp with ease the structural differences of closely allied plants. In this edition five new plates are given of the mosses discovered since the former edition was published; these are by Mr. Dixon, and have all the exactness and excellence of the earlier plates.

On page 4, Mr. Dixon has a note explaining his reasons, after careful consideration, for not adopting the views of Dr. Warnstorf on the *Sphagnaceæ;* and most British bryologists will endorse his remarks. Still, new additions—such as *S. medium*—have been made to the *Sphagnaceæ*, and the varieties of *S. acutifolium* are more fully treated; an informing note is given on *S. Girgensohnii* Russ. *S. riparium* is made a subspecies of *S. intermedium*, and illustrations are given of *S. medium* and *S. riparium*. Several of the varieties of *S. acutifolium* are dropped, such as *S. tenellum*, *S. elegans*, *S. deflexum*, *S. arctum*, and *S. patulum*, the reason for this being fully explained in a note under the species. *Catharinea tenella*, one of the new mosses from Kent, is described and figured. *Oligotrichum incurvum* gives place to the older name *O. hercynicum*. Under *Polytrichum nanum*, *P. aloides*, *P. gracile*, and *P. formosum*, attention is called to the difference in the size of the spores—a character often of value in the determination of nearly allied species. *Ditrichum vaginans*, an addition to our moss flora from Co. Antrim, is described and figured; *D. zonatum* is made a subspecies of *D. homomallum*, and *Cynodontium laxirete* has been adopted as a subspecies of *C. polycarpum*. A useful note is given discriminating this moss from *D. pellucidum*. To *Campylopus Schwarzii* is added a new variety, *Hunti*, found by G. E. Hunt on Snowdon; to *C. flexuosus* is added the rare variety *zonatus* Limpr.; and to *C. atrovirens* the var. *gracilis* Dixon, first published in this Journal for 1902, p. 374.

Under the rare *Dicranum undulatum* several new stations are recorded, giving the species wider geographical range; under *D. Bonjeani* the var. *rugifolium* Bos. is adopted, I think with good reason; the varieties *flexicaule* and *robustum* of *D. fuscescens* are merged into var. *congestum*, from which they differ only in secondary characters. A new record—Roslyn Wood, Edinburgh—is given for the rare *D. strictum;* to this I may add another—near Droitwich, Worcestershire. *Fissidens tamarindifolius* is reduced to a variety of *F. incurvus*. *Octodiceras Julianum* Brid. is recorded as a new species from Bewdley; it also occurs higher up the river Severn, in Shropshire.

Under *Grimmia apocarpa* is a new variety, *alpicola*, found on stones in streams. *G. arenaria* Hampe, first found by Dr. Barker in Merionethshire, is placed as a subspecies under *G. orbicularis;* this is described and figured. An interesting note on *Acaulon mediterraneum* Limpr. gives good reasons for omitting it from our list. A new variety, *littoralis* Mitt., of *Pottia intermedia* is admitted in deference to some of Mr. Dixon's correspondents; *P. commutata*

Limpr., first found in Sussex by Mr. W. E. Nicholson, is described and figured as a subspecies of *P. minutula*. *Tortula cernua* Lindb., one of Mr. G. Webster's discoveries in West Yorkshire, is described and figured; *T. inermis* Mont. appears as a new var. of *T. subulata*; *T. lævipilæformis*, formerly raised to specific rank by Limpricht, is here given as a var. of *T. lævipila*.

Weissia sterilis Nicholson, found by Mr. Nicholson at Reigate, and described by him as a species, appears as a subspecies of *W. crispa*; *W. rupestris* var. *ramosissima* is dropped; for this Mr. Dixon gives good reasons. The remarkable form of *Trichostomum tortuosum* described in the *Revue Bryologique*, 1900, p. 36, from Glencoe, is considered to be only a state of that species. *Cinclidotus riparius*, recorded from the Teme, Shropshire, and River Fergus, Ennis, is not, Mr. Dixon thinks, the true plant; in which view he will be supported by most bryologists. *Tetraplodon Wormskjoldi* Lindb., discovered by Messrs. Horrell and Jones in Teesdale, an interesting addition to our flora, is described and figured; as is *Ephemerum stellatum* Philib., another of Mr. Nicholson's discoveries. The var. *calvescens* of *Funaria hygrometrica* is considered a mere form, and is dropped; a new variety, *arctica*, is described; this was found at Beeston Regis by Mr. Burrell. *Philonotis fontana* var. *ampliretis* Dixon is fully described. *P. calcarea* var. *mollis* Vent., Mr. Dixon thinks is merely an undeveloped form. Under *Webera annotina* the vars. *tenuifolia* and *angustifolia* are dropped; and two new vars., *erecta* and *bulbifera*, are described and figured; a new subspecies, *W. proligera* Bryhn, is described and figured.

Among the more interesting Bryums figured and described are *B. arcticum* R. Br., discovered by Mr. Dixon on Ben Lawers; *B. mamillatum* Lindb., found at Hunstanton by the Rev. W. E. Thompson; *B. Lawersianum* Phil., found on Ben Lawers by Messrs. Dixon, Nicholson, and Salmon; *B. barbatum* Wils. is considered a form of *B. capillare*. *Myrinia pulvinata* Schp., of the first edition, is considered to be more correctly named *Helicodontium pulvinatum* Lindb. Under *Heterocladium heteropterum* B. & S. is a long and interesting note on the varieties and forms of this species; *H. squarrosulum* of the former edition is now given as *H. dimorphum* B. & S. *Pseudoleskea patens* Limpr. is a new species from Ben Lawers, figured and described. *Lescurea striata* B. & S. of the first edition now stands as *Pseudoleskea striata* Dixon. *Thuidium hystricosum* Mitt., a new subspecies, is figured and described; *T. Philiberti* Limpr. is figured and described, with an interesting note. *Pleuropus sericeus* Dixon now stands as *Camptothecium sericeum* Kindb.

Eurhynchium meridionale De Not. is figured and described as a subspecies of *E. striatum*; under *E. myosuroides* Schimp. two new varieties are *β rivulare* Holt and *γ brachythecioides* Dixon. *Rhynchostegium demissum* B. & S. and *Hypnum micans* Wils. are now placed under the genus *Sematophyllum* Mitt. *Plagiothecium Borrerianum* Spr. is referred to its old name *P. elegans* Sull.; *P. Mullerianum* Schimp. and *P. piliferum* B. & S. are figured and described; *P. striatellum* Lindb. is now quoted as *P. Muhlenbeckii* B. & S. *Amblystegium compactum* Aust. and *A. Juratzkanum* Schimp. are figured and described.

The *Harpidium* section of the *Hypnum* group has been recast; many new varieties are described, and the whole group rendered is more intelligible to the student. *Hypnum fluitans* is divided into groups, such as group *amphibium* and group *falcatum*, under which the various varieties of this polymorphic species are described. Under *H. vernicosum* a new variety, *β majus* Lind., is described; under *H. molluscum* is an interesting note on new forms of that species. In the addenda and corrigenda a new subspecies, *Grimmia retracta* Stirton, is described.

This summary of the contents will suffice to show that the new edition is indispensable not only to the beginner, but to the advanced student. It cannot fail to promote the study of bryology, and to stimulate research; and we may confidently expect that the third edition, when it comes, will afford the same testimony to the results of the present issue as this does to the influence of its predecessor.

J. E. Bagnall.

BOOK-NOTES, NEWS, &c.

The *Handbook to the Natural History of Cambridgeshire*, edited by J. E. Marr, Sc.D., and A. E. Shipley, M.A., was issued by the University Press on Aug. 17, the opening day of the meetings of the British Association at Cambridge. It is an extremely handy and well-printed volume, creditable in every way to the editors and to the various contributors. The section dealing with botany, with which alone we are concerned, has been entrusted to Mr. A. Wallis, B.A., who, in an exceedingly interesting sketch, has given a short analysis of the flora, dealing on modern lines with the "plant associations" found in the district, with some special notes on the coast flora of Hunstanton. Mr. Wallis groups these associations under four heads—the fen, the dry land, the meadows, and the woods—and his summary under each shows a thorough acquaintance both with the plants and the county. The proofs might have been read more carefully—we find on one page (236) *Juncus* "*Geradii*," *Statice* "*rareflorum*," and *Triglochium* "*maritima*"—and we think a bibliography of the subject would have been a useful and interesting addition. There is a small but useful map, and a very meagre index.

The new part of the *Flora Capensis*—"Vol. iv. sect. 2, part ii."—is entirely occupied by the continuation of Mr. Hiern's monograph of the *Scrophulariaceæ*, the earliest portion of which we noticed on p. 124. It includes a new genus, *Glumicalyx*, placed between *Veronica* and Marloth's somewhat anomalous genus *Charadrophila*, from the Orange River Colony. The typography and arrangement present all the peculiarities on which we have more than once commented, and which distinguish the *Flora Capensis* unfavourably from the other Kew floras. It may be urged that this is at least consistent with the earlier portion of the work, but this principle has not prevented the present editor from adopting in the volumes issued under his direction the objectionable Kew innovation by which the adjectival forms of proper names are

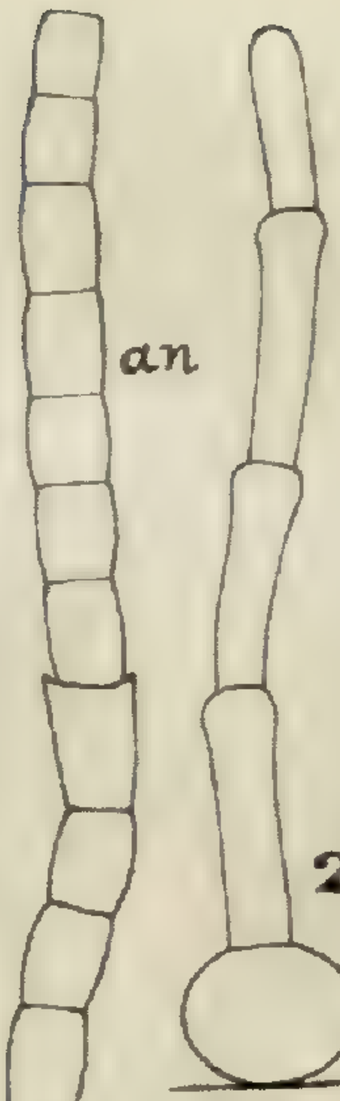
begun with a small initial. We note that this part is styled "Vol. iv. sect. 2, part ii.," whereas its predecessor was simply "Vol. iv. sect. ii." : we gather from this that, owing to some miscalculation, vol. iv. will really be two volumes bearing sectional numbers—an inconvenience which cannot fail to cause much confusion in citation and reference.

We live and learn. Mr. C. J. Cornish's recent biography of Sir William Henry Flower contains the following paragraph (pp. 134–5) on the Department of Botany:—"In the Botanical Department was the herbarium of Sir Hans Sloane, containing 8000 specimens; the great botanical collection of Sir Joseph Banks; and William Wilson's herbarium of British and foreign specimens, containing the identical plants from which the original descriptions made by Linnæus, Amblett, Jagny, Brown, and Bentham were written." This summary of the contents of Wilson's herbarium will astonish botanists, who may also be pardoned for ignorance of the work of "Amblett" and "Jagny"; we can only conjecture that these names, hitherto unknown to fame, represent respectively "Aublet" and "Jacquin." Considering Sir William's intimate connection with the Museum, it seems strange that Mr. Cornish did not submit his proofs to some one acquainted with its contents.

Messrs. George T. Moore and Karl F. Kellerman describe "a method of destroying or preventing the growth of Algæ and certain pathogenic Bacteria in water supplies" (U.S. Dept. of Agriculture, Bulletin No. 64, Washington, 1904, 44 pp.), which is likely to find its uses in this country. "It has been found that copper sulphate in a dilution so great as to be colorless, tasteless, and harmless to man, is sufficiently toxic to the algæ to destroy or prevent their appearance. The mode of application makes this method applicable to reservoirs of all kinds, pleasure ponds and lakes, fish-ponds, oyster-beds, watercress-beds, etc. It is also probable that the method can be used for the destruction of mosquito larvæ. At ordinary temperatures 1 part of copper sulphate to 100,000 parts of water destroys typhoid and cholera germs in from three to four hours. The ease with which the sulphate can then be eliminated from the water seems to offer a practical method of sterilizing large bodies of water, when this becomes necessary." All traces of copper seem to disappear from the water within twenty-four hours. Though fatal to algæ, infusoria, and the bacteria of disease, the treatment appears to leave the saprophytic and harmless bacteria unaffected.—A. G.

Dr. C. Warnstorf, the distinguished sphagnologist, has just issued his third contribution to the *Kryptogamenflora der Mark Brandenburg* (Band ii. 1, Laubmoose, Leipzig, 1904. 240 pp., with figs.). The first volume contained the hepatics and sphagna; the present part is concerned principally with the cleistocarpous genera of the mosses, and the tribes *Weisieæ*, *Dicraneæ*, *Pottieæ*, and *Trichostomeæ*. The descriptions are adequate, are carefully written, and are accompanied by keys to the orders, tribes, genera, and species.—A. G.

1.



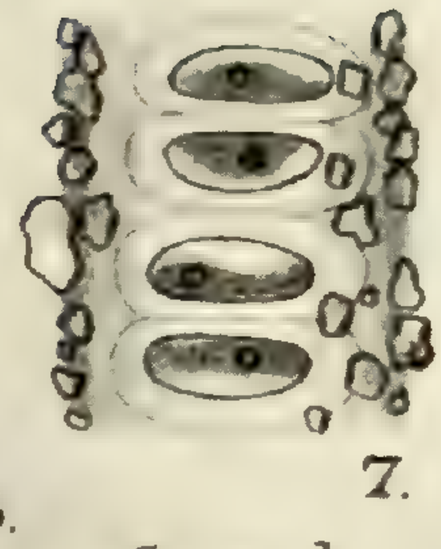
2.

3.

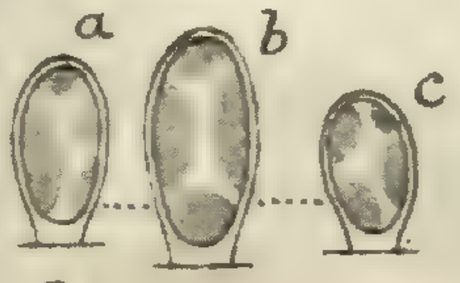
4.

5.

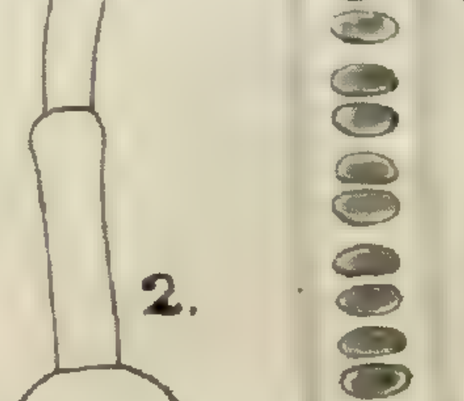
6.



7.

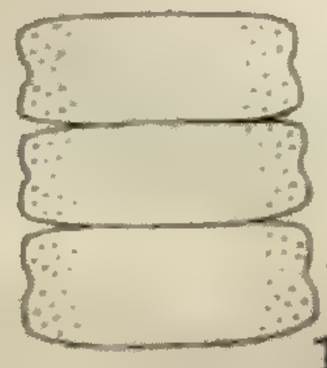


8.

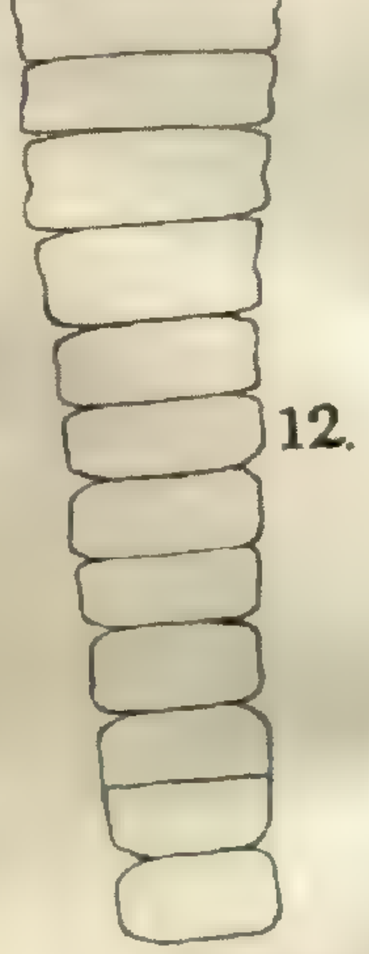


9.

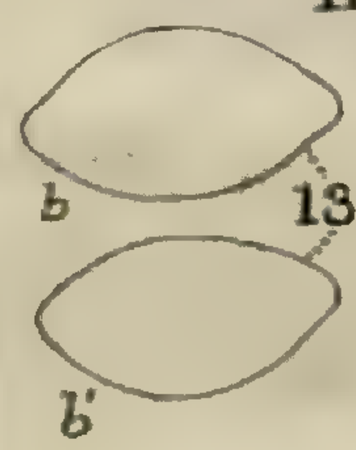
10.



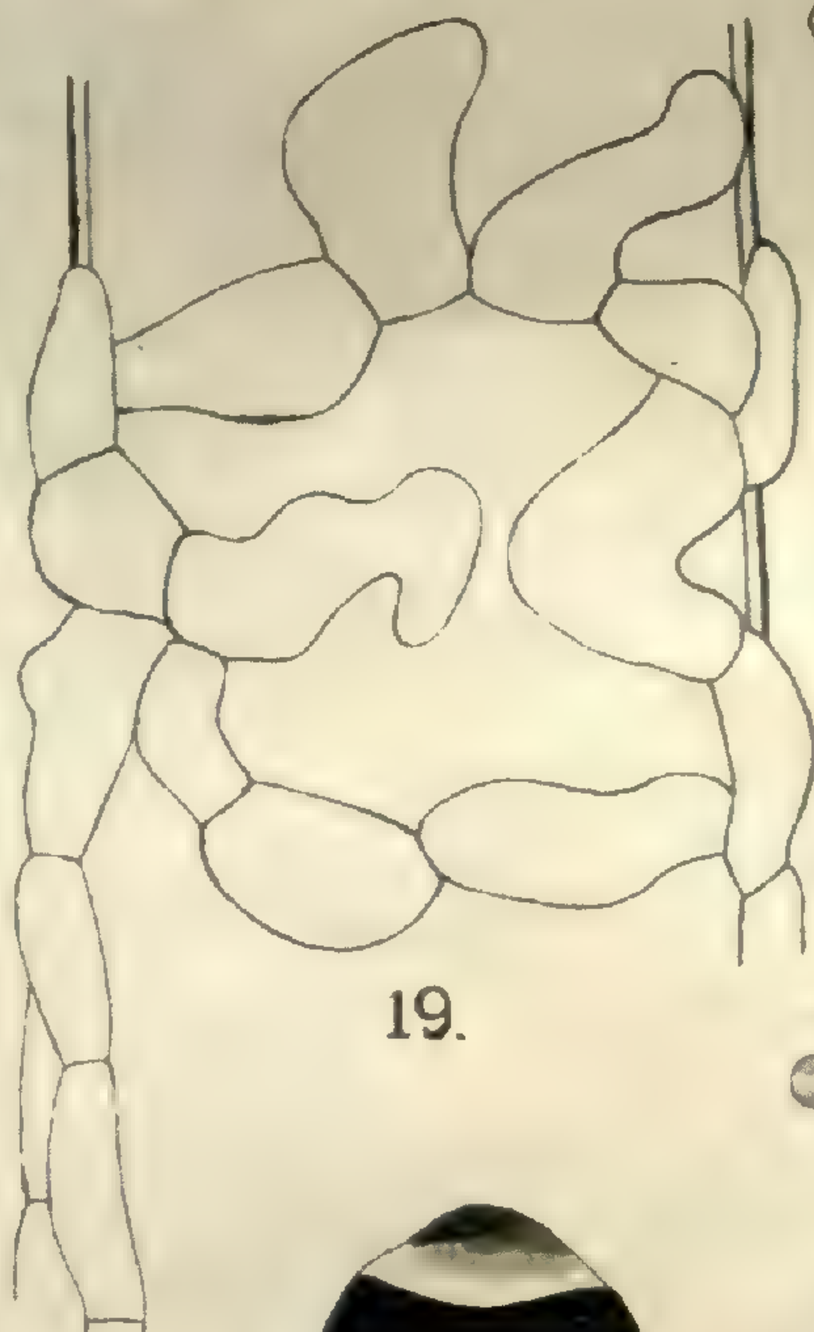
11.



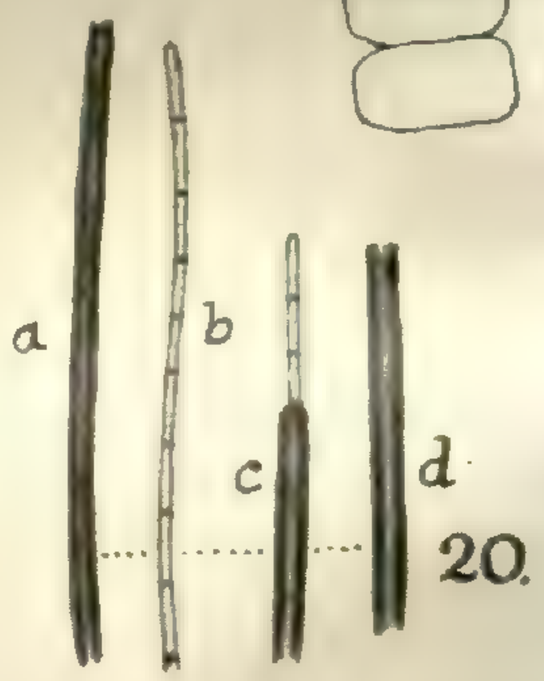
12.



13.

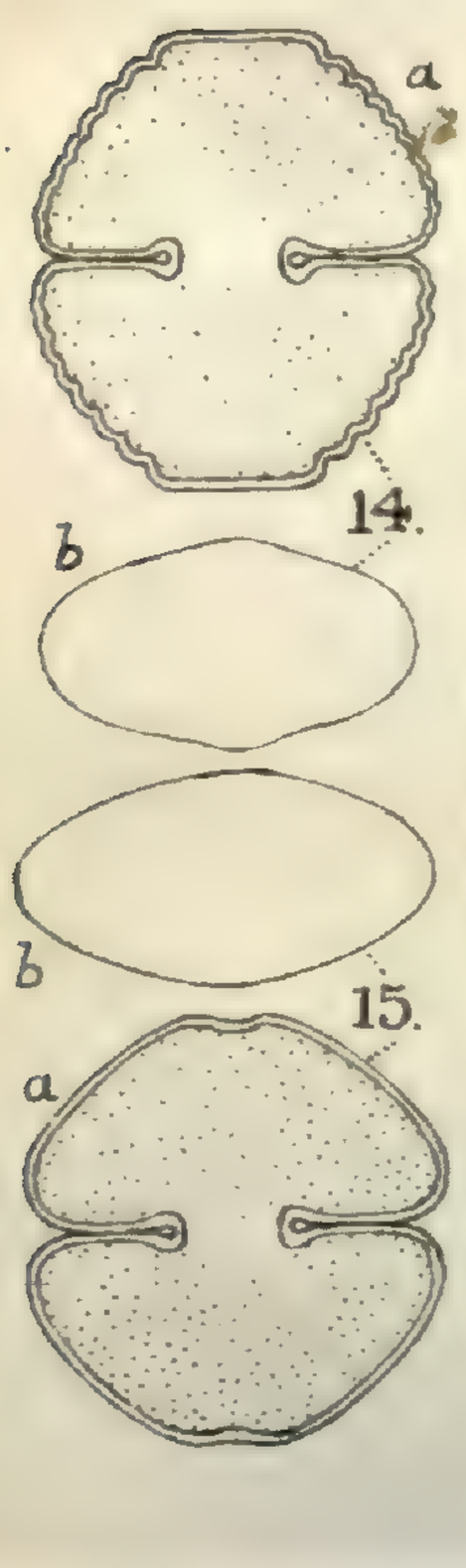


19.



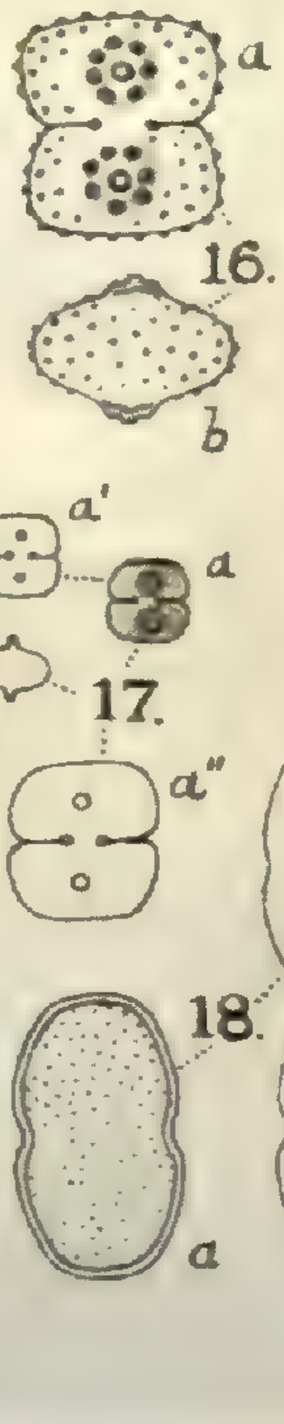
20.

21.



14.

15.

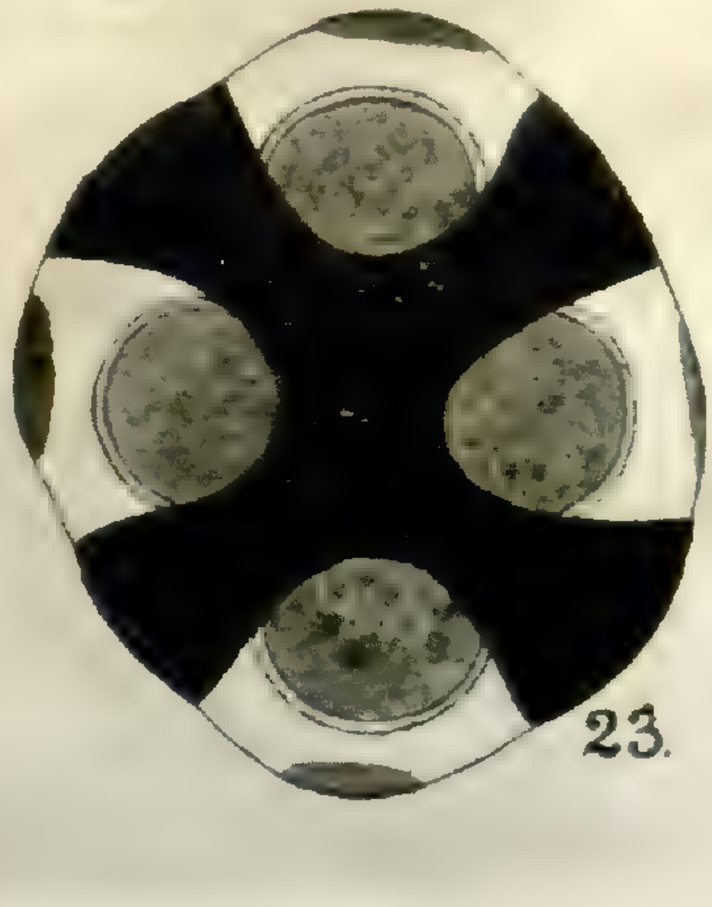


16.

17.

18.

22.



23.

C. S. West del.

West. Newman proc.

WEST INDIAN FRESHWATER ALGÆ.

WEST INDIAN FRESHWATER ALGÆ.

By G. S. West, M.A., F.L.S.

(Plate 464.)

The Algæ which form the subject of this paper were very kindly collected at my request by Mr. A. Howard during 1901–2 in the islands of Barbados, Dominica, and Trinidad. Some of them have proved of great interest, particularly as so little is known concerning the Freshwater Algæ of the West Indies. The *Myxophyceæ* and *Bacillarieæ* are better represented in the collections than the other classes of Algæ, and the number of species belonging to the *Oscillatoriaceæ* is relatively large. Three interesting epiphytes occurred on some fine fruiting specimens of *Pithophora Cleveana* Wittr., all of which have proved to be new.

Glæotænium Loitlesbergerianum Hansg. and *Cosmarium bireme* Nordst. var. *barbadense* are worthy of special mention; the former on account of the extraordinary deposition of black pigment in its integuments, and the latter because of its minute size. Of the diatoms, the most interesting are: *Achnanthes Hörmannii* Gutw., *Cataulus lævis* var. *thermalis* (Men.) Grun., *Tropidoneis Van Heurckii* (Grun.) Cleve, and *Terpsinoë musica* Ehrenb.

The first important papers on Freshwater Algæ from the West Indies were two by Lagerheim,* in which he recorded a number of Desmids from Cuba, Puerto-Rico, and Jamaica. One Desmid (*Euastrum incaratum* Josh. et Nordst.) has been recorded from Jamaica by Nordstedt,† and several others have been mentioned from Cuba and Trinidad by Borge.‡ Two other papers, somewhat more comprehensive in their scope, have also appeared on Freshwater Algæ from Dominica and St. Vincent.§ *Pithophora Cleveana* Wittr. was also described originally from St. Thomas.

Most of the Algæ recorded in the present paper are additional to those already known from the West Indies.

Chlorophyceæ.

1. **Œdogonium Howardii,** sp. n. (Figs. 1–5.) Œ. dioicum. macrandrium, oogoniis singulis, globosis vel subglobosis, operculo apertis, circumcissione mediana et distincta; oosporis globosis vel subdepresso-globosis, oogonia complentibus; antheridiis pluricellu-

---

* G. Lagerheim, "Bidrag till Amerikas Desmidié-flora," Öfvers. af K. Vet.-Akad. Förh. 1885, no. 7. G. Lagerheim, "Algologiska Bidrag II," Botaniska Notiser, 1887.

† *Vide* Wittrock et Nordst. Alg. aq. dulc. exsic. Fascic. 21, p. 36, no. 657, 1884.

‡ O. Borge, "Ueber tropische und subtropische Süswasser-Chlorophyceen," Bih. till K. Sv. Vet.-Akad. Handl. Bd. 24, no. 12.

§ W. West, "On Some Freshwater Algæ from the West Indies," Journ. Linn. Soc. (Bot.) xxx. 1894. W. West & G. S. West, "A further Contribution to the Freshwater Algæ of the West Indies," Journ. Linn. Soc. (Bot.) xxxiv. 1899.

laribus; antherozoideis singulis?; cellulis vegetativis evidenter leviter capitellatis; cellula fili basali subhemisphærica vel subsphærica, haud elongata.

Crass. cell. veg. fil. masc. 7·5–9 μ; altit. 2–4-plo major;
,, ,, ,, ,, fem. 9·5–11 μ; ,, 2–4-plo ,,
,, oogon. 29–33 μ; ,, 29–33 μ;
,, oospor. 25–29 μ; ,, 25–29 μ;
,, cell. antherid. 7·5–9 μ; ,, 8–14 μ;
,, cell. fil. basal. 14–16 μ; ,, 10–11 μ.

Barbados.—Bay Estate, epiphytic on *Pithophora Cleveana* Wittr.

I forwarded specimens of this alga to Dr. K. E. Hirn, of Jyväskylä, Finland, and he confirmed my idea that the species had not previously been described. It approaches *Œ. capitellatum* Wittr. and *Œ. pœcilosporum* Nordst. et Hirn. From the former it is distinguished by its diœcious macrandrous habit, by its globose oospores, and by its somewhat larger size; from the latter it differs in its globose oospores, and in the capitellated vegetative cells. Of the diœcious nannandrous species of *Œdogonium*, it approaches nearest to *Œ. decipiens* Wittr.

The antheridia sometimes possess as many as sixteen cells. The basal cells of the filaments are somewhat peculiar. They are depressed subglobose in form, and the first formed cell of the filament grows through a circular opening at the upper pole of the basal cell. This type of germination of the zoogonidia occurs in very few species of *Œdogonium*, and has been well described by Scherffel ("Einige Beobacht. über Œdog. mit halbkugeliger Fusszelle," Berichte Deutsch. Botan. Gesellsch. 1901, Bd. xix. pp. 557–563, t. xxxi.).

A number of other species of *Œdogonium* were noticed from Barbados, Dominica, and Trinidad, but they were not in a condition for satisfactory identification.

2. Ulothrix subtilis Kütz. var. variabilis (Kütz.) Kirchn.

Trinidad.—Pools on the Pitch Lake, La Brea.

3. **Hormospora scalariformis**, sp. n. (Figs. 6–7.) H. cellulis anguste oblongo-ellipsoideis, subremotis, transverse dispositis in tubo mucoso hyalino ampliato; margine exteriori tegumenti mucosi subarenaceo; chromatophoris singulis parietalibus, cum pyrenoide singulo et multis granulis parvis. Long. max. (transv.) cell. 7–8·5 μ; long. min. cell. 2·3–2·6 μ; diam. tegument. mucos. 13·5–17 μ.

Barbados.—Near Bridgetown.

The cells of this alga are very minute, oblong-ellipsoid in form, and are disposed in a single series within a cylindrical gelatinous investment, the long axis of the cells being placed transversely to the length of the mucous envelope. Each cell is also surrounded by a differentiated part of this mucus. The exterior of the mucous envelope is more or less partially covered with minute grains of sand. The chloroplast agrees well with that of other species of the genus, being a thin parietal plate containing a pyrenoid. It

stands nearest to *H. irregularis* Wille (Christiania Videnskab. Forhandl. 1880, no. 11, p. 63, t. 2, f. 41, 42), but differs in its smaller size, in the form of its cells, and in the unbranched and more regular habit.

4. Uronema confervicolum Lagerh. in Malpighia, 1887, p. 518, t. xii. f. 1–10. Crass. fil. 5–5·5 μ. *Barbados*.—Graeme Hall Swamp.

5. **Endoderma Pithophoræ,** sp. n. E. epiphytica; filis brevibus, irregulariter subramosis, ramis subconcretis et attenuatis; cellulis magnis, subglobosis, ellipsoideis, ovoideis vel oblongis; chromatophoris singulis parietalibus, cum pyrenoide singulo; membrana cellularum crassa. Long. thall. usque ad 210 μ; diam. cell. 25–38 μ; diam. cell. apic. ram. 10·5–16 μ; crass. membr. cell. 3–3·8 μ.

Barbados.—Bay Estate; epiphytic on *Pithophora Cleveana* Wittr.

The thallus is small, epiphytic, and almost invariably situated in the vicinity of one of the intercalary spores of the *Pithophora*. Not the slightest trace of an endophytic habit was observed in any of the specimens. The cells are much more rounded than is usual in this genus, and the cell-walls are remarkably thick.

Endoderma Pithophoræ may almost be regarded as a species of *Epicladia* Reinke, except for the absence of all tendency to form an expanded thallus.

6. **E. polymorpha,** sp. n. (Fig. 19.) E. epiphytica; filis subelongatis, irregulariter subramosis et anastomosis; cellulis depressis, polymorphis, plerumque elongatis et multe irregularibus; chromatophoris parietalibus; membrana cellularum firma et tenui. Long. thall. usque ad 250 μ; long. cell. 15–39 μ; lat. cell. 6–19·5 μ; altit. cell. 3–7·5 μ.

Barbados.—Bay Estate; epiphytic on *Pithophora Cleveana* Wittr.

This epiphyte is remarkable by reason of the polymorphic character of the cells. The branching is very irregular and somewhat anastomosing, and the cells are much depressed, being flattened against the wall of the host. Each cell contains a parietal chloroplast with one pyrenoid (sometimes more ?), and the cell-walls are firm but thin.

It is somewhat strange that two very distinct species of *Endoderma* should exist on the same plants of *Pithophora*; *E. Pithophoræ* being situated upon and near the spores, whereas *E. polymorpha* was clothing the vegetative cells only.

7. Rhizoclonium hieroglyphicum Kütz.; em. Stockm. Crass. fil. 20–23 μ. *Trinidad*.—In fountains, Roy. Botan. Gardens, St. Ann's.

Var. Kochianum (Kütz.) Stockm. Crass. fil. 23–29 μ; cell. diametro 1½–2-plo longioribus. *Barbados*.—In freshwater tank, near Bridgetown.

8. R. crassipellitum W. & G. S. West in Journ. Bot. Febr. 1897, p. 35.

Var. robustum var. n. Var. filis crassioribus; cellulis diametro

1¼–2-plo longioribus. Crass. fil. 68–74 μ; crass. membr. cell. 9·5–13·5 μ.

Barbados.—On damp ground, Porter's Estate.

The complete absence of rhizoids and also the peculiar habit of the plant are characteristic. The typical form, the filaments of which are 33–43 μ in thickness, is known from damp earth in Loanda, W. Africa.

9. Cladophora crispata (Roth) Kütz. *Barbados*. — Porter's Estate.

10. Pithophora Cleveana Wittr., "On the devel. and system. arrang. of the *Pithophoraceæ*," Acta Nova Upsala, 1877, p. 58, t. 2, f. 13–15; t. 4, f. 12–18; t. 5, f. 1–8. Crass. fil. prim. 70–77 μ; crass. ram. 41–60 μ; long. spor. intercal. 200–258 μ, lat. 100–156 μ; long. spor. term. 175–233 μ, lat. 91–104 μ.

Barbados.—Bay Estate.

This species was originally described from the West Indies, having been found by Cleve near Soldier Bay, St. Thomas. Cleve's specimens were clothed with an epiphytic *Œdogonium*; this was a monœcious species subsequently described by Wittrock as *Œ. Pithophoræ*. Strange to say, the specimens from Barbados were also clothed with an epiphytic *Œdogonium*—*Œ. Howardii*.

11. Vaucheria sp. Sterile specimens with filaments 70–112 μ in thickness. They were largely encrusted with sand-grains, numerous diatoms, and a sterile species of *Œdogonium*. *Trinidad*.—Royal Botan. Gardens, St. Ann's.

12. Mougeotia elegantula Wittr. Sterile specimens with cells 4·8–5·4 μ in diameter, and 16–32 times longer than broad. The chloroplast occupied about the central two-thirds of the cell, and contained from 5 to 8 pyrenoids. *Barbados*—Bridgetown. *Trinidad*.—St. Clair.

13. Mougeotia sp. Sterile; cells 13–14 μ in diameter, and 7–8 times longer than broad. *Dominica*.—Roseau Valley. *Trinidad*.—St. Clair.

14. Spirogyra sp. Sterile; cells 26–32·5 μ in diameter, and 2–8 times longer than broad; chloroplasts 2–3, with smooth edges and small pyrenoids, making from 1 to 2½ turns in each cell.

Barbados. — Near Bridgetown. *Dominica*. — Roseau Valley. *Trinidad*.—Pools on Pitch Lake.

Fragmentary specimens of two other sterile species of *Spirogyra* were observed from Barbados.

15. Closterium acerosum (Schrank) Ehrenb. Long. 408–575 μ; lat. 35·5–40 μ. *Barbados*.—Graeme Hall Swamp.

16. C. lanceolatum Kütz. *Barbados*. — In pond amongst water-lilies.

17. C. moniliferum (Bory) Ehrenb. *Dominica*.—Roseau Valley.

18. C. Dianæ Ehrenb. *Barbados*. — Graeme Hall Swamp. *Dominica*.—Roseau Valley. Lat. 16–22 μ; apicibus 198–236 μ inter se distantibus.

19. C. ACUTUM Bréb. *Trinidad.*—Pools on the Pitch Lake, La Brea.

20. COSMARIUM GRANATUM Bréb. *Trinidad.*—In fountains, Roy. Botan. Gardens, St. Ann's.

21. C. GALERITUM Nordst. Forma apicibus minus truncatis et subretusis. Long. 41 μ; lat. 40 μ; lat. isthm. 10·5 μ; crass. 21 μ. *Trinidad.*—Pools on the Pitch Lake. (Fig. 15.)

22. C. OBSOLETUM Reinsch. The specimens observed were all small forms similar to those observed from Koh Chang (*cf.* West & G. S. West in Botanisk Tidsskrift, xxiv. 1901, p. 172). Long. 47 μ; lat. 50 μ; lat. isthm. 12·5 μ; crass. 26 μ. *Dominica.*—Roseau Valley.

There are apparently two forms of this species widely distributed throughout the tropics; a large form with a prominent pore at the thickened basal angles, and a small form destitute of this pore. It is the latter form which was observed from Dominica.

23. C. LÆVE Rabenh. Long. 16–24 μ; lat. 13·5–17·5 μ; lat. isthm. 3–4·2 μ. *Trinidad.*—Government Farm, St. Clair; Roy. Botan. Gardens, St. Ann's.

24. C. IMPRESSULUM Elfv. Long. 29 μ; lat. 23 μ; lat. isthm. 5 μ. *Barbados.*—Graeme Hall Swamp.

25. C. LIBONGENSE West & G. S. West in Journ. Bot. April, 1897, p. 120, t. 368, f. 12.

Var. INEVOLUTUM var. n. (Fig. 14.) Var. crenis lateralibus reductis; semicellulis a vertice visis ellipticis, ad medium utrobique leviter inflatis; pyrenoidibus binis. Long. 44 μ; lat. 38 μ; lat. isthm. 11·5 μ; crass. 21 μ. *Barbados.*—Near Bridgetown.

This variety should be compared with *Cosmarium sublatereundatum* W. & G. S. West, from which it is distinguished by its relatively greater length, its more attenuated semicells with narrower apices, and by the inflated vertical view.

26. C. FORMOSULUM Hoff. Long. 44 μ; lat. 38 μ; lat. isthm. 11·5 μ. *Barbados.*—Bay Estate and Graeme Hall Swamp. The specimens were not quite typical, differing in the possession of smooth apices.

27. C. SUBCOSTATUM Nordst. Long. 24 μ; lat. 19·5–22 μ; lat. isthm. 4·6 μ; crass. 12·5 μ. *Barbados.*—Bay Estate. The specimens were rather small, but were otherwise similar to the type, and the chloroplasts were furnished with two pyrenoids.

28. **C. sublatifrons**, sp. n. (Fig. 16.) C. minutum, tam longum quam latum, profundissime constrictum, sinu augustissimo-lineari; semicellulæ obtrapeziformes, lateribus leviter convexis, angulis superioribus rotundatis, apicibus subrectis vel levissime convexis; membrana subsparse et irregulariter granulata, in centro cum annulo granulorum 7 circum granulum majus centrali; a vertice visæ ellipticæ, tumore granulato in media utrobique. Long. 22 μ; lat. (max.) 19·5 μ; lat. isthm. 4·5 μ; crass. 14·5 μ. *Barbados.*—Bay Estate.

This species is nearest to *C. latifrons* Lund., but is only about half the size, with rounder angles, fewer granules, and a different central inflation.

29. C. BIREME Nordst. var. BARBADENSE var. n. (Fig. 17.) Var. minor, semicellulis subtrapezoideis, marginibus lateralibus leviter convexis, apice latiori. Long. 7·3–7·7 μ; lat. 7·4–8 μ; lat. isthm. 1·3 μ; crass. cum papill. 5·4 μ. *Barbados.*—Near Bridgetown.

This minute *Cosmarium* differs from typical *C. bireme* Nordst. in its somewhat smaller size, in the absence of the lateral angles, and in the wider apices of the semicells. There is one pyrenoid in each chloroplast.

It should be compared with *C. bireme* var. *rotundatum* W. & G. S. West (in Trans. Linn. Soc. (Bot.) ser. 2, v. 1895, p. 56, t. 6, f. 37), from which it is distinguished by its smaller size, its proportionately greater breadth, and its narrowly linear, closed sinus. Compare also with *C. adoxum* W. & G. S. West in Journ. Roy. Micr. Soc. 1897, p. 487, t. 7, f. 24.

30. C. CUCURBITA Bréb. var. ATTENUATUM nob. (*Dysphinctium Cucurbita* (Bréb.) Hansg., "forma ad apices versus *attenuata* ibique late rotundato-truncata," Schmidle in Österr. botan. Zeitschr. 1895, p. 347, t. 14, f. 16.) Long. 24–27 μ; lat. 15·2–17 μ; lat. apic. circ. 10–11·5 μ; lat. isthm. 14–15 μ. *Trinidad.*—Pools on the Pitch Lake, La Brea. (Fig. 18.)

This variety is somewhat smaller than typical *C. Cucurbita*, and the semicells are distinctly attenuated towards their apices.

31. C. PSEUDARCTOUM Nordst. Long. 15·4–19 μ; lat. 10·5–11·5 μ; lat. isthm. 9·5–10 μ. *Trinidad.*—Pools on the Pitch Lake.

32. SPONDYLOSIUM DESMIDIIFORME (Borge) nob. (*Sphærozosma desmidiiforme* Borge, "Alg. erst. Regn. Exped.," Arkiv. för Bot. utgifv. af K. Sv. Vet.-Akad. Bd. 1, 1903, p. 120, t. 5, f. 23.) Long. cell. 8·8–12·5 μ; lat. 25–29 μ; lat. isthm. 23–25 μ; crass. 15–16·5 μ. *Trinidad.*—Pools on Pitch Lake, La Brea. (Figs. 11–13.)

This species occurred in abundance, and the twisted filaments were of relatively great length. The specimens differ somewhat from those described by Borge from Brazil, but not sufficient to be regarded as a distinct variety. The cells are a little smaller, and the lateral margins on each side of the median constriction are not so rounded as figured by Borge. In many cells the vertical view is somewhat asymmetrical (*vide* fig. 13*b*, *b'*), and the cell-wall in the vicinity of the lateral margins is delicately and sparsely punctate.

This Desmid could almost equally well be placed in the section *Didymoprium*, of the genus *Desmidium*. Borge describes the presence of a mucous envelope round the filaments, but there was no trace of such a mucous investment in the Trinidad specimens.

33. STAURASTRUM TURGESCENS De Not. Long. 33–36·5 μ; lat. 28–31·5 μ; lat. isthm. 10–12 μ. *Barbados.*—Graeme Hall Swamp.

34. CHARACIUM SIEBOLDII A. Br. Long. cell, 15·5–25 μ; lat. cell. 4·2–9·5 μ. *Barbados.*—Graeme Hall Swamp; epiphytic on *Nitzschia spectabilis.*

35. Pleurococcus vulgaris Menegh. Diam. cell. 6·2–12 μ. *Barbados*.—Bay Estate. Many of the cells were angular by compression. The chloroplast was lobed and contained a single pyrenoid.

36. **P. Kützingii,** sp. n. (*Protococcus minor* Kütz. Phycolog. germ. 1843, p. 144; Tab. Phycolog. 1845, i. t. 3; Spec. Alg. 1849, p. 198 (in part). *? ? Pleurococcus minor* (Kütz.) Rabenh.). P. cellulis minutis, globosis vel angulari-globosis, plerumque 2–4–8–12 in familias consociatis, et in strato tenue molle luteo-viride 1 mm. crasso aggregatis; chromatophoris singulis, magnis, parietalibus et homogeneis, sine pyrenoidibus. Multiplicatio cellularum vegetativarum divisione in duas (vel tres) directiones alternante. Diam. cell. 3·8–5·7 μ; diam. fam. parv. (4–12 cell.) 9–16 μ. (Figs. 9–10.)

Barbados.—Bay Estate; forming a yellow-green stratum about 1 mm. in thickness, with a species of *Lyngbya*.

The small size of the cells and their yellow-green colour at once distinguish this species from *P. vulgaris* Menegh. The cells when solitary are globose, but in the small families of two, four, or eight cells they are generally somewhat angular by compression. The cell-wall is firm and of some appreciable thickness. There is only one chloroplast in each cell, of a pale-green colour and quite homogeneous. It is parietal and relatively massive, occupying a large part of the cell, and it contains no pyrenoid.

Under the name of "*Protococcus minor*," Kützing described a number of minute unicellular algæ the specific identity of which has long been questionable. It is now generally understood that a large proportion of Kützing's figures refer to a blue-green alga which has come to be known as "*Chroococcus minor* (Kütz.) Näg." Some of his drawings, rough though they are, clearly refer to chlorophyceous algæ, and I think it extremely probable that they include the species found in the West Indies.

37. Protoderma viride Kütz. Long. cell. 3·8–9·6 μ; lat. cell. 2·3–3·6 μ. *Barbados*.—Bridgetown; epiphytic on *Chara* sp. The flat colonies were very small, containing not more than from 18 to 30 cells.

38. Scenedesmus obliquus (Turp.) Kütz. *Barbados*. — Bay Estate.

39. S. quadricauda (Turp.) Bréb. *Barbados*.—Bay Estate.

Var. ellipticum W. & G. S. West. Long. cell. 11·5–12 μ; lat. cell. 4·8–5 μ. *Barbados*—Bay Estate. This is a 4-celled variety with ellipsoidal cells and a characteristic arrangement of the long bristles. It has only previously been recorded from Madagascar.

40. S. denticulatus Lagerh. var. linearis Hansg. *Trinidad*.—Pools on the Pitch Lake, La Brea.

41. Oocystis solitaria Wittr. *Barbados*.—Near Bridgetown.

42. **Palmellococcus thermalis,** sp. n. (Fig. 21.) Cellulæ globosæ, minutæ; chromatophoris parietalibus 2–3, intense viridibus, pyrenoidibus carentibus; membrana cellularum firma et

tenuissima. Multiplicatio cellularum vegetativarum divisione in omnes directiones. Propagatio fit gonidiis immobilibus minutis 4–16 intra cellulas maternas ortis. Diam. cell. 2·2–6·5 μ.

Dominica.—In hot spring, forming a thin green stratum. Temperature of water 90° F. (32·2° C.).

This species can be distinguished from *P. miniatus* (Kütz.) Chod. by the presence of more than one chloroplast in each cell, and by the total absence of the red oily material which is such a conspicuous feature of that alga.

The chloroplasts appear to be perfectly homogeneous, and they possess regular and entire margins. The number of gonidia produced in each cell is 4, 8, or 16. They are minute, globular, non-motile spores, which escape by the rupture of the mother-cell-wall.

The discovery of this species necessitates a slight alteration in the generic characters of *Palmellococcus*, so as to include a species with more than one chloroplast, and in which red pigment is never developed.

43. Glœocystis gigas (Kütz.) Lagerh. *Barbados*.—Graeme Hall Swamp. *Trinidad*.—Pools on the Pitch Lake, La Brea.

44. Glœotænium Loitlesbergerianum Hansg. in Sitz-bericht. d. k. Böhm. Gesellsch. 1890, p. 10; Nuova Notarisia, 1890, pp. 264–5; Stockmeyer in Sitz-bericht. k. k. zool.-botan. Gesellsch. Wien, 1891, Bd. xli. (*Glœocystis cincta* Gutw. in Kom. Fizyogr. Akad. Umiej. Krakow. tom. xxx. 1894, p. 73, t. 2, f. 6.)

Diam. cell. 17–28 μ; diam. fam. 4-cell. 61–80 μ; crass. fam. 4-cell. 50 μ. (Figs. 22–23.)

Trinidad.—In fountains, Roy. Botan. Gardens, St. Ann's.

The only distinction between this genus and *Glœocystis* is the presence of an opaque zone of peculiar shape, which is closely bound round the transparent gelatinous envelope. In the 4-celled colony, this zone, which is quite black in appearance, is somewhat cruciform in the front view of the colony, but in the side view it is oblong-rectangular, with a central space. In the 2-celled colony the black zone is in the form of a ring extending round the median part of the gelatinous envelope. The rest of the mucous covering often becomes impregnated with this same black material.

Gutwinski's figure of this plant under the name of "*Glœocystis cincta*" is a very good one. The figures given by Turner of Indian specimens (in Kongl. Sv. Vet.-Akad. Handl. 1893, Bd. 25, no. 5, p. 157, t. 21, f. 12) scarcely represent the plant. Schmidle has also found and figured a form of it from Australia (*vide* Flora, 1896, Bd. 82, Heft 3, p. 302, t. 9, f. 3).

The idea once put forward that this plant stood near to some of the *Desmidiaceæ* is quite erroneous. Its nearest ally is *Glœocystis*.

Heterokontæ.

45. **Characiopsis ellipsoidea**, sp. n. (Fig. 8). Cellulæ vegetativæ anguste ellipsoideæ, apicibus obtuse rotundatis, stipite brevissimo crasso sine disco basali prædito; chromatophoris 4, parietalibus,

subellipticis et luteo-viridibus, pyrenoidibus carentibus. Zoogonidiis . . . . ? Long. cell. 15–22 μ; lat. cell. 7·7–9·6 μ.

Barbados.—Near Bridgetown; epiphytic on *Chara* sp.

This species is characterized by the ellipsoid cells with rounded apices, and by the short, thick stalks of attachment. There are four chromatophores in each cell, of a yellow-green colour, somewhat granular in appearance, but destitute of pyrenoids. It should be compared with *Characiopsis minuta* (A. Br.) Borzi, from which it differs in the form of the vegetative cells, and in the absence of the narrow stalk with its basal disc.

Bacillarieæ.

46. Cyclotella Meneghiniana Kütz. *Barbados*.—Graeme Hall Swamp; "Chancery Lane" Estate.

47. Cerataulus lævis (Menegh.) Ralfs var. thermalis (Menegh.) Grun. *Dominica*.—Roseau Valley.

This diatom occurred in quantity amongst *Terpsinoë musica*. I have to thank Mr. E. Lemmermann, of Bremen, for its correct identification.

48. Terpsinoë musica Ehrenb. *Barbados*.—Graeme Hall Swamp. *Dominica*.—Roseau Valley.

This species has been previously recorded for Dominica (*vide* W. & G. S. West in Journ. Linn. Soc. (Bot.) xxxiv. 1899, p. 295).

49. Synedra pulchella Kütz. *Barbados*.—In pools, Bay Estate. *Trinidad*.—Roy. Botan. Gardens, St. Ann's; Government Farm, St. Clair.

50. S. Ulna (Nitzsch) Ehrenb. *Trinidad*.—Roy. Botan. Gardens, St. Ann's; Government Farm, St. Clair.

51. S. Acus (Kütz.) Grun. *Barbados*.—Graeme Hall Swamp. *Trinidad*.—Pools on the Pitch Lake, La Brea.

52. S. radians (Kütz.) Grun. *Trinidad*.—Government Farm, St. Clair.

53. Ceratoneis Arcus (Ehrenb.) Kütz. var. Amphioxys (Rabenh.) De Toni. *Barbados*.—Graeme Hall Swamp.

54. Eunotia pectinalis (Dillw.) Rabenh. *Barbados*.—Near Bridgetown. *Trinidad*.—Roy. Botan. Gardens, St. Ann's.

Forma curta Van Heurck. *Trinidad*.—Pools on the Pitch Lake, La Brea.

55. E. lunaris (Ehrenb.) Grun. *Barbados*.—Graeme Hall Swamp.

56. Achnanthes microcephala (Kütz.) Grun. *Trinidad*.—Roy. Botan. Gardens, St. Ann's.

57. A. coarctata (Bréb.) Grun. *Barbados*.—"Porter's Estate."

58. A. Hörmannii Gutw. "O Algama, sabranim oko Travnika po valacasnom prof. Erichu Brandisu," Capajebo, 1898, p. 258 (c. fig. xylogr.). *Dominica*.—Roseau Valley.

59. Navicula viridis Kütz. *Barbados*.—Bridgetown.

60. N. GIBBA (Ehrenb.) Kütz. *Trinidad.*—Pools on the Pitch Lake, La Brea.

61. N. GRACILIS Kütz. *Barbados.*—In water-lily pond.

62. N. VIRIDULA Kütz. *Barbados.*—With the preceding species.

63. N. RADIOSA Kütz. *Barbados.*—"Porter's Estate."

Var. TENELLA (Bréb.) Van Heurck. *Trinidad.*—Drinking fountain, St. Clair. *Barbados.*—"Porter's Estate."

64. N. CRYPTOCEPHALA Kütz. *Barbados.*—Graeme Hall Swamp.

65. N. GALLICA (W. Sm.) Van Heurck. *Barbados.*—Bay Estate.

66. N. CUSPIDATA Kütz. *Barbados.*—Bay Estate; Graeme Hall Swamp.

67. N. AMBIGUA Ehrenb. *Barbados.*—Bay Estate.

68. N. SPHÆROPHORA Kütz. *Barbados.*—In water-lily pond; Bridgetown; Graeme Hall Swamp.

69. N. EXILIS Grun. *Trinidad.*—Government Farm, St. Clair; pools on the Pitch Lake, La Brea.

70. N. IRIDIS Ehrenb. *Barbados.*—Near Bridgetown.

71. GYROSIGMA HIPPOCAMPUS (W. Sm.). *Barbados.*—Graeme Hall Swamp.

72. TROPIDONEIS VAN HEURCKII (Grun.) Cleve. (*Plagiotropis Van Heurckii* Grun.) *Barbados.*—Graeme Hall Swamp.

73. GOMPHONEMA GRACILE Ehrenb. *Barbados.*—Bay Estate; Graeme Hall Swamp. *Trinidad.*—Roy. Botan. Gardeus, St. Ann's; pools on the Pitch Lake, La Brea.

74. G. MICROPUS Kütz. *Trinidad.*—Roy. Botan. Gardens, St. Ann's.

75. G. INTRICATUM Kütz. var. VIBRIO (Ehrenb.) Van Heurck. *Barbados.*—Bay Estate.

76. COCCONEMA CUSPIDATUM (Kütz.). *Trinidad.*—Roy. Botan. Gardens, St. Ann's.

77. C. PUSILLUM (Grun.). *Barbados.*—Graeme Hall Swamp.

78. C. CÆSPITOSUM (Kütz.) G. S. West. *Trinidad.*—Roy. Botan. Gardens, St. Ann's.

79. AMPHORA OVALIS Kütz. *Barbados.*—Near Bridgetown; Graeme Hall Swamp.

80. A. NORMANII Rabenh. *Barbados.*—"Porter's Estate."

81. EPITHEMIA TURGIDA (Ehrenb.) Kütz. *Barbados.*—"Chancery Lane Estate."

82. E. GIBBERULA (Ehrenb.) Kütz. *Dominica.*—Roseau Valley. *Trinidad.*—Government Farm, St. Clair.

83. NITZSCHIA DENTICULA Grun. *Trinidad.*—Roy. Botan. Gardens, St. Ann's.

84. N. SPECTABILIS (Ehrenb.) Ralfs. *Barbados.*—Near Bridgetown; Graeme Hall Swamp.

85. N. LINEARIS (Ag.) W. Sm. *Barbados.*—Near Bridgetown.
Var. TENUIS (W. Sm.) Grun. *Dominica.*—Roseau Valley.

86. N. PALEA (Kütz.) W. Sm. *Barbados.*—Bay Estate.
Var. TENUIROSTRIS Van Heurck. *Dominica.*—Roseau Valley, hot spring (temp. 90° F.).
Var. DEBILIS Van Heurck. *Barbados.*—Graeme Hall Swamp.

87. N. COMMUNIS Rabenh. *Barbados.*—Graeme Hall Swamp; "Porter's Estate."

88. N. SUBTILIS Grun. *Barbados.*—"Chancery Lane Estate."

89. HANTZSCHIA AMPHIOXYS (Ehrenb.) Grun. *Barbados.*—Bay Estate.

90. SURIRELLA ROBUSTA Ehrenb. var. SPLENDIDA (Ehrenb.) Van Heurck. *Barbados.*—Near Bridgetown; Graeme Hall Swamp.

91. S. STRIATULA Turpin. *Barbados.*—Near Bridgetown.

92. CAMPYLODISCUS CLYPEUS Ehrenb. *Barbados.*—Graeme Hall Swamp.

MYXOPHYCEÆ.

93. HAPALOSIPHON AUREUS W. & G. S. West in Journ. Bot. June, 1897, p. 59. Crass. fil. prim. 11–12·4 μ; diam. cell. 8–9·5 μ; crass. ram. 7·5–9 μ; crass. cell. ram. 5–6·5 μ; crass. heterocyst. 5–9 μ. *Barbados.*—Bay Estate.

This species has previously been recorded only from Huilla, Angola, W. Africa. The disparity in thickness between the primary filaments and the branches, and the golden-yellow colour of the sheaths are characteristic features.

94. NOSTOC MICROSCOPICUM Carm. *Barbados.*—"Chancery Lane Estate."

95. ANABÆNA sp. Crass. trich. 3 μ; crass. heterocyst. 4·5 μ; long. spor. 16 μ; lat. spor. 9 μ. Heterocysts ellipsoid. Spores cylindrical, solitary (so far as observed), and remote from the heterocysts. *Barbados.*—Near Bridgetown.

96. NODULARIA HARVEYANA Thur. Crass. cell. veget. 4·6–5·7 μ; crass. heterocyst. 6·5–7·5 μ; crass. spor. 7–7·8 μ. *Barbados.*—"Chancery Lane Estate."

97. SYMPLOCA MUSCORUM (Ag.) Gom. *Barbados.*—Bay Estate.

98. LYNGBYA ÆSTUARII Liebman. Crass. fil. 16–22 μ; crass. trich. 11·5–15 μ. *Barbados.*—Near Bridgetown; Bay Estate.

99. L. MAJOR Menegh. *Barbados.*—Bay Estate.

100. L. LUTEA (Ag.) Gom. Crass. fil. 8 μ; crass. trich. 5–6·4 μ; *Barbados.*—On roots of mangroves in brackish swamp nr. Bridgetown.

101. L. MARTENSIANA Menegh. *Barbados.*—Near Bridgetown; Graeme Hall Swamp.

102. L. VERSICOLOR (Wartm.) Gom. *Barbados.*—Bay Estate.

103. L. SUBTILIS West. *Barbados.*—Bay Estate.

104. L. LAGERHEIMII (Möb.) Gom. Crass. trich. 2 μ. *Barbados.*—Near Bridgetown. This species has previously been recorded from Brazil.

105. **L. ferruginea,** sp. n. (Fig. 20.) L. filis tenuissimis, in stratum luteo-ochraceum dense intricatis; vaginis initio tenuibus, hyalinis, demum crassioribus et ferrugineis; trichomatibus ærugineis, continuis, non torulosis, ad dissepimenta non constrictis; cellulis diametro trichomatis 5–6-plo longioribus; dissepimentis distinctis et non granulosis; cellula apicali cylindrica et obtusa, calyptra nulla. Crass. fil. 1·8–2·4 μ; crass. trich. 0·8–0·9 μ.

Dominica.—Roseau Valley, forming a yellow-brown ferruginous stratum.

This species occurred in a compact stratum with much ferrugineous material. On the sheaths of all except the youngest parts of the filaments there is a thick deposit of this yellow-brown material. The trichomes are exceedingly narrow, of a bright blue-green colour, and the cells are from five to six times longer than the diameter. The latter character alone at once distinguishes this species from *L. ochracea* (Kütz.) Thur.

106. Phormidium persicinum (Reinke) Gom. Crass. trich. 1·8–2 μ. *Barbados.*—Near Bridgetown, on roots of mangroves in brackish swamp.

107. P. tenue (Menegh.) Gom. *Barbados.*—Near Bridgetown; Bay Estate; Graeme Hall Swamp.

108. P. luridum (Kütz.) Gom. Crass. trich. 1·8–2 μ. *Dominica.*—Roseau Valley.

109. P. laminosum (Ag.) Gom. Crass. trich. 1·3 μ. *Trinidad.*—Roy. Botan. Gardens, St. Ann's.

110. Oscillatoria princeps Vauch. Crass. trich. 31–40 μ. *Barbados.*—Graeme Hall Swamp. The specimens were very fine, agreeing more with North American than with European ones in point of view of size.

111. O. sancta Kütz. Crass. trich. 10·5–11·5 μ. *Barbados.*—Bay Estate.

112. O. limosa Ag. *Barbados.*—Graeme Hall Swamp.

113. O. lætevirens Crouan. Crass. trich. 4·1–4·4 μ. *Barbados.*—Near Bridgetown, on roots of mangroves in brackish swamp. A somewhat thinner form (trichomes only 3 μ in thickness) was observed from Graeme Hall Swamp.

114. O. tenuis Ag. Crass. trich. 3·9–4·3 μ. *Barbados.*—"Porter's Estate."

115. O. brevis Kütz. *Barbados.*—Near Bridgetown.

116. O. subbrevis Schmidle, in Engler's Botan. Jahrbüch. Bd. xxx. 1902, p. 243, t. 4, f. 7. Crass. trich. 5·1–5·7 μ. *Barbados.*—Bay Estate.

This species was present in some quantity amongst *O. sancta.* It seems distinct from *O. brevis* Kütz., by reason of the extreme shortness of its cells and the blunt apices of the filaments. The transverse cell-walls are often bent, some being concave towards one extremity of the filament, and others convex towards the same

extremity. The apical cell is almost disciform with a convex outer margin. Numerous dark-coloured, disc-shaped masses occur at intervals along the filaments. Each of these is probably a mass of intercellular substance, very refractive in appearance, and projecting slightly beyond the margins of the filament. Schmidle's African specimens were from the neighbourhood of Lake Nyassa, and were from hot water (temp. 52° C.). The West Indian specimens were not from hot water.

117. O. ANGUSTISSIMA W. & G. S. West. Crass. trich. 0·6 μ. *Barbados*.—Bay Estate.

118. SPIRULINA TENUISSIMA Kütz., 1836 (*S. subsalsa* Œrsted, 1842). Diam. spir. 3 μ; crass. trich. 1 μ. *Barbados*.—Near Bridgetown, on the roots of mangroves; Graeme Hall Swamp.

119. CALOTHRIX BREVIARTICULATA W. & G. S. West in Journ. Bot. June, 1897, p. 240. Crass. fil. ad med. 11–12·5 μ; crass. trich. ad med. 7·3–8·2 μ. *Trinidad*.—Roy. Botan. Gardens, St. Ann's; epiphytic on *Vaucheria* sp.

120. CAMPTOTHRIX REPENS W. & G. S. West, *l. c.* 1897, p. 67, t. 370, f. 12–17. Crass. fil. 3·7–5·2 μ. *Barbados*.—Near Bridgetown; epiphytic on *Chara* sp. This alga was first described from Angola, West Africa, and it has since been found in the neighbourhood of Lake Nyassa (*vide* Schmidle in Engler's Botan. Jahrbüch. Bd. xxxii. 1904, p. 63).

121. CHAMÆSIPHON CONFERVICOLA A. Br. Long. cell. 27–31 μ; lat. 2·5–3·1 μ. *Barbados*.—Near Bridgetown; attached to *Chara* sp.

122. APHANOTHECE MICROSCOPICA Näg. *Barbados*.—Bay Estate.

123. A. PRASINA A. Br. *Barbados*.—"Chancery Lane Estate."

124. MERISMOPEDIA GLAUCA (Ehrenb.) Näg. *Barbados*.—Graeme Hall Swamp.

125. M. HYALINA Kütz. *Barbados*.—Near Bridgetown; Graeme Hall Swamp.

126. M. ELEGANS A. Br. Diam. cell. 5·5–7 μ. Large colonies with up to 8000 cells. *Barbados*.—Graeme Hall Swamp.

127. GOMPHOSPHÆRIA APONINA Kütz. *Barbados*.—Near Bridgetown; Graeme Hall Swamp.

128. MICROCYSTIS MARGINATA Menegh. Diam. cell. 2–2·8 μ; diam. colon. usque ad 120 μ. *Barbados*.—Graeme Hall Swamp.

129. GLŒOCAPSA DIDYMA Kütz. Tab. Phycolog. t. 19, f. iii.; Rabenh. Flor. Europ. Alg. ii. 1865, p. 38. Diam. cell. 2·6–3·4 μ. *Barbados*.—Graeme Hall Swamp.

130. CHROOCOCCUS TURGIDUS (Kütz.) Näg. *Barbados*.—Bay Estate; near Bridgetown; Graeme Hall Swamp. *Trinidad*.—Roy. Botan. Gardens, St. Ann's.

131. C. COHÆRENS (Bréb.) Näg. *Barbados*.—Graeme Hall Swamp.

132. C. HELVETICUS Näg. *Barbados*.—Bridgetown.

EXPLANATION OF PLATE 464.

FIGS. 1–5.—*Œdogonium Howardii*. sp. n. (× 250). 1 and 2, young plants showing basal cells; 3 and 4, female plants showing oogonia (*oo*); 5, male plant with antheridial cells (*an*).

,, 6–7.—*Hormospora scalariformis*, sp. n. 6, × 520; 7, × 1000, showing chloroplasts.

,, 8.—*Characiopsis ellipsoidea*, sp. n. × 520.

,, 9–10.—*Pleurococcus Kützingii*, sp. n. 9, × 520; 10, × 1000, showing chloroplasts.

,, 11–13.—*Spondylosium desmidiiforme* (Borge) nob. × 520.

,, 14.—*Cosmarium Libongense* W. & G. S. West, var. *inevolutum* var. n. (× 520).

,, 15.—*C. galeritum* Nordst., forma. × 520.

,, 16.—*C. sublatifrons*, sp. n. × 520.

,, 17.—*C. bireme* Nordst. var. *barbadense*, var. n. *a*, *a'*, and *b*, × 520; *a''*, × 1000.

,, 18.—*C. Cucurbita* Bréb. var. *attenuatum* nob. × 520.

,, 19.—*Endoderma polymorpha*, sp. n. Small portion of thallus, × 520.

,, 20.—*Lyngbya ferruginea*, sp. n. × 520.

,, 21.—*Palmellococcus thermalis*, sp. n. × 520.

,, 22–23.—*Glœotænium Loitlesbergerianum* Hansg. (× 520). 22, side view of 4-celled colony; 23, front view of another 4-celled colony.

BIOGRAPHICAL NOTES.

THE following notes seem worth bringing together in print, as they are from sources not likely to be consulted by botanists in search of biographical information.

JOHN AIKIN (1747–1822).

In R. A. Salisbury's MS. on *Campanulaceæ*, preserved in the Department of Botany, is the following note under *Aikinia*:—"Our beautiful little wild plant, *Campanula hederacea* L., is the type; Delile discovered a 2d species in Egypt; and I have a 3d from Burchell, under which he says, 'Caules humifusi. Flores erecti, post occasum solis dormiunt corollis clausis.' I therefore call these 3 species after my earliest botanical preceptor, the late John Aikin, M.D., whose accurate knowledge of our indigenous Vegetables renders a British Genus peculiarly applicable to him. Formerly in very extensive practice, when kept up during the night, he made it a rule to go to bed, though for ever so short a time, like this Genus, & latterly in a green old age, enjoyed the *otium cum dignitate* which he so well merited, beloved by all who knew him."

JOHAN ERHARD ARESCHOUG (1811–1887).

"Areschoug . . . a charming Swede, Professor at Lund, came over here for a month or so, years back. His ardour was such, that on seeing a new and promising bramble bush, he would plunge into it for specimens, like the Guards charging at Waterloo, and emerge eventually streaming with gore from face and hands. He had undertaken the light job of investigating Rubus in Europe, and was after

the original and primordial typus, which he suspected was *Rubus Leesii*, and which was to be ancestor of all the cousinhood of blackberries and raspberries in existence. I fear he has left his monography unfinished. Life is short, and brambles are interminable."

Letter from J. L. Warren (under date May 26, 1887), in Sir Mountstuart Grant Duff's *Notes from a Diary*, 1886–1888, i. 119.

John Ball (1818–1899).

". . . . I send you a Latin epigram, which I discharged against our friend John Ball, who had written to suggest to me that if I had sought my out-of-door pleasures among plants and flowers instead of in the pursuit of woodcocks, I should have escaped my misadventure. I wished to suggest to him that my pleasures were near at hand, while his involved great wanderings, incompatible with my mode of life. I think you will admit that I have shown some ingenuity in weaving into my hexameters

'Strange names . . . . .
Such as would make Quintilian stare and gasp.'

I am especially proud of my victory over Popocatapetl."

The following is the epigram alluded to:—

"In Johannem Ballum
[1]Botanistam Vagabundum.

Alpibus emensis currit Botanista per Andes
Quâque humeris cœli pondus grave sustinet Atlas[2]
Carpathiumque legit per summa cacumina florem.
Quid memorem Libanum? Montes quid vos Scopulosi?[3]
Omne solum erroni patria est gratissima Ballo!
Nec mora, nec requies! Petit ardens Dhawalagiri,
Nec metuet legum contemtores Garamantas![4]
Resplendens glacie Mons Cookius attrahet; et qui[5]
Sopitos queritur Popocatapetlius ignes.[6]
Lassatusque redit, necdum satiatus ad Anglos."

Letter from Lord Aberdare (under date 3 March, 1887) in Sir Mountstuart Grant Duff's *Notes from a Diary*, 1886–1888, i. 66-7.

Brodrick.

"I had never before seen the Herbarium of 1672, collected by a member of the Brodrick family in, as [Lord] Midleton thinks, the neighbourhood of Wandsworth. It contains both wild and cultivated plants, many of them admirably preserved, and I should like to examine it a great deal more carefully than I had time to do."

Sir Mountstuart Grant Duff, *Notes from a Diary*, 1889–91, ii. 16 [Farnham Castle, Aug. 7, 1890].

---

[1] Vocabulum à me audacter inventum, spreto Herbario.
[2] Travels in Morocco with Sir Joseph Hooker.
[3] Rocky Mountains.
[4] Touaregs, gens nefasta Africana.
[5] Mount Cook in S. New Zealand, 13,000 feet high, of which the glaciers descend almost to the sea.
[6] Popocatapetl, extinct volcano in Mexico, 17,000 feet high.

[The herbarium is at Peper Harrow, near Godalming. Sir M. Grant Duff *in litt.* There is no reference to any Brodrick in the *Biographical Index;* perhaps this reprint of Sir M. G. Duff's note may elicit further information.]

William Carey (1761–1834).

"Dr. Carey, late of Serampore, one of the best, the most amiable, gifted, and indefatigable of men; whose] virtues and talents adorned his country, and whose labours have promoted the glory of the Almighty. I never saw that excellent man, but fifteen years' correspondence had accustomed me to look upon him as a dearly valued friend. His life was devoted to the diffusion of the Gospel; horticulture, natural history, and botany afforded the brief recreation he allowed himself from his daily toils. His favourite plants were the Amaryllidaceous family, and to him we are indebted for our knowledge of many of them. He was born in 1761, at Hackleton, in Leicestershire, and embarked for India in 1793. In 1800 he was settled at Serampore, and he closed the labours of his useful life in 1834, beloved by all who knew him, honoured by all whom his name has reached, having translated and superintended the publication of the gospel in forty oriental languages, which he had the perseverance to acquire for that purpose. Born in the humblest circumstances, often uncertain of his daily bread, at first a journeyman shoemaker, then a village schoolmaster, he had before his departure from England taught himself to read the Bible in Greek, Latin, Hebrew, French, Italian, and Dutch, and had become conspicuous by his eloquent preaching, and his ardent desire to bring about the mission to India which originated in his powerful mind. When he arrived there he found it necessary to offer his services by a hand-bill to make or repair shoes, and after he had risen to the head of a flourishing establishment, and occupied the chair of three professorships, he was not ashamed to nail up the original hand-bill against the wall of his study, but took pleasure in considering from what a humble grade he had been lifted up to a more useful and distinguished station by the grace of God and his own virtuous perseverance."

Herbert, *Amaryllidaceæ*, pp. 264–5 (1837).

John Kennedy (1759–1842).

The reference to Lewis Kennedy in the *Biographical Index of Botanists* (see also Journ. Bot. 1899, 214) being not only incorrect in itself, but having led at least one other writer* into error, it seems desirable to correct it. This may be done by the simple substitution of "John" for "Lewis," and of the dates "1759–1842" for "fl. 1775–1818"; all the subsequent matter refers to John, and has no reference to Lewis, who indeed can hardly claim a place in the *Index*.

The confusion seems to have originated with Lindley, who (Bot. Reg. t. 1336 (1830)) says that the genus *Kennedia* (which, in common with most other writers, he misspells *Kennedya*) was named in

* Prof. Sargent, *Silva N. Amer.* iv. 16.

compliment to "*the late* Mr. Kennedy, a partner in the celebrated nursery of Lee and Kennedy." But a reference to Ventenat's *Jardin de la Malmaison*, ii. t. 104, where the genus was established, indicates that the "M. Kennedy, célèbre cultivateur," whom it commemorates, was then alive; the volume bears date 1804, and Lewis died in 1783. This is further evidenced in the Addenda to Rees's *Cyclopædia* (under *Kennedia*) (1819), where the "well-known cultivator of Hammersmith" to whom the genus was dedicated is spoken of as if then living.

John Kennedy was born at the Vineyard, Hammersmith, on Oct. 30, 1759. In November, 1783, he became a member of the firm of Lee and Kennedy, which was subsequently carried on by the sons of the two founders until 1818, when they dissolved partnership, and it became the sole property of James Lee. John Kennedy was a constant contributor to the first five volumes (1799–1803) of H. C. Andrews's *Botanists' Repository*, and in a lesser degree to later volumes. This is established by the quotations from the *Repository* in Salisbury's writings—*e.g.* in the Trans. Hort. Soc. i. 261–366, where other contributors to Andrews's work are indicated, and in Knight's *Proteæ*. In the Addenda to Rees, already quoted, it is stated that "his skill and experience have much enriched the works of his son-in-law, Mr. Andrews." According to Johnson (*Hist. Engl. Gardening*, 301), Kennedy was "considered to be the author of *Page's Prodromus*"—a list of the plants cultivated in the Southampton Botanic Gardens, published in London in 1817. Page went to Southampton from the Hammersmith Nursery, having married a daughter of John Kennedy. In addition to the catalogue, the book contains "a cursory review of the principles on which the sexual system of Botany is established; with the Classes and Orders, and some of the terms of art explained." After leaving Hammersmith, John Kennedy went to Eltham, Kent, where he died on Feb. 18, 1842, and was buried. For much of the above information I am indebted to Mr. James Lee, a descendant of the founder of the firm of Lee and Kennedy.

The following paragraph may be substituted for that on Lewis Kennedy in the *Index*, and for that on John Kennedy in this Journal for 1903, p. 376:—

Kennedy, John (1759–1842): b. Vineyard, Hammersmith, 30 Oct. 1759; d. Eltham, Kent, 18 Feb. 1842; bur. Eltham. Nurseryman. Contrib. to *Botanists Repository* of H. C. Andrews (his son-in-law). Author of 'Page's Prodromus,' 1817. Journ. Bot. 1904, 297; Johnson, Hist. Gardening, 301; Rees, Addenda; Ventenat, Jard. Malmaison, t. 1804. *Kennedia* Vent.

John Stuart Mill (1806–1873).

"I remember once, in the division lobby, asking him whether it was true that he was preparing a Flora of the department of Vaucluse. 'Yes,' he said, 'I make a Flora of every district in which I settle. I made a Flora of Surrey.'"

Sir Mountstuart Grant Duff's *Notes from a Diary*, 1886–88, i. 187.

Sir James Paget (1814–1899).

"My mother's love of collecting had influenced in various degrees all her children, chiefly, in relation to natural history, my next elder brother Charles and myself. He gave himself chiefly to entomology; I to botany, being guided to it by Mr. Palgrave, a nephew of Mr. Dawson Turner, who represented in Yarmouth what might justly be called the Norfolk School of Botanists. Its leader had been Sir James Smith, the purchaser of the Linnæan collections and chiefly founder of the Linnæan Society; and now its chief members were Mr. Turner and his son-in-law Sir William Hooker. . . . .

"I cannot remember all the times at which I used to collect. I think they were chiefly on Saturday afternoons and on casually unoccupied bits of days, and often before breakfast, when I could gather algæ on the beach and the plants which were abundant on the denes and sand-cliffs and salt-marshes near the town, and were valuable for exchange with inland collectors. They were enough to enable me to make a nearly complete collection of the flora of the district, with specimens for exchange with other botanists, especially with the Hookers and some other pupils, and with Coterell (*sic*) Watson. I was able to study the Flora pretty well after the manner of the time—the merely descriptive manner fit for exact systematic arrangement in the Linnæan orders, then deemed natural enough, though now looking so rigidly artificial. My father in his wealthy days had collected a considerable library; not for his own use—for he was too busy, and had never been able to cultivate his natural good taste and love of all beautiful and gentle things—but for the use, as he hoped, of his children, whatever might chance to be their tastes for study. And among his books were the great *English Botany* of Smith & Sowerby, in its 36 vols., with coloured plates of all known Phanerogams; and Dawson Turner's *Historia Fucorum* with its beautiful illustrations. With these and a few more I could fairly and fully study my botany, could name and arrange the specimens, and make myself enthusiastic in collecting. I studied the botany of the district sufficiently to take part with my brother Charles in publishing the *Natural History of Great Yarmouth;* a thin 8vo in which I first appeared in print. He supplied the entomological part of it, I the rest, using not only my own collections but those of all the local naturalists who had recorded anywhere within my reach their observations. The enumeration of species was, I think, nearly complete for the time. It would be more than complete for the present time; for drainage and various cultivations, including even that of natural history itself, have sadly exterminated many of the species we used to be proud of. . . . .

"I think it impossible to estimate too highly the influence of the study of botany on the course of my life. It introduced me into the society of studious and observant men; it gave me an ambition for success, or at the worst some opportunities for display in subjects that were socially harmless; it encouraged the habit of observing, of really looking at things and learning the value of exact descriptions; it educated me in habits of orderly arrangement.

I can think of none among the reasons of my success—so far as I can judge of them—which may not be thought of as due in some degree to this part of my apprentice-life. My early associations with scientific men; my readiness to work patiently in museums and arrange them, and make catalogues; the unfelt power of observing and of recording facts; these and many more helps towards happiness and success may justly be ascribed to the pursuit of botany. And as I look back, I am amused in thinking that of the mere knowledge gained in the study—the knowledge of the appearances and names and botanical arrangement of plants—none had in my after-life any measure of what is called practical utility. The knowledge was useless; the discipline of acquiring it was beyond all price."

From *Memoirs and Letters of Sir James Paget;* edited by Stephen Paget, one of his sons, 1901, pp. 25–28.

William Paine (fl. 1732–8).

Mr. Archer Briggs in this Journal for 1872 (p. 174) called attention to an old herbarium containing about five hundred common wild or garden plants, then in the possession of Mr. Clark, of Efford Manor, near Plymouth, to a member of whose family it was presented by the author with the following dedication:—"To y^e^ Hon. Mrs. Treby, this Hortus Siccus is presented by your Humble Servant, Wm. Paine, Botanist, collected from the Sea, Rivers, Fields, Woods and Gardens of Most Parts of y^e^ West of England, Anno Dom. 1732." Mr. Briggs inquired whether more of Paine's collections were in existence, but hitherto no answer has been forthcoming. There is in the Sloane Herbarium, vol. 317, a collection entitled "Filax's and Fungus's Taken in y^e^ West of England by Wm. Paine, Botanist, 1737/8," with an autograph catalogue of contents. This extends to two hundred numbers, which are disposed on nine sheets; the names are all in English, with one or two notes of localities. The collection includes—besides "filax's and fungus's"—mosses, marine algæ, *Cuscuta Epithymum*, *Drosera rotundifolia*, and the egg-purse of the skate, with the note: "This is Call about poole and waymouth Toads skins, about Barnstaple and Bideford pixeys purses, about Looe and Fowy meg merrins purses, about Portsmouth and Gostport purses. N.B.: its y^e^ Bagg that houlds y^e^ food or spawn of y^r^ wray fish." Among the ferns is "Welsh Fern, or sarated polypodey plenty about Salt-ash"; "sweet cicely" (*Myrrhis*) is included among them. In the herbarium of Joseph Andrews,* the Sudbury apothecary and friend of Dale—which came into the possession of the Rev. John Hemsted, of Bedford, and was presented to the Department of Botany by Miss Hemsted some years since—is a small collection of marine algæ, labelled by Andrews, "Curious Sea Plants taken between Yarmouth and Lyn by William Paine, Botanist"—evidently a transcript of Paine's original description; from this it would appear that his industry was not confined to the West of England. It is evident from the lists that

* We hope before long to publish some notes on this interesting collection.

Paine was a man of no education—his claim to the title "botamist" seems to have consisted in the preparation of collections for sale; but, as inquiry has been made, it may be worth while to place on record what has been ascertained about him.

Thomas Palgrave (1804–1891).

The reference to Palgrave under Paget (see above) suggests an extract from his first letter to W. Wilson, written from Liverpool, where he was a solicitor, on 28 April, 1856. His letters, up to Dec. 1869, are, as stated in the *Biographical Index*, in Wilson's Correspondence in the Department of Botany. From 1866 he was living at Llansaintffraid, near Conway.

"I commenced the pursuit [of muscology] as a schoolboy in 1818, and followed it closely for some years in Norfolk, and with the assistance of Dr. Greville and my relatives Hooker and Turner made nearly a complete collection of all the Mosses named in Hooker and Taylor's 1st edition, having gathered many of the alpine mosses in Scotland, Wales, and Ireland. Engrossed by my professional avocations in Liverpool for the last twenty-five years, I have made but little progress in the study, more particularly as I knew no one here who took an interest in the subject until the last month, when I fell in with Mr. Marrat. He has named many for me I was doubtful about, and is going through my collection and assorting them with reference to your work which I have recently purchased." In a subsequent letter (29 July, 1856) Palgrave speaks of meeting by chance his "cousin Sir W. Hooker in April last year, when at seventy years of age he walked over Snowdon and through part of North Wales as well as myself, twenty years his junior."

James Frodsham Robinson (1838–1884).

The following passage from Sir Mountstuart E. Grant Duff's *Notes from a Diary*, 1881–86, vol. ii. p. 9, refers to the above-named:—

"John Warren writes . . . . 'A day or two back writes Newbould to announce the demise of a certain botanist, who was a man of singular proclivities, and who, by his unaided efforts, nearly (some say quite) spoilt a volume of topographical botany. He lived, moreover, in a district of whose flora I had special charge, and no *Rubus* was half the thorn in my flesh that he was. His original and amiable leading idea was this. When he wanted to find a rare plant in any given spot, where it had as yet been fruitlessly searched for, he recorded it there boldly as found, and so saved himself much trouble, though he gave more to other people. Perhaps in the Elysian plains the wish to find a plant and its actual occurrence may prove synonymous. But, in the present imperfection of earthly affairs, he gave (while he was spared) Watson and myself a world of perplexity.'"

[The "volume of topographical botany" referred to is of course Watson's well-known work, *Topographical Botany*. In 1873 Robinson (whose name is erroneously given by Watson as "J. Frederic") sent to him *London Catalogues* "checked for plants seen" in the

counties of Carnarvon, Flint, and Anglesea. Watson (Top. Bot. ed. 1, pt. 2, 533) says: "These three catalogues came to hand too late in 1873 for citation under the orders *Ranunculaceæ—Umbelliferæ*. They are quoted from *Sambucus* onward; and they often supply a personal authority for one or more of the counties named, which might otherwise have stood in blank only, as quoted from books, or have been altogether left out of the county lists under some species." It will always remain inexplicable that Watson, usually prone to suspicion rather than to credulity, should have accepted Robinson's records, especially as indications (additional to that given above by Warren) are not wanting that he had doubts regarding some of them—aroused, perhaps, after the list had been printed. In his "miscellaneous notes" (*l. c.* 650) Watson writes (under *Primula farinosa*): "On page 321, the county of Carnarvon is given for this plant on faith of Mr. Robinson's catalogue, and also of his after assurance, in reply to special inquiry, that it was found in the Snowdon district, where it 'looks as truly wild as it does in the Lake district.'" In 1878, when Robinson was visiting the Department of Botany, I cross-examined him about this plant, and took down his account of it. He said that it "was growing on the banks of a pond near Hawarden; I think the place was called Northop; I will not state positively it was a genuine native; it had the appearance of such, however." It will be remembered that neither Northop nor Hawarden is in Carnarvon, but in Flint. About this time I visited him at Frodsham, and endeavoured unsuccessfully to obtain a sight of his herbarium. He carried on the business of a druggist in a small way, but no notice of his death (which took place 4 Nov. 1884) appeared in the *Pharmaceutical Journal*. The fullest account of him is that in the *Biographical Index*, p. 144; there is a brief notice in Trans. Bot. Soc. Edinb. xvi. 313, and an estimate of his work in Lord de Tabley's (J. L. Warren's) *Flora of Cheshire* (p. lxxxvii):—"Records anterior to 1868 are quoted where definite and probable, and some later ones when substantiated through other sources. The recent ones are declined."—Ed. Journ. Bot.]

W. Fraser Tolmie (d. 1886).

W. F. Tolmie, one of the last survivors of the earlier botanical collectors on the North-West coast of America, died at Victoria, British Columbia, towards the end of 1886. Sir W. J. Hooker, writing in 1836, speaks of him as "one of my most zealous botanical students," and adds, "I had the pleasure of recommending [him] to [a] medical appointment in the Hudson Bay Company's possessions on the North-West coast of America." He was at that time "stationed at Fort M'Loughlin, in Millbank Sound, N. lat. 52" (Comp. Bot. Mag. ii. 159), but, according to Dr. Asa Gray (Amer. Journ. Sci. cxxxiii. 244), had previously (in 1832) acted as medical officer at Fort Vancouver. Dr. Tolmie and Dr. Meredith Gairdner (who died in or before 1840) sent several collections additional to those of Richardson and others, on which the 'Flora Boreali-Americana' was founded; and in that work a genus, subsequently

identified with Bongard's *Cladothamnus* was named after him by Sir W. J. Hooker. Here and elsewhere he is styled *Mr.* Tolmie, but Dr. Gray styles him Dr. Torrey and Gray subsequently dedicated to him a genus of *Saxifragaceæ*, which is still maintained. Mr. Tolmie does not appear to have published any botanical memoirs, or to have followed up his botanical studies: "in his later years [he] devoted himself very much to the ethnology and linguistics of the Indian tribes with which he had so long been intimate" (Amer. Journ. Sci. cxxxiii. 245).

BOTANICAL EXCHANGE CLUB REPORT, 1903.

[The following notes are extracted from the Report of the Botanical Exchange Club for 1903 (issued April, 1904), which is edited by Mr. G. C. Druce, who is also Hon. Sec. of the Club. Mr. Druce prefaces the Report (which for the first time has the editor's name on the cover, and an announcement of the price—2s.) with an unusually long address, which includes notes on "some of the chief botanical features of British Botany for the year." This, among other things, contains a suggested arrangement of the species of *Statice* and *Limonium*, which it is instructive to compare with the same author's arrangement published less than three years previously in the *Journal of the Linnean Society*. Of the nine names in this earlier paper, three are changed and other alterations are made, in accordance with corrections suggested in this Journal for 1901 (pp. 195–7, 315); this results in the reduction of certain names to the rank of synonyms, and affords another example of the mischief resulting from insufficient care and undue haste in proposing new combinations. Even the revised list is not free from error—e. g. "*S. maritima* var. *pubigera* (Boiss.)" should clearly be given as of "Druce" (in the Linnean paper referred to).

The objection we have more than once expressed to the printing of notes which convey no definite information, but only tend to confuse, still remains. For example, it is difficult to see what is gained by the following:—

"*Euphrasia gracilis* Fries. . . . . From Barbon, Westmoreland, July, 1902.—W. H. Painter. . . . . Mr. Painter's *E. gracilis* is badly dried, probably withered before it was dried, and very mouldy also, so it is not easy to determine: but it is not *E. gracilis*. It may be *E. scotica*.—F. Townsend."

Mr. Druce's note on *Potentilla opaca* might also be cited; and

"*Fumaria Boræi* Jord., forma. Garden weed, S. Briavel's, West Gloucester, 23 Sept. 1903. I am unable to identify the forms of *F. Boræi* with those described by Mr. Pugsley in Journ. Bot. 1892. The curvature of the pedicel is generally more noticeable than one would gather from studying his paper.—Augustin Ley. I believe so. Flowers much smaller than type. Perhaps var. *serotina* Clavaud, but I do not know the varieties well.—E. S. Marshall. Yes, an autumnal form of the type.—H. W. Pugsley."

The notes on the Violets of the *tricolor* group, although showing commendable caution on the part of Mr. E. G. Baker, their chief contributor, can hardly be said to give definite information; it is to be hoped that the numerous names suggested (including *V. alpestris* Jord., from Slough, Bucks, which sounds unlikely) will not find their way into our lists without further investigation. We agree with Mr. Wheldon that "it would be a boon if Mr. Baker would give us a key to the numerous British forms of this section," but this is followed by the ominous remark: "No comment by Mr. E. G. Baker, and we have reason to fear that no such key is at present in contemplation."—Ed. Journ. Bot.]

Cardamine trifolia L. This species is well established in the woods at Gill Foot, near Egremont, Cumberland, where it carpets about a rood of ground, and appears to be spreading, June, 1903.—Joseph Adair.

Lepidium Smithii Hook. var. *alatostyla* Towns., Sept. 1903. Garden specimen from a two-year old plant raised from seed collected at Redbridge, near Southampton, Sept. 1901. Hab., rough banks on the coast. Coll. and comm. F. Townsend. I think Mr. Townsend's *Lepidium* deserves subspecific rank, and in that case it should be called *L. alatistylum* Townsend. Apparently Mr. N. E. Brown is quite wrong in identifying it with *L. heterophyllum* Benth. (see Suppl. E. B. p. 27), where he records it as also growing at Lydd, Kent; but of this statement no notice is made in the *Flora of Kent*, although *L. hirtum* (which is given as synonymous with *L. Smithii* Hook.) is cited from that locality. The nomenclature of the allies of *L. Smithii* Hook., to give the name it is best known by, is much involved. In the Desiderata lists many members ask for *Lepidium hirtum* var. *canescens* of the *London Catalogue*, while few ask for *L. hirtum*. It is possible that they are misled by the mistake in the *London Catalogue* of putting the census number 88 after *L. hirtum* Sm., and not after the variety *canescens*, which should have Gren. and Godr. put in brackets, as the authors of the *Flore de France* correctly described it as a variety of *L. heterophyllum*, to which it belongs, the latter being synonymous with *L. Smithii* Hook.—G. C. D.

[Mr. Druce seems to have overlooked Mr. Townsend's paper in Journ. Bot. 1903, 97, in which he himself suggests the name *L. alatistylum* for the subspecies. In a previous paper (Journ. Bot. 1900, 420) Mr. Townsend deals with Mr. N. E. Brown's so-called *heterophyllum*.—Ed. Journ. Bot.]

Cerastium semidecandrum L. Near Ampthill, Beds, June, 1903. This is doubtless the plant which Abbot, in the *Flora Bedfordiensis*, p. 102, records as *C. pumilum* (see Top. Bot. p. 81, where it is bracketed for 30 Beds.). The true *C. pumilum* is not contained in Abbot's herbarium, while *C. semidecandrum* is represented by another species. Ampthill is one of the localities given by Abbot for his *C. pumilum*, and the other locality mentioned also yields the same form of *C. semidecandrum*. The soil is a ferruginous sand, whereas the true *C. pumilum* appears to be confined in England to calcareous soils.—G. Claridge Druce.

C. pentandrum Syme? Near stream and in short turf, Carding Mill Valley, Church Stretton, Salop, Sept. 10th, 1903.—J. Cosmo Melvill. I have not seen the type of *C. triviale* Link, var. *pentandrum* Syme, but these specimens answer the description in being *pentandrous* in the shorter capsule and size, but from being gathered in September are not in good condition. I should call it *C. vulgatum* var. *pentandrum* (Syme).—G. C. Druce. That var. is described by Sir J. D. Hooker as an annual, found on sea-shores. Mr. Melvill's plant looks like a late-flowering perennial, small-flowered, of compact stunted growth.—E. S. Marshall.

[This note is another example of the kind to which objection is taken in our prefatory note. It will be observed that Mr. Marshall's pertinent objection has not prevented the publication of a new combination.—Ed. Journ. Bot.]

Euonymus europæus L., forma. From limestone rocks at top of a hillside wood, Cefn, Breconshire (v.-c. 42), June, 1903. This unusually lax form, with cymes of very few flowers, generally one or two, is perhaps only caused by growing among other bushes. But the same conditions in other places do not always seem to produce this effect; in fact, I do not remember to have seen it elsewhere.—H. J. Riddelsdell. Probably *E. vulgaris* (Mill. Dict. No. 1) Scop. var. *angustifolius* Schultz ap. Reichb. Fl. Excurs. p. 827, which is described in Rouy and Foucaud's *Flore de France*, iv. p. 159, as having "Feuilles plus étroites oblongues-lancéolées, longuement acuminées, les plus grandes atteignant 6–7 cent. de long; pédoncules 2–4 flores; capsules plutôt petites," which appears to be near this plant, which we should call *E. europæus* var. *angustifolius*.—G.C.D. Mr. E. G. Baker says it requires comparison with this variety.

[Would it not have been better to have delayed the publication of a new combination until the comparison suggested by Mr. E. G. Baker had been made?—Ed. Journ. Bot.]

Saxifraga Andrewsii Haw. (*S. Guthriana* Engler). Originally discovered by Mr. Andrews on rocks at head of Glen Curragh, Co. Kerry, but since sought in vain. Grown in garden at Prestwich for the last quarter of a century from specimens obtained from the Botanical Gardens at Cambridge, where the examples are labelled "received from Mr. Andrews from Glen Curragh, Co. Kerry." My brother and sister visited the Irish habitat two or three years ago, and well searched the mountain at the head of the Glen, where Mr. Andrews recorded the species, but the only Saxifrages they noted were *umbrosa* and *hirsuta*. It has been by some considered a hybrid between *umbrosa* and *Aizoon*, the last not British, but I am not sure whether this has been proved. I have both these growing together, and have never noticed the least tendency to hybridize. It is true that the seeds [of *Andrewsii*] are infertile; and this lends some colour to the assumption of hybridity. It increases by barren shoots bearing rosettes very profusely, and is one of the handsomest of the Robertsonian group.—J. Cosmo Melvill. This has just the characters that one would expect to result from *S. Aizoon* (or one of its allies) hybridizing with *S. umbrosa*. That such a plant was ever wild in Kerry is incredible. Most probably it arose from natural

crossing in Mr. Andrews' garden, and was erroneously supposed by him to have been brought from Glen Curragh. The only apparent alternative to suggest is wilful imposition.—E. S. MARSHALL.

Gentiana lingulata Agardh, var. *præcox* Towns. Plentiful on Warminster Downs, v.-c. S. Wilts. Growing side by side with *G. Amarella* L., this contrasted greatly with it in size, and in the colour of its herbage; being also in full bloom, while the other was not yet even in bud. The corolla-lobes are frequently 5, though 4 is the preponderating number.—E. S. MARSHALL.

Scirpus maritimus L. var. *monostachys* Sonder. Oxwich Bay, Glamorganshire, v.-c. 41, July, 1903. This is only one extreme of a series of forms ranging up to the var. *compactus* of Koch (as I suppose), which is the form with several sessile spikelets. The type *maritimus* was present on the same spot in abundance, so that every step might be traced which leads from the extremely depauperate state now sent to the ordinary luxuriant-looking *S. maritimus* of our salt-marshes. Among these specimens one or two show the tendency upwards to a more luxuriant form.—H. J. RIDDELSDELL.

Carex fusca All. From the locality at Arisaig, in West Inverness. In very fair quantity and good condition, and its situation is happily of such a nature as to make it improbable that other agencies than those of the ordinary struggle for existence will help to reduce the quantity.—H. J. RIDDELSDELL.

C. Goodenowii J. Gay, var. From a swamp near Llwydcoed, by Aberdare, Glamorgan, 11 July, 1903. Also in several spots in the neighbourhood. A densely cæspitose form, the barren stems of which grow to the height of 3 ft. or so; the flowering stems are much shorter, and attain a length of about 18–24 in. The latter are therefore produced only on the outside of the tufts; and as the long slender barren stems overhang to a noticeable extent, the impression first produced is that there is nothing else there. On turning aside the overhanging ends, however, it is found that the fertile stems are there in fair quantity, though still in a decided minority. It is a very beautiful and interesting form of the sedge. H. J. RIDDELSDELL. *Carex Goodenowii* var. *recta* (Fleischer).—G. KÜKENTHAL. Referable to var. *juncella*, I believe.—E. S. MARSHALL.

C. extensa Good. From the tidal mud of Three Cliffs Bay, in Gower, Glamorganshire, July, 1903. This is a more luxuriant form than usual, and I suppose only that. Sowerby allows for 2–4 fertile spikes; these specimens show five or six as a rule; they often have a spike near the middle of the stem, and the lowermost of the upper sessile spikes is sometimes compound. The stem is erect, and the bracts of great length, even reaching 10 in. in extreme cases. The contrast with specimens I possess from Scotland (? var. *minor* of Syme, and *pumila* of Anders.) is most marked; even in the latter the bract is on the average longer than is figured in E. B.—H. J. RIDDELSDELL.

Bromus. This grass grew on a steep, uncultivated down near Warminster, v.-c. 8, S. Wilts, facing nearly due south, on exposed

chalk *débris*, but I doubt its being native. *B. secalinus* and *B. racemosus* have both been suggested; but I do not think either fits the plant. It has remarkably small and elegant spikelets.—E. S. Marshall. This is *Bromus brachystachys* Hornung, in *Flora*, xvi. (1833), ii. 417, a species from the Orient (I have specimens from Syria), introduced long ago in Northern Germany. The introduction in England seems more recent; I find it nowhere mentioned.—E. Hackel.

Lepturus. Rubbish-heaps at Iver and West Drayton, Bucks, and Middlesex, July, 1903.—G. Claridge Druce. The *Lepturus* from Bucks is a very interesting variety of *L. filiformis* Trin., which I should call var. *pycnanthus*, differing from the type by the internodes of the rachis being only half as long as the spikelet, whereas in the type they are almost of the same length as the spikelet. I do not believe it an abnormal or casual state of *filiformis*, but a true variety, with a certain area of distribution; it occurs in Egypt and Sicilia, and I only am astonished that it has never been distinguished from the type. In my last letter I have accepted Ascherson's nomenclature of *L. filiformis* (*L. incurvatus* var. *strictius* Buch.), but now I think it better to maintain the name of Trinius. — E. Hackel. *L. filiformis* Trin. var. *pycnanthus* Hackel *in lit.*, not previously recorded in Britain, is only casual in Bucks.—G. C. D.

REPORT OF DEPARTMENT OF BOTANY, BRITISH MUSEUM, 1903.

By George Murray, F.R.S.

The additions to the collections by presentation have consisted of:—81 phanerogams and 6 cryptogams of Singapore, from H. N. Ridley; 16 phanerogams and 1 cryptogam of Shanghai, from F. W. Styan; 43 specimens from Colombia and Venezuela, from T. Sprague; 595 phanerogams and 40 cryptogams, collected by A. Robert in the province of Matto Grosso (Brazil) and Paraguay, from Mrs. Percy Sladen; 266 phanerogams and 4 cryptogams of Johannesburg, from Dr. F. Rand; 80 phanerogams and 5 cryptogams, Canadian, from James M. Macoun; 301 phanerogams from Uganda, from Col. Delmé-Radcliffe; 8 Korean phanerogams, from Dr. J. Palebin; 5 grasses of Ceylon, from J. F. Jowitt; 259 phanerogams, Indian, from Major Prain; 13 phanerogams of North America, from P. E. F. Pérrèdes; 90 phanerogams of South-west Africa, from Dr. Schinz; 60 phanerogams and 1 cryptogam of South Africa, from H. T. Ommanney; 58 phanerogams, Chinese, from Dr. Henry; 3 specimens of Bombay plants, from Dr. A. Theodore Cooke; 66 phanerogams and 48 cryptogams, from Mount Roraima, collected by Messrs. McConnell and Quelch; 38 specimens from Korea, from Arthur Bennett; 43 algæ from the Funafuti Coral Reef, from the Government Grant Committee of the Royal Society; 36 Hepaticæ from Jamaica and Cuba, from A. W. Evans; 11 species of India Ocean algæ and a rare fern

from Sumatra, from Prof. F. O. Bower; 48 mosses of Jamaica, from the Hon. W. Fawcett; 143 Bolivian mosses, from Sir Martin Conway.

The following additions have been made by presentation to the British Herbarium:—12 specimens of pansies, from C. E. Britton; 21 specimens of *Saxifraga* collected by George Don, from J. Henry van Stone; 3 specimens, from G. K. Dunstall; 6 specimens, from Miss Bray; 20 specimens, from C. E. Salmon; 18 specimens and 15 fruits, from Clement Reid; 2 specimens, from Prof. D. Oliver; 139 specimens, from Rev. E. S. Marshall; 2 rare mosses, from W. E. Nicholson; a new British liverwort, from Mrs. Tindall; 2 fungi, from F. J. Chittenden.

The following additions have been made by exchange of duplicates:—Specimens from the Pacific Islands, from J. H. Maiden; 24 specimens of *Potamogeton* and *Najas* from Manchuria, from Dr. Litwinow; 100 Kryptogamæ Exsiccatæ, from the K. K. Naturhist. Hofmuseum of Vienna.

The following specimens have been acquired by purchase:—Herb. Normale, fascicle xliv. Dörfler; 25 specimens of American woods, by R. Hough; 946 phanerogams, 649 cryptogams, and 130 fruits from Australia, New Zealand, &c., by G. Podenzana; 65 specimens, Flora Bulgarica, by V. Stribrny; 240 specimens from Mexico, by E. Palmer; 371 phanerogams and 81 cryptogams from Georgia, by Roland M. Harper; 493 phanerogams and 21 cryptogams from the Gulf States of America, by S. M. Tracy; 100 phanerogams and 100 cryptogams (Flora Exsiccata Austro-Hungarica, Centuriæ xxxv., xxxvi.) from the Naturhistorisches Hofmuseum, Vienna; 115 phanerogams and 7 cryptogams from Vancouver Island, by C. O. Rosendahl; 442 plants, Iter Transcaspico-persicum, fascicles vi.–x., by Sintenis; 140 phanerogams and 9 cryptogams from West Tropical Africa, by Zenker; 1968 specimens from Columbia, by Herbert W. Smith; 280 specimens, Plantæ Mexicanæ, by C. G. Pringle; 393 phanerogams and 4 cryptogams from Togoland, by Warnecke; 1228 phanerogams and 12 cryptogams from West Australia, by Cecil Andrews; 76 specimens from Brazil, by E. M. Reinecke; 472 specimens from Persia, by J. Börnmuller; 179 phanerogams and 21 cryptogams, Flora Exsiccata Carniolica, Centuriæ iii.–iv., by A. Paulin; 400 West American fungi, by Griffiths; 245 British mosses, mostly *Sphagna*, by Horrell; 200 micro-fungi, by Vestergren; 15 American Uredinæ with drawings, by Arthur and Holway; 250 North American algæ, by Collins, Holden, and Setchell; 250 cryptogams of Germany, by Migula; 93 German Hepaticæ, by Warnstorf; 120 Venetian Hepaticæ, by Massalongo; 38 slides and 38 herbarium specimens of British micro-fungi, by Miss A. L. Smith; 87 East Indian Hepaticæ, by Schiffner; 50 micro-fungi of North Germany, by Jaap; 216 Welsh mosses, by Painter; 75 Ascomycetes, by Rehm; 100 economic fungi of North America, by Seymour and Earle; 25 Italian fungi, by Briosi and Cavara; 40 North American lichens, by Cummings; 100 European fungi, by Paschke; 212 fresh-water algæ, by Wittrock, Nordstedt, and Lagerheim; 50 Japanese algæ,

by Okamura; 150 Uredineæ and 100 German fungi, by Sydow; 200 Italian fungi, by Saccardo; 50 parasitic fungi, by Krieger; 30 sketches of British Basidiomycetes, by Worthington G. Smith; 34 water-colour drawings of British marine algæ, and 21 of British lichens, for public exhibition, by P. Highley.

SHORT NOTES.

Spiræa Ulmaria L. var. denudata Boenn. — This variety was originally described as a distinct species (*S. denudata*) by Presl (Fl. Eich. p. 101, 1819). Subsequently Boenninghausen (Prod. Fl. Monast. p. 146, 1824) placed it under *S. Ulmaria* as a variety, a distinction accorded it in the *London Catalogue* ed. 9. The reputed difference between the variety and the type practically lies in the absence of a white under-surface to the leaves in the former, which moreover has usually been found to be less robust. In the Report of the Exchange Club for 1900, p. 626, Mr. Riddelsdell says: "It seem to me to be a weakened state of the type, with which it usually grows. The quantity of bloom is usually smaller than with the type, and is frequently diseased, and the fruit does not ripen freely. The contrast between type-specimens and the weak unhealthy *denudata* form is very striking, especially at Llwhydcoed.' In the early part of this year I gathered leaves characteristic of the so-called variety growing suspiciously near the type at Scraptoft, Leicestershire, but unfortunately did not make sure whether there was any real connection between the two or not, though, like many others, I had always thought the variety worthless. Later, on mentioning this fact, Mr. A. B. Jackson informed me that he had the same suspicions with regard to a plant found by him at Lystre, in the same county. Quite recently, at another station at Scraptoft, I found typical *S. Ulmaria* L., possessing leaves characteristic of the so-called variety *denudata*, and also a leaf intermediate in character, with a whitish *margin* only, the central portion of the under-surface being of a uniform green colour; the supposed variety can thus only be considered at best as a condition. The exclusion of this variety from the British flora is perhaps only one amongst many similar erasures that might be made, if students would only take the trouble to record their observations. This would greatly simplify the work of beginners who are bewildered by the long list of varieties enumerated under some of our British species, many of which are clearly not entitled to be so considered.
A. R. Horwood.

[A further objection to the swelling of our lists by the names of varieties is the very slender evidence on which many of them are recorded. It is but seldom that types have been consulted, and in some instances even the descriptions do not seem to have been properly understood, as they agree very imperfectly with the plants referred to them. There is also too great promptitude in naming as varieties forms or states which have no claim to such distinction.

A revision of the varieties published in the *London Catalogue*, and still more of those in some of our local floras, would assuredly lead to a considerable diminution of their number.—Ed. Journ. Bot.]

Salvia verticillata L.—It may be as well to record that *Salvia Verbenaca* L., named in my list of Wandsworth Common casuals in Journ. Bot. 1901, 345, was really this species. The correction was made by Mr. S. T. Dunn, on my showing him the specimens. In June, 1893, I gathered the same plant on Banstead Downs, near the railway-station; a small group of it seemed quite at home there.—William Whitwell.

[A specimen was lately sent from Leatherhead; the plant seems frequent in Surrey.—Ed. Journ. Bot.]

Kent Plants.—Mrs. Davy showed me a small patch of *Elymus europæus* growing on a sand-bank near Littlestone-on-Sea; this puts this species on distinct record for the county. Near Wye there are several trees of *Ulmus stricta*, and I saw another at Ham Street; it is not included in the *Flora of Kent*. *Sagina ciliata*, Lydd; *Hyoscyamus niger*, fine specimens at Littlestone; *Sparganium neglectum*, Ollantighe; *Eriophorum angustifolium*, *Carex diandra*, near Lydd; *C. Oederi*, Dungeness; *Phleum nodosum*, *Agrostis pumila*, *Koeleria cristata* var. *gracilis*, *Festuca ambigua*, Lydd; *F. arundinacea*, Dungeness Ponds; *Bromus secalinus*, Littlestone; *Chrysanthemum coronarium*, a casual on the beech at Littlestone.—G. Claridge Druce.

Essex Plants.—I saw *Trifolium ochroleucon* in large quantities between Castle Hedingham and Twinstead; *Carex axillaris*, *C. elata*, *Ranunculus sardous*, *Sagina apetala*, Twinstead; *S. ciliata*, Castle Hedingham; *Genista tinctoria*, Norton; *Melilotus arvensis*, *Epilobium roseum*, Colchester; *Callitriche obtusangula*, near Sudbury, on the Essex side of the stream; *Galium Mollugo*, Norton; *Picris hieracioides*, Fyfield; *Lactuca virosa*, Colchester; *Senecio erucifolius*, *Chenopodium rubrum*, Chipping Ongar; *Carex divulsa*, Castle Hedingham; *Glyceria aquatica*, Fyfield; *G. plicata*, Chipping Ongar; *Festuca rubra*, Fyfield; *Chara vulgaris*, Twinstead.—G. Claridge Druce.

Alsine and Minuartia.—In this Journal for 1899 (p. 317), in a paper entitled "*Alsine* in the British Flora," Mr. Hiern gave his reasons for considering that the name *Alsine* L. should be applied to the genus theretofore variously known as *Spergularia*, *Lepigonum*, *Buda*, and *Tissa*, and the name *Minuartia* L. to that known as *Alsine* Wahl. We agree with Mr. Hiern's conclusions on these points, believing that the system he adopts is the only one by which we are likely to arrive at anything like stability in nomenclature. As regards two of the specific names, *Alsine media* and *Minuartia tenuifolia*, we regret that we cannot follow him. To the plant generally known under the names *Spergularia salina*, *S. neglecta*, *Lepigonum neglectum*, and *L. medium*, Mr. Hiern applies the name *Alsine media* Crantz, citing it as follows:—"Alsine media Crantz, Instit. ii. 407, n. 19 (1766), excl. syn., pro parte; non L. (1753)." As Mr. Hiern states, Linnæus's *Alsine media* was the plant now known as *Stellaria media*,

and to our thinking the name should be applied to no other. In the new edition of Babington's *Manual* we have therefore given the name of *Alsine salina* to the species which appeared in the former edition as *Lepigonum salinum*. The rule we have followed is that, dating from 1753, a name once published belongs inalienably to the genus or species to which it was originally applied. Few botanists, we are aware, have adopted this view, and no doubt, to carry it out universally, would necessitate the alteration of a certain number of recognized names. In the present instance, however, there is no displacement of an established name, *Alsine media* Crantz not having, as far as we know, been adopted by recent botanists other than Mr. Hiern. In the paper cited, Mr. Hiern writes: "By limiting Crantz's name so as to stand for *Lepigonum medium* Fries the giving of a new name under *Alsine* is avoided." We quite agree that it is undesirable to multiply names needlessly, but to our thinking it is better to give a new name than to use an old one in an entirely different sense to that originally intended. If the contrary view is adopted, the authority becomes an essential part of the name, which we contend it is not; the system at once becomes trinomial, and we ought to write "*Alsine media Crantzii*" to distinguish it from the synonym of *Stellaria media*, "*Alsine media Linnæi*." In the second instance in which we have not followed Mr. Hiern the case is somewhat different. The name *Minuartia tenuifolia* was apparently first published by Martius in Plant. Hort. Acad. Erlang. (1814), p. 44. From the description there given it is very improbable that *Arenaria tenuifolia* L. was intended, and, as Mr. Hiern points out, some botanists refer Martius's plant to *Arenaria mucronata* L. There may not at present be sufficient evidence forthcoming to settle the name down definitely either to *A. mucronata* (although, in *Index Kewensis*, it is so quoted without a query), or to any other species, but it is quite possible that such evidence may come to light at any time, in which case Martius's name would most likely have to be used. We are therefore surprised that Mr. Hiern should have started a fresh *M. tenuifolia* upon so precarious a footing. We have thought it better to apply a new name, *Minuartia leptophylla*, to *Arenaria tenuifolia* L. in the new edition of Babington's *Manual*, rather than use a name which in all probability belongs to another plant.—H. & J. Groves.

New Stations for Glyceria festucæformis (see Journ. Bot., 1903, 353; 1904, 77, 121).—Since the discovery last year of this Mediterranean species on the eastern shore of Strangford Lough, its range has been considerably extended. A grass which I found on the shore of the Irish Sea, six or seven miles north of the entrance of Strangford Lough, in July, 1903, and which at the time was without inflorescence, proves on cultivation to be this species. This opens a wide range of possibilities as to the plant's distribution on the coasts of County Down. In August last I devoted three days to an exploration of the western and southern shores of Strangford Lough, from Comber to Strangford. This coast-line is exceedingly complicated, presenting a tangled succession of bays, peninsulas, and islands. The amount of shore-line

which I explored was about sixty miles. Starting from Comber, the whole of the first day passed without any trace of the plant being seen. Well on in the second day a small colony was found at Ringhaddy, about two-thirds way down the west side of the lough. In the south-west corner of the lough lies the long, island-studded estuary of the Quoile River. Near the mouth of this estuary, between Killyleagh and Delamont, on the northern shore, *G. festucæformis* was found again; first one plant, then a good colony, till from Moore's Point to Delamont it was the most conspicuous plant of the shore, growing in grand erect tussocks a foot across and two feet high. On the third day the shore from Strangford to Downpatrick was explored. The littoral vegetation, both of the mainland and of the larger islands, was hopelessly eaten down by cattle, so I turned to the small islets and visited the nearest of them by swimming. This excursion was well rewarded. The plant was found in almost sole possession of the islet, which lies on the southern side of the Quoile estuary, almost opposite Delamont. Summing up our present information regarding the range of this interesting plant, it is found to have its headquarters in the Quoile estuary, in the south-western corner of Strangford Lough. Thence it spreads up both shores of the lough for some miles, in some abundance on the eastern side, apparently very sparingly on the western. From the whole upper part of the lough, embracing the regions around Ardmillan, Comber, Newtownards, and Greyabbey, it is, so far as at present known, an absentee. Then, in addition, there is the (at present) isolated station at Cloghey, outside Strangford Lough. An examination of the Strangford islands will probably supply further information, and on this point I hope to report later. I have to thank Dr. Rendle for examining some doubtful specimens. While normal *G. festucæformis* looks utterly different from normal *G. maritima*, the group *Atropis* is, as Prof. Hackel wrote when first naming the Irish plant, a critical one, and I found it difficult in the field to say where strong *G. maritima* stopped and where weak *G. festucæformis* began. — R. Lloyd Praeger.

Carex præcox Jacq.—During the last three years I have found a Carex growing in two boggy places near Tunbridge Wells, which at first I thought must be *C. tomentosa* L. In this I was confirmed at first also by Mr. C. B. Clarke; but on taking him further specimens, he decided against that species, and sent the specimens to Herr Kuckenthal, who pronounced them to be *C. præcox* Jacq., "typische." They, however, differ from *C. præcox* as I have observed it in England, in being much slenderer and taller (six to fifteen inches or more); the leaves much longer, narrower, more flaccid, and not at all glaucous; in growing in boggy places with several other species of Carex, *Habenaria conopsea*, &c.; and, I believe, in flowering some weeks later. In the National Herbarium there is a large number of specimens of British *C. præcox*, but among them only two just like those in these boggy places, and in both instances a note is made that they came from boggy ground. Perhaps a note of the difference which seems to exist in the plant

when it grows in such ground from its condition when growing in drier meadows, as it usually does, may be worth placing on record. Edw. G. Gilbert.

Viola stagnina Kit. and other Plants in Glamorganshire.—Dr. Shoolbred kindly passed on to me a specimen of this plant found in Gower last June by his friend Mr. Worsley-Benison. Within a few days I went into the district in which the plant grows, and under Mr. Benison's guidance found a few specimens still in flower. The plant grows, in company with *V. ericetorum* Schrader, in a rough, furzy, enclosed area, which was apparently once much wetter than now, though it still has some very damp holes and shallow gullies. The Violas were confined to the driest part of the area, and only occurred in patches of *Ulex Gallii*, so that considerable difficulty was found in getting at the specimens. There was plenty of *V. ericetorum*. Cattle were pastured in the field, and I thought it possible that they had grazed down all the plants unprotected by furze. Though very little that is striking grew in the same field (*Carex pulicaris*, *C. echinata*, *Salix ambigua*, and other ordinary representatives of a damp moorish flora), yet in the immediate neighbourhood—lower down the slope, but in similar though wetter ground—were *Osmunda regalis* Linn. in great quantity and luxuriance (over a small area), *Aquilegia vulgaris* Linn., *Orchis latifolia* Linn., *Habenaria viridis* R. Br., *H. bifolia* R. Br. The Violas and Habenarias are new records to v.-c. 41.—H. J. Riddelsdell.

Euphorbia Esula near Dover.—I have found *Euphorbia Esula* growing on one of those grassy slopes near Dover; I think it is the first time that it has been reported from Kent. Close by, *Coronilla varia* is plentiful, and *Euphorbia Cyparissias* is to be found on the same slope. I should say that the ground has never been cultivated, and there is no dwelling near.—W. H. Hammond.

[It seems evident from the plants associated with it that *E. Esula* is here an introduction, but Messrs. Hanbury & Marshall (Fl. Kent, 308) record *E. Cyparissias* from a similar locality, where "it may be indigenous."—Ed. Journ. Bot.]

Some Dartmoor Rubi (1904).—In August I saw the following Rubi on the moorland to the south and south-east of the Hey Tor Rocks, Dartmoor:—*R. Briggsianus* Rogers, *R. Lindleianus* Lees, *R. erythrinus* Genev., *B. rhamnifolius* Wh. & N., *R. dumnoniensis* Bab., *R. pulcherrimus* Nuem., *R. villicaulis* Koehl., *R. ramosus* Briggs, *R. argentatus* P. J. Muell., *R. rusticanus* Merc., *R. Sprengelii* Weihe, *R. pyramidalis* Kalt., *R. leucostachys* Schleich., *R. angustifolius* Rogers, *R. mucronatus* Blox., *R. Borreri*, Bell Salt, and its var. *dentatifolius* Briggs, and *R. dasyphyllus* Rogers. Most of these eighteen forms were growing among the bracken and gorse on the granite-strewn moor on which stands the Moorland Hotel at about 1100 ft. above sea-level; the rising ground thence to the Hey Tor Rocks (1491 ft.) being wholly bare of brambles. Of these, *R. Briggsianus*, *R. erythrinus*, and *R. dentatifolius* are especially abundant, and clearly identical with the plants of the Plymouth neighbourhood. *R. dentatifolius* is perhaps the most conspicuous bramble

on this part of Dartmoor, with its long leafy prostrate stems and strongly developed panicles. Here, as elsewhere in the county, it keeps quite distinct from typical *R. Borreri*, which I saw growing near it in two or three spots. *R. Briggsianus* and *R. ramosus* are equally well marked, though often on this high ground with rather weakly developed panicles. *R. argentatus* and *R. angustifolius* are new for South Devon. *R. mucronatus* (uncommon in South-west England) is locally abundant lower down than the rest, about Hey Tor Vale (about 1000 ft.). It is a strong and nearly glabrous-leaved form, quite distinct from my South Coast var. *nudicaulis*, which has not yet been found in Devon or Cornwall. Further species seen by me at a still lower level, but within the same moorland parish of Ilsington, are *R. imbricatus* Hort., *R. macrophyllus* Wh. & N., *R. longithyrsiger* Bab., *R. sublustris* Lees. and *R. cæsius* Linn.—W. Moyle Rogers.

Scrophularia Ehrharti in West Norfolk.—I saw this local species growing by a stream-side, which was shaded by trees, with *S. Balbisii*, near Watton, and also, very luxuriantly, at Scoulton. It appears to be a new record to Norfolk.—G. Claridge Druce.

NOTICES OF BOOKS.

A Rock-Soil Flora.

Every botanist in search of plants often expects to find what he does not find, and finds what he does not expect. This would not so frequently be the case if he took into consideration the character of the soil on which he is working. In any modern flora he will see plants called "common," which in his neighbourhood are never seen, and "rare," which occur abundantly. If the method proposed by Mr. Woodruffe-Peacock in his paper, *How to make Notes for a Rock-Soil Flora** were carried out for every county as he has carried it out for Lincolnshire, many a fruitless search would be abandoned, and many a supposed rarity would be found to be only what might have been expected. With regard to soils, it is sometimes forgotten that they may be of a totally different character from that which would be formed by the disintegration of the underlying rock. Oolitic Limestone, for instance, may have upon it many yards of sand, gravel, or peat; and Chalk may be covered by Boulder Clay, in which cases the flora will be that of the covering, and not of the underlying stratum. The Drift-maps of the Geological Survey are thus seen to be invaluable, for from them we can form a very fair idea of the nature of the soils in any given area, and make our lists of the plants which are found on them. They will show us how it is that we can walk through the whole length of Lincolnshire on the same stratum, and find practically the same flora; whereas, if we walk *across* it, passing

* 8vo, pp. 20, price 1s. Goulding, Louth.

over different strata, we find (often within a few miles), several different floras, telling us what stratum we have left or reached.

"After the accurate description of the rock-bed, and the list of the species it can grow," says the author, "comes the all-important question of the frequency of each species flourishing on its soil, and of the symbols by which their quantity, greater or less, may be indicated." On page 9 is given the following "Frequency Table," with a caution against applying a standard of frequency which may be true of all soils taken together, but is not true of any given soil:—

Flourishing Species	Predominant Species.	V.C. = Very common	1st	Frequency Position.
		C. = Common	2nd	
	Subsidiary Species	F.C. = Fairly common	3rd	
		R.R. = Rather rare	4th	
Declining Species	Failing Species	R. = Rare	5th	
		V.R. = Very rare	6th	
	Vanishing Species	A.E. = Approaching extinction		
		E. = Extinct		
Erratic Species	Certain	L. = Local		
	Uncertain	S. = Sporadic		

"A few points must be *carefully* noted at once regarding this table. Species *are not* to be numerically compared one with another at any given spot or on any rock-bed soil. In the bulk (for all the localities and circumstances in which they can possibly grow) *they must be compared* but *only* to ascertain what is the V.-C., C., &c., standard for each species. On any soil which grows them, the number of specimens of *Quercus Robur*, *Cnicus lanceolatus*, and *Bellis perennis* differs most widely, and yet each may be V.-C., C., &c., as the case may be. The comparison for any given spot or rock-soil is not between the numbers of one species with the numbers of another species—*that would be simply aimless folly leading nowhere*—but between the frequency of any species on the soil at the spot under consideration, with the frequency of the same species on the same soil elsewhere, or on other soils which have been fully studied."

There is another point of great importance as regards frequency. Two soils (say, for example, Lower Lias Clay and Oxford Clay) may have almost exactly the same sample flora in species, but the frequency of the species will be very different, for frequency depends on three important subsidiary matters: firstly, on moisture; secondly, on the presence or absence of lime, sand, &c.; and, thirdly, on fertility.

Lastly, the importance of *locality* is pointed out, for, on the same soil, we may have meadow, pasture, moorland, woodland, hedge-banks, road-sides, streams, ditches, &c., and all these at different altitudes, "Each of these spots," says the author, "has to be marked as a separate locality, if the botanist wants his notes to reflect the actual circumstances of living nature, and not merely to be a fragmentary and untrue analysis."

Mr. Woodruffe-Peacock tells us that he has studied the soils, frequency, and locality of plants for fully twenty years, and has

made more than fifty thousand notes according to this new method of recording. He has also given us, from his register, examples in illustration of his method, and an extensive list of sign-contractions for use in the field. Those who read his paper attentively, will find an explanation of the fact that no two floras agree as to the commonness or rarity of certain plants, and will be led to study more the correlations of species to the soils on which they grow, to the localities in which they are found, to the altitudes at which they occur. There is interest in knowing what plants are found in county, vice-county, or river-area; but that interest is greatly increased, if, in that county, vice-county, or river-area, we can see *why*, in some parts of it, certain plants are found, which it would be useless to look for in others. If, in a botanical excursion, the author's method were adopted, we should gain much greater knowledge of our plants and their environment, as well as far greater pleasure in our study of them. But whether they adopt the new method or not, all botanists will find much to interest them in the very able paper which is the subject of this notice. W. F.

Praktikum für morphologische und systematische Botanik. By Professor Dr. KARL SCHUMANN, late Custos at the Royal Botanical Museum, and Privatdocent in the University of Berlin. 8vo, pp. viii, 610, tt. 154. Jena: Fischer. 1904. Price 13 Marks; bound, 14 Marks.

A CERTAIN melancholy interest attaches to this book in that the author was seeing it through the press when his brief illness and death ended a career rich in botanical work. Few men have ranged more widely over the field of systematic and morphological botany than did Karl Schumann. During the last twenty years which have seen so great a development in the Berlin school of systematic botany, Schumann has admirably seconded the efforts of his chief—Professor Engler—towards that development. He was one of the chief contributors to Engler's *Jahrbuch* from its foundation; his was the first contribution, serving as a pattern for those that follow, to the great *Pflanzenreich*, for which he monographed the *Musaceæ*, followed later by the *Marantaceæ*; and the large and important volume on the Botany of German East Africa contains much of his work. An admirable monograph of the *Cactaceæ* has been interrupted by his death, and under his editorship the well-known work of reference, Just's *Jahrbuch*, attained dimensions and value far in advance of the earlier volumes. To pure morphology also Schumann had made important contributions, including two useful papers on the inflorescence. He also produced a general Text-book of Botany.

The subject of the present review is also a book for students. The plan is an original one. The author has selected a number of seed-plants (about a hundred and fifty) for a detailed morphological description, to serve as an introduction to serious systematic work based on the morphology of the vegetative, floral, and fruit organs. Directions are given for collecting specimens of the mature plant in various stages, followed by a description of the chief points of interest

in the morphology of the leaf-bud, the stem, leaf, inflorescence, flower, fruit, and seed. Details of development, especially in the case of the leaf-bud and inflorescence, are also given; and the pollination of the flower and other points of interest are mentioned.

The arrangement of the plants studied is at first sight somewhat puzzling. The first six, for instance, are *Magnolia Yulan*, *Ornithogalum nutans*, *Primula elatior*, *Asarum europæum*, *Populus nigra*, and *Prunus avium*. But, as will be seen from the introduction, the arrangement is a seasonal one. The book is divided into two courses, intended for two summers' work, and the subjects in each course run as far as possible in the order of their flowering in the field or garden. The work of the second course embraces more difficult subjects, and is thus supplementary to the first. The arrangement therefore follows no system, and in the detailed accounts of the individual plants, especially in the earlier course, there is but little information of a pure systematic character; the plant itself is studied, its relations to other plants are rarely discussed, and the author scarcely refers to its place in a systematic arrangement. His aim is rather to encourage and help that detailed examination of the plant which must form the basis of the best kind of systematic work. The latter will follow in due course. At the end of the book the author gives directions for such work, and sketches the principles underlying the preparation of monographs and floras.

The book will be of great value to teachers and students who are interested in advanced botanical work, forming an admirable introduction for those whose inclination tends towards the systematic study of the higher plants. Our review would be incomplete without a reference to the numerous clear and helpful illustrations, most of which were prepared expressly for the work by Prof. Schumann's daughter.

A. B. R.

Die Europäischen Laubmoose beschrieben und gezeichnet. Von Georg Roth. Leipzig. 1904. Lief. 4–8.

Five more parts of this publication have lately been received. The general plan of the work and a sketch of the introductory chapters were given in this Journal for 1903 (p. 319). The parts have succeeded one another as rapidly as was promised, eight having appeared in fourteen months. The first five parts go to form vol. i., which contains xiv + 598 pages and 52 plates, and stops just short of the *Bryaceæ*. The subsequent three parts carry the work on as far as *Platygyrium*, a genus of *Cylindrotheciaceæ*, and considerably in advance of the figures on the plates. In the former notice attention was drawn to the overcrowding of the plates, and to the extent to which the figures have suffered by the process of photographic reproduction. The lines have lost their sharpness, and are woolly. The names and numbers are so minute that they are read with difficulty. The capsules and other parts of the plant are often superposed on the leaves. This is a measure of economy which destroys all artistic effect, though it does not necessarily detract

from the scientific value. The value of the plates depends largely on the fact that many of the species have never been figured before. All the drawings are new, and in many cases are made from original or authenticated specimens. The descriptions have the great merit of uniformity; they are the product of one hand, and were drawn up specially for this book; they are carefully and somewhat lengthily written. The distinctive characters of each species are emphasized. As the synonymy is but briefly treated, and no exsiccati are quoted, it is evident that Herr Roth's work is chiefly suited to the needs of the practical bryologist; but, as its scope includes the whole of Europe, it should prove an indispensable handbook to every student of European mosses. The whole of the text is German.

A. GEPP.

Mosses with Hand-lens and Microscope. A non-technical Hand-book of the more Common Mosses of the North-eastern United States. By A. J. GROUT. Part II. New York. 1904. Pp. 87–166. Price 1 dollar.

THE first part of this book appeared in June, 1903, and was noticed in this Journal (p. 319). The scope and object of Mr. Grout's work were there described, and it is unnecessary to repeat what was there stated. Part I. treated of the Acrocarpi from *Sphagnaceæ* to *Dicranaceæ*, including in all about forty-four species. Part II. advances the subject as far as the genus *Tortula*, and contains nearly one hundred species. The number of species allotted to a given genus are often very few, and limited to the commonest, and those most easily identified. The *Sphagnaceæ* receive a short and generalized account, with figures, but without mention of definite species. *Seligeria* has but a few lines of description, and *Archidium* is wholly omitted. On the other hand, eleven species of *Dicranum*, the same number of *Grimmia*, and seven of *Ephemerum* receive recognition. The keys appear to be clear, simple, and trustworthy, though often unsuited to the determination of sterile specimens. The diagnoses, though often brief, are very practical, and confined to such prominent characters as are readily detected under slight magnification. The illustrations are abundant. Many of them are original, but the majority are excellent reproductions from the plates of the *Bryologia Europæa*, a work which, owing to its costliness, is beyond the reach of most students.

Though primarily intended for American students, Mr. Grout's book would form a useful addition to the working library of any British bryologist, since the species are in many cases accessible to both. Further, it is so well got up and so attractively illustrated as to constitute one of the best inducements to a beginner to take up the study of mosses.

A. GEPP.

BOOK-NOTES, NEWS, &c.

At the meeting of the Linnean Society on June 3rd, 1903, there were shown a hundred pen-and-ink drawings of British *Compositæ* made by Mr. E. W. Hunnybun, of Huntingdon. For many years Mr. Hunnybun has been engaged on a series of drawings of living British plants, both in flower and fruit, and of natural size; the place of growth being recorded in all cases. The artist is anxious to secure the help of field-botanists in obtaining average specimens of critical species for inclusion in the series. It is intended, if sufficient support be forthcoming, to issue fascicles of drawings, reproduced in the highest style of engraving (uncoloured), that may accomplish for British botany something like what has been done in Germany by Reichenbach's sumptuous *Icones Floræ Germanicæ et Helveticæ*. This work was begun in 1834, and is still in progress, parts being issued at somewhat rare intervals, at present under the direction of Prof. Beck v. Mannagetta. The plates which accompany the third edition of *English Botany* scarcely reflect high credit on scientific plant-illustration in this country, and it is Mr. Hunnybun's ambition to produce an illustrated British Flora worthy to be compared with the German model. He will be glad to hear from British botanists who are in favour of the scheme proposed, who are willing to lend support, both financially and by sending living specimens of critical species and varieties. In the event of publication, the cost to subscribers will depend to a great extent on the nnmber of names sent in. No pains will be spared in the process of reproducing the drawings, in making them scientifically accurate, as well as beautiful examples of plant-illustration. In the scheme as at present outlined it is not proposed to issue any letterpress with the drawings. Botanists who are willing to encourage the venture are invited to communicate with Mr. E. W. Hunnybun, Field House, Buckden, Huntingdon.

The first of a series of six volumes on *Trees*, by Prof. Marshall Ward, has been issued in the Cambridge Biological Series (8vo, pp. xiv, 271, price 4s. 6d. net). It is devoted to "Buds and Twigs," and is an extremely comprehensive survey of practically all that is known—or at any rate all that the ordinary student need know—about them. The attractiveness of the book is greatly enhanced by the numerous and excellent illustrations, those of twigs, drawn for this volume by Miss Dawson, of the County School, Cambridge, being especially good. The author's preface is a much-needed plea for "closer work in the field," the importance of which he fully recognizes and which such books as this are likely to stimulate.

The most recent issue (vol. x. part 1) of the *Annals of the Royal Botanic Garden, Calcutta*, is devoted to a monograph of "the Species of *Dalbergia* of South-eastern Asia," by Major Prain, illustrated by ninety-one excellent plates by native artists.

The nineteenth fascicle has appeared of M. Rouy's expensive *Illustrationes Plantarum Europæ rariorum*—"reproduction photographique des Exemplaires existant dans les grandes collections

botaniques et notamment dans l'Herbier Rouy." We do not think the usefulness of this publication is equivalent to its costliness. If it were confined to types of rare and doubtful species, it would be of value; but this hardly seems to be the case, and it is not always clear whence the figure is derived. For example, the first plant in this number is *Alyssum creticum* L., "pro parte"; specimens from five collections are cited in the text, but there is no indication from which of them the figure is taken, and the type is in the Linnean Herbarium. Then follow two hybrid violets, the first named *Viola Rolandi-Bonaparte!* All the plants in this fascicle are from Herb. Rouy, and, except in the cases where that author's own species are represented, do not appear to be in any way authentic as types—at least, nothing in the text indicates that they are such.

MM. A. AND E. G. CAMUS have issued a *Classification des Saules d'Europe et Monographie des Saules de France*. The work consists of an octavo volume of text and a portfolio containing forty not very satisfactory quarto plates, and costs 30 francs.

DR. LADISLAUS HOLLÓS has published (price 80 marks) a handsome folio volume, with thirty-one very fine plates, devoted to *Die Gasteromyceten Ungarns*.

MR. J. M. WOOD is continuing the publication of his useful illustrations of *Natal Plants*. The last instalment (vol. iv. pt. 2) contains numerous *Compositæ*, and a new *Lotonomis*—*L. Wylei* Wood. It is unfortunate that the specific name—after its discoverer, Mr. James Wylie—should be misspelt, as is also that of *Pentas Wylei*, which its describer, Mr. N. E. Brown, rightly published as *Wyliei*.

THE Trustees of the British Museum have issued the first volume of *The History of the Collections contained in the Natural History Departments*. It contains a full account, extending to over a hundred pages, of the Herbarium, prepared (with the assistance of Mr. Gepp) by Mr. Britten, who also helped Mr. B. B. Woodward in drawing up the account of the interesting collections of drawings preserved in the library of the Department of Botany. We hope to publish a fuller notice later.

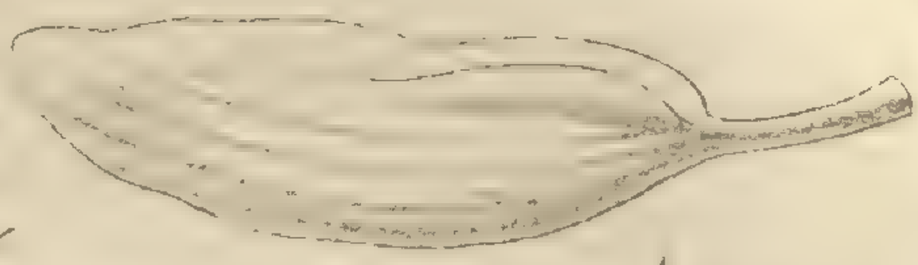
Uses and Wonders of Plant-Hairs is the title of a little book by Kate E. Styan (Bemrose & Sons, price 1s.), in which the author describes the form, uses, and distribution on the plant-organs of the widely varying structures known as hairs. That the term is not used in a strictly botanical sense will be seen from the inclusion, as glandular hairs, of the tentacles of the sundew. As to the origin of the hairs, the author adopts the view that they arose in the first instance as the result of irritation, a view which figures largely in the Rev. G. Henslow's *Origin of Floral Structure*. She suggests, however, that "some other origin for hairs may yet be found, of which at present we are ignorant." Plant-names, both popular and scientific, occasionally prove stumbling-blocks; we notice, for instance, the "amphibious persecaria," *Tragopogon patensis*, *Bomeliaceæ*, and a few similar errors, which might have been avoided.

The Abbé Boulay's long promised work on the French hepatics (*Muscinées de la France. II. Hépatiques.* Paris, 1904. Pp. clxviii, 224, 15) forms a companion volume to that on the mosses published twenty years ago. The author discusses at considerable length the structure and physiology of the hepatics and their geographical distribution, grouping them into lists according to their habitats on rocks, soils, trees, &c., within the limits of the three regions—Mediterranean, forest, alpine. He supplies a long dichotomous key to the 179 species, employing vegetative characters as far as possible; also a synoptical table of the families, genera, and species. He then describes the species systematically, adding critical notes and descriptions of foreign species which occur in neighbouring countries. The book will doubtless prove as helpful to students as the volume on mosses has been.—A. G.

We note that the price of the few remaining copies of Messrs. Methuen's admirable reprint of Parkinson's *Paradisus* has been raised to three guineas, which will shortly be increased to four.

The *Pharmaceutical Journal* for Aug. 13 contains an article on the cultivation and collection for pharmaceutical purposes of Valerian in Derbyshire by Mr. F. A. Upsher Smith. "Some months ago," says the writer, "Mr. E. M. Holmes suggested to me the desirability of ascertaining whether the Derbyshire drug was the product of *V. sambucifolia* Mikau [Mikan] fil., or of *V. Mikauii* [*Mikanii*] Syme. For some time I have, in conjunction with Dr. Drabble, investigated the matter, and we hope shortly to publish our views. At present we may say in regard to this difficult problem that the balance of evidence in our possession points to *V. Mikauii* Syme as the source."

The Enumeration of Chinese Plants which has been publishing since 1886 in the *Journal of the Linnean Society* has been brought to a close with Dr. Rendle's monograph of the Grasses, in which we notice a large number of new species, many from the collections sent to the National Herbarium by Father Hugh Scanlan from North Central China. An appendix of "Genera and species discovered in China since the publication of the various parts of the Enumeration, from 1886 to 1904" begins somewhat oddly with a species published by Hance in this Journal for 1871. The plant in question, *Abelia adenotricha*, has no claim to a place in the appendix, as it was subsequently identified by Hance with *Lonicera Elisæ* Franchet, which appears in the body of the work. Another Hance plant—*Aganosma Edithæ*, published in 1866—is equally to be excluded, as it is quoted as a synonym under *Cryptolepis elegans* on p. 100 of the second volume of the work. The list of additions promises to be extensive, as the six pages now issued only go as far as *Ardisia*.



M. Smith del.
J. N. Fitch lith.

West, Newman imp.

A. Araarthrophyllum Prichardi *Rendle.*
B. Patagonium campestre *Rendle.*

MR. HESKETH PRICHARD'S PATAGONIAN PLANTS.

By A. B. Rendle, M.A., D.Sc.

(Plate 465.)

The following is a detailed account of the plants collected in Patagonia by Mr. Hesketh Prichard, and presented by him to the National Herbarium. A somewhat hastily compiled list (by Mr. Britten and myself) forms Appendix C of *Through the Heart of Patagonia*, published at the end of 1902, in which Mr. Prichard gives an account of his expedition to the mountain forests of Western Patagonia in search of the *Mylodon*.

The plants were collected at the western end of Lake Argentino, where the lake is broken into numerous fiords by the forest-clad foot-hills of the Andes. The Burmeister Peninsula on which most of the plants were gathered is formed by one such narrow recurving arm at the extreme south-west of the lake. Mt. Buenos Aires, the highest portion of the peninsula, attains a height of 4725 ft.; Mt. Frias lies on the east of the peninsula. Lake Argentino lies about 650 ft. above sea-level, a little to the south of 50° S. latitude, and is the last large piece of water in the long chain of Andean lakes and lagoons. From it the River Santa Cruz flows eastward to the Atlantic. A large scale map of the lake and surrounding country will be found in Mr. Prichard's book.

As will be seen from the localities cited, the plants represent in part a pampas flora, in part the flora of the open mountain slopes, and in part the mountain forest flora. Mr. Prichard makes several references to the dense primæval forests, but was unable to explore them botanically, except in the small area of the Burmeister Peninsula, which is about fifteen miles across. "There are," he says, "many thousands of square miles of unexplored forest in Patagonia. . . . . From afar the forests appear to rim the slopes of spurs of the Cordillera with a seemingly impenetrable mass of blackness, reaching towards and often running up into the snow-line; as you approach the colour assumes its true hue, a deep dense green, a green that seems to have the quality of absorbing light, so that as you gaze upon the expanse of foliage stretching back into the distances, fold beyond fold, where the valleys and mountain-sides close in behind each other, an impression of gloom and mystery lays hold upon your mind. Upon still nearer inspection you find the trees ranked in heavy phalanxes, while between their close-set trunks has grown up an undertangle of thorn. . . . . Most common of the trees was the antarctic beech." "The aspects of the various forests and the trees of which they were composed varied greatly. Some were bare and devoid of undergrowth as a northern forest; others were absolutely tropical in their heavy luxuriance. In one, a majestic place, the tall antarctic beeches were draped with long trailing Spanish moss," presumably the parasitic loranth, *Myzodendron*. "Few places are more mournful than this region when

rain is falling. After the rain ceases, mists arise and circle round you, shutting you in, these in their turn often being dissipated by a sudden fierce squall. In summer the climate is very humid, and many of the plants have the fat damp aspect seldom observable save in the tropics. The huge masses of rank vegetation seem to stifle you; once you have been in that great black insatiable woodland you can never quite shake off its influence." "In that particular forest was one glade by the outrunning of a little brook where the ground was thick with orchids," presumably *Chloræa*, &c. "There were also orchids growing about the foot-hills of the Cordillera."

The flora of the small area investigated includes two distinct elements which call for remark. On the one hand there is a well-marked Andine element represented by a number of Chilian plants, such as *Stipa pogonathera*, *Carex inconspicua*, *Luzula chilensis*, *Sisyrinchium cuspidatum*, *Solenomelus Lechleri*, *Calandrinia cæspitosa*, *Draba Gilliesii*, *Escallonia rubra*, *Scyphanthus elegans*, *Collomia coccinea*, *Oreopolus citrinus*, and by diminishing numbers of more and more widely distributed Western American mountain types, such as *Relbunium pusillum*, *Bowlesia tropæolifolia*, *Acæna pinnatifida*, *A. ovalifolia*, *Saxifraga Pavonii*, *Quinchamalium procumbens*, *Sisyrinchium junceum*, and others. On the other hand, there is an equally well-marked antarctic element represented by many Fuegian or extreme south Patagonian types, such as *Rumex magellanicus*, *Lychnis magellanica*, *Draba fascicularis*, *Geum magellanicum*, *Acæna cuneata*, *Maytenus magellanica*, *Colletia discolor*, *Azorella trifurcata*, *Scutellaria nummulariæfolia*, *Micromeria Darwinii*, *Calceolaria Darwinii*, and other, fewer but more widely distributed antarctic species, such as *Trisetum subspicatum*, *Arundo pilosa* (Falkland Islands), *Poa Alopecurus* (Falkland Islands), *Acæna adscendens*, *Primula magellanica* (Falkland Islands), and others.

A third category includes plants of a more endemic type, which find their northern limit of distribution in southern Chili, and spread southwards to Fuegia. Such are the characteristic forest tree, the antarctic beech, *Fagus antarctica* (South Chili to Cape Horn); the proteaceous shrub, *Embothrium coccineum*; and the species of *Myzodendron* which lives parasitically on the beech. There are also several familiar northern plants, of arctic and alpine or temperate distribution. Such are *Phleum alpinum*, *Alopecurus alpinus*, *Deschampsia cæspitosa*, *Poa pratensis*, *Hordeum jubatum*, *Cerastium arvense*, *Nasturtium palustre*, *Cardamine pratensis*, *Senebiera pinnatifida*, *Potentilla Anserina*, *Erigeron alpinus*, *Taraxacum lævigatum*, and *Sonchus asper*.

The new species belong for the most part to characteristic temperate South American genera, such as *Alstroemeria*, *Tristagma*, *Patagonium* (a name arbitrarily set aside by De Candolle in favour of his own *Adesmia*), *Azorella*, *Boopis*, and *Nassauvia*.

The arrangement of the families is that now generally followed by Continental and American botanists—namely, that of Professor Engler's *Syllabus*. Mr. Spencer Moore has worked out the *Compositæ*, which will be found at the end of the paper.

Monocotyledons.

Stipa pogonathera Desv. in Gay Fl. Chil. vi. 277; Macloskie in Rep. Princeton Univ. Exped. Patagonia, viii. 175.

Sandy slopes of foot-hills, Burmeister Peninsula.

Inflorescences only. The spikelets are larger than usual in the species, the three-nerved glabrous acute barren glumes measuring 2·7 and 2·2 cm. respectively, while the flowering glume and callus together measure 1 cm.; the awn, which is pilose throughout its length, is 11 cm. long.

Chili; South Patagonia.

Phleum alpinum L. Sp. Pl. 59; Macloskie, *l. c.* 179.

Mountain slopes, Burmeister Peninsula.

A widespread arctic and alpine species, found in South America on the Andes, in Patagonia, and in Fuegia.

Alopecurus alpinus Sm. Fl. Brit. iii. 1386; Macloskie, *l. c.* 179.

Springs, Burmeister Peninsula.

An arctic and alpine species found in South America in Chili, Patagonia, Fuegia, and in the Falkland Islands.

Polypogon interruptus H. B. K. Nov. Gen. et Sp. i. 134, t. 44.

Beach of Punta Bandera.

From the Orinoco basin along the Andes to Chili and Paraguay.

A small form with culms 4–8 in. high, and violet-coloured panicles 1–1½ in. long.

Deschampsia cæspitosa Beauv. Agrost. 160.

Bank of stream, Burmeister Peninsula.

Widely distributed.

The large effuse panicle reaches more than a foot in length.

Trisetum subspicatum Beauv. Agrost. 180; Hook. f. Fl. Ant. 377.

Sheltered pampas, Burmeister Peninsula.

Antarctic America and Islands.

Arundo pilosa D'Urv. in Mém. Soc. Linn. Paris, iv. 603. *A. Egmontiana* Roem. & Schult. Syst. ii. 511.

Low slopes of mountains, Burmeister Peninsula.

Fuegia and Falkland Islands.

Note.—*Arundo Egmontiana* was founded on a specimen from Port Egmont, in the Falkland Islands, received by the authors from Zea. It has been referred to *Phragmites* (*P. Egmontiana* Trin. ex Steud. Nom. ed. 2, ii. 324), under which it appears in the *Index Kewensis* with the query, "Quid?" We have in the National Herbarium, in Herb. Roemer (received from Shuttleworth), the original specimen sent by Zea. It bears the ticket "Arundo sp. indet. ex Portu Egmond." in Zea's hand, in addition to the Herb. Roemer label, and exactly resembles the Falkland Island specimens of *Arundo pilosa*.

Poa Alopecurus Kunth, Revis. Gram. 116; Steud. Syn. Gram. 260; Macloskie in Rep. Princeton Univ. Exped. Patag. viii. 223. *Festuca Arundo* Hook. f. Fl. Antarct. 381. *F. Alopecurus* Brongn. in Duperry, Voy. autour du Monde, Botan. pt. 2, 32.

Springs, Burmeister Peninsula.

Resembles the specimen from the Strait of Magellan, described as var. γ by Sir Joseph Hooker. The species, a larger, more robust plant, inhabits the Falkland Islands.

Poa Prichardi, sp. nov. Herba dioica, glauca, perennis, rhizomate repente tenui, caule cum innovationibus vaginis marcescentibus circumdata ; folio caulino singulo, vagina valida, striata, scabridula, laminam duplo excedente; ligula longa, membranacea, subacuta; lamina plicata, anguste lineare, scabridula, apice breviter pungente; panicula compacta, rhachide, ramis, ramulisque scabridulis, ramis brevibus dense spiculiferis, spiculis pallide viridibus purpureo-tinctis, glumis sterilibus subæqualibus acutis, 3-nerviis, carina, in parte superiore, scabridula, rhachilla glabra, glumis fertilibus 6, glabris, 5-nerviis, in parte tertia vel quarta superiore scariosis et enerviis, carina obscure scabridula, palea quam gluma ¼ breviore, floribus fœmineis.

A low-growing grass 30 cm. high, growing erect from a rhizome 1 mm. thick. The aerial stem is surrounded by a mass of withered leaf-sheaths, from which also spring the erect young shoots. The single stem-leaf has a sheath 11 cm. long, a triangular-ovate ligule 8 mm., and a blade 6 cm. long, and in its natural closely folded state scarcely exceeding 1 mm. in width. Spike-like panicle nearly 10 cm. long, interrupted at the base, but compact above, suggesting that of *Poa Alopecurus* Kunth, but less dense. Spikelets 8–9 mm. long, glumes membranous, lower barren glume 5 mm., upper 5·5 mm. long; lowest fertile glume 6 mm. long, pale 4·5 mm.

Springs on slopes, Mt. Buenos Aires.

This grass suggests from its habit a small form of *Poa Alopecurus*, from which it is distinguished by its more graceful, less compact panicle, and its glabrous spikelets.

P. PRATENSIS L. Sp. Pl. 67; Macloskie, *l. c.* 229.

Sheltered pampas, Burmeister Peninsula.

A widely-spread north temperate grass, recorded from several localities in Patagonia; also in Fuegia and the Falkland Islands.

P. SCABERULA Hook. f. Fl. Antarct. 378; Macloskie, *l. c.* 231.

Mountain slopes, Burmeister Peninsula.

Patagonia; Fuegia.

BROMUS PICTUS Hook. f. Fl. Antarct. 387; Macloskie, *l. c.* 243.

Pampa, Burmeister Peninsula.

Patagonia; Fuegia.

HORDEUM JUBATUM L. Sp. Pl. 85; Hook. f. Fl. Antarct. 388; Macloskie, *l. c.* 249.

Slopes of mountains, Burmeister Peninsula.

Temperate North and South America; Eastern Siberia.

CAREX BANKSII Boott in Hook. f. Fl. Antarct. 365, t. cxlii.; Macloskie in Rep. Princeton Univ. Exped. Patag, viii. 278.

Swampy springs in forest on mountain slopes near Lake Argentino.

South Patagonia; Fuegia.

C. INCONSPICUA Steud. Syn. Pl. Cyp. 221.

Springs, Burmeister Peninsula.

Chili.

C. MACLOVIANA D'Urv. in Mém. Soc. Linn. Paris, v. 599.
High springs on serras, Burmeister Peninsula.
Widely spread (arctic and antarctic).

LUZULA CHILENSIS Nees & Meyen, ex Kunth Enum. iii. 312.
High springs on serras, Burmeister Peninsula.
Chili.

Tristagma inflatum, sp. nov. Herba glabra, foliis linearibus, scapum paullo excedentibus; floribus 2–3; bracteis involucrantibus 2, scariosis, lanceolatis, acuminatis, flores subæquantibus; perianthio inflato, atro-rubro, limbis tubo brevioribus, linearibus, atratis, recurvis, corona deficiente; staminibus 6, tubo biseriatim affixis et inclusis; filamentis tenuibus, brevibus; antheris oblongis flavis; ovario ovoideo, stylo brevi, columnare.

Leaves 17–23 cm. long by 4–5 mm. broad. Scape 14–17 cm. long; bracts 2 cm. long; flower-stalk 5–10 mm. long. The inflated corolla-tube is 1 cm. long by 5–8 mm. in diameter; the limb 5–7 mm. long by 1·3 mm. broad at base, tapering slightly to the blunt apex. Mr. Prichard describes the flowers as "black"; the tube is lighter, with a strong dull crimson tinge, but the lobes are so deep a crimson as to appear black. Staminal filaments 1·5 mm., anthers 1·75 mm.; ovary 1 cm. long, style 1·5 mm. long.

Top of gullies, Mt. Frias; rare, only two specimens found.

An interesting addition to this little Chilian genus. It resembles *T. nivale* in habit and the absence of the corona, but is at once distinguished by the shorter inflated perianth, the flowers strongly suggesting bladder campion.

It is very near *T. australe* Neger (in Svenska Exped. till Magellansländ. iii. no. 5, p. 207) from Rio Guillermo, South Patagonia, which I have not seen, but which from the description differs in its much shorter bracts (12 mm. long), shorter stalked flowers, and shorter perianth-lobes (3 mm. long).

Alstroemeria nana sp. nov. Herba humilis glabra, caule fertile crassiusculo, nodis in parte inferiore cum squamis scariosis ovato-acuminatis, superne in foliis viridibus linearibus brevibus transeuntibus, instructis; flore singulo, terminale, erecto; perianthio flavo, lobis spathulatis, cuspidatis, 3 interioribus paullulo angustioribus et longioribus, et colore sanguineo sparse punctatis; filamentis tenuibus complanatis, superne ± recurvatis, antheris brevibus subreniformibus; caulibus sterilibus minus robustis, squamigeris, apice cum foliis sublinearibus vel anguste lineari-lanceolatis, margine sæpe crispulatis, arcte rosulatis, instructis.

Flowering stems about 10 cm. high, about 2 mm. thick, colourless below, tinged with red or sometimes greenish above; scales 6–8 mm. long; the stems are sometimes scale-bearing almost to the flower, in other cases the uppermost nodes bear slender linear leaves 2 cm. or less in length. Leafy stems about half the length and thickness of the flowering; leaves 2·5 cm. long, 2 mm. or less in breadth. Perianth-lobes about 2 cm. long, the outer 7–8 mm. broad. Stamens and style shorter than the perianth; anthers 1 mm. broad; stigmas linear.

Slopes of Mt. Frias, and shingle beach of Lake Argentino (flowering specimens); top of Mt. Frias (leafy specimens).

The plants are about the same size as those of the Andine species *A. pygmæa* Herb., which is also one-flowered; our specimens differ in the absence of a leafy involucre round the flower, and in the much narrower, more fleshy leaves.

This is evidently very near *A. patagonica* Phil., which I know only from a brief description by Macloskie in *Report of the Princeton University Expeditions to Patagonia*, viii. 312 (1904); the stigmas are described as "elongate, broad, margined," which does not agree with the character in our plant.

Sisyrinchium cuspidatum Poepp. Fragm. 3.

Low slopes of mountains, Burmeister Peninsula.

Chili.

S. filifolium Gaud. in Ann. Sci. Nat. v. 101; Hook. f. Fl. Antarct. 352, t. 126; Macloskie, *l. c.* 315.

Pampas, Burmeister Peninsula.

South Patagonia, Fuegia, and Falkland Islands.

S. junceum E. Meyer in Presl, Reliq. Haenk. i. 118; Macloskie, *l. c.* 316.

Swamp on flat pampa, Burmeister Peninsula.

Andes of Peru, Bolivia, and Chili; Patagonia; Fuegia.

Solenomelus Lechleri Baker, Handb. Irid. 139. *Susarium Segethi* Philippi in Linnæa, xxxiii. 249; Macloskie, *l. c.* 319 (under *Symphyostemon*).

Low slopes of Mt. Buenos Aires.

Chili; Patagonia.

Symphyostemon narcissoides Miers ex Hook. f. Fl. Antarct. 353. *S. biflorus* Macloskie, *l. c.* 318.

Pampas and low shingle on edges of Barrancos, Burmeister Peninsula.

There is some variation in the size and colour of the flowers, which range from (apparently) yellow to deep red. The stem and leaves are glabrous, or more or less scabridulous; specimens otherwise similar and collected in the same locality showing these differences.

South Chili; Straits of Magellan; Fuegia.

Chloræa magellanica Hook. f. Fl. Antarct. 350; Macloskie, *l. c.* 323.

Slopes of Mt. Buenos Aires.

South Patagonia; Straits of Magellan; Fuegia, and Islands.

Asarca araucana Phil. in Linnæa, xxix. 56.

Chili. Slopes of Mt. Buenos Aires.

Dicotyledons.

Fagus antarctica Forst. f. in Comm. Gotting. ix. 24; Hook. f Fl. Antarct. 345.

Forests on mountains, near Lake Argentino.

Very abundant from South Chili to Cape Horn.

URTICA MAGELLANICA Juss. ex Poir. Encycl. Suppl. iv. 223; Hook. f. Fl. Antarct. 344; Macloskie, *l. c.* 331.

Low slopes of mountains, Burmeister Peninsula.

Andes of tropical and subtropical America; Chili; South and West Patagonia; Straits of Magellan, and Fuegia.

EMBOTHRIUM COCCINEUM Forst. Char. Gen. 16, t. 8, figs. g–m; Hook. f. Fl. Antarct. 341; Macloskie, *l. c.* 334.

Low slopes of mountains, Burmeister Peninsula.

Southern Chili; South and West Patagonia; Straits of Magellan; Fuegia.

MYZODENDRON PUNCTULATUM Banks & Soland. MS. ex Hook. f. Fl. Antarct. 289; Macloskie, *l. c.* 338.

Forests on mountains near Lake Argentino.

Chili; Patagonia; Fuegia.

M. QUADRIFLORUM DC. Collect. Mem. vi. t. xii. fig. 2; Hook. f. Fl. Antarct. 301 *bis*; Macloskie, *l. c.* 338.

Forests, Burmeister Peninsula.

South Patagonia; Straits of Magellan; South Fuegia.

QUINCHAMALIUM PROCUMBENS Ruiz & Pav. Fl. Peru et Chil. ii. 1, t. 107 *b*.

Pampa, Burmeister Peninsula.

Chili; Peru.

The Patagonian plant agrees with the specimens from Ruiz and Pavon in the National Herbarium. These are probably referable to *Q. chilense* Lam., an earlier name; but it is doubtful whether Lamarck's plant is identical with the still earlier *Q. chilense* of Molina, which is very insufficiently described in his Saggio Stor. Nat. Chili. Our specimens from Dombey, Peru, suggest that Brongniart's *Q. Dombeyi* is identical with the species of Ruiz and Pavon; the plant figured by Brongniart (*Voyage Coquille*, t. 52 B) has, however, much broader leaves than those of Dombey's specimens.

RUMEX CRISPUS L. Sp. Pl. 335; Hook. f. Fl. Antarct. 341.

By water, slopes of pampa near Lake Argentino.

Widely distributed. Recorded from Chili and the Falkland Islands, though, as regards the latter, Sir Joseph Hooker remarks, *l. c.*, "undoubtedly introduced."

R. MAGELLANICUS Griseb. in Abhandl. Ges. Wiss. Götting. vi. (Phys. Cl.) 118.

Shingle beach, Lake Argentino.

Straits of Magellan; Fuegia.

LYCHNIS MAGELLANICA Desv. in Lam. Encycl. iii. 641; Hook. f. Fl. Antarct. 246.

High slopes of mountains, Burmeister Peninsula.

The leaves are much broader than in the specimens from the Straits of Magellan, recalling the species collected on the Andes of Chili by Gillies, to which reference is made in the Fl. Antarct. *l. c.*

A southern representative of the arctic and north temperate *L. apetala*.

CERASTIUM ARVENSE L. Sp. Pl. 438; Hook. f. Fl. Antarct. 251.

Low slopes of mountains, Burmeister Peninsula.

Andes of Bolivia; Chili; Patagonia; Fuegia; Falkland Islands; and widely distributed in the north temperate and arctic zones.

Stellaria debilis D'Urv. in Mém. Soc. Linn. Paris, iv. 618; Hook. f. Fl. Antarct. 250; Spegazz. in Anal. Mus. Nacion. Buenos Aires, vii. 242.

Low slopes of mountains, Burmeister Peninsula.

South Patagonia; Fuegia; Falkland Islands.

Arenaria serpens H. B. K. var. andicola Rohrb. in Linnæa, xxxvii. 270. *A. andicola* Hook. & Arn. in Hook. Bot. Miscell. iii. 148.

Sheltered pampas and beach, among rocks and low slopes, Burmeister Peninsula.

From Mexico along the Andes to Chili; Brazil.

A southern extension of the range of this alpine species.

Calandrinia cæspitosa Gill. ex Arn. in Cheek, Edinb. Journ. iii. 356.

Top of hills, among stones, Burmeister Peninsula.

Mountains of Chili.

Anemone multifida Poir. Encycl. Suppl. i. 364, var. grandiflora, var. nov. Planta floribus albidis quam in typo valde majoribus.

A fine plant, agreeing in its foliage with the type, but with large white flowers $1\frac{1}{4}$–$1\frac{3}{4}$ in. across.

Low slopes and pampa, Burmeister Peninsula.

The species is widely spread in north temperate America from Hudson Bay to Colorado, and also occurs in Southern Chili, Patagonia, and Fuegia. The Chilian *A. lanigera* Gay is indistinguishable.

Ranunculus pedunculatus Sm. in Rees Cycl. xxix. n. 49; Spegazz. in Anal. Mus. Nacion. Buenos Aires, vii. 208.

Low slopes of mountains, Burmeister Peninsula.

Chili; South Patagonia; Fuegia.

Berberis buxifolia Lam. Illustr. t. 253, fig. 3; Spegazz. *l. c.* 209.

Burmeister Peninsula.

Chili; Patagonia; Fuegia.

B. empetrifolia Lam. Illustr. t. 253, fig. 4.

Slopes of mountains, Burmeister Peninsula.

Andes of Bolivia; Cordilleras of Chili; Patagonia; Straits of Magellan.

Nasturtium palustre DC. Syst. ii. 191; Spegazz. *l. c.* 210.

Sheltered slopes of mountains, Burmeister Peninsula.

Chili; South Patagonia.

A widely distributed plant in the northern hemisphere.

Cardamine pratensis L. Sp. Pl. 656.

Swamp, Burmeister Peninsula.

Southern Chili, and widely distributed in the northern hemisphere.

Draba Gilliesii Hook. & Arn. in Hook. Bot. Misc. iii. 137; Spegazz. *l. c.* 213.

Tops and high slopes of mountains, Burmeister Peninsula.

Chili; South Patagonia.

Sisymbrium magellanicum Hook. f. Fl. Antarct. 243. *Brassica magellanica* Pers. Syn. ii. 207 ; Deless. Icon. Select. ii. 24, t. 85. *Arabis magellanica* Dusén in Svensk. Exp. Magellansländ. iii. no. 5, 177.

Forest, Burmeister Peninsula.

South Patagonia ; Fuegia.

A remarkable looking plant originally described under *Brassica*, to which it was also referred by De Candolle, and later transferred to *Sisymbrium* by Sir Joseph Hooker. Quite recently Dusén has relegated it to *Arabis*, suggesting a comparison with *A. macloviana* Hook. f., a very distinct plant.

There is evidently considerable variation in the amount of hairiness. Hooker describes the plant as *glaberrimum*, in which our specimen agrees, while Dusén says, "Closely covered with stellate hairs."

Braya glebaria Spegazz. in Anal. Museo Nacion. Buenos Aires, vii. 224.

Mountain tops, Burmeister Peninsula.

Mr. Prichard's specimens apparently represent a much less robust and smaller form than that on which Spegazzini based the species. The latter is described as having "caudex majusculus tortuosus, 10–20 cm. long., 5–10 mm. diam.," whereas in our specimens the stem barely exceeds 2 mm. in thickness ; it may, however be a branch of the main stem, which is itself not present. Otherwise our specimens agree with Spegazzini's description.

The type-specimens come from basalt rocks between Lago Musters and Choique-lauen, more than three hundred miles to the north-east of Lake Argentino.

Senebiera pinnatifida DC. in Mém. Soc. Hist. Nat. Paris, 1799 144, t. 9.

Low slopes of mountains, Burmeister Peninsula.

Widely distributed in both Old and New Worlds.

Thlaspi gracile Phil. in Linnæa, xxviii. 670.

Swamp, Burmeister Peninsula.

Mountains of southern Chili.

Donatia fascicularis Forst. Char. Gen. 9, t. 5.

Top of mountains, Burmeister Peninsula.

Patagonia ; Fuegia.

Saxifraga Pavonii D. Don in Trans. Linn. Soc. xiii. 434.

On rocks on low slopes overhanging Lake Argentino.

Peru ; Chili.

Escallonia rubra Pers. Syn. i. 235. *Stereoxylon rubrum* Ruiz & Pavon, Fl. Per. Chil. iii. t. 236. *E. rubra* var. *multiflora* Poepp. & Endl. Nov. Gen. & Sp. i. 9.

Low slopes of Mt. Buenos Aires.

The species frequent in Chili under numerous forms, some of which approach *E. macrantha* Hook. & Arn.

The var. *multiflora* of Poeppig & Endlicher is based on Ruiz & Pavon, Fl. Per. Chil. iii. t. 236, which is also the foundation of Persoon's species. Mr. Prichard's plant agrees fairly with the

original specimen from Ruiz & Pavon in the National Herbarium, but has the panicle rather broader.

Escallonia Britteniana, sp. nov. Frutex ramis junioribus glabrescentibus, parce glandulosis, sordide stramineis, densius foliosis, senescentibus glaberrimis, cinereis; foliis glaberrimis, obovatis vel ellipticis, basim versus cuneatim attenuatis, serratis (basim versus integris), nervo medio tantum subtus prominulo; racemis foliosis, sæpe 5–7-floris, ramulos terminantibus; pedicellis brevibus velut ovario et bracteolis plus minus glandulosis, bracteolis linearilanceolatis, glabris; calyce vix glanduloso, tubo lato ecostato, limbis triangularibus acutis subæquante; petalis erectis calyce plus triplo longioribus, lineari-spathulatis, limbo recurvato; disco cupuliforme, crenato; stylo integro, fructu glabro subæquante; stigmate capitato, bilobo.

Leaves, including the short petiole, 2–2·3 cm. long when full-sized, by 1 cm. or a little more in breadth, densely arranged on the short ultimate shoots, becoming much narrower, oblanceolate to linear-oblanceolate, in the leafy raceme. Pedicel 2–3 mm., bracteoles 3–4 mm. long. Calyx, including the teeth, about 3·5 mm. long; petals 12 mm. long, including the claw (8 mm.), barely 4 mm. broad towards the apex. Stamen, including anther, about 1 cm. long, style slightly shorter.

Low slopes, Punta Bandera, Mt. Buenos Aires.

Near the Chilian species *E. alpina* Poepp. (with which it was compared in the original list), which it apparently resembles in habit, but is distinguished by the very glabrous leaves, and the larger flowers.

I have named the species after my colleague, Mr. Britten, who shared in the preparation of the original list of Mr. Prichard's plants, and has made many helpful suggestions in the course of their more detailed elaboration.

Ribes cuneifolium Ruiz & Pavon, Fl. Per. Chil. iii. 13.

Wild currant. Valleys and low hill-sides, Burmeister Peninsula. Chili.

Geum magellanicum Comm. ex Pers. Ench. ii. 57; Hook. f. Fl. Antarct. 262, excl. synonym.

Slopes, Punta Bandera; Mt. Buenos Aires.

South Patagonia; Fuegia.

Mr. Prichard's specimen differs from the plants collected at Success Bay by Banks & Solander, and at Port Famine by Captain King, in its short, less interrupted leaves, which are about 11 cm. long, the rachis bearing successively smaller leaflets below the large suborbicular terminal one, with but few minute leaflets inserted. The flowers are also larger than in the more southern specimens, the largest measuring over 3 cm. across.

Potentilla Anserina L. Sp. Pl. 495.

Swamps in open places of forest, on mountain side.

Chili. Widely spread.

Acæna adscendens Vahl, Enum. i. 297; Hook. f. Fl. Antarct. 268; Dusén in Svensk. Exp. Magellansländ. iii. no. 5, 165.

Under trees and shrubs, slopes of mountains, Mt. Buenos Aires.

South Patagonia; Fuegia; Falkland Islands, and islands of the Southern Ocean to New Zealand.

A. CUNEATA Hook. & Arn. in Bot. Miscell. iii. 307; Hook. f. Fl. Antarct. 265.

Loose sandy soil.

Straits of Magellan.

A. OVALIFOLIA Ruiz & Pav. Fl. Per. Chil. i. 67, t. 103, fig. c; Hook. f. Fl. Antarct. 267; Dusén, *l. c.*, 166.

By springs and streams in forest, Mt. Buenos Aires.

Andes of Bolivia and Chili; South Patagonia; Fuegia.

A. PINNATIFIDA Ruiz & Pavon, Fl. Per. Chil. i. 68, t. 104, fig. *b*.

Low slopes and slopes of pampas.

Evidently a widely distributed plant in western America, being recorded from California, and apparently common in the Chilian Andes, from which it was originally described by Ruiz & Pavon.

Anarthrophyllum Prichardi, sp. nov. (Tab. 465 A). Suffrutex ramosissima, ramulis dense foliatis; foliis præcipue junioribus adpresso-argenteo-sericeis, tripartitis, segmentis propter margines involutas semiteretibus (interdum segmentum medianum solum adest) apice pungentibus, stipulis magnis triangulis apice pungentibus, basi in vaginam amplexicaulem coadunatis; floribus sub apice ramulorum solitariis, conspicuis, aurantiacis, breviter pedicellatis, pedicello et calyce, dense albo-pubescentibus; calyce bilabiato, labio antico tridenticulato, segmentis posticis triangularibus, obtusis; vexillo rubescente, calycem haud superante, suborbiculare, apice emarginato; alis oblongis, in margine posteriore supra unguem plica utrinque auctis, carina leviter incurva, obtusa, alas excedente, et velut in alis, in marginibus posterioribus utrinque cum plica aucta; antheris alternis paullo majoribus basifixis, alternis versatilibus, stigmate parvo capitellato.

Plants apparently about 4–5 in. high, with the habit of *Anarthrophyllum Desideratum*, the tough woody stem reaching 2 lines in thickness, clothed in the older parts with the persistent leaf-sheaths, covered above, as are the branches, with the crowded leaves. Leaf-segments reaching 6 mm. in length, stipules slightly shorter and broader; margins of segments closely rolled in on the hairy upper face. Calyx a little over 1 cm. long, anterior lip 7 mm. long, the two posterior lobes 5 mm. Vexillum 9 mm. broad, alæ 17 mm. long (including the claw, 4 mm.), barely 4 mm. broad, carina nearly 2 cm. long (including the claw), ·5 cm. broad.

Very near *A. Desideratum* Benth. (to which it was previously referred), which is known only from fruiting specimens, but is distinguished by the deeply cut anterior calyx lip and the acute posterior lobes.

Top of Mt. Frias.

ASTRAGALUS BREVICAULIS Dusén in Svensk. Exp. till Magellansländ. iii. no. 5, 158.

High slopes of mountains, Burmeister Peninsula.

Eastern Fuegia.

This species is very near the widely distributed arctic and north temperate *A. alpinus* L. The Patagonian specimens differ in the silky white indumentum of the stem and leaves (dorsal surface), and the blunt or retuse leaf-apex.

Patagonium boronioides O. K. Rev. Gen. Pl. i. 200 (*boroniodes*). *Adesmia boronioides* Hook. f. Fl. Antarct. 257.

Burmeister Peninsula.

Patagonia; Straits of Magellan.

P. salicornoides Spegazz. in Anal. Mus. Nacion. Buenos Aires, vii. 275. *Adesmia carnosa* Dusén in Svensk. Exp. till Magellansländ. iii. no. 5, 159, t. vii. figs. 1 & 3.

Mountain tops, Burmeister Peninsula.

Patagonia; Eastern Fuegia.

P. karraikense Spegazz. *l. c.* 274. *Adesmia karraikensis* Spegazz. Nova Add. Fl. Patagon. n. 49. *A. Negeri* Dusén, *l. c.* figs. 2 & 4.

High slopes of mountains, Burmeister Peninsula.

South Patagonia.

Patagonium campestre, sp. nov. (Tab. 464 B). Frutex cum ramulis florentibus denuo spinescentibus; ramis sublaxiter foliosis; foliis juvenilibus velut ramulis novellis albido-pubescentibus, adultis glabrescentibus, 4–6-jugis, foliolis obovato-cuneatis, apice emarginatis; petiolo subvalido, stipulis triangularibus, scariosis, persistentibus; floribus in ramulorum apicibus racemosis; calyce viride velut pedicello pilosulo, 5-nervi, dentibus acutis 5 quam tubo triplo brevioribus; corolla aurantiaca calycem plus duplo excedens, vexilli lamina reflexa cum striis brunneo-purpureis in area mediana ornata, margine ad basin utrinque ciliata, cum alis pæne glabris carinam incurvatam pallidiorem margine anteriore dense ciliatam, excedens; ovario densius albido-piloso; legumine immaturo brunneo, æquale, aspectu anteriore densiter albido-piloso, pilis simplicibus.

Apparently a small woody shrub with a gorse-like habit, glabrous, except on the young shoots and leaves; branches of present season pale green, of last season stout (2–3 mm. in thickness), woody and pale brown in colour. Leaves 1·5–2 cm. long, easily falling when dry, leaflets 4–6 mm. long, barely 3 mm. broad, petiole exceeding the leaflet-bearing portion. Flowers in short subcorymbose racemes (generally 10–12-flowered) below the pungent ends of the shoots; bracteoles minute, concave; pedicels ultimately exceeding the flower in length. Calyx-tube 3 mm. long, teeth 1 mm.; vexillum 1 cm. long, and nearly as broad, alæ 1 cm. long, 3·5 mm. broad, limb saccate posteriorly at the base. The immature pod (1 cm. long) shows no trace of a division into joints.

Nitrate pampas.

The species falls into the section *Dasycarpum* (lomentis puberis hispidis v. villosis, pilis simplicibus, Spegazzini), in which it is characterised by its spinescent habit and racemed flowers.

P. glanduliferum, sp. nov. Herba perennis glanduloso-hispidula, caulibus divaricatis, laxe foliatis, angulatis; foliis 6–9-jugis, foliolis cuneato-obovatis, mucronulatis, crassiusculis, facie superiore glandulis atris punctata, et interdum in linea mediana setosa, mar-

gine quoque setoso, petiolo rhachi foliolifero subæquale vel breviore, stipulis cum dentibus binis acutis instructis; racemis terminalibus plurifloris demum laxis; bracteis viridibus oblongo-ovatis, obtusis; calyce viride plus minus præcipue in dentibus purpureo suffuso, tubo lato dentes 5 acutos, dorso hispidos, æquante; corolla calycem duplo excedens, glabra, aurantiaca, plus minus purpureo tincta vel lineata, vexilli lamina reflexa, orbiculari-reniforme, emarginata, glabra, pilis paucis in ungue brevi exceptis, alis concoloribus, carina pallida valde incurvata; legumine 5-articulato, viride, facie utraque cum pilis plumosis strigosa, suturis setulosis.

Apparently a low-growing herb, becoming woody below; the branches dark, with short stiffish glandular hairs. Leaves about 3 cm. long, leaflets 5–6 mm. long by scarcely 4 mm. broad. Bracts 3–4 mm. long, glandular hispid, like the pedicels, which are about equal in length to the flower. Calyx 4 mm. long; limb of standard about 7 mm. long, nearly 1 cm. broad, bent at right angles to the short claw (2·5 mm. long); wing nearly as long as the standard, incurved at a right angle about the middle of the claw, lamina narrowly saccate posteriorly at the base; keels nearly as long, incurved at right angles. Pods 1·5 cm. long, segments 4 mm. broad.

High slopes of mountains, Burmeister Peninsula.

A member of the section *Ptilocarpum* (lomentis setis villosis vel plumosis præditis, Spegazzini), resembling in habit and glandular hairs *Adesmia conferta* Hook. & Arn., which is, however, a larger, more woody plant, with larger hairy leaflets and smaller flowers.

P. Morenonis O. K. Rev. Gen. iii. 2, 70. *P. villosum* Spegazz. in Anal. Mus. Nacion. Buenos Aires, vii. 277. *Adesmia villosa* Hook. f. Fl. Antarct. 256.

High slopes, Mt. Buenos Aires.

Apparently a very variable and common species in Patagonia.

Var. argentea, var. nov. Planta argenteo-sericea, foliolis obovato-cuneatis, mucronatis, 4–6 mm. longis; legumine multiarticulato.

High slopes, Mt. Buenos Aires, and Mt. Frias.

Vicia bijuga Gill. ex Hook. & Arn. in Hook. Bot. Misc. iii. 197; Dusén in Svensk. Exp. till Magellansländ. iii. no. 5, 262.

Low slopes of mountains, Burmeister Peninsula.

Andes of Chili; South Patagonia.

V. sericella Spegazz. Nov. Add. Fl. Patag. i. no. 67.

Low slopes of mountains, Burmeister Peninsula.

I have not seen Spegazzini's plant, but, judging from the description, Mr. Prichard's plant must represent the same or a very closely allied species.

Lathyrus nervosus Lam. Encycl. ii. 708; Britten, Journ. Bot. 1901, 98.

Low slopes of mountains, Burmeister Peninsula.

South Patagonia; Urugnay.

L. magellanicus Lam. Encycl. ii. 708.

Low slopes of mountains, Burmeister Peninsula.

Chili; Patagonia; Straits of Magellan.

Referred to this species with some doubt; the specimen consists only of a small flowering branch.

Erodium cicutarium L'Hérit. ex Ait. Hort. Kew. ii. 414; Spegazz. in Anal. Mus. Nacion. Buenos Aires, vii. 255.

Low slopes of mountains, Burmeister Peninsula.

Widely distributed.

Geranium magellanicum Hook. f. Fl. Antarct. 251; Dusén in Svensk. Exp. till Magellansländ. iii. no. 5, 157.

Low slopes, Mt. Buenos Aires.

South Patagonia; Fuegia.

Oxalis enneaphylla Cav. var. pumila Hook. f. Fl. Antarct. 253.

High slopes and top of Mt. Frias.

Fuegia; Falkland Islands.

Oxalis Prichardi, sp. nov. (Folia bina et flos singulus solum suppetunt.) Glabra, petiolo pæne filiformi, foliolis subduodecim lineari-cuneatis cum apice obtuso, facie utrinque spongiosis; pedunculo quam petiolo vix robustior, bracteolis parvis, ovatis, acutis, amplexicaulibus; sepalis anguste ovatis, obtusis, purpureo-marginatis; petalis obovatis, albidis (ut apparet), violaceo-marginatis.

Leaf-stalks 5–6 cm. long; leaflets 10–12 mm. long, 1–1·5 mm. broad. Bracteoles 4 mm. long; sepals 6 mm. long by 2 mm. broad; petals 22 mm. long by 12 mm. broad, the apex probably emarginate, but in every case damaged.

Evidently near *Oxalis laciniata* Cav. (Icon. v. t. 412), but the leaves are much smaller, and the leaflets are cuneate and very blunt, not sharp-pointed as in that species, in which, moreover, the corolla is described as of a deep violet colour.

Bare sandy ground, Burmeister Peninsula.

Polygala salasiana Gay, Fl. Chil. i. 237.

North slopes of Mt. Frias.

Mountains of Chili; Patagonia.

Euphorbia portulacoides Spreng. Syst. iii. 792.

Pampa, Burmeister Peninsula.

A Chilian littoral plant, collected also at Cape Fairweather, in the extreme south of Patagonia, by Captain King.

Empetrum nigrum L. var. andinum DC. Prodr. xii. i. 26.

Grassy top of mountain, Burmeister Peninsula.

Mountains of Chili.

Maytenus magellanica Hook. f. Fl. Antarct. 254; Dusén, Svensk. Exp. till Magellansländ. iii. no. 5, 155.

Slopes of Punta Bandera, Mt. Buenos Aires.

Fuegia.

Colletia discolor Hook. f. Fl. Antarct. 255.

Low slopes of mountains, Burmeister Peninsula.

Straits of Magellan.

Viola maculata Cav. Icon. vi. 20, f. 539; Hook. f. Fl. Antarct. 244.

Sheltered slopes of forests, Burmeister Peninsula.

Chili; Patagonia; Fuegia; Falkland Islands.

(To be concluded.)

MOSSES AND HEPATICS OF LLANWRTYD, BRECONSHIRE.

By the Rev. W. H. Painter.

The valley in which Llanwrtyd is situate is an upland one in Breconshire, and lies for the most part north and south, through which the River Irfon runs to join the River Wye. On either side of it high hills rise, on the west, to an elevation of 1695 ft., and on the east, to about 1200 ft. The lowest part of the valley is 645 ft. above the sea. The mosses which I found in this valley in the years 1901 and 1902 were collected within a radius of three miles from the modern village of Llanwrtyd Wells. More might have been gathered, had the weather been more suitable than it was for walking on these high hills, the rainfall of which is greatly in excess of that of the neighbouring counties of England.

I desire to express my gratitude to Mr. E. C. Horrell, F.L.S., for naming the specimens of *Sphagnum* for me; to Messrs. W. P. Hamilton, D. A. Jones, and J. A. Wheldon, for verifying my determinations of the other mosses; and to the Revs. Canon Lett and C. H. Waddell, for assisting me with the hepatics.

Mosses.

Sphagnum Russowii Warnst. and *S. subnitens* Russ. & Warnst. 1000 ft.—*S. teres* Angstr. var. *subsquarrosum* Warnst. and *S. cuspidatum* Russ. & Warnst. 1000 ft.—Var. *submersum* Schimp. 1100 ft.—*S. recurvum* Russ. & Warnst. 700 ft.—Var. *amblyphyllum* Warnst., var. *mucronatum* Warnst., and *S. subsecundum* Limpr. 1000 ft.—*S. inundatum* Warnst. 700–1000 ft.—*S. rufescens* Warnst. 1000 ft.—*S. crassicladium* Warnst. 700–1000 ft. — *S. papillosum* Lindb. var. *sublæve* Warnst. and var. *normale* Warnst. 1100 ft.

Andræa petrophila Ehrh., *c. ft.*; and var. *homomalla* Thed., *c. ft.* 1100 ft. — *A. Rothii* W. & M., *c. ft.*; and var. *falcata* Lindb., with type, *c. ft.* 1000 ft.

Catharinea undulata W. & M., *c. ft.* 750 ft.

Polytrichum aloides Hedw., *c. ft.* 717 ft.—*P. urnigerum* L., *c. ft.*; *P. piliferum* Schreb., *c. ft.*; and *P. juniperinum* Willd., *c. ft.* 700 ft.—*P. strictum* Banks, *c. ft.* 1573 ft. — *P. gracile* Dicks., *c. ft.*; and *P. formosum* Hedw., *c. ft.* 900 ft.—*P. commune* L., *c. ft.* 1000 ft.

Ceratodon purpureus L., *c. ft.* 834 ft.

Cynodontium Bruntoni B. & S., *c. ft.* 900 ft.

Dicranella heteromalla Hedw., *c. ft.* 700 ft. — *D. squarrosa* Schimp. 900 ft.

Dicranoweissia cirrata Lindb., *c. ft.* 700 ft.

Campylopus flexuosus Brid. 1075 ft. — Var. *paradoxus* Husn. 1100 ft.

Dicranum Bonjeani De Not. 1000 ft. — *D. scoparium* Hedw., *c. ft.* 900 ft.—Var. *spadiceum* Boul. 1573 ft.

Fissidens bryoides Hedw., *c. ft.*; *F. adiantoides* Hedw.; and *F. decipiens* De Not. 700 ft. *F. taxifolius* Hedw. 645 ft.

Grimmia apocarpa Hedw., *c. ft.* 700 ft.—Var. *rivularis* W. & M., *c. ft.* 650 ft.—*G. pulvinata* Sm., *c. ft.* 700 ft.

Rhacomitrium aciculare Brid., *c. ft.* 650 ft.—*R. protensum* Braun. 1100 ft.—*R. fasciculare* Brid. 700 ft.—*R. heterostichum* Brid. *c. ft.* 1573 ft.—Var. *gracilescens* B. & S., *c. ft.*; and *R. lanuginosum* Brid. 700 ft.—*R. canescens* Brid. var. *ericoides* B. & S. 645 ft.

Ptychomitrium polyphyllum Fürnr., *c. ft.* 700 ft.

Tortula muralis Hedw., *c. ft.*; var. *rupestris* Wils., *c. ft.*; and *T. subulata* Hedw., *c. ft.* 700 ft.

Barbula rubella Mitt., *c. ft.*; *B. tophacea* Mitt., *c. ft.*; and *B. fallax* Hedw., *c. ft.* 700 ft.—*B. convoluta* Hedw., *c. ft.* 1000 ft.—Var. *Sardoa* B. & S., *c. ft.* 700 ft.

Trichostomum mutabile Bruch. 645 ft.

Encalypta streptocarpa Hedw. 700 ft.

Zygodon Mougeotii B. & S. 900 ft.

Funaria hygrometrica Sibth., *c. ft.* 645 ft.

Aulacommium palustre Schwaegr. 700 ft.

Bartramia pomiformis Hedw., *c. ft.* 700 ft.

Philonotis fontana Brid., *c. ft.* 800 ft.

Breutelia arcuata Schimp. 900 ft.

Webera nutans Hedw., *c. ft.* 1573 ft.

Bryum pendulum Schimp., *c. ft.* 700 ft.—*B. inclinatum* Bland., *c. ft.*; and *B. pseudo-triquetrum* Schwg., *c. ft.* 1000 ft. — *B. cæspiticium* L., *c. ft.*; and *B. capillare* L., *c. ft.* 700 ft. — *B. alpinum* Huds. 800 ft.

Mnium affine Bland. and *M. undulatum* L. 900 ft.— *M. hornum* L., *c. ft.*; and *M. punctatum* L. 700 ft.

Fontinalis antipyretica L. 1000 ft.—*F. squamosa* L. 900 ft.

Thuidium tamariscinum B. & S. 700 ft.

Isothecium myurum Brid. 700 ft.

Pleuropus sericeus Dixon, *c. ft.* 700 ft.

Brachythecium rutabulum B. & S., *c. ft.*; *B. velutinum* B. & S., *c. ft.*; and *B. populeum* B. & S., *c. ft.* 700 ft.—*B. plumosum* B. & S. f. *homomalla*. 900 ft.—*B. purum* Dixon. 700 ft.

Hyocomium flagellare B. & S. 900 ft.

Eurhynchium piliferum B. & S. 1086 ft.—*E. prælongum* B. & S. 645 ft. — Var. *Stokesii* Lond. Cat. ed. ii. 900 ft. — *E. myosuroides* Schimp. 800 ft.—*E. striatum* B. & S. 700 ft.

Plagiothecium Borrerianum Spr. 1573 ft. — *P. denticulatum* B. & S. 645 ft.

Amblystegium serpens B. & S., *c. ft.* 700 ft.—*A. filicinum* De Not. 900 ft.

Hypnum stellatum Schreb. 1000 ft. — *H. examulatum* Gümb. var. *pinnatum* Boul., f. *stenophylloides* Ren. 1100 ft. — *H. fluitans* L. 1573 ft. — Var. *gracile* Boul. 1000 ft. — *H. vernicosum* Lindb. 1200 ft.—*H. cupressiforme* L. 700 ft.—Var. *filiforme* Brid. 645 ft. —Var. *minor* Wils., *c. ft.* 700 ft.—*H. molluscum* Hedw., *H. ochraceum* Turn., and *H. cuspidatum* L. 900 ft. — *H. Schreberi* Willd. 645 ft.

Hylocomium splendens B. & S. 1000 ft. — *H. brevirostre* B. & S. 800 ft. — *H. squarrosum* B. & S. 700 ft. — *H. triquetrum* B. & S. 750 ft.

Hepatics.

Frullania dilatata L. 645 ft.
Scapania undulata L., *S. speciosa* L., and *S. purpurea* L. 1000 ft.
Diplophyllum albicans L. 700 ft.
Chiloscyphus polyanthos L. 700 ft.
Plagiochila asplenioides L. 900 ft.
Gymnocolea (*Jungermania*) *inflata* Huds. 645 ft.
Jungermania gracillima Sm. 1100 ft.
Nardia scalaris Schrad. 645 ft.
Marsupella emarginata Ehrh. 700 ft.

LEICESTERSHIRE PLANT NOTES, 1886–1904.

By A. B. Jackson.

There being no immediate prospect of a second edition of the *Flora of Leicestershire* issued by the Leicester Literary and Philosophical Society in 1886, it seems desirable to bring together in these pages the accumulated records resulting from the observations of field-workers in the county during the past eighteen years. A number of earlier records culled from various sources, which appear to have escaped the notice of the compilers of the work named, are also included in the following notes.

It is much to be desired that an entirely new flora of the county should be brought out at an early date, giving a more complete account of plant distribution in Leicestershire than has yet been attempted. In the published *Flora* 1015 species and varieties were noted, 44 of these being Rubi. In a paper respecting the botany of the county, read before the Literary and Philosophical Society in 1900, Rev. T. A. Preston mentions 65 additional species and varieties, 40 casuals, and 22 Rubi, or a total of 127. Since then there have been several interesting additions, especially in the genus *Rubus*. I propose to make this prickly group the subject of a future paper, consequently no bramble records are here inserted.

Much of the material for these notes has been obtained from the well-arranged herbarium of Leicestershire plants at the local museum. Thanks chiefly to the unremitting labour of the Rev. T. A. Preston, this has now become one of the most representative collections of its kind. It comprises about 10,000 sheets.

The most notable additions to the county flora since 1886 include *Trifolium scabrum*, *Hippocrepis comosa*, *Inula britannica*, *Senecio campestris*, *S. viscosus*, *Vaccinium Vitis-Idæa*, *Asarum europæum*, *Potamogeton Zizii*, *P. undulatus* var. *Cooperi* (*P. perfoliatus* × *crispus*), *Orobanche elatior*, and *Alopecurus hybridus*. It will be as well to mention here that the records in the *Flora* of *Ranunculus confusus*, *Fumaria densiflora*, *Vicia gracilis*, *Galium sylvestre*, *Lamium intermedium*, and *Scirpus carinatus* have since proved to be errors.

Agricultural and building operations have been, no doubt,

responsible for the disappearance of many rare and interesting species from their localities in Leicestershire. This remark applies especially to the bog plants, very few of which are now to be met with in Charnwood Forest and other stations noted by the older botanists. The shores of the Leicester Corporation reservoirs at Cropston, Thornton, and Swithland yield a characteristic flora, especially when the water is at a low level. This was notably the case at Cropston during the dry summer of 1893, when *Inula britannica*, a continental plant allied to *I. salicina*, was first noticed. The banks of these reservoirs have also become the dumping ground of numerous aliens, which languish here for a season or two, and then disappear. The Beaumont Leys Sewage Farm near Leicester and a small plot of waste ground near Blaby Mill have also yielded numerous alien species. At Blaby their introduction appears to be accounted for by Turkish barley siftings which have been used to feed fowls kept near this spot; about 100 different species appeared here during the years 1902–3.

In the preparation of these notes, I have to acknowledge the help of Prof. Hackel, Messrs. H. and J. Groves, A. Bennett, W. H. Beeby, S. T. Dunn, F. Townsend, Revs. E. S. Marshall and W. Moyle Rogers, who have determined many critical plants for me. I am indebted to Mr. G. C. Druce for records from the British Museum Herbarium and the herbarium of the late Prof. Babington at Cambridge. Appended is a list of observers whose initials are used in the records:—

W. B. . . W. Bell.
T. C. . . . T. Carter.
E. F. C. . E. F. Cooper.
F. K. . . . Mrs. Foord-Kelcey.
A. E. F. . Rev. A. E. Furnival.
A. R. H. . A. R. Horwood.
M. K. . . Miss M. Kirby.
M. H. . . M. Holland.
F. T. M. . F. T. Mott.
T. A. P. . Rev. T. A. Preston.
H. P. R. . Rev. H. P. Reader.
G. R. . . . G. Robson.
W. M. R. . Rev. W. M. Rogers.
T. E. R. . T. E. Routh.
W. A. V. . W. A. Vice.

Section . Botanical Section, Leicester Lit. & Phil. Society.
Other records are from my own observation.

The prefix † denotes that the plant is probably or certainly introduced. New county records are distinguished by an asterisk. The numbers prefixed to the records indicate the districts as defined in the published *Flora*. I have endeavoured to include in the present list only those plants noted for districts additional to those already published in the *Flora*, together with any new species and varieties not mentioned in that work.

†*Clematis Vitalba* L. Hedge at Knighton, introduced with manure, *W. B.* 5. Near Nanpanton, Loughboro', *W. A. V.* Longcliff, *G. H. Storer.* Quorn, *F. K.*

Thalictrum flavum L. 5. Glenfield Brook, 1831, *Mrs. Oldham.* 9. Croft, *W. B.* Stony Stanton, *M. H.*

*†*Anemone apennina* L. 1. Birstal Copse, 1897, *F. Bott.*

Myosurus minimus L. 1. Casual from foreign corn, Blaby Mill, *W. A. V.* 6. Cornfield near the Trent, Castle Donington, 1902, *T. E. R.*

**Ranunculus trichophyllus* Chaix. 5. Swithland, brook near the railway, *T. A. P.* Pond by roadside near Sileby, *F. K.* — Var. *paucistamineus* Tausch, teste Freyn. 5. Pond near Buddon Wood. See Rouy & Foucaud, *Flore de France*, i. 68.—*R. heterophyllus* Web. ex p., var. *triphyllus* (Hiern). 1. Ditch near Stoughton Lane. Dried-up pond near Burrough-on-the-Hill, 1873, *F. T. M.* — *Var. *submersus* (Hiern). 1. Watercress-trench, Blaby, *W. A. V.* Pond near Humberstone. 5. Brook in the old canal reservoir, Charnwood Forest, *F. T. M.* — *R. Drouetii* Godr. *var. *Godronii* (Gren.). 2. Syston, 1894, *T. C.* — *R. sardous* Crantz. 5. Cropston Reservoir, *T. A. P.* Thornton Reservoir, *F. T. M.* Swithland Slate-pits, *F. K.* — *R. parviflorus* L. 6. Limestone quarry, Breedon, 1904. — *R. Ficaria* L. *var. *incumbens* (Schultz). 4. Anstey Lane, 1880, *G. R.* —*†*R. falcatus* L. 1. Blaby Mill, one plant, 1903, *W. A. V.*

Caltha palustris L. *var. *Guerangerii* (Bor.). 5. Cropston Reservoir, *T. A. P.*

*†*Helleborus viridis* L. 5. Site of old pond at Anstey, 1901, *C. Lowe.*

Aquilegia vulgaris L. 4. Saltby Spinneys, 1902, *W. B.* 8. Roadside between Bardon Hill and Copt Oak, 1901.

Aconitum Napellus L. 2. Thicket by a stream at Baggrave, naturalized, 1902, *A. R. H.*

Papaver Rhœas L. *var. *Pryorii* Druce. 2. Cornfield, Syston, *A. R. H.* 12. Potato-field, Great Easton, *W. B.* — *P. dubium* L. var. *Lecoqii* Lamotte. 5. Clay-pit, Cropston, 1896, *T. A. P.* Barrow, *F. K.* Garden weed at Thurcaston Rectory for several years, *T. A. P.* 9. Hinckley, *H. P. R.* 11. Smeeton Westerby, *W. B.* 1. Grounds of Humberstone Hall, 1904. — †*P. somniferum* L. 7. Ashby-de-la-Zouch, *W. B.* 5. Railway embankment, Thurcaston, *T. A. P.* The Brand, Swithland, *F. K.*

*†*Glaucium phœniceum* Crantz. 1. A single plant among other aliens at Blaby Mill, 1903.

†*Neckeria lutea* Scop. 9. Stone Bridge, Huncote Mill, *W. B.*

†*Cheiranthus Cheiri* L. 5. Old wall, Mountsorrel, *Rev. W. G. Whittingham.*

Nasturtium officinale R. Br. var. *microphyllum* (Reichb.). 5. Bradgate Hill, 1873, *Miss Russell.*

Barbarea vulgaris R. Br. *var. *divaricata* Dyer. 1. Birstal, *A. R. H.* 11. Market Harboro', *T. C.* — *†*B. præcox* R. Br. 5. Groby Granite Quarries, 1904.

Cardamine amara L. 11. Saddington Reservoir, *T. C.* By the Welland near Theddingworth, *H. P. R.* — *C. flexuosa* With. 1. Oadby, *A. R. H.* 11. Market Harboro', *T. C.* — **C. impatiens* L. 1. Casual in garden, Knighton Park Road, 1888, *T. C.* 7. Near Ashby, *Herb. Bloxam*, no date.

**Diplotaxis muralis* DC. 11. Near Market Harboro' Station, 1895, *F. T. M.*

Erophila stenocarpa* Jordan. 1. Humberstone, *M. K.* 5. Cropston. 9. Croft, *W. B.*—E. majuscula* Jord. 5. Lane at Cropston. —*E. præcox* DC. 9. Dunton Bassett.

†*Hesperis matronalis* L. 1. Railway bank near Birstal, 1901, *F. T. M.* 6. River-bank near Zouch Mills, *Section.*

Sisymbrium officinale Scop. *var. *leiocarpum* DC. 1. S. Wigston, 1901, *W. A. V.* Waste ground near Stonygate, 1898. Blaby Mill, 1903, *W. A. V.* Aylestone, 1904, *A. R. H.* — *S. Sophia* L. †1. Casual at Blaby Mill, 1903, *W. A. V.* 4. Muston, *A. E. F.* 11. Market Harboro', *E. F. C.* 12. Near Rockingham Station, 1892, *F. T. M.* 9. Elmsthorpe Station, 1903, *W. B.* — *†*S. pannonicum* Jacq. 1. Beaumont Leys Sewage Farm, 1896, *T. A. P.* Blaby Mill, 1903, *W. A. V.* — *†*S. Columnæ* Jacq. 1. Blaby Mill, 1903, *W. A. V.*

Erysimum cheiranthoides L. 1. Blaby Mill, 1903, *W. A. V.* Abbey Park Gardens, 1902. Garden near Evington, 1904. — †*E. perfoliatum* Crantz. 1. Garden, Birstal Hill, 1903, *F. T. M.* Blaby Mill, 1903, *W. A. V.*

*†*Alyssum incanum* L. 1. Blaby Mill, 1903, *W. A. V.* — †*A. calycinum* L. 5. Swithland Sand-pit and Thurcaston, *T. A. P.*

†*Camelina sativa* Crantz. 1. Thurmaston, 1897, *T. Bowker.* 2. Syston, 1894, *T. C.* Cornfield near Queniboro', 1903, *A. R. H.* 1. Blaby Mill, 1903, *W. A. V.*

*†*Coronopus didyma* Sm. 1. Casual at Blaby Mill, 1903, *W. A. V.*

*†*Lepidium latifolium* L. 1. Blaby Mill, 1903, *W. A. V.* — †*L. ruderale* L. 1. Found as an alien in waste places near Leicester, probably introduced with foreign seeds. — *L. campestre* R. Br. 4. Muston, *T. C.* 5. Thurcaston and Swithland, *T. A. P.* Railway bank near Bagworth, 1904.—*†*L. Draba* L. 1. S. Knighton, 1902, *W. B.* Aylestone Cricket-ground, 1904. Blaby Mill, for several years, *W. A. V.* 5. Sewage Farm, Beaumont Leys, 1896, *T. A. P.* — *†*L. perfoliatum* L. 1. Blaby Mill, 1903, *W. A. V.* — *†*L. virginicum* L. 1. Blaby Mill, 1903, *W. A. V.*

Thlaspi arvense L. 1. Knighton, *W. B.* Allotment gardens, Leicester, *W. H. Langton.* 5. Beaumont Leys Sewage Farm, and fields near Thurcaston, *T. A. P.* Barrow, *F. K.* 11. Railway banks, Market Harboro', *G. C. Druce.*

†*Reseda lutea* L. 1. Pumping Station, Belgrave, 1900, *W. B.* Blaby Mill, 1903, *W. A. V.* West Bridge, Leicester, 1903, *A. R. H.* 5. Swithland Clay-pit, 1896, *T. A. P.* 9. Stony Stanton, *W. B.*

Helianthemum Chamæcistus Mill. 4. Saltby Spinneys, 1886, *Section.* 9. Hedge-bottom by the railway near Huncote, 1898, *W. B.*

Viola silvestris Reichb. 1. Uppingham Road, near Leicester, 1903. 9. Near Thurlaston, 1896, *H. P. R.* Burbage Wood, 1902. 12. Owston Wood, 1902.

**Polygala oxyptera* Reichb. 9. Burbage Common, 1896, *H. P. R.*

*†*Saponaria glutinosa* Bieb. 1. Alien, at Blaby Mill, 1903, *W. A. V.* —*†*S. Vaccaria* L. Stackyard, Blaby, 1903, *W. A. V.*

Silene Cucubalus Wibel. 9. Stony Stanton, *W. B.* 11. Kibworth Harcourt, *W. B.* — *S. anglica* L. 1. Blaby, *W. A. V.* 5. Swithland, 1902, *Mrs. Dixon.* — *†*S. quinquevulnera* L. 5. Swithland, 1902, *Mrs. Dixon.* — *S. noctiflora* L. Weed in the Abbey Park gardens, 1902. 5. Field at Swithland, 1895, and subsequent years, *T. A. P.* 6. Breedon Quarries, 1904. — *†*S. dichotoma* Ehrh. 5. Cropston Reservoir, 1894, *T. A. P.* 1. Blaby Mill, 1903, *W. A. V.* —*†*S. conica* L. Blaby Mill, 1903, *W. A. V.*

Cerastium semidecandrum L. 5. Thurcaston. 1. Blaby. — *C. arvense* L. 4. Muston, *A. E. F.* Saltby Spinneys, *Section.*

Stellaria palustris Retz. 6. Margin of pond near the Trent at Castle Donington, 1902, *T. E. R.*—**S. umbrosa* Opiz, var. *decipiens* Marshall (*S. neglecta* Weihe). 2. S. Croxton and Queniboro'. 5. Cropston, *T. A. P.* 6. Near Castle Donington.

*†*Claytonia perfoliata* Donn. 5. Garden weed, Quorn, 1899, *F. K.* 9. Elmsthorpe Station, 1904, *M. H.*

Hypericum pulchrum L. 1. Billesdon Coplow, *A. R. H.*

*†*Malva pusilla* Sm. 1. Oadby. Blaby Mill, 1901, *W. A. V.*

†*Linum usitatissimum* L. 1. Knighton Grange, *W. B.* Victoria Park, *G. C. Turner.* 5. Beaumont Leys Sewage Farm, *W. B.* Seagrave, *F. K.* Thurcaston, *E. Sibson.* Cropston, *Miss L. Atkinson.* 8. Bardon, *T. C.*

†*Geranium phæum* L. 1. Roadside between Stretton and King's Norton, *Miss A. Baker.* — *G. pyrenaicum* Burm. 1. Roadside near Braunstone, 1902. Mere Lane, Oadby, 1902, *W. B.* 5. Barrow-on-Soar, *T. C.*—*G. lucidum* L. 1. Weed in garden at Knighton, 1899, *W. B.* †5. Cropston, *T. A. P.* 8. Several plants under hedge at Earl Shilton, 1902. 6. King's Mills, Castle Donington, 1901, *T. E. R.*

†*Erodium moschatum* L'Hér. 1. Market garden, N. side of Birstal, 1886, *F. T. M.* Casual, at Western Park, Hinckley Road, 1899.

Acer campestre L. var. *leiocarpum* Wallr. 1. Scraptoft, 1904, *A. R. H.* 5. Cropston, *T. A. P.* Thurcaston, *Rev. E. F. Linton.*

Cytisus scoparius Link. 2. Baggrave Park, *A. R. H.*

Ononis spinosa L. 2. S. Croxton and Hungarton, *A. R. H.*

*†*Trigonella cærulea* Ser. 1. Casual, Blaby Mill, 1903, *W. A. V.*

*†*Medicago falcata* L. 5. Casual, Beaumont Leys Sewage Farm, 1896, and following years, *T. A. P.* Oadby, 1898, *W. B.* — †*M. sativa* L. 4. Muston, *A. E. F.* — *†*M. denticulata* Willd. var. †*lappacea* (Dur.). 1. Belgrave Pumping Station, 1900.

*†*Melilotus alba* Don. 1. Belgrave Pumping Station, 1900. Blaby Mill (casual). 5. Swithland Clay-pit, *T. A. P.* Quorn, *F. K.* — *†*M. indica* All. 1. Thursley, one plant. Blaby Mill, 1903, *W. A. V.* — *†*M. arvensis* Wallr. 1. Belgrave Pumping Station, 1900. 5. Thurmaston, *T. A. P.* 7. Ashby-de-la-Zouch, *W. B.* 6. Nailstone, 1903, *A. R. H.*

Trifolium pratense *var. *parviflorum* ——. 5. Thurcaston, 1901, *T. A. P.*—*T. striatum* var. *erectum* Leighton. 5. Cropston Reservoir, 1899, *T. A. P.* 6. Lane near the Trent at Castle Donington, 1903, *T. E. R.*—**T. scabrum* L. 4. Muston, 1894, *A. E. F.* Measham, *Bloxam.*—†**T. agrarium* L. 5. Swithland, 1891, *T. A. P.*—*T. filiforme* L. 2. Loseby, *A. R. H.*

Anthyllis Vulneraria L. 2. Queniboro', *T. C.* 1. Brickyard, Thurcaston, 1904, *A. R. H.* 5. Rockley Plain, *W. Low.* Swithland Clay-pits, *T. A. P.* Quorn, *F. K.*

Lotus tenuis Kit. 5. Cropston Reservoir, 1896, *T. A. P.* 9. Elmsthorpe, 1895, *H. P. R.*

Astragalus glycyphyllos L. 10. Road between Ullesthorpe and Lutterworth, 1891, *W. G. Whittingham.* — *A. hypoglottis* L. 4. Saltby Spinneys, 1887, *Section.* Muston, 1894, *A. E. F.*

*†*Coronilla varia* L. 5. Casual, Beaumont Leys Sewage Farm, *T. A. P.*—*C. scorpioides* Koch. 1. Blaby Mill, *W. A. V.*

**Hippocrepis comosa* L. 4. Saltby Spinneys, 1887, *Section.*

†*Onobrychis sativa* Lam. 5. Swithland, *T. A. P.* Quorn, *F. K.*

Vicia gemella *var. *tenuissima* Druce. 4. Muston, 1894, *A. E. F.* 5. Swithland Reservoir, 1900. — *†*V. villosa* var. *glabrescens* Koch. 1. Casual at Birstal Hill, 1901, *F. T. M.*—*†*V. hybrida* L. 1. Belgrave Pumping Station, 1900.

†*Prunus Padus* L. 6. Park Woods, near Castle Donington, *T. E. R.*

Spiræa Filipendula L. 2. Roadside near S. Croxton, 1902.

Geum intermedium Ehrh. (*G. urbanum* × *rivale*). 9. Burbage Wood, 1895, *H. P. R.*

Potentilla procumbens Sibth. 6. Coleorton. — *P. reptans* × *procumbens*, fide W. R. Linton. 9. Burbage Wood, 1896, *H. P. R.* The Rev. E. S. Marshall considered this only a form of *P. reptans*. —*P. inclinata* L. Rev. E. S. Marshall considers a plant gathered by Miss Barber at Narboro' Bogs in July, 1904, to belong here. Although there are slight differences, it matches very nearly specimens of *P. inclinata* named by Dr. Wolf, of Dresden.

Alchemilla vulgaris var. *pratensis* (Schmidt). 8. Near Market Bosworth, *N. P. Small.*—Var. *filicaulis* Buser. 1. Highway Spinneys, Braunstone, *W. B.* Knighton Grange, *W. B.* 2. Old Dalby and Wartnaby, *F. K.* 5. Site of Swithland Reservoir, *T. A. P.* Thurcaston. Groby, *M. K.* Holly Hayes, *E. F. C.* 6. Waste land near Lorent Wood, *W. M. R.* Worthington Field Farm. 9. Stony Stanton, *M. H.* 12. Tugby, *W. B.*

Agrimonia odorata Mill. 5. Border of Blakeshay Wood, near Newtown Linford, with *A. Eupatoria*, 1900, *T. A. P.* Swithland Wood, *T. A. P.* 12. Tugby Wood, 1888, *F. T. M.*

**†Poterium polygamum* Waldst. & Kit. 4. Saltby Heath, 1902, *W. B.* Old Dalby, *F. K.* 5. Swithland Reservoir, 1900, *W. B.*

Rosa mollis Sm. 7. Ashby, *Miss Kidger.* 8. Ravenstone, *T. C.* — *R. tomentosa* Sm. 5. Rothley Plain and Thurcaston, *T. A. P.* Ulverscroft, *W. M. R.* 1. Near King's Norton, *Miss Miller.* 6. Lount Wood, *W. M. R.* 9. Normanton Wood and Ullesthorpe, *T. C.*—Var. *subglobosa* (Sm.). 10. Bitteswell, *T. C.*—Var. *scabriuscula* Sm. 1. Kirby Muxloe, *M. K.* — **R. obtusifolia* Desv. var. *frondosa* Baker. 5. Thurcaston, *W. M. R.* — *R. canina* L. var. *dumetorum* (Thuill.). 1. Birstal Gorse, *T. A. P.* — **R. glauca* Vill. 5. Ulverscroft Lane, *W. M. R.*—Var. *subcristata*. 5. Ulverscroft Priory, *F. T. M.* — Var. *implexa* (Gren.). Thurcaston, *Rev. E. F. Linton.*—Var. *Watsoni* Baker. 2. S. Croxton, *A. R. H.*

Chrysosplenium alternifolium L. 5. Blackbrook, *T. C.* 9. Elmsthorpe, 1902, *M. H.*

Ribes nigrum L. 5. Groby Pool, *E. F. Linton.* 9. Narboro' Bogs, *Section.*

Hippuris vulgaris L. 12. Horninghold, *Rev. T. Norris.*

Callitriche verna L. 2. Pond near S. Croxton, 1902, *teste Groves.* — *C. hamulata* Kuetz. 9. Croft, *W. A. V.* 11. Gumley, *F. F. C.* — **C. obtusangula* Le Gall. 1. Pond between Wanlip and Syston, *W. B.* 5. Ditch, Great Meadow, Loughboro', *F. T. M.* 6. Ditch

at Sawley Bridge, 1903.—Var. *Lachii* Warren. Mr. Marshall suspects a plant which I gathered at Sawley Bridge in June, 1903. The rosette, leaves, and fruit resemble *C. obtusangula*, but it has the submerged leaves of *C. hamulata* Kuetz., with truncate emarginate tips forming a slight hook on either side. Mr. Marshall suggests that it may be of hybrid origin. Mr. Arthur Bennett calls the plant *C. obtusangula*. This summer (1904) I failed to find it again, owing to the ditch being completely choked with *Lemna*. Typical *obtusangula* is found in the same ditch, but I saw no trace of *C. hamulata*.

Epilobium roseum Schreb. 5. Cropston Reservoir, 1894, *T. A. P.* —**E. montanum* × *obscurum*. 5. Cropston, 1897, *T. A. P.* —**E. montanum* × *hirsutum*. 5. Thurcaston, 1899, *T. A. P.* —**E. montanum* × *roseum*. 5. Between Swannington and Coalville, 1903, *A. R. H.* 9. Hinckley, 1894, *H. P. R.* —**E. obscurum* × *roseum*. 5. Cropston Reservoir, 1894, *T. A. P.*

†*Œnothera biennis* L. 5. Sewage Farm, Beaumont Leys, *A. Jarvis*. 1. Blaby Mill, *W. A. V.*

Bupleurum rotundifolium L. †1. Casual at Birstal Hill, 1891, *F. T. M.* Blaby Mill, 1903, *W. A. V.* 4. Muston, 1894, *A. E. F.* †5. Thurcaston. *T. A. P.* —*†*B. Odontites* W. A pretty species allied to *B. aristatum*, which appeared among other aliens at Blaby Mill in 1903.

†*Apium graveolens* L. 5. Swithland Clay-pit, 1896, *T. A. P.*

*†*Ammi majus* L. Waste ground, Western Park, Leicester, 1899.

**Carum segetum* Benth. & Hook. fil. 5. Barrow Lime-works, 1902, *F. K.* 2. Hungarton Churchyard, 1903, *A. R. H.* —†*C. Carui* L. 5. Beaumont Leys Sewage Farm, 1896, *T. A. P.*

Pimpinella Saxifraga L. *var. *dissecta* With. 8. Market Bosworth, *N. P. Small*. 9. Burbage, *H. P. R.* Sapcote, *W. B.*

*†*Scandix australis* L. 1. Blaby Mill, 1903, *W. A. V.*

*†*Bifora radians* Bieb. 1. Railway-station, Castle Donington, 1904, *T. E. R.*

*†*Anthriscus Cerefolium* Hoffm. 5. Weed in the garden of Thurcaston Rectory.—*A. vulgaris* Bernh. 3. Sproxton, *W. B.* 6. Near Hemington, 1904, *W. B.* 9. Huncote, *W. A. V.*

†*Fœniculum vulgare* L. 1. Spinney, Groby Road, 1872, *G. Robson* (probably an escape).

Œnanthe Lachenalii C. Gmel. 1. Marshy ground near Evington, 1903, *A. R. H.* Bog near Thurnby, 1904, *A. R. H.* —*Œ. Phellandrium* Lam. 2. By the Wreake, near Brooksby, *F. T. M.* 6. Pot Bottom, near Kegworth, 1901, *T. E. R.* 11. Saddington, 1891.

Heracleum Sphondylium L. var. *angustifolia* Huds. 1. Oadby and Knighton, *W. B.* 2. Lane near S. Croxton, *A. R. H.* 12. Allexton, 1904, *W. B.* 4. Redmile, *W. B.*

Caucalis arvensis Huds. 5. Thurcaston, 1843, *M. K.*—*C. nodosa* Scop. 1. Canal-side near the West Bridge, Leicester, 1900, *W. B.* Blaby Mill and Arnesby, *W. A. V.* —†*C. daucoides* L. 1. Blaby Mill, 1903, *W. A. V.*—*†*C. latifolia* L. 5. Disused chicken-pen at Thurcaston, one plant, 1899, *M. Leake*. 1. Blaby Mill, 1903, *W. A. V.*

Adoxa Moschatellina L. 9. Potter's Marston, *M. H.* Hinckley, *H. P. R.* 11. Gumley, *E. F. C.*

*†*Lonicera Xylosteum* L. 1. Braunstone, *Thomson, ex herb. Kirby.*

*†*Symphiocarpus racemosus* L. Naturalized in Budden Wood Quarry, and also in hedges around Leicester.

Galium uliginosum L. 1. Thurmaston, *T. C.* — **G. erectum* Huds. 1. Railway bank at Knighton, 1904, *F. Gamble.* 5. Swithland and Cropston, *T. A. P.* 6. Worthington, *A. R. H.* 7. Ashby-de-la-Zouch, *A. R. H.* 9. Stony Stanton, *F. Brown.*—**G. Vaillantii* DC. 5. Cropston, 1904, *T. A. P.* — *G. tricorne* Stokes. 1. Casual in garden at Birstal Hill, *F. T. M.* Blaby Mill, *W. A. V.* 5. Thurcaston, 1895, *A. Mansfield.* Cornfield near Barrow Lime Works, *F. K.* 9. Cornfield near Burbage, *H. P. K.*

*†*Asperula arvensis* L. 5. Beaumont Leys Sewage Farm.

Valeriana Mikanii Syme. 5. Botcheston Bog, *E. F. C.* 12. Ouston, *J. H. Neele.* Tugby, *W. B.*

**Valerianella carinata* Lois. 6. Breedon Quarries, 1903, *T. E. R.*

Scabiosa Columbaria L. 3. Stonesby Quarries, *F. T. M.* 5. Swithland, *F. K.*

*†*Xanthium spinosum* L. 5. Sewage Farm, Beaumont Leys, 1896, *J. Jarvis.*

Erigeron acre L. 1. Pumping Station, Belgrave, 1901, *W. B.* Between Leicester Abbey and the River Soar, plentiful, 1894, *F. T. M.*

Inula britannica L. This species, a native of damp meadows and river-banks in France, Spain, and Belgium, occurring as far north as Silesia, was first noticed on the shore of Cropston Reservoir in 1893, and has now become naturalized in stony ground on the north-east side of the Reservoir, having of late years considerably increased in luxuriance. It flowers freely during July and August, but in the winter and spring the spot is submerged. The first specimens found were unbranched, and not characteristic. On this account it was first referred to *I. montana*, and also the Irish *I. salicina.* It differs from the former chiefly by its corymbose inflorescence, and from the latter by its hairy achenes. The waterfowl which haunt the locality were probably responsible for its introduction into Leicestershire. It has not been noted from any other locality in Britain. See Bot. Exchange Club Reports, 1894, p. 451, and 1895, p. 485.

*†*Calendula officinalis* L. 7. Ashby-de-la-Zouch, *W. B.*

Gnaphalium sylvaticum L. 9. Stony Stanton, 1902, *M. H.*

Bidens cernua L. 1. Canal-bank near Wigston, *W. A. V.* 5. Rothley, *M. K.* 11. Church Langton, *T. C.* 12. Keythorpe, *Rev. T. Norris.*

Anthemis arvensis L. 4. Saltby Heath, *W. B.* 2. Queniboro', *T. A. P.* 1. Casual at Blaby Mill, 1903. 5. Black Brook, *T. C.* Cropston, Swithland, and Thurcaston, *T. A. P.* 8. Kirkby Mallory, *T. C.*

†Eclipta erecta W. 5. Beaumont Leys Sewage Farm, *T. A. P.*

†Ambrosia trifida L. 1. Blaby Mill, 1903, *W. A. V.*

Artemisia Absinthium L. 12. Near Rockingham Station, *F. T. M.*

Senecio viscosus* L. 5. Groby Granite Quarries, 1904, *A. R. H.* —S. campestris* DC. 4. Saltby Spinneys, 1887, *Section.*

*†*Centaurea Verutum* L. 1. Weed in Garden near Soar Corn Mills, Leicester, probably introduced with foreign corn, *F. T. M.*— *†*C. solstitialis* L. 5. Swithland Clay-pit, 1896, *T. A. P.* — *C. Scabiosa* L. 9. Stony Stanton, *F. Brown.* — *C. Cyanus* L. †1. Blaby Mill, *W. A. V.* 2. Thussington, *T. C.* †5. Swithland Clay-pit and Thurcaston, *T. A. P.* — *†*C. melitensis* L. 1. An alien at Blaby Mill, 1903, *W. A. V.*

**Arctium intermedium* Lange. 4. Saltby Spinneys, *F. T. M.*

Carduus nutans × *crispus.* 2. Hill above Loseby Station, 1904, *A. R. H.*

Onopordon Acanthium L. 6. Breedon, *T. C.*

Mariana lactea Hill. 3. Edmondthorp, *T. C.*

†*Cichorium Intybus* L. 5. Casual at Beaumont Leys Sewage Farm and Swithland Clay-pit, *T. A. P.* 1. Blaby Mill, *W. A. V.*

Picris hieracioides L. 1. Kilby, *E. F. C.*

Crepis biennis L. 3. Brentingby Field, 1887, *Section.* 5. Cropston Reservoir, 1894, *T. A. P.* — *†*C. setosa* Hall. fil. 1. Blaby Mill, 1903, *W. A. V.* — **C. taraxacifolia* Thuill. 1. Glen Parva Station. 5. Beaumont Leys Sewage Farm and Cropston, *T. A. P.*

*†*Hieracium aurantiacum* L. 1. Pumping Station, Belgrave, 1901, *W. B.* 9. Stoney Stanton, *M. H.* — *H. rigidum* Hartm. var. *scabrescens* Johanss. 5. Roccliffe, 1904, *W. B.*

*†*Hemizonia pungens* Torrey & Gray. 1. Manure-heap between Scraptoft and Leicester, 1898.

*†*Villanova dissecta* DC. 1. Blaby Mill, *W. A. V.*

Taraxacum officinale Web. var. *erythrospermum* (Andz.).—1. Scraptoft and King's Norton, *A. R. H.* 2. Loseby and Quenby, *A. R. H.*—Var. *palustre* (DC.). 9. Narboro' Bogs.

Campanula latifolia L. 11. Saddington Reservoir, *T. C.*

Specularia hybrida A. DC. 12. Rockingham Road, Gt. Easton, *W. A. V.*—*†*S. Speculum* A. DC. 1. Blaby Mill, *W. A. V.*

**Vaccinium Vitis-Idæa* L. 5. Boggy ground at the southern foot of High Sharpley, June, 1887, *Miss Kidger.* Searched for in vain a month later.

Primula acaulis × *veris.* 5. Cropston Reservoir. 12. Owston Wood.

Anagallis cærulea Schreb. 1. Leicester Frith, 1900, *J. H. Woolley.* Blaby Mill, 1903, *W. A. V.* 9. Normanton, *T. C.*

Blackstonia perfoliata Huds. 1. Railway-bank between Humberstone and Thurmaston, 1890, *Rev. G. N. Pochin.*

*†*Collomia linearis* Nutt. 1. Appeared in a garden at Humberstone in 1899 and subsequent years. Supposed to have been introduced with bulbs.

Lycopsis arvensis L. 2. Queniboro', *T. C.* 9. Burbage, *H. P. R.*

*†*Asperugo procumbens* L. 1. Blaby Mill, 1903, *W. A. V.*

Myosotis sylvatica Hoffm. 5. Buddon Wood, *T. C.* Swithland, *Miss Stapleton.* 11. Copse near Theddingworth, *H. P. R.*—*M. collina* Hoffm. 5. Bradgate Park, 1880, *G. Robson.* Thurcaston, *J. Bowler.*—*M. versicolor* Reichb. 2. Shoby, *T. C.* Loseby, *A. R. H.* 3. Wall at Waltham, and Stonesby, *F. T. M.*

*†*Amsinckia lycopsioides* Lehm. 1. Blaby Mill, *W. A. V.* 5. Cropston, *T. A. P.* 6. Castle Donington, *T. E. R.*

Cuscuta europæa L. 9. Elmsthorpe, *M. H.* — †*C. Trifolii* Bab. 5. Cropston, *T. A. P.* 9. Clover-field at Sapcote, *W. Spencer.*

Hyoscyamus niger L. 1. Stackyard, Blaby Mill, *W. A. V.* 2. Syston Rifle-range, 1899, one plant. 5. Beaumont Leys Sewage Farm, *T. A. P.* Between Barrow and Seagrave, *F. K.* 7. Ashby-de-la-Zouch, *W. B.* 11. Kibworth, *L. C. Haward.* Saddington Reservoir, *F. R. Rowley.*

Solanum nigrum L. 9. Blaby, *W. A. V.* — *†*S. Lycopersicum* L. 5. Abundant on the Beaumont Leys Sewage Farm. There is no doubt the seeds are carried down by the sewage. The fruit is gathered and ripened indoors.

†*Datura Stramonium* L. 5. Quorn, *F. K.*

Plantago major var. *intermedia* Gilib. 5. Cropston Reservoir, *F. T. M.*—*P. lanceolata* L. *var. *Timbali* Reichb. 5. Quorn, 1899, *W. M. R.*—*†*P. arenaria* W. & K. 1. Belgrave Pumping Station, one plant, 1900.

Verbascum virgatum Stokes. 5. Cropston, *L. Atkins.*

†*Linaria Cymbalaria* Mill. 11. Saddington Church, *W. B.* — *L. spuria* L. 1. Newton Fields, Oadby, with *L. Elatina*, 1902, *W. B.*

†*Antirrhinum majus* L. 4. Muston, *A. E. F.* 6. Breedon Quarries, *T. C.*

†*Mimulus Langsdorffii* Donn. 5. Cropston Reservoir and streams connected, *T. A. P.* Blackbrook, *F. K.* Naturalized about the brook at Gracedieu, *F. T. M.*

Veronica scutellata L. 6. Wet ground near Hemington. 12. Great Easton, *W. B.*

Euphrasia stricta Host. 1. Hamilton grounds, *W. B.* 2. S. Croxton, *A. R. H.* — *E. curta* Fr. 5. Ulverscroft, *T. A. P.*— Var. *glabrescens* Wittr. 5. Field at Cropston, *T. A. P.* — *E. Rostkoviana* Hayne. 5. Cropston Reservoir, *T. A. P.* Shepshed Lane, *F. T. M.* Ulverscroft and near High Towers, *Section.* Copt Oak. — *E. nemorosa* H. Mart. 3. Stonesby, old quarries. 5. High Towers, *Section.* Field between Thurcaston and Cropston, *T. A. P.* 6. Breedon Cloud, *W. M. R.* Lount Wood, *T. E. R.* Coleorton Wood, *T. C.* 8. Bagworth. 9. Stony Stanton, *M. H.* 12. Owston Wood.

Orobanche elatior* Sutton. 11. On *Centaurea Scabiosa*, near Smeeton Westerby, 1888, *Mrs. Macauley.*—O. minor* L. 1. Garden of St. Paul's Vicarage, Leicester, on *Digitalis*, 1894, *Rev. J. Mason.*— *O. Hederæ* Duby. 1. On ivy-covered wall near Blaby Mill, 1901, *W. A. V.*

Verbena officinalis L. 6. Single plant in an orchard at Castle Donington, *T. E. R.* 12. Roadside, Horninghold, *W. B.*

Mentha longifolia Huds. var. *nemorosa* Willd. 5. Orchard at Woodhouse Eaves, *F. T. M.* — *M. sativa* L. var. *subglabra* Baker. 5. Cropston, 1873, *Miss Russell.*

Thymus Serpyllum L. 2. Upland pasture near Beeby, *W. A. V.* 3. Stonesby, *T. C.* 4. Saltby Heath, *W. B.*

Nepeta Cataria L. 9. Roadside near Narborough.

Lamium hybridum Vill. 5. Garden ground, Copt Oak. Road-

side in Thurcaston Village, *T. A. P.* 9. Blaby Workhouse garden. 10. Lutterworth, *W. B.* 1. Mowmacre Hill.

*†*Stachys annua* L. 1. Blaby Mill, casual, 1903, *W. A. V.*

Scleranthus annuus L. 2. Wartnaby, *F. K.*

Chenopodium ficifolium Sm. 5. Cropston Reservoir, *T. A. P.* — **C. hybridum* L. 9. Garden weed at Hinckley, *H. P. R.*—**C. Vulvaria* L. 1. Blaby Mill, one plant, 1903, *W. A. V.*

Polygonum Bistorta L. 9. Stony Stanton, *M. H.* — *P. minus* Huds. 5. Cropston Reservoir, *F. T. M.*

**Asarum europæum* L. 9. Hedge-side, Galloway's Close, Stony Stanton, 1899, *M. H.* To all appearance wild.

**Mercurialis annua* L. 1. Male plant in garden at Leicester, 1890, casual, *E. F. C.*

**Salix triandra* × *fragilis* (*S. decipiens* Hoffm.). 5. Thurcaston, *Rev. E. F. Linton.* 2. Brooksby, *F. T. M.* — **S. aurita* × *cinerea* (*S. lutescens* A. Kern.). 9. Burbage, *H. P. R.* Scraptoft, 1904, *A. R. H.* — *S. purpurea* L. form *styligera*. 9. From an apparently very old tree by a pond at Sapcote, 1887, *Mrs. Lomax.*—*S. caprea* × *viminalis* (*S. rugosa* Leif.). 2. Quenby, 1904, *A. R. H.*

Populus alba L. 5. Apparently wild on the edge of the plantation on the west side of a lane near Swithland, *F. T. M.*

Orchis incarnata L. 5. Botcheston Bog, with *O. latifolia*, 1893, *Section.* This bog has since been drained. Cropston Reservoir, *A. Toone.*

Ophrys apifera Huds. 5. Swithland Reservoir, 1904, *Murray-Dixon.*

Epipactis latifolia Sw. 1. Billesdon, *A. R. H.* — **E. media* Fr. 4. Belvoir, *G. C. Druce.*

**Allium oleraceum* L. 5. Hedge at Thurcaston, 1897, *E. Leake.* —*A. vineale* L. var. *compactum* (Thuill.). 1. Spinney near Knighton, *W. B.*

Fritillaria Meleagris L. 1. Meadow near Thurmaston, 1902, *W. H. Langton.* 2. Meadow near Barkby, 1901, *W. B.* 8. Near Higham-on-the-Hill. Doubtfully wild in Leicestershire.

Juncus compressus Jacq. 9. By the spring at Willoughby Waterless, *F. T. M.* Meadow near Narborough. Normanton Park, *H. P. R.*

**Luzula Forsteri* DC. 6. Belton Wood, 1791, *J. Babington* (*Herb. C. C. Babington*).

Typha angustifolia L. 5. Cropston Reservoir and Groby Pool, *T. A. P.* 2. Quenby Pond, *A. R. H.*

Lemna polyrrhiza L. 2. Ballast-pond near Syston, *Section.* 3. Old canal at Edmondthorpe, *F. T. M.*

Alisma Plantago-aquatica L. var. *lanceolatum* Afz. 11. Great Bowden, *E. F. C.*—*A. ranunculoides* L. 9. Pond near Elmsthorpe, very sparingly, *H. P. R.*

Potamogeton lucens L. var. *acuminatus* Schum. 1. Canal at Aylestone, *E. F. C.* — **P. decipiens* Nolte. 7. Moira, *E. F. C.* 1. Canal near the Twelve Bridges, Leicester.—**P. crispus* × *perfoliatus* (*P. undulatus* var. *Cooperi* Fryer). 5. Abundant in the canal near Loughboro', 1885, *E. F. C.* See Journ. Bot. 1891, p. 289). — **P. Zizii* Roth. 7. Moira Reservoir, *E. F. C.* — *P. zosterifolius.* 4. Canal, Redmile, *W. B.* — *P. pusillus* L. 1. Canal at Aylestone.

Pumping Station, Belgrave. 5. Canal at Loughboro', *E. F. C.*—*P. Friesii* Rupr. 1. Lake in the Abbey Park, Leicester. Aylestone, *E. F. C.* 11. Canal near Theddingworth.

Eleocharis acicularis R. Br. 5. Shore of Cropston Reservoir, *T. A. P.*

Carex dioica L. 5. Botcheston Bog, 1893, *F. T. M.*—*C. disticha* Huds. 11. Lutterworth, *F. T. M.*—*C. paniculata* L. 5. Rothley Plain Farm, *T. A. P.* 11. Husband's Bosworth, *Miss E. D. Shenton.* Canal near Theddingworth.— Var. *simplicior* Anderss. 11. Canal near Theddingworth.—*C. pendula* Huds. 9. Burbage Wood, *E. F. C.* —*C. pilulifera* L. 9. Burbage Common, *H. P. R.*—*C. lævigata* Sm. 5. Gracedieu Wood.—*C. sylvatica.* 2. S. Croxton. Beeby, *W. B.* Gumley, *E. F. C.*—*C. flava* var. *lepidocarpa* Tausch. *fide* Townsend. 5. Botcheston Bog, 1893, *F. T. M.* — *C. Pseudo-cyperus.* 11. Old canal at Market Harboro', *H. P. R.* 5. Thurcaston, *T. A. P.*

*† *Panicum capillare* W. 1. Casual, Blaby Mill, 1903, *W. A. V.*

*† *Setaria italica* P. de B. 1. Blaby Mill, 1903, *W. A. V.*

*† *Phalaris paradoxa* L. var. *præmorsa* Coss. & Dur. 1. Casual at Blaby Mill, 1903, *W. A. V.*

**Alopecurus hybridus* Wimm. (*A. pratensis* × *geniculatus*). 6. Rough ground by the Soar at Kegworth, 1902. 1. Canal-bank, Birstal, 1903. See Journ. Bot. 1901, 232. — *A. fulvus* Sm. 5. Swithland Clay-pit and Cropston Reservoir, *T. A. P.* Thornton Reservoir. 7. Edge of a pond in Gopsall Park, *Bloxam.* 11. Saddington Reservoir, *W. B.*

*† *Phleum tenue* Schrad. and *P. græcum.* 1. Casual at Blaby Mill, *W. A. V.*

**Agrostis nigra* With. 1. Field near Thurnby. 5. Cropston, *F. T. M.* 8. Ravenstone, *T. C.* 9. Stony Stanton, *F. Brown.* Near Hinckley, *H. P. R.*—*A. canina* L. 2. Quenby, *A. R. H.*

Calamagrostis epigeios Roth. 4. Saltby Heath. *W. B.* 9. Burbage Wood, *E. F. C.* Sapcote, *W. B.* 12. Tugby Wood, *T. C.* Loddington Wood, *Norris.*

*† *Apera Spica-venti* Beauv. 1. Casual at Blaby Mill, 1903, *W. A. V.* — *† *A. intermedia* Hackel ined., sp. nov. 1. Blaby Mill, June, 1903, *W. A. V.* In looking through some Leicestershire gatherings collected last summer, I came across a grass labelled "*Polypogon monspeliensis*"; but, although the plant on the sheet bore a superficial resemblance to that species, it was obviously quite different in structure. I submitted some specimens to Professor Hackel, who writes as follows:—"In working out the grasses which a friend of mine—Dr. Zederbauer, of Vienna—collected upon the Erdschias-Dagh, a volcano in Asia Minor, I met with a new species of *Apera*, which in some degree is intermediate between *A. Spica-venti* and *A. interrupta*, but differs from both by certain characters. I named it *A. intermedia*, and it will be published with full description in the next volume of the Transactions of the Academy of Sciences, Vienna. The Erdschias-Dagh was the only known locality until now. Here this grass has been found from 1100 to 2300 mm. I was highly surprised to find in your collection this well-marked species as a casual in England. This fact indicates that *Apera intermedia* may have a wider area of distribution in Asia Minor. Perhaps it

has been introduced into England with wool, together with *Phleum græcum*, which is also very widely distributed in Asia Minor. The English specimen has somewhat longer panicles than the original one."

Avena fatua L. 9. Cornfield near Burbage, *H. P. R.* — *A. pratensis* L. Scraptoft, *A. R. H.*

†*Cynosurus echinatus* L. 9. Casual at Blaby Mill, 1903, *W. A. V.*

Koeleria cristata Pers. *var. *gracilis* (Boreau). 6. Breedon Quarries, *T. E. R.*

Melica uniflora Retz. 9. Burbage Wood, *H. P. R.*

Poa pratensis L. *var. *angustifolia* L. 5. Swithland Clay-pit, *T. A. P.* Coleman Road, Leicester, *A. R. H.*—*P. trivialis* L. *var. *Koeleri* (DC.). 1. Plantation at Birstal Hill, *F. T. M.*

Glyceria plicata F. var. *pedicellata* Towns. 1. Ponds at Knighton and Evington, *W. B.* 3. Pond near Brentingby Field, *Section.* 12. Horninghold, *Norris.* 2. S. Croxton, *A. R. H.* — *G. distans* Wahlb. 1. Casual at Coleman Road, Leicester, 1904, *A. R. H.*

Festuca sciuroides Roth. 3. Sysonby, *W. B.* 4. Saltby Heath, *W. B.* — *F. Myuros* L. 1. Elm's Road, Knighton. — *F. rigida* Kunth. 3. Sysonby, *W. B.*

Bromus erectus Huds. 4. Near Redmile, *W. A. V.* 5. Cropston Reservoir, *T. A. P.* 11. Canal-side near Theddingworth, 1898.—*†*B. arvensis* L. 1. Casual at Blaby Mill, 1903, *W. A. V.* 5. Cropston Reservoir, *T. A. P.* — *†*B. tectorum* L. 1. Abundant at Blaby Mill, 1903, *W. A. V.*—*†*B. inermis* W. 5. Swithland Clay-pit, *T. A. P.* Thurcaston, *N. Holden.*—*†*B. unioloides* Kunth. 5. Thurcaston, *T. A. P.*

Brachypodium pinnatum Beauv. 12. Stockerston, *W. B.*—Var. *pubescens* Syme, 3. Stonesby Quarries, *F. T. M.*

*†*Lolium perenne* L. var. *multiflorum* (Lam.). 1. Blaby Mill, 1903, *W. A. V.*—*†*L. italicum* var. *muticum* DC. 9. Hinckley. *H. P. R.* — *†*L. temulentum* L. 1. Both type and the var. *arvense* (With.) occurred at Blaby Mill in 1903, *W. A. V.*

*†*Hordeum jubatum* H. K. 1. Casual at Knighton, *W. B.* — **H. Caput-Medusæ* Coss. & Dur. 1. Blaby Mill, 1903, *W. A. V.*

Cystopteris fragilis Bernh. 5. Long Lane, near Coalville, 1887, *Herb. Mott.*

Botrychium Lunaria Sw. 2. Field near Barkby, 1904, *W. B.* 1. Field near Hathall, Lubbesthorpe, *W. B.* 5. Meadow at Thurcaston, 1904, *N. Holden.*

Ceterach officinarum Willd. 5. A single plant at Quorn, *T. C.* 9. Stone wall at Narboro', 1901, *W. B.*

Lycopodium clavatum L. 5. Buddon Wood and Beacon Hill, *F. K.*

Chara fragilis Desv. 1. Pond between Kilby and Fleckney, *W. A. V.* 9. Pond near Elmsthorpe, form approaching var. *capillacea* Coss. & G., *teste* H. & J. Groves.—*C. hispida* L. 6. Hemington Hole. — *C. vulgaris* L. 7. Mona, *E. F. C.* 9. Near Burbage, *H. P. R.*

Nitella opaca Ag. 5. Colery Reservoir, Charnwood Heath, *H. P. R.* 9. Pond near Burbage Wood, *H. P. R.*

NOTES ON AFRICAN ASCLEPIADEÆ.

By James Britten, F.L.S.

I have lately been arranging the Tropical African *Asclepiadeæ* in the National Herbarium in accordance with Mr. N. E. Brown's monograph in the *Flora of Tropical Africa*. I am greatly impressed with the thorough and exhaustive nature of Mr. Brown's work, and it is satisfactory to know that the Asclepiads for the *Flora Capensis* are in his capable hands. One or two notes which I made during my work may perhaps be worth recording.

Although the National Herbarium has been consulted, it has not been examined as exhaustively as might have been desired; and as a consequence certain species have been left doubtful which might have been cleared up. For example, of *Ceropegia Steudneri*, which Mr. Brown only knows from description, there are excellent specimens of the Schimper plant (no. 225) on which Vatke founded his species. Under *Podostelma Schimperi* he cites "Hildebrandt 484 (ex Vatke)"; but the set of Hildebrandt's plants to which this belongs, and which similar citations show that Mr. Brown has not seen, is in the National Herbarium: the plant in question is, moreover, the type of the species, which was originally described by Vatke under *Astephanus*. Of each of the four species of *Leptadenia*, the British Museum has specimens not cited by Mr. Brown, and of one of them—*L.? visciformis*—which Mr. Brown says he has not seen, we have the Hildebrandt number cited by Vatke as the type of his species; the specimen is in fruit, and would have enabled Mr. Brown to render his description—"follicles mentioned, but not described"—more complete.

Other examples of similar omissions might be cited—for instance, specimens from the Rev. W. E. Taylor named *Ceropegia denticulata* K. Schum. by Mr. Schlechter, might have been worth examination, as Mr. Brown says he has not seen the species—but sufficient has been said to show that the enumeration, comprehensive as it is, might without difficulty have been made more complete by a more thorough investigation of an easily accessible collection. Such omissions may be noted in other of the Kew Floras; thus, in Fl. Brit. Ind. iv. 52, Sir Joseph Hooker says: "*Dischidia clavata* Wall. Cat. 4209 is unknown to me; I have not found it in Wallich's herbarium at the Linnean Society"; but the number in question is in the National Herbarium.

One or two matters of nomenclature suggest a note. Mr. Brown does not cite the names given by Hochstetter on the tickets issued with some of the Schimper collections. These tickets comply with the requirements laid down in the De Candollean laws as constituting publication, and although botanists are not agreed as to whether they should be so regarded, the plants are widely distributed in herbaria; moreover, these printed names have been quoted in the *Flora* by other monographers, and their omission is thus inconsistent with earlier portions of the work. The

taking up of manuscript names in herbaria, is, of course, optional, and Mr. Brown is within his rights in ignoring them; but it is usually considered an act of courtesy to adopt them when they are available, and when they appear on a distributed set convenience would suggest their use. Mr. Brown places *Cryptolepis myrtifolia* of Schlechter (Journ. Bot. 1895, 301) as a synonym of the later *C. Welwitschii* Hiern (Welw. Cat. i. 677 (1898)), on the ground that the former is "name only"; but this is not so, as Mr. Schlechter cites *Ectadiopsis myrtifolia* Baill. as a synonym, and his name is clearly the earliest under the genus. On the other hand, Mr. Brown supersedes the well-known name *Pentatropis spiralis* by "*P. cynanchoides* R. Br. in Salt, Voy. Abyss. Append. lxiv.," which is certainly a *nomen nudum*, and as such has no claims to recognition. The substitution of a new combination—*Asclepias semilunata* N. E. Br.—in place of *A. denticulata* Schlechter, can only be justified on the principle of maintaining the oldest specific name, which, so far as I have observed, is not adopted anywhere else in the monograph, and is not in accordance with Kew practice. The practice of citing "Benth. & Hook. f." for combinations which they never made is now, we think, pretty generally abandoned: *A. filiformis* should stand as of Schinz in Verhl. Bot. Brandenb. xxx. 262, unless his *A. Buchenaviana* of even date, reduced by Mr. Brown to a variety, be adopted for the species.

The fact that these few criticisms are all that Mr. Brown's work suggests is the best testimony to its excellence.

SHORT NOTES.

Chantransia Alariæ Jónss. in the British Isles.—Specimens of this plant were obtained at Portrush, Co. Antrim, on Aug. 12th, 1904, growing on the lamina of *Alaria esculenta*. Monosporangia occurred plentifully on all the plants, but neither antheridia nor cystocarps were observed. The species was first described by Helgi Jónsson in Bot. Tidskrift, xxiv. 132 (1901); his diagnosis is as follows:—"Plant ·5–1 mm. high, clothing the lamina of *Alaria esculenta* with a dense woolly nap; filaments erect, 1–2, of a beautiful rose-colour, growing out of a single basal cell; filaments naked below, higher up bearing branches which are opposite, alternate, or secund, at the lower part 11–23 μ, but above 7–11 μ thick. Sterile threads piliferous. Sporangia obovoid-ellipsoid, sessile on the upper part of each cell of the branches, and of the top of the primary axis, opposite, and in the last cell terminal, 17–22 μ long, 10–11 μ thick. Sporangia in August." The specimens obtained at Portrush agree in most points with this description, except that the dimensions are somewhat smaller. The measurements are as follows:—Height of plants, ·42–·70 mm.; sporangia, 14 μ–18·2 μ long, 9·3 μ–11·2 μ thick; lower filaments, 8·4 μ–11·2 μ thick; upper filaments, 5·6 μ–8·4 μ thick. One important point of difference is that in all the specimens I have examined the monosporangia are,

as a rule, alternate in position. Hairs were not found terminating the filaments, though they may have been present earlier in the year. Besides occurring on the coast of Iceland, as described by Jónsson, the same species has been recorded for the Færöes by Börgesen (*Botany of Færöes*, 356 (1902)).—J. Adams.

Banks's Newfoundland Journal (p. 84). — The original of this Journal is in the possession of Mr. S. W. Silver, of 3, York Gate, N.W., who has been good enough to allow me to see it. It consists of two small quarto volumes, the first of which alone was transcribed by his sister, as noted on p. 84. It ends with a note on a severe storm encountered on the voyage to Lisbon: "Among other things that suffered, my poor Box of Seeds was one, which was entirely demolished; as was my Box of Earth with Plants in it, which stood upon Deck"; so that it would seem that Banks did not bring home living plants, as suggested on p. 85. The second volume has only nineteen pages of MS., beginning "Nov. 17, 1766. Arrived from Newfoundland in the river Tagus": it contains nothing of interest. James Britten.

Glyceria festucæformis (p. 310).—Among some critical plants recently re-examined, which were collected by Mr. S. A. Stewart and myself in 1889–90 during our examination of the Mourne Mountain district in Co. Down, I find two fine specimens of this grass, gathered by me on the shore between Kilkeel and Annalong in July, 1890, and labelled "*G. maritima?*" The coast here is stony for many miles, the result of the cutting back of a high bank of glacial detritus. As at the other Irish Sea station for the grass—near Cloghey—it is unfrequented, and its flora unusually free from chances of contamination. The existence of this station extends the range of *G. festucæformis* over thirty miles south-eastward along the coast. Besides providing a further proof that the plant is native in Ireland, it furnishes another hint as to a possible much wider extension of range.—R. Lloyd Praeger.

Charles Cardale Babington.—We have no wish to criticize Mr. Williams's review of the new edition of the *Manual of British Botany*, which appeared in the September number of this Journal (p. 271); but we cannot allow his statements as to the author himself to pass without a protest. Professor Babington's character and the value of his work are well known to all the older British botanists; but the rising generation might easily conclude from Mr. Williams's remarks that he represented the dogmatic and insular attitude in relation to British botany, whereas the exact opposite was the case. No one in his day did more to bring this country up to the level of the Continent as regards critical botany; no one had a more open mind in respect to his own work, and no one was more ready to welcome suggestions and assistance from others. A reference to Mr. Britten's appreciative obituary notice in this Journal for September, 1895 (p. 257), would have saved Mr. Williams from forming such an entirely false conception of Babington's work. The remark that, had Professor Babington visited the Continent, "he could have seen for himself how little real difference there is between the

constituent elements of the alpine flora of Switzerland and Austria and that of Scotland," would seem to indicate ignorance of the relationships of the Scottish flora.—H. & J. Groves.

Lemna polyrrhiza.—I found this plant in flower near Tenterden, Kent, on Aug. 22nd. This is, I believe, of rare occurrence in this state.—G. R. Ward.

Statice bahusiensis Fr.—This name cannot claim the precedence often accorded to it by those who retain *Statice* for the plants now more correctly placed under *Limonium*. The *Index Kewensis* cites for it "Fries Mant. i. 10" (1832), but reference shows that, although Fries here pointed out the differences between the two plants placed together by Linnæus in *Flora Suecica* (no. 270), he did not claim for them specific rank. His note begins, "Planta Scanica a Bahusiensi tantum differt," and the geographical terms he derives from the Linnean localities. Later (Mant. ii. 17, which according to Hartman, as Mr. B. D. Jackson informs me, was published in 1839) Fries distinguishes the two as species and retains these names for them, but meanwhile Drejer (Fl. Hafn. 121 (1838)) had raised them to specific rank as *S. rariflora* ("*St. Lim. bahusiensis* Fr. Mant.") and *S. Behen* ("*St. Limonium scanica* Fr. Mant."). Fries in Mant. ii. cites these names, but places them as synonyms of his *S. bahusiensis* and *S. scanica*. The latter name is not in the Kew *Index*, although it has precisely the same claim as *S. bahusiensis* to appear there. In the *Summa* (i. 201, 1846) Fries adopts the name *S. Behen* Drejer for his "*St. L. scanica*," but retains *bahusiensis*, of which he describes two forms—*borealis* ("*St. Bahusiensis* Fr. Nov. Mant. 1832, p. 12, ii. p. 17") and *danica* ("*S. rariflora* Drey."). His reasons for this retention are hardly convincing: he writes—"*E. prioritatis lege* hæc species *S. Bahusiensis*, sub quo nomine sex annos ante Dreyerum descripsi et in H. N. distribui, dicenda est. At cum *S. rariflora* Dr. specie non differat, hoc nomen ab aliis receptum ad *speciem nostram*, hac ratione dilatatam, transferrem, nisi Bahusiensis nomen utpote speciei stationem centralem indicans revera aptius esset; *St. rariflora* autem cum *plurimis* speciebus sui generis, floribus a se invicem vere remotis, comparata potius densiflora, quam rariflora dicenda." It is obvious that the existence of a name in MS. cannot claim priority over a published one; and the distribution of specimens in the *Herbarium Normale*, even if such distribution be recognized as publication (as to which botanists are by no means agreed), cannot avail in this case, as the printed tickets accompanying the specimens are not dated. The synonymy may be tabulated thus:

S. rariflora Drejer, Fl. Hafn. 121 (1838).
S. Limonium [forma] *bahusiensis* Fries Mant. i. 10 (1832).
S. bahusiensis Fries Mant. ii. 17 (1839); Summa, i. 201 (1846).

S. Behen Drejer, Fl. Hafn. 122 (1818).
S. Limoninum [forma] *scanica* Fries Mant. i. 10 (1832).
S. scanica Fries Mant. ii. 17 (1839).

North Devon Plants.—The Hon. Mrs. Cardew has quite lately gathered *Scirpus Holoschœnus* in open and wild common near sandhills on the River Taw, in North Devon. It grows in company with

Scirpus maritimus, *Juncus acutus*, *Carex Pseudocyperus*, *Senecio Jacobæa*, &c.—Fredk. Townsend.

A Correction.—The Areschoug of the bramble excursion (Journ. Bot. p. 294) was Dr. Frederik Wilhelm Christian Areschoug, Emeritus Professor of Botany at Lund, a man of about my own age, who is still living.—J. G. Baker.

NOTICES OF BOOKS.

The Timbers of Commerce and their Identification. By Herbert Stone, F.L.S., F.R.C.I. Illustrated with 186 photo-micrographs of sections prepared by Arthur Deane. Demy 8vo. Cloth, gilt. London: William Rider & Sons, Ltd. 1904. 7s. 6d. net.

Considering the vast importance of the timber trade in the commerce, not only of this country but of the world at large, it is somewhat surprising that the literature of the subject is chiefly confined to small contributions dealing for the most part with one particular branch of a vast study. It is true that we have a great Forest Conservancy Department in India, and many excellent volumes have appeared in connection with the useful work there carried on—such, for instance, as Gamble's *Manual of Indian Timbers*. In Australia and South Africa also the forest products have received a particular amount of attention; but in other British timber-producing colonies—such, for instance, as British Guiana—little or nothing has been done either towards clearing up the botanical nomenclature of such trees as are known to furnish valuable woods, or in developing the resources of the forests themselves: this, notwithstanding that the British Guiana forests are known to produce many excellent and beautiful woods, specimens of which have been shown at the several International Exhibitions, and have since found a permanent home in the great wood collections at Kew.

The interest attaching to a subject of such widespread and real importance ensures for any literary contribution to its knowledge a welcome from the large number of persons whose interests in many ways are so intimately connected with timbers. This is especially the case with the book under notice, whose author is well known as a specialist, and it needs only a glance at its contents to show that Mr. Stone's knowledge of the subject, both scientifically and commercially, is as great as is his interest in its study. This is further proved by the excellence of the 186 photo-micrographs with which the work is illustrated, and which, as the author says in his preface, "are not mere process blocks, as they show more detail when examined with a lens."

In the arrangement of the timbers enumerated in the book the author has followed the classification of Bentham and Hooker. The common name is succeeded by the scientific name, with reference to the plate where illustrated. Only those synonyms have

been quoted which have been found to be pitfalls in connection with the subject, hence the list does not pretend to be complete. Following the synonymy come other popular names, then "sources of supply," and "physical characters," under which, besides weight per cubic foot, we are glad to see smell and taste, conditions of burning, nature of ash, and whether colour is yielded to water or alcohol, are all considered. A description of the grain follows, then the uses to which the wood is put, the chief authorities to which reference is made, colour, anatomical characters (in which pores, rays, rings, and soft tissue are considered in transverse, radial, and tangential sections), concluding with the source from which the actual specimen described was obtained, and with notes on any differences observable on comparison with other specimens or descriptions.

It will thus be seen that the system adopted for identification is very complete, though at the same time we fully endorse the concluding paragraph of his Introduction, where Mr. Stone remarks that "it must be clearly stated that no varieties such as are due to different conditions of growth, climate, locality, or other external conditions can be distinguished by their structure. It is hardly possible to find language which will enable a reader to tell Honduras from Tobasco mahogany, or even American from African mahogany. There are characters which strike the St. Domingo variety and distinguish it from the others; but let any one attempt to put upon paper a description which will enable a second person to tell for certain which is which, and he will admit that the time has not yet come to essay it."

Under the head of "Practical Hints," the following very excellent remarks occur:—"The more familiar aspect of wood is of no less importance than the structure. The user of wood has from time immemorial relied upon the evidence of his unaided senses to tell one kind from another, and, just as in other arts, this rule-of-thumb method will always remain the chief factor in the discrimination of timbers. Science with its precise definitions and accurate instruments steps in only where common-sense stops short. A carpenter has no need for text-books to tell him the difference between oak and walnut, any more than a child has need for a work on botany to tell a daisy when he sees it; nor does the expert timber merchant need anything beyond his impressions coupled with his experience until he meets with a wood that he has never seen before. Here something more is needed. By noting minute details, usually overlooked, so many more characters are added to the obvious features, that a timber may be recognizedly described." These words will commend themselves to the practical readers of Mr. Stone's book as an indication that their so-called rule-of-thumb knowledge is not despised by those who are able to bring science into union with it. The fault of late has been to substitute scientific for practical knowledge, especially in matters relating to plant products; but the constant worker in timbers and ornamental cabinet-woods is often better able by "rule-of-thumb" and quick perception of differences in working to distinguish varieties not to be discriminated by scientific examination.

The number of woods dealt with is 247; a long list of names not admitted occur to us at the moment of writing; but we note that Mr. Stone says in his Preface that "some of the colonial specimens did not arrive in time to be incorporated in the list of species described, but they will be dealt with subsequently, and will form portions of a series of which the present book is the first instalment." We are glad to see this announcement; if the whole series of woods that are included in the Official Guides to the Kew Museums, especially those in the Timber Museum, are treated in the same way as the 247 dealt with in the present volume, Mr. Stone will have compiled a monumental work which will be indispensable for foresters and wood-workers for many years to come, for we must remember that Mr. Stone's aim is to introduce only such woods as he is able to personally investigate.

Bearing in mind the difficulties which surround the production of such a work, it would be ungenerous to refer to a few inaccuracies, which will no doubt be detected by the author, and set right in a future edition. We may, however, draw attention to the difficulty in finding the consecutive plates after Plate viii., Plate xiv. being placed between it and Plate ix., which is followed by x. to xiii. in proper sequence, when another break occurs with xvi., xv., xvii., and after this in proper order.

JOHN R. JACKSON.

The History of the Collections contained in the Natural History Departments of the British Museum. Vol. I. London: Longmans, &c. 1904. 8vo, pp. xvii, 442. Price 15s.

THIS volume, printed by order of the Trustees of the British Museum, contains severally the histories of the Libraries and of the collections in the three Departments of Botany, Geology, and Minerals. The article on the Libraries is not signed, but in the preface to the volume it is stated, on the authority of the Director, Mr. E. Ray Lankester, that it was written by the Librarian, Mr. B. B. Woodward; Mr. Britten rendered valuable assistance in the matter of the botanical drawings. A general alphabetical Authors' Catalogue of the whole Library, exclusive of minor separates, is in progress, the first volume of which was issued in August, 1903. According to a rough estimate (p. 22), based on the cataloguing returns, there were in the Natural History Museum at the end of the year 1900, without taking count of continuations, 75,202 volumes and 5780 maps; at the present time there are probably at least 80,000 volumes and 7500 maps.

The section on the Department of Botany (pp. 79–193) is signed by the Keeper, Mr. George Murray, who (p. 84) states that "advantage has been taken of Mr. Britten's unique knowledge of the history of the botanical collections," and that the latter, "with Mr. Gepp's help, completed the work." This statement is curiously expressed and difficult to appreciate—possibly the word "completed" is used to mean "composed"; it may, however, be expected that the expression will be explained or expanded in a later issue, and made

applicable to the whole section. A similar correction will no doubt be made in the preface by the Director.

The British Museum was established by Parliament in 1753, under the provisions of 26 Geo. II. ch. 22, an Act for the purchase of the Museum or Collection of Sir Hans Sloane and of the Harleian Collection of Manuscripts, and for providing one general Repository for the better reception and more convenient use of the said collections, and of the Cottonian Library, and of the additions thereto. Section 4 of the Act appointed a body of trustees, consisting of eighteen *ex officio* persons besides each of the principal Secretaries of State, whether peers or commoners, together with seven representative persons mentioned by name, and also fifteen other persons to be elected and nominated by them to be and to continue trustees for the term of their natural lives; there were in this and the succeeding sections provisions for filling up vacancies among the trustees. Section 14 provided that, for the better execution of the purposes of the Act, the said trustees should be a Body Politick and Corporate in deed and name, and should have succession for ever by the name of the Trustees of the British Museum. Sir Hans Sloane died January 11th, 1753.

According to Mr. George Murray's evidence, taken before the Departmental Committee on Botanical Work, November 1st, 1900, the Sloane and other pre-Linnean herbaria number about 90,000 specimens. No very large additions seem to have been made to these collections between 1753 and 1827; but in the latter year the Banksian herbarium, which was the foundation of the general herbarium, was acquired, and is one of the most frequently cited in botanical works.

A chronological account of the principal accessions to the botanical collections from 1829 to 1902 is supplied on pp. 85–128; every year is represented except 1830, 1832, 1833, and 1835; there are altogether 705 items. In 1876 the study set of Robert Brown's Australian plants and the second set of Welwitsch's African plants were acquired. This account is followed on pp. 129–193 by an alphabetical list of the more important contributions to the collection of plants in the Department of Botany. There are altogether 969 separate entries in the list, besides two cross-entries. In the great majority of cases, after the surnames of the collectors the Christian names or initials are added in parentheses; in seventeen cases, however, these latter are left blank, apparently for want of information. Among the blanks is the case of *Oldenburg* (p. 171); "*Fr. Pet.*" might be given to supply the want; this Swede collected at the Cape during the years 1771 and 1772; it is reckoned that about a thousand of his plants exist in the Banksian herbarium; nineteen species of *Scrophulariaceæ* are illustrated by specimens in this set.

The Brazilian collector, *Claussen*, on p. 140, has also a blank for his Christian name. Is not this the same person as the *Claussen* (*P.*) mentioned in the article on Geology on p. 278? *Dick*, a collector of Swiss plants, is another name similarly with a blank. The following paragraph, extracted from Alb. v. Haller, Hist. Stirp. Indig. Helvet. præf. p. xvii (1768), probably refers to him:—

"Sic D. *Jacobus* Dick V. D. M. pariter me curante, cum *Abrahamo* Thomas sylvarum custode, *Curiam*, *Spelugam*, *Clavennam*, *vallem Tellinam*, *juga Burmiensia*, montesque *Trone* & *Fräla*, *Berninam*, altissimum montem *Septimum* adiit, inde per *Furculam*, *Misaucum*, *Bellitionem*, alpesque *Grajas* & Valesiam *Rupem* rediit, multis rarissimis plantis ditatus. Porro alpes Valesiacas *Salanfe*, *Herbagere*, *Combe de Martigny* & *Valorsin* montem. Inde alpes vallis *Gastern*, aliasque impositas valli *Kienthal*, & regionem subalpinam, circa *Spiez* utiliter peragravit."

Again, the collector *Lund* (without any added initial), on p. 164, whose plants from Finmark were presented in 1843, is apparently the "Candidat N. Lund" mentioned in M. N. Blytt's Norges Flora, i. p. 251 (1861); the name of N. Lund is also cited elsewhere in the same work as a collector of Finmark plants; he is likewise named in C. J. Hartman's *Handbok i Skandinaviens Flora*.

The Botanical Department deserves great credit for the amount and quality of the information supplied in the several portions of the article. The particulars of the principal contents of the herbaria of Sloane and Banks, detailed with reference to the geographical sources, form a very valuable enumeration. In the list of the more important contributors are interspersed many original notes, and mention is made of MS. descriptions which are preserved in the department; also occasional references to this Journal, where Mr. Britten has printed learned memoranda on the subject. The account contrasts favourably with the very meagre information regarding the Kew Herbarium which was published in the *Bulletin of Miscellaneous Information* for 1901. It is to be regretted that, owing to the discontinuance of the Annual Reports of the Royal Gardens and the cessation of the *Bulletin*, botanists have now no means of knowing what collections are acquired by Kew.

W. P. H.

BOOK-NOTES, NEWS, &c.

Dr. Francis Bossey, who was prematurely included in the first supplement to the *Biographical Index of British Botanists*, died at his residence at Redhill, Surrey, on Sept. 27th. He was born at Sutton-at-Hone, Kent, Oct. 21st, 1809, studied at Guy's Hospital and in Paris, and took his M.D. in Glasgow, after which he was for many years in practice at Woolwich, from which he retired in 1867, and settled at Redhill. He was a member of the Botanical Society of London, before which, in 1838, he read a paper on fungi which attack cereals: in the following year he published some notes on Kent plants in the *Annals and Magazine of Natural History*; he also contributed to Gibson's *Flora of Essex* (1862). Bossey was a Fellow of the Royal Microscopical Society, and when he settled at Redhill took much interest in establishing the local microscopical society (now defunct), of which he was the first President. His herbarium is to be presented to the Holmesdale Natural History Club. He is buried in the family vault at Sutton-at-Hone.

Messrs. Hodges, Figgis & Co., of Dublin, announce as in the press, and shortly to be published, with a new map, price 12s. 6d. net, to subscribers 10s. 6d., a *Flora of the County Dublin*, including the Flowering Plants, Higher Cryptogams, and Characeæ, by Nathaniel Colgan, M.R.I.A. "The results of the writer's personal researches into the popular plant-names now current amongst the Dublin country-folk will be given in detail in a special Supplement, with a commentary and illustrative notes; while the historical section of the Introduction will sketch the course of botanical investigation in the county from the days of Threlkeld up to the opening of the present century."

We have received the first part of the second series of the *Vegetationsbilder*, edited by Dr. G. Karsten and Dr. H. Schenck. For this part, which is entitled "Epiphyten der Amazonasgebietes," Dr. E. Ule is responsible. Plate 1 represents a Bromeliad, *Nidularium eleutheropetalum* Ule, n. sp., and *Hillia Ulei* K. Schum., n. sp. (Rubiaceæ), epiphytic upon *Japarandiba Spruceana* Ule, n. sp. (Lecythidaceæ). No description is given of these three new species; while the plate, though giving an idea of the general habit of the two epiphytes, in no way supplies the place of specific diagnoses. Plate 2, representing a *Clusia* upon a small myrtaceous tree, gives only a very general idea of the method of growth of the epiphyte. The next two plates are good representations of the fern *Platycerium andinum*; a second epiphytic fern (*Polypodium Ulei* Hieron., n. sp.) is depicted, though not at all clearly, in Plate 3. Plate 5 shows one of the Cactaceæ, *Cereus megalanthus*, depending from a *Ficus*. Plate 6 represents three of the so-called ant-epiphytes (a *Streptocalyx*, an *Anthurium*, and a *Codonanthe*), plants with a berried fruit, the seeds of which are sown in suitable places on trees and shrubs by ants, which also tend the young seedlings. While commending the general usefulness of these photographic representations of aspects of vegetation which are inaccessible to most students of botany, we must deprecate their use for starting new specific names, especially when unaccompanied by any description.

In *Die Transpiration der Pflanzen* (8vo, pp. x, 283, 24 figs. in text) Dr. Alfred Burgerstein gives a useful account of the work which has been done by the very numerous workers on the subject of transpiration. The author has brought within a useful compass results and methods which are scattered through a long series of books and papers, and has also contributed some observations, hitherto unpublished, of his own. At the end of the book is a bibliography of the subject, occupying more than thirty pages; the arrangement is alphabetical, according to the authors' names. Dr. Burgerstein's book will be invaluable to students (price 7½ marks).

The Clarendon Press sends us "the Fitzpatrick Lectures for 1903" on *English Medicine in the Olden Times*, by Dr. J. F. Payne—an interesting summary of Anglo-Saxon medical literature. For the portion relating to the old herbals, the author has largely, but by no means exclusively, relied on Cockayne's *Anglo-Saxon Leechdoms*. We note that he does not always accept Cockayne's identifications,

which indeed are often open to question. There seems little doubt, for example, that the "bonewort" or banwort, glossed (p. 85) as "generally interpreted as violet or pansy" is the common daisy, which is still called "banwort" in the north, as it was in Turner's days, "because," says he, "it helpeth bones to knit again"—a property indicated by its herbal name "Consolida media or middle consound." A few interesting reproductions of old figures are given: among them one of "lactuca leporina" from the Latin Apuleius, B. Mus. Ms. Harley 1585," which is no doubt Dandelion, although the Hare's Lettuce was, according to Gerard, *Sonchus oleraceus*. The volume, which is beautifully printed, costs 8s. 6d. net.

Sir George King is prosecuting with much vigour the important publication of *Materials for a Flora of the Malayan Peninsula*. In the two parts (14 and 15) recently to hand, Sir George has secured the co-operation of Mr. J. S. Gamble; save for the three species of *Viburnum*, they are entirely occupied with the *Rubiaceæ*, the proportion of new species being very large. Each genus is furnished with an elaborate clavis, which in the case of species and genera often nearly allied must prove of the greatest value in the determination of the plants.

A very good group-photograph of most of the botanists present at the recent meeting of the British Association has been published by Mr. H. C. Stearn, of Cambridge, price 2s. 6d. A slip with the names accompanies the photograph.

We have received from Messrs. Lovell Reeve & Co. a copy of the second edition of Mr. Townsend's *Flora of Hampshire*, which we hope to notice next month. It is a handsome volume of about 700 pages, and is published at a guinea net.

Mr. John Bennett Carruthers, Assistant Director of the Royal Botanic Gardens, Peradeniya, has been appointed Director of Agriculture and Government Botanist of the Federated Malay States.

Mr. F. N. Williams, who is publishing, in the *Bulletin de l'Herbier Boissier*, the enumeration of Siam plants foreshadowed in his paper in this Journal for 1903, p. 306, has, in the September issue of the *Bulletin* (p. 1027), a somewhat ambiguous note on nomenclature. He writes:—"In the matter of nomenclature, I have mainly followed the suggestions issued by the botanical authorities of the Berlin Museum, being for the most part readily applicable by practical botanists; but I am in complete accord with the views long held by the scientific staff of the Kew Botanic Gardens and Herbarium, who disregard the multifarious and mutually conflicting 'rules' for nomenclature each and all severally recommended for adoption in bewildering succession, to the confusion of botanical literature, and who rightly relegate nomenclature to a subordinate place in systematic botany." We *do* not suppose Mr. Williams *means* to say that the Kew "views" lead to "the confusion of botanical literature," but he certainly *says* it, and we are not inclined to deny that the absence of any principle other than that of "convenience" is likely to bring about something of the kind.

C.E. Salmon del.
M. Smith lith.

West, Newman imp

Limonium.

NOTES ON LIMONIUM.*

By C. E. Salmon, F.L.S.

II.—Limonium Neumani (*L. humile* × *vulgare*).

(Plate 466.)

Dr. L. M. Neuman in 1897 (Bot. Not. 207) pointed out that plants evidently to be referred to this hybrid occurred in Denmark, but it was not until 1901 that attention was called to it in England. In August of that year Revs. E. F. Linton and E. S. Marshall discovered it at Bosham, in West Sussex, and recorded it from there a few months later (Journ. Bot. 1902, 41). In the following September, and again in 1903, I was able to spend some hours on the salt-marshes near Bosham, and the following notes were then put together.

Both *L. humile* and *L. vulgare* are frequent here and there for many miles along the coast- and creek-line, but it was only where the two grew *thickly* together that the hybrid occurred. Very great variety of habit was noticeable in these hybrids (see plate), the examples now approaching one parent, now the other; some perfect intermediates were seen, but the majority of the hybrids favoured *L. humile*.

The hybrids possessed a very irregular panicle, its branches, often springing from the same point (as in *L. vulgare* var. *hallandicum*), were irregularly recurved or incurved; the spikes were *unequally* dense, or the spikelets *loosely* in two contiguous rows, or with empty bracts interrupting somewhat densely-placed spikelets; the styles were shorter or longer than the stamens; the fruit was formed here and there, but many of the ovaries were barren and shrivelled.

From *L. humile* one may separate *L. Neumani* (as I name the hybrid) by its scape being usually branched near the summit, or at any rate well away from its base, the shorter, less flexuose spikes, the closer set spikelets and the individual spikelets being shorter. The petals, too, were emarginate or entire. From *L. vulgare* it may be distinguished by the brighter colouring of calyx and bracts, by the longer spikes, often incurved, and the absence of the regular distichous imbricate arrangement of spikelets. The calyx varied greatly in degree of pilosity, which seemed to be determined by which parent had been prepotent.

Dr. L. M. Neuman has stated (Bot. Not. 1897, 207) that the hybrids of Drejer's collecting may be separated from *L. humile*, of which they possess somewhat the habit, by a less hairy calyx, bad pollen, and more or less dense sub-bilateral spikes. Dr. Neuman tells me that some of these Danish examples exactly matched many of the Bosham hybrids, a series of which I had sent him for inspection.

---

* See Journ. Bot. 1903, 65.

These Sussex specimens differed, however, in that all had good pollen, and he divided the plants sent into two bundles, labelling one, "These are most like the primary hybrid, going nearer to *scanica* [*vulgare*] than to *bahusiensis* [*humile*]." Of the other he said, "All in this cover are *S. bahusiensis* Fr. var. *danica* Fr. I do not assert it is a hybrid because the pollen is very good! Perhaps here, as in Denmark, the primary hybrid is not to be found nowadays, but only secondary hybrids, returning to the parents." There is a specimen of *L. Neumani* in the Copenhagen Herbarium, where Gelert has named it as a variety of *S. Behen*.

This summer I was able to examine a portion of the Hampshire coast near Fareham—where W. L. Notcutt sixty years ago found some plants (now in Hb. Watson at Kew) that I felt sure must be of hybrid origin. It was satisfactory to be able to verify this from living plants, for *L. Neumani* was seen in some abundance, growing with the parents, for some distance along the shore, under somewhat similar conditions as at Bosham.

It would seem that this hybrid is not of very rare occurrence; it should certainly be looked for wherever the two parents grow together; it is fairly easily separated when growing, but, like many hybrids, hard to define and difficult to recognize when dried.

LIMONIUM NEUMANI ×.

L. humile Mill. × *L. vulgare* Mill.

Statice variflora Drejer! Fl. Excurs. Hafn. 121 (1838) (pro parte).

S. bahusiensis Fr. var. *danica* Fr. Sum. Veg. Scan. 200 (1846) (pro parte).

The following is a description of plants selected as being fairly intermediate between the two parents; forms closer to each species also occur:—

Scapus ab imo vel juxta apice ramosus, *inæqualissimus*, nunc corymbosus nunc paniculatus; spicæ sæpe laxe *incurvatæ et recurvæ in eodem specimine*; spiculæ *contiguæ*, sed *non dense imbricatæ*; spicæ a bracteis sterilibus *sæpe interruptæ*; styli staminibus breviores vel longiores; petala nunc emarginata nunc integra.

Plant about 10 in. high or less. *Leaves* pinnately-veined, usually of the elliptic-lanceolate *humile* shape. *Scape* rather slender, subangular or subterete, branched from base or near the middle, or apex only. *Branches* remarkably irregular, now forming a panicle, now corymbose, erect or spreading, or even patent-arcuate. *Branchlets* often with empty bracts. *Spikes* shorter than those of *humile* and longer than those of *vulgare*, erecto-patent, straight or flexuous, loosely incurved or recurved. *Spikelets* 1–3-flowered, contiguous, but not densely imbricate, often irregularly crowded, with the spike interrupted with empty bracts. *Outer bract* 1–1⅜ lines long, as in *vulgare*. *Middle bract* 1–1⅜ lines long, as in *vulgare*, but sometimes shorter than outer. *Inner bract* 1⅞–2¼ lines long, as in *humile*. *Calyx* slightly tinged with purple of *humile* type, but less hairy. *Styles* shorter or longer than stamens. *Petals* emarginate or entire. *Fruit* formed here and there, but many barren shrivelled ovaries present.

A G & P H. del
P Highley lith

West, Newman imp. London.

Rhipidosiphon and Callipsygma.

Distribution.—England! Scotland! Denmark! Sweden!

? 10. *Isle of Wight.* Yarmouth! 1900, *H. W. Pugsley.* — 11. *Hants South.* Fareham! *W. L. Notcutt* (*Hb. Watson*) *& C. E. S.*, 1904. Hythe! 1895, *G. C. Druce* (*Hb. Oxford*). Hayling Island! 1880, *J. Groves; and C. E. S.*, 1904. —13. *Sussex West.* Bosham! 1827 (*Hb. Borrer*), *and E. F. Linton & E. S. Marshall*, 1901; *and C. E. S.*, 1901, 1903, 1904. — 15. *Kent East.* Between St. Margaret's Bay and Dover! Ex hb. Soc. Bot. Lond. 1840 (*Hb. Watson*). Whitstable! 1850, *F. Brent* (*Hb. Watson*). — ? 19. *Essex North.* Walton-on-the-Naze! 1876, *Churchill Babington* (*Hb. Brit. Mus.*).— ? 52. *Anglesey!* 1884, *J. E. Griffith* (*Hb. R. P. Murray*). — ? 54. *Lincoln North.* Cleethorpes! 1879, *H. Searle* (*Hb. Brighton*).— 60. *Lancashire West.* Blackpool! 1874, *W. R. Linton.* — ? 66. *Durham.* Hilton! (*Hb. Smith at Linn. Soc.; L. humile* is not on record for this county.) — 73. *Kirkcudbright!* 1868, *Prof. Balfour* (*Hb. Edinburgh*).—? 74. *Wigtown.* Garlieston! 1836 (*Hb. Edinburgh*).

EXPLANATION OF PLATE 466.

1 & 2. *L. Neumani*, half full size. 3. *L. vulgare* Mill. var. *hallandicum*, half full size. 4. Calyx of *L. vulgare*. 5. Ditto, var. *macrocladon*. 6. Ditto, var. *hallandicum*. 7. Ditto, *L. humile* Mill. All enlarged four times.

RHIPIDOSIPHON AND CALLIPSYGMA.

BY A. AND E. S. GEPP.

(PLATE 467.)

THESE two rare genera have been placed by systematists in *Udoteaceæ*, or in the slightly more comprehensive order *Codiaceæ*. Neither of them has been recorded more than once, though *Rhipidosiphon* occurs in herbaria under another name. Having been so fortunate as to discover some new facts concerning both genera, we believe that the following notes, with the accompanying figures, will be of considerable aid to algologists in the identification of the plants.

RHIPIDOSIPHON.

This genus, which was founded by Montagne in Prodr. Phycolog. Antarct. 1842, p. 14, and was placed in *Siphoneæ*, has long been a standing puzzle to algologists. Montagne described it as a fan-shaped thallus with dichotomous and anastomosing filaments. The single species *R. jarensis* was collected by Hombron off Java, and has never been recorded since. When Madame Weber van Bosse kindly entrusted us with the working out of the *Codiaceæ* of the Siboga Expedition to the Dutch East Indies, we hoped to find specimens of *Rhipidosiphon*. There were several plants exactly like it in size and habit, but we were unable to detect in any of them the characteristic anastomosis described and figured by Montagne in Dumont-d'Urville's *Voyage au Pôle Sud*, Bot. i. (1845), p. 23,

pl. 7, fig. 3. We had previously regarded these as being very young specimens of *Udotea glaucescens*; but so entirely did we find them to correspond with Montagne's figures in every respect except the anastomosis, that we began to suspect that Montagne had been inaccurate in his observation. And so, indeed, it proved; for we discovered at last in one of our plants instances of an "anastomosis"—not indeed of the filaments of the flabellum, but of the lines of calcareous cement which fills the grooves between contiguous filaments, and also forms a ring round the constriction at the base of each branch of a dichotomy. This can be made clear by figures. Fig. 4*a* shows the "anastomosis" as represented by Montagne, who mistook the shaded parts for filaments, while in reality they are merely lines of calcification outlining the dichotomy of a real filament. Fig. 4*b* renders this more obvious; while fig. 4*c* shows the same dichotomy decalcified.

In order to verify our conclusions, we compared the Siboga specimens with Montagne's type in Herb. Mus. Paris, kindly lent to us by M. P. Hariot, and found them to be identical. There is not a trace of anastomosing filaments in the type. Further than this, the specimens issued as *Udotea glaucescens* var. *tenuis* (or *tenuior*) Grun. in Ferguson's *Ceylon Algæ* (No. 439) proved also to be *Rhipidosiphon javensis*, but larger and better grown specimens. (Fig. 1 *a*.)

The existence of anastomosis being thus definitely disproved in *Rhipidosiphon*, it is no longer possible to maintain the genus. It is clearly nothing but a very simple *Udotea*, closely resembling *U. glaucescens* in its monostromatic flabellate frond, but differing from it in its simple monosiphonous translucent stipe; the stipe of *U. glaucescens* is always composed of several parallel filaments bearing numerous lateral branchlets, which form a calcified cortex. We therefore merge *Rhipidosiphon* in *Udotea*, thus adding to the latter genus one species, with the following diagnosis slightly altered from Montagne's original description :—

Udotea javensis (syn. *Rhipidosiphon javense* Mont. *l. c.*). Frons 2·5–30·0 mm. alta, glaucescenti-viridis, e stipite continuo monosiphonio non incrustato inferne sparsim radicellifero flabellatim expansa, e ramis iterum iterumque dichotome divisis monostromatice dispositis a stipite radiantibus strictis juxtapositis conglutinatis constituta, plana, basi cuneata, superne rotundata fimbriata sæpe fissa, crustâ calcareâ obducta.

Hab. Ad madreporam in oris insulæ Leyden Bataviæ, *Hombron*! Ceylon, *Ferguson*! (no. 439); Malay Archipelago, *Mme. Weber van Bosse*!

Callipsygma.

This genus is hardly more than a name to most people. It was described by J. G. Agardh in *Till Algernes Systematik* viii. pp. 65–67, and there are, so far as we know, only two specimens extant, being parts of the same Australian plant; one is in the Agardh herbarium at Lund, and the other in the Bracebridge Wilson collection in the British Museum (fig. 5*a*, *b*). The Lund specimen we have not

seen, since the same strict rule holds good in the Agardh herbarium as in the British Museum, that no part of the collection may be lent. The example in the British Museum is unfortunately a mutilated one, and to remove for examination anything but a minute fragment from so scanty a representative of a unique plant would be reprehensible. As no figure of *Callipsygma* has ever been published hitherto, the difficulty of botanists and collectors in recognizing it is all the greater. We therefore publish some figures of it here, together with a few remarks on its structure, in the hope that collectors may search for it successfully, and send some of their material to us to be examined and included in our forthcoming Monograph of the *Codiaceæ*, if the genus should really prove to belong to that order.

The description by J. G. Agardh (*l. c.*) is as follows:—"Frons supra stipitem, inferne adparenter hirtum et vix incrustatum, ancipitem, parce a marginibus subpinnatim ramosum, utrinque expansa, tota complanata, ramis singulis abeuntibus in flabellum terminale, demum suæ rachidis prolongatione magis plumosum; flabelli cujusque filis inferioribus subseparatis in ramos novos properantibus. Fila totam frondem componentia articulatim constricta, articulis oblongis; *laminarum* a margine rachidis exeuntia, repetite dichotoma, juxtaposita, lateraliter conglutinata; *stipitis* paulisper flexuosa, invicem superposita et conglutinata secus mediam lineam densiora."

We do not find that the filaments of the flabellate laminæ are laterally juxtaposed in one plane as the above description seems to imply; but they often overlap, and are partly superposed (fig. 6).

Agardh places *Callipsygma* in the *Codiaceæ*, and in the remarks which follow his diagnosis he compares it briefly with an imaginary *Rhipocephalus* having all its parts flattened into the same plane; but, whereas the typical structure of *Rhipocephalus* consists of an undivided, terete, calcified stalk bearing a head or cone of many little cuneate calcified flabella emerging on all sides, *Callipsygma* is constructed on a different plan. The stipe is two-edged, uncalcified, and throws out at the margins complanate rachides, which grow out each into a terminal flabellum. The whole plant is, however, complanate, and, so far as we have seen, entirely uncalcified; and the green flabella are totally unlike the regular, monostromatic, calcified flabella of *Rhipocephalus Phœnix* (the only species which Agardh knew). We would further point out that they bear a close superficial resemblance to branchlets of Harvey's specimen of *Cladophora valonioides* (Exsicc. Alg. Austral. No. 587 A), but not to his plate lxxviii. in *Phycologia Australica*, vol. ii. (1859).

We gather from Agardh's account that the two-edged rachis is composed of parallel primary filaments, the middle ones being wider and thick-walled; its lower part is clothed with short flexuose branchlets and with the bases of the old broken-off flabella. Each flabellum arises from a filament which grows out from the edge of the rachis, and Agardh describes how secondary flabella are formed from basal filaments of the primary flabella. The filaments are

constricted at fairly regular intervals, and at these points dichotomy usually occurs ; and the dark green chlorophyll becoming massed at the constrictions (in the dried plant at least), the flabellum acquires a somewhat zonate appearance.

We have compared *Callipsygma* above with *Cladophora*, and the resemblance holds good even in so far that *Callipsygma*, unless very closely examined, appears to be transversely septate at the constrictions. And this might well mislead algologists into the supposition that the plant has nothing to do with *Siphoneæ*. A careful microscopic examination, however, reveals that the septa are perforated ; they are, in fact, thick rings of cellulose which have grown inwards from the sides, leaving a small aperture in the centre through which protoplasmic continuity is maintained (fig. 7). Agardh does not allude at all to these structures. Under a high power of magnification with a well-adjusted substage condenser, it is possible to see clearly the striation of the walls of the ingrowing ring, and when the preparation has been stained with chlor-zinc-iodide (a treatment adopted at the suggestion of Mr. V. H. Blackman) the thin strand of protoplasm appears quite distinct. We have been able to examine only a mature part of the thallus, where the process of occlusion has been going on for some time. It is probable, however, that in the filaments of apical or young flabella the cellulose ring would still be very narrow, and the aperture large and distinct. Similar perforated plugs are well known in *Codium*, and have been described and figured in a paper by R. J. Harvey Gibson and Helen P. Auld (Liverpool Marine Biology Committee. Memoir iv. Codium, 1900).

It appears to us, so far as we have been able to study *Callipsygma*, that the affinities of the genus may as likely be with *Bryopsis* as with the *Codiaceæ*. For the resemblance to *Rhipocephalus* as suggested by Agardh is misleading, and has caused both De Toni and Wille to give *Callipsygma* a systematic position between *Rhipocephalus* and *Udotea* to which it is in no way entitled.

The only species, *Callipsygma Wilsonis* J. Ag., was collected at Sorrento, Port Phillip Heads, Victoria, by J. Bracebridge Wilson, in 1881.

EXPLANATION OF PLATE 467.

Udotea javensis.—FIG. 1. Plants, natural size; *a*, Ferguson, Ceylon; *b*, "Siboga." 2. "Siboga" plant, × 22. 3. Bases of two fronds, showing ramification and rhizoids, × 29. 4 *a*, *b*, *c*. Figures explaining Montagne's "anastomosis," × 120.

Callipsygma Wilsonis.—FIG. 5. Plant, natural size; *a*, in Herb. Agardh, from rough sketch by Mr. M. A. Howe; *b*, in Herb. Brit. Mus. 6. Filament of lamina, × 22. 7. In-growing cellulose rings forming incomplete septa, treated with chlor-zinc-iodide; *a*, showing protoplasm; *b*, at a dichotomy, showing striæ of ring.

MR. HESKETH PRICHARD'S PATAGONIAN PLANTS.

By A. B. Rendle, M.A., D.Sc.

(Concluded from p. 334.)

Scyphanthus elegans D. Don in Sweet, Brit. Flow. Gard. ser. i. t. 238.

Low slopes, Mt. Buenos Aires.
Chili.

Epilobium patagonicum, sp. nov. Planta glaberrima glaucescens (pars florifera solum adest), caule erecto lignescente ramoso, ramis ascendentibus, internodiis lineis vix elevatis interdum purpureo-tinctis e foliorum basibus notatis; foliis alternis, sed subopposite approximatis, rariter oppositis, vel ternatim confertis, sessilibus, siccis papyraceis, anguste lanceolatis, acutis, basi angustata, nervo medio solum prominente, margine cum denticulis purpureis parvis subfrequentibus munita; alabastris ellipsoideis, purpureis; floribus corymbosis, pedicellatis, sepalis lanceolatis, purpureo-tinctis, petalis circa $\frac{1}{3}$ longioribus, roseo-purpureis, obcordatis; stigmate late oblongo; capsulis elongatis, purpurascentibus; seminibus papillosis, ellipsoideis, basi angustatis, apice pæne trunctatis, haud appendiculatis.

The specimens consist only of the upper flowering portion of the plant about 20 cm. long, the hollow stem narrowing upwards from a diameter of about 3 mm. Leaves reaching 3 cm. long by 6–7 mm. broad. Flower-stalks about 1 cm. long, sepals 6 mm., petals 8–9 mm. long, a little over 5 mm. broad. The broad flattened oblong stigma 1·5 mm. long by 1 mm. broad. Capsule 5·5 cm. long, stalk about 1·5 cm. Seeds (not including the long hair tuft) 1 mm. long.

Low slopes, Punta Bandera.

The most nearly allied species is apparently *E. Haenkeanum* Hausskn. (Monogr. Gattung *Epilobium*, 268, t. xvi. fig. 2), from which it differs in its very glabrous character, smaller narrower leaves, darker-coloured flowers, and longer and longer-stalked fruits.

Œnothera odorata Jacq. Ic. Pl. Rar. iii. 3, t. 456.

Mountain slopes and low slopes.

The specimen labelled "mountain slopes" is very hairy, and has petals $1\frac{3}{4}$ in. long; that from the low slopes is glabrescent, with much smaller flowers, the petals barely $\frac{3}{4}$ in. long.

Patagonia; Chili; Argentina.

Fuchsia macrostema Ruiz & Pavon, Fl. Peru & Chili, iii. 88, t. 324, fig. 6.

Punta Bandera.
Chili; Fuegia.

Hippuris vulgaris L. Sp. Pl. 4; Hook. f. Fl. Antarct. 272.

Standing water (locality not given).
Fuegia.
Widely distributed in the north temperate zone.

Azorella concolor, sp. nov. Fruticulus pusillus cæspitosus glaber, ramulis brevibus cum foliis persistentibus nigrescentibus imbricatis indutis; foliis juvenilibus læte viridibus, vagina lata amplexicaule membranacea, lamina trifurcata, lobis rigidis, crassis, apice breviter pungente, subtriquetribus, dorso leviter convexulis, facie ventrale convexa; umbellis acrogenis, interdum geminis, 1–2-floris, pedunculo brevissimo, involucro trifido, lobis lineari-triangularibus, acutis, pedicello paullo longiore, floribus folia suprema haud superantibus; sepalis brevibus triangulis obtusis; petalis flavidis, concavis, elliptico-orbicularibus, obtusis; fructu . . . .

The closely crowded ultimate branches, generally 1–1·5 cm. long, form a flat turfy growth. The small trifurcate leaves persist on the short branches of several degrees preceding the ultimate branchlets which bear a dense rosette-like growth of young green leaves, in which nestle the sessile 1–2-flowered umbels, the yellowish colour of the flowers in the dried specimens contrasting but little with that of the leaves. Leaf-sheath about 2 mm. long, the trifurcate blade about the same length. Sepals scarcely 1 mm. long, petals 1·5–2 mm.

Mountain tops, Burmeister Peninsula.

Near the antarctic species *A. lycopodioides* Gaud., which it resembles in habit, but differs in the form and texture of the leaf-segments, which are not polished as in that species, and are blunt and abruptly mucronate; while those of *A. lycopodioides* taper gradually to the acute apex. Also near the Chilian *A. nivalis* Phil., which, however, has leaf-lobes twice as long (4 mm.), with other differences.

A. TRIFOLIOLATA Clos in Gay, Fl. Chili, iii. 85, Atlas, t. 30, fig. 2.

A form with the leaf-segments generally entire, linear-oblong, and blunt; the middle lobe is sometimes shortly trifid, and more rarely one or both of the lateral lobes are shortly and unequally bifid, or all three lobes are trifid.

Shingle on beach, Lake Argentino.

Chili.

A. TRIFURCATA Pers. Syn. i. 303; Hook. Ic. Pl. t. 539; Hook. f. Fl. Antarct. 283.

Top of mountains on Burmeister Peninsula.

Patagonia; Fuegia.

BOWLESIA TROPÆOLIFOLIA Gill. & Hook. in Hook. Bot. Misc. i. 325.

Low slopes of mountains, Burmeister Peninsula.

Andes of Chili; Patagonia.

MULINUM SPINOSUM Pers. Syn. i. 309; Dusén in Svensk. Exp. Magellansländ. iii. no. 5, 146.

Pampa under Mt. Buenos Aires, and low slopes.

Chili; Patagonia.

SANICULA GRAVEOLENS Poepp. ex DC. Prodr. iv. 85.

Top of Mt. Buenos Aires.

Chili.

APIUM GRAVEOLENS L. Sp. Pl. 264; Hook. f. Fl. Antarct. 287.

Springs, Burmeister Peninsula.

Chili; Patagonia; Fuegia; Falkland Islands. Apparently widely distributed in the south temperate zone, as in the northern.

Sir J. Hooker, *l. c.*, remarks on the abundant occurrence of this species in the arctic regions, referring at the same time to the absence of all injurious and disagreeable properties (the plant being constantly used as a vegetable both raw and cooked).

Mr. Prichard's specimen from Patagonia does not at sight suggest the European celery. The plant is a low-growing herb with a stout woody perennial crown, and resembles a specimen from the Falkland Islands received from Mrs. Nichol. In its small size it contrasts with the specimen in Herb. Banks from Tierra del Fuego (*Apium antarcticum* Banks & Sol.), which is a taller, stouter plant, suggesting in its habit and foliage a nearer approach to the northern form. We have in the Department of Botany an excellent figure of the latter by Sydney Parkinson among the drawings made on Cook's first voyage in 1769.

Osmorhiza chilensis Hook. & Arn. in Hook. Bot. Misc. iii. 355.

Forests on Mt. Buenos Aires above south-west fiord of Lake Argentino.

Chili; Fuegia.

Pernettya mucronata Gaud. ex G. Don, Gen. Syst. iii. 836; Dusén in Svensk. Exped. till Magellansländ. iii. no. 5, 140.

Low slopes of mountains, Burmeister Peninsula; and high wooded slopes, Mt. Buenos Aires.

Chili; South Patagonia; Fuegia and Fuegian Islands.

P. pumila var. minor Hook. f. Fl. Antarct. 326.

Mountain tops, Burmeister Peninsula.

South Patagonia; Fuegia; Falkland Islands.

Primula magellanica Lehm. Monogr. Prim. 62, t. 6. *P. farinosa* var. *magellanica* Hook. f. Fl. Antarct. 337; Dusén, *l. c.* 139.

Swamp, Burmeister Peninsula.

Straits of Magellan to Cape Horn; Falkland Islands.

Samolus spathulatus Duby in DC. Prodr. x. 74; Hook. f. Fl. Antarct. 338.

Swamp on pampa, Burmeister Peninsula.

South Patagonia; North Fuegia.

Statice punicea nom. nov. *Armeria chilensis* Boiss. in DC. Prodr. xii. 681; Spegazz. in Anal. Mus. Nacion. v. 68; Dusén, *l. c.* 138.

Low slopes of mountains, Burmeister Peninsula.

Chili; Straits of Magellan.

Mr. Prichard's specimen has sparsely puberulous leaves and scape, agreeing with Boissier's var. *magellanica*. It would seem, however, that this difference is scarcely worth a varietal distinction, the plant collected at Port Famine by Anderson in King's voyage agreeing in other respects with the western Patagonian specimen. King's specimen is referred by Boissier to *Statice andina* (*Armeria andina* Poepp.), from which, however, it differs in its much narrower leaves. The same plant is referred in the *Flora Antarctica* (p. 339) to *Statice Armeria* L., but I do not think the Patagonian is con-

specific with the British plant; it differs, for instance, in the smaller heads and flowers.

Owing to the confusion which might arise from another *Statice chilensis*, as there is already a *Statice chilensis* Phil. (now referred to *Armeria*), I have, to avoid confusion, adopted another specific name.

Phacelia circinata Jacq. fil. Ecl. Plant. Rar. i. 135, t. 91.

North slope, Mt. Frias, and low slope of pampa, Burmeister Peninsula.

North and South America.

Collomia coccinea Lehm. ex Benth. Bot. Reg. 1622.

Low shingly ground, Burmeister Peninsula.

Chili.

C. gracilis Dougl. ex Benth. *l. c.*

Low shingly ground near Lake Argentino; and low slopes of mountains, Burmeister Peninsula.

Western parts of North and South America.

Amsinckia angustifolia Lehm. Del. Sem. Hort. Hamb. 1831, 7.

Low sheltered ground and sheltered forest, Burmeister Peninsula.

Chili; South Patagonia; Fuegia.

Verbena bonariensis, sp. nov. Suffruticosa, ut apparet diffusa, ramis vetustioribus rufescentibus, juvenilibus densiter pilosulis; foliis sessilibus parvis hispidulis pæne ad basin trisectis, segmentis lineari-oblongis, obtusis, interdum subcuneatis; floribus circa 6 in ramulorum apice aggregatis, bracteis parvis, inferioribus ovatis obtusis, superioribus lanceolatis, hispidulis; floribus sessilibus, calycis tubo longo, cylindrico, 5-costato, pilosulo, dentibus 5, parvis, ex aspectu floris posteriore diminuentibus, triangulis, acutis; corollæ ut apparet lilacinæ, tubo supra medium tenui, superne inflato et subrecurvato, pilosulo; limbis patentibus subæqualibus (anterioribus paullulo minoribus) rhomboideo-cuneatis, apice emarginatis; filamentis brevibus, antheris emarginatis, anterioribus minoribus tubo inclusis, posterioribus flavis, in ore conspicuis; stylo tubo æquilongo, supra medium clavato, stigmate subintegro.

Apparently a small spreading undershrub. Main branches barely exceeding 2 mm. in diameter, covered with a thin easily-peeling dull reddish-brown bark. Leaf-segments reaching ·5 cm. long, generally shorter, often not exceeding 2·5 mm., subequal, or sometimes the median a little longer than the lateral ones. Bracts 4 mm. long. Calyx-tube about 7 mm. long, dorsal tooth 1·5 mm., anterior teeth about 1 mm. long. Corolla apparently mauve or lilac; tube 12 mm. long, a little over 1 mm. in diameter in the lower portion, increasing to about twice that diameter above the middle, shortly hairy on the inside; lobes about 4 mm. long, united for less than 1 mm. above the mouth of the tube, 2·5-3·5 mm. broad. Anterior stamens inserted 2·5 mm. below the mouth of the corolla-tube, anthers barely 1 mm.; upper anthers a good mm. long.

Slopes of Mt. Buenos Aires.

Has somewhat the habit of *V. microphylla* H. B. K., but is amply distinguished by the small trisected leaves, and larger flowers.

SCUTELLARIA NUMMULARIÆFOLIA Hook. f. Fl. Antarct. 336.
Shingle beach, Lake Argentino.
Fuegia.

MICROMERIA DARWINII Benth. in DC. Prodr. xii. 222.
Pampa, Burmeister Peninsula.
South Patagonia.

Fagelia Prichardi, sp. nov. Suffrutex stoloniferus ramis brevibus cum foliis subrosulatis, vel plus minus elongatis, rufescentibus, puberulis; foliis oppositis, ovalibus, apice obtusis, basi in petiolum gradatim angustatis, margine obsolete denticulato et cum pilis brevissimis interdum glandulosis ciliolato, venis utrinque conspicuis sparse puberulis; pedunculis sæpius geminis, glanduloso-puberulis, rufescentibus, unifloris, infra florem articulatis, rarissime cum bracteola parva instructis; flore mediocre; sepalis ovatis, obtusis, glanduloso-puberulis; corolla lutea, minute glanduloso-puberula, labio superiore calycem haud æquante, labio inferiore, e basi lato subelongato, orbiculare, colore sanguineo punctulato; antheris ovatis, loculis horizontaliter divaricatis; ovario hemisphærico, glanduloso-puberulo.

Mr. Prichard's specimens comprise two forms. A smaller subalpine form with somewhat the habit of *Bellis perennis*, the short woody rhizome-like branches bearing the opposite leaves aggregated in a rosette; the leaves and flowers are also smaller than in the other form; leaves, including the stalk (barely 1·5 cm.), 4 cm. or less in length, 1·2 cm. broad; peduncles about 7 cm. long, sepals 5 mm. long, 2·5–4·5 mm. broad.

The other form, from banks of streams on low ground, has more elongated shoots (to 7 cm. long in the specimen, but broken off), the larger, longer-stalked leaves separated by internodes 2–3 cm. long; leaves, including the petiole (to 2·5 cm.), reaching 10 cm. long by 2·5 cm. broad; peduncles 15 cm. long; sepals 6–7 mm. long by 4 to barely 5 mm. broad. The lower lip of the corolla is densely spotted with crimson on the concave upper portion, the spots becoming smaller and disappearing at the base of the broad rounded lower portion, the diameter of which (about 1·5 cm.) is equal to the length of the upper part, to which it is attached at right angles.

Burmeister Peninsula, low ground and low slopes of mountains.

A member of Bentham's section *Eucalceolaria*, subsection *Scaposæ*, the smaller form recalling *F. Darwinii*, but at once distinguished by the orbicular end portion of the lower lip and the shorter upper part.

F. DARWINII O. K. Rev. Gen. Pl. i. 459. *Calceolaria Darwinii* Benth. ex Hook. f. Fl. Antarct. 333.
High slopes of mountains, Burmeister Peninsula.
South Patagonia; Straits of Magellan; Falkland Islands.

VERONICA PEREGRINA L. Sp. Pl. 14.
Sheltered pampa, Burmeister Peninsula.
Widely spread, extending in America from Canada to Patagonia.

PLANTAGO MARITIMA L. Sp. Pl. 114; Hook. f. Fl. Antarct. 339.
Nitrate pampa.

Straits of Magellan. Widely distributed in arctic and north temperate zones.

P. UNIGLUMIS Wallr. ex Walp. in Nov. Act. Nat. Cur. xix. Suppl. 1, 402.

Stony top of mountains, Burmeister Peninsula.
Chili.

GALIUM APARINE L. Sp. Pl. 108; Hook. f. Fl. Antarct. 302 *bis*.
Forest, Mt. Buenos Aires.
South Patagonia; Fuegia.

RELBUNIUM PUSILLUM K. Schum. in Mart. Fl. Bras. vi. pt. 6, 117. *Rubia pusilla* Gill. ex Hook. & Arn. Bot. Misc. iii. 363.

Mountain slopes, Burmeister Peninsula.

Apparently a widely spread andine plant; recorded from Bolivia, Chili, and Argentina.

OREOPOLUS CITRINUS Schlecht. in Linnæa, xxviii. 493. *Cruckshanksia glacialis* Poepp. & Endl. Nov. Gen. & Sp. iii. 31, t. 236.

Top of mountains, Burmeister Peninsula.
Chili.

VALERIANA CARNOSA Smith, Icones Ined. t. 52; Hook. f. Fl. Antarct. 304 *bis*.

Low slopes, Mt. Buenos Aires.
Chili; Straits of Magellan.

CALYCERÆ AND COMPOSITÆ.

(BY SPENCER LE M. MOORE, F.L.S.)

BOOPIS LEPTOPHYLLA Spegazz. Nov. Add. ad Fl. Patag. pars i. 71 (e descript.), reprint.

Nitrate pampa.
Patagonia.

Boopis Prichardi, sp. nov. Humilis, glabra, annua, caule simplici abbreviato erecto penitus densissime foliato, foliis sessilibus anguste linearibus vel angustissime lineari-spathulatis obtusis integris vel prope apicem utrinque 1–3-dentatis breviterve dentato-lobulatis crassiusculis in sicco læte viridibus, capitulis subsessilibus arcte glomeratis parvis paucifloscululosis floscululis omnibus fertilibus vel uno intimo crudo et sterili, involucri anguste campanulati bracteis 7 usque vel ultra medium connatis lobis ovato- vel triangulari-oblongis obtusis vel brevissime apiculatis, receptaculo parvo plano nudo, calycis lobis ovatis obtusis quam ovarium brevioribus, corollæ tubo obsoleto faucibus elongatis et basi ad normam generis glandulosis, filamentorum vagina angusta elongata, antheris sessilibus inclusis, achæniis . . . .

Tops of mountains, Burmeister Peninsula; also shingle beach, Lake Argentino.

Planta 3·0–5·0 cm. alt., radice fere omnino simplici 0·1 cm. diam. fulta. Folia 2·0–3·0 cm. long., deorsum 0·1 cm. sursum 0·12–0·2 cm. lat., basi cauli arcte applicata eumque omnino obtegentia. Pedunculi circa 0·2 cm. long. Capitulorum glomerulus circa 1·5 cm. diam. Involucrum in toto 0·53 cm. long., sursum 0·45 cm. lat.; lobi modici circa 0·25 cm. long. Calycis lobi 0·07 cm.

long. Corollæ fauces 0·45 cm. long., 0·2 cm. lat.; lobi oblongi, 0·15 cm. long. Filamentorum vagina 0·2 cm. long., 0·04 cm. diam.; antheræ 0·18 cm. long. Ovarium compressum 0·2 cm. long. Stylus 0·6 cm. long.

Known by the lowly habit, the stem completely hidden by the very narrow grass-like leaves, the small subsessile heads aggregated into an apparently single terminal one, the tube of the corolla suppressed so that the throat-glands are situated just over the top of the ovary, and the filaments united throughout, as in *Acicarpha*.

Nardophyllum humile A. Gray in Proc. Amer. Acad. v. 123.
High slopes of mountains and mountain-tops, Burmeister Peninsula.
South Patagonia; Fuegia.

Chiliotrichum amelloideum Cass. in Dict. Sc. Nat. viii. 577.
Springs on slopes of mountains, Burmeister Peninsula.
South Patagonia; South Chili; Fuegia; Falkland Islands.

Erigeron alpinus L. Sp. Pl. 864.
Low slopes of mountains, Burmeister Peninsula.
Widely distributed.

E. spiculosus Hook. & Arn. Bot. Beech. Voy. i. 32.
Banks of streams, slopes of Mt. Buenos Aires.
South Chili; Patagonia; Fuegia.

Baccharis magellanica Pers. Syn. ii. 425.
Grassy gullies, Mt. Buenos Aires.
Argentina; Patagonia; South Chili; Fuegia.

B. patagonica Hook. & Arn. in Hook. Journ. Bot. iii. 29.
Beach, Punta Bandera, Lake Argentino.
Patagonia; Fuegia.

Antennaria chilensis Remy in Gay, Fl. Chil. iv. 235.
Pampa, Burmeister Peninsula.
South Chili.

Gnaphalium spicatum Lam. Encycl. ii. 757.
Low slopes of mountains, Burmeister Peninsula.
North and South America; Falkland Islands.

Madia sativa Mol. Sagg. Chile, 136.
Low slopes of mountains, Burmeister Peninsula.
North-west and temperate South America.

Matricaria Chamomilla L. Sp. Pl. 891.
Low slopes of mountains, Burmeister Peninsula.
An introduction from Europe.

Senecio argyræus Phil. in Ann. Univ. Chile, lxxxviii. 261.
Low slopes of mountains, Burmeister Peninsula.
South Chili.

Senecio argentatus, sp. nov. Suffrutex parvus tomento sericeo-argenteo densissimo appresso vestitus, caule verisimiliter repente ramos ascendentes breves dense foliosos emittente, foliis sessilibus basi imbricatis comparate elongatis angustissime linearibus apice pungentibus, capitulis mediocribus heterogamis radiatis

multifloscu losis terminalibus solitariis longipedunculatis ac revera una cum caule brevi inflorescentiam subscaposam constituentibus, involucri campanulati phyllis circa 20 oblongo-linearibus sursum leviter attenuatis apice sphacelatis margine sæpissime membranaceis dorso dense sericeo-argenteis, calyculi phyllis paucis subulatis, ligulis circiter 15 involucrum bene superantibus luteis, achæniis adhuc crudis compressiusculis 10-costatis glabris, pappi setis scabriusculis albis.

Pampa, Burmeister Peninsula.

Ramulorum pars foliosa 6·0–8·0 cm. long., raro multo brevior et tunc folia majus approximata et inflorescentia vere scaposa. Folia 3·5–5·5 cm. long., modo 0 1 cm. vel paullulum ultra lat., ima basi aliquantulum dilatata. Pedunculi fere adusque 10·0 cm. long. Capitula pansa circa 2·5 cm. diam. Involucrum paullo ultra 1·0 cm. long et diam.; calyculi phylla 0·4 cm. long. Receptaculum breviter foveolatum. Ligulæ oblongæ, brevissime 3-denticulatæ, 4-nerves, vix 1·0 cm. long. Disci corollæ sursum leviter ac gradatim amplificatæ, 1·0 cm. long. Genitalia exserta; antheræ basi integræ. Styli rami truncati, penicillati, fere 0·2 cm. long. Achænia 0·2 cm. long.; pappus 1·0 cm.

Known by the close silvery tomentum on all parts, the narrowly linear leaves, and subscapose habit with solitary heads.

S. MAGELLANICUS Hook. & Arn. in Hook. Journ. Bot. iii. 343.

Among stones on the top of Mt. Buenos Aires.

South Patagonia; Fuegia.

S. ALBICAULIS Hook. & Arn. in Hook. Journ. Bot. iii. 344.

Mountain slopes, Burmeister Peninsula.

Argentina; Patagonia.

S. COLU-HUAPIENSIS Spegazz. Nov. Add. ad Fl. Patag. pars ii. 5 (e descript.), reprint.

Tops of mountains, Burmeister Peninsula.

Patagonia.

S. pæninsularis, sp. nov. Herbaceus caule erecto optime folioso ut folia minute glanduloso, foliis sessilibus crassiusculis ambitu spathulato-oblongis deorsum integris sursum 3–5-lobis, lobis erectis lineari-oblongis obtusis, capitulis mediocribus homogamis discoideis multifloscu losis ramulos breves inferne foliosos superne rari- et parvi-bracteatos coronantibus, involucri campanulati phyllis circa 20 oblongo-linearibus sursum gradatim attenuatis apice sphacelatis necnon breviter barbellatis margine membranaceis dorso minute glandulosis additis paucis exterioribus parvis linearibus brevissime glanduloso-ciliolatis, flosculis exsertis, corollis sursum subito late campanulatis, achæniis immaturis compressiusculis 10-costatis glabris, pappi setis achænia longe excedentibus scabridis albis.

Low slopes of mountains, Burmeister Peninsula.

Sec. specimina visa radice orba planta fere 20·0 cm. alt. Folia in sicco virentia, 2·5–4·0 cm. long., deorsum sæpissime 0·3–0·5 cm. lat., sursum 0·6–fere 1·0 cm.; lobi laterales modice circa 0·4 cm. long., lobus terminalis ± 0·7 cm. Pedunculi 2·0–4·0 cm. long.

Capitula pansa adusque 1·5 cm. diam. Involucrum vix 0·8 cm. long.; phylla inter se inæquilata (latiora 0·2 cm. angustiora 0·15 cm. lat.); calyculi phylla circa 0·3 cm. long. Receptaculum foveolatum. Corollæ luteæ, fere 1·3 cm. long., inferne 0·07 cm.. ore 0·3 cm. diam. Genitalia exserta; antheræ basi brevissime auriculatæ. Styli rami truncati, penicillati. Achænia 0·2 cm., pappus 0·7 cm. long.

Nearest *S. baccharidifolius* DC., but different, *inter alia*, in lobing of leaf, and shape and size of capitula.

S. Kingii Hook. f. Fl. Antarct. 314.

High slopes of mountains, Burmeister Peninsula.

South Patagonia; Fuegia.

S. poculiferus, sp. nov. Planta humilis, cæspitosa, glandulis microscopicis lucentibus exemptis glaberrima, caule deorsum foliorum reliquiis onusto et radices longos sat crassos emittente, foliis confertis parvis sessilibus crassiusculis late spathulatis inferne integerrimis superne dentato-lobulatis lobulis acutis vel obtusis raro obtusissimis, capitulis heterogamis disciformibus circa 50-flosculosis flosculis extimis femineis 1-serialibus, pedunculo scapiformi folia bene excedente, bracteis calyculique phyllis lineari-lanceolatis acutis breviterve acuminatis nonnullis margine membranaceis, corollis extimis ad merum cyathum redactis reliquis breviter exsertis, stylis et eorundem ramis fil. extimorum incrassatis valde prominentibus, achæniis crudis 10-costatis, pappi setis scabridis albis achænia excedentibus.

Among rocks on the mountain-tops, Burmeister Peninsula.

Folia ± 1·0 cm. long., deorsum 0·15–0·2 cm. sursum circa 0·5 cm. lat., in sicco lutescenti-viridia; costa media perspicua, costæ reliquæ obscuræ. Pedunculus fere 2·5 cm. long.,; hujus bracteæ ut calyculi phylla 0·3–0·4 cm. long. Capitulum 1·3 cm. diam. Involucri phylla 1·0 cm. long., 0·1–0·2 cm. lat. Corollæ fem. 0·08 cm. long., hermaph. 0·55 cm. Styli coroll. fem. ægre 0·3 cm., horum rami 0·23 cm. long. et 0 05 cm. lat. Achænia 0·15 cm. pappus 0·5 cm. long.

A remarkable species, owing to the very short corollas of the outermost row of florets, and the lengthily exserted prominent fleshy styles and style-arms of the same. These latter are also possessed by *S. Kingii* Hook. f., together with, although short, yet considerably longer corollas than those of *S. poculiferus*. *S. Kingii* is therefore a connecting link between ordinary discoid species and the new one here described

S. Prichardi, sp. nov. Suffrutex parvus ramulis ascendentibus e caule jam nudo reliquiis foliorum dilapsorum onusto oriundis, foliis sessilibus anguste linearibus integris vel apicem versus breviter 2–5-cornuto-lobulatis crassiusculis glandulis minimis sessilibus lucentibus indutis margine revolutis, capitulis parvis ad apicem ramulorum solitariis vel 2–3-nis pedunculis paucibracteatis quam folia longioribus fultis homogamis discoideis circa 40-flosculosis, involucri late campanulati phyllis 13–15 lineari-oblongis infra apicem sphacelatum angustatis una cum pedunculis minute glandulosis, calyculi phyllis paucis subulatis, flosculis involucrum superantibus luteis,

achæniis nondum maturis parvis compressiusculis 10-costatis glabris, pappi setis scabriusculis albis.

Mountain slopes, Burmeister Peninsula.

Circa 15·0 cm. alt. Folia 1·5–2·5 cm. long., summum vix 0·1 cm. lat., in sicco læte viridia. Pedunculi 3·0–4·0 cm. long., graciles; hujus bracteæ subulato-filiformes 0·3 cm. long. Capitula paullo ultra 1·0 cm. diam. Involucrum 0·55 × 0·7 cm.; phylla margine membranacea, 0·1–0·13 cm. lat. Receptaculum foveolatum. Corollæ 0·65 cm. long., sursum gradatim dilatatæ. Antheræ basi integræ. Styli rami truncati, penicillati. Achænia 0·13 cm., pappus ægre 0·5 cm. long.

Near *S. longipes* Hook. fil., but differing in the leaves, among other points.

Leuceria purpurea S. Moore. *Chabræa purpurea* DC. Prod. vii. 59.

Pampa and high slopes of mountains, Burmeister Peninsula.

South Patagonia; Fuegia.

L. Hoffmanni Dusén in Svensk. Exped. till Magellansländ. iii. 116 (e descript.).

High slope of Mt. Buenos Aires.

South Patagonia.

L. patagonica Spegazz. Pl. Patag. Aust. 538 (e descr.), reprint.

East slope of Mt. Frias.

South Patagonia.

L. lanigera O. Hoffm. in Svensk. Exped. till Magellansländ. iii. 115 (e descript.).

Tops of mountains, Burmeister Peninsula.

South Patagonia.

L. multifida S. Moore. *Chabræa multifida* DC. Prod. vii. 60.

Low slopes of mountains, Burmeister Peninsula.

South Patagonia.

Perezia linearis Less. Syn. 412.

High slopes of mountains, Burmeister Peninsula.

South Chili; South Patagonia.

Nassauvia Darwinii Dusén in Svensk. Exped. till Magellansländ. iii. 112.

Tops of mountains, Burmeister Peninsula.

South Patagonia; Fuegia.

N. pygmæa Hook. f. Fl. Antarct. ii. 319. *N. Nordenskjöldii* O. Hoffm. in Svensk. Exped. till Magellansländ. iii. 113 (e descript.).

Tops of mountains, Burmeister Peninsula.

South Patagonia; Fuegia.

N. pygmæa was originally described as having leaves entire in their upper part, and the leaves of Nordenskjöld's specimens being strongly toothed, Dr. Hoffmann, not having seen the type, naturally considered that he had to do with a different species. As a matter of fact, the leaves of the type specimens are either slightly toothed distally, or strongly so (Port Famine; *King* 105, for the latter characteristic). Mr. Prichard's specimen agrees exactly with King's just mentioned, as also with the figure and description of *N. Nordenskjöldii*.

N. REVOLUTA Gill. in Comp. Bot. Mag. i. 37.
Among shingle on tops of mountains, Burmeister Peninsula.
Southern Andes; South Patagonia; Fuegia.
There is some doubt about this determination, owing to the immature state of the flowering heads.

Nassauvia (§ NASSÆA) **purpurascens,** sp. nov. Ramulis e caule sparsim radicante cæspitosis densissime foliosis, foliis radicalibus ovato-oblongis acutis vel sæpius spinoso-acuminatis glabris inferne integris superne utrinque 3–4-dentato-lobulatis lobulis triangularibus acutis vel breviter spinosis, foliis caulinis imbricatis superne parum patulis lanceolatis apice breviter spinosis integris vel rarius hinc inde spinoso-denticulatis piloso-pubescentibus ut radicalia colore purpureo suffusis, capitulorum glomerulis terminalibus globosis multicephalis, foliis floralibus caulinis similibus nisi paullo minoribus ultimis lineari-lanceolatis, capitulis 5-flosculosis, involucri piloso-pubescentis 3-serialis phyllis extimis linearibus quam interiora lanceolata spinoso-acuminata plane brevioribus, corollæ labio antico ovato brevissime 3-denticulato postico lanceolato-oblongo breviter bifido, achæniis adhuc immaturis compressis oblongis obscure puberulis, pappi paleis subsetiformibus 1-serialibus scabriusculis caducissimis.
Beaches and mud-flats of Lake Argentino.
Planta circa 10·0 cm. alt. Folia radicalia modice 1·5–2·5 cm. long., 0·4–0·5 cm. lat., rigida, costis 5 prominulis percursa. Folia caulina 1·5–2·0 cm. long. Involucrum 1·0 cm. long.; phylla extima 0·6 cm. reliqua 0·9 cm. long. Corollæ tubus basi angustatus, 0·4 cm. long.; labium anticum 0·32 × 0·2 cm., posticum 0·28 × 0·13 cm. Antherarum caudæ 0·2 cm. long.; loculi 0·1 cm.; appendices 0·12 cm. long., cyaneæ. Styli rami 0·15 cm. long. Achænia 0·3 × 0·1–0·12 cm.; pappi paleæ 0·5–0·6 cm. long.
Habit and general appearance of *N. macracantha* DC. and *N. pyramidalis* Meyen, but with somewhat different radical and cauline leaves, markedly longer and narrower involucral leaves with spinose-acuminate tips, larger and broader achenes, and narrower paleæ to the pappus.

HIERACIUM PATAGONICUM Hook. f. Fl. Antarct. 324.
Low slopes of mountains, Burmeister Peninsula.
South Patagonia.

ACHYROPHORUS TENUIFOLIUS DC. Prod. vii. 94.
Mountain slopes, Burmeister Peninsula.
South Chili; South Patagonia.

TARAXACUM LÆVIGATUM DC. in Cat. Hort. Monsp. 149.
Low slopes of mountains, Burmeister Peninsula.
A plant of wide distribution.

SONCHUS ASPER Hill Herb. Brit. i. 47.
Punta Bandera, Mt. Buenos Aires.
Lower leaves not seen; upper ones short (3–5 cm. long), oblong, with closely set prominent spiny teeth all the way up.
World-wide.

EXPLANATION OF PLATE 465.

A. *Anarthrophyllum Prichardi* Rendle, part of plant, nat. size. — 1. Leaf with stipules, × 3. 2. Flower, calyx opened and turned back, × 3. 3. Standard, × 2. 4. Wing, × 2 (about). 5. Keel, × 2 (about). 6, 7. Stamen showing versatile and basifixed anthers, × 6. 8. Pistil, × 3.

B. *Patagonium campestre* Rendle, part of plant, nat. size. — 1. Flower, calyx opened and turned back, × 5. 2. Standard, × 2. 3. Wing, × 2 (about). 4. Keel, × 2. 5. Pistil, × 5.

BIOGRAPHICAL INDEX OF BRITISH AND IRISH BOTANISTS.

BY JAMES BRITTEN, K.S.G., F.L.S., & G. S. BOULGER, F.L.S., F.G.S.

SECOND SUPPLEMENT (1898–1902).

(Concluded from Journ. Bot. 1903, p. 378.)

Milne-Redhead, Richard (1828–1900): b. Islington, Manchester, 16 Jan. 1828; d. Holden Clough, Clitheroe, Lancs., 24 Feb. 1900. F.L.S., 1865. Barrister; travelled and collected in India, W. Indies, Brazil, &c. 'Desert Flora of Sinai' in Journ. Linn. Soc. ix. 208 (1866). Proc. Linn. Soc. 1900–1, 47. R. S. C. viii. 713.

Morgan, Robert (1863–1900): b. Norwood, Surrey, 9 May, 1863; d. London, 6 Nov. 1900. F.L.S., 1887. Artist and lithographer. Illustrated Fryer's 'Potamogeton.' Drew and lith. plates in Journ. Bot. 1882–1900. Journ. Bot. 1900, 489, portr.

Morley, John (1829–86); b. 1829; d. Birmingham? 10 Dec. 1886. Pteridologist. F.R.M.S. Secretary, Birmingham Nat. Hist. Soc., 1876–86. Midland Nat. 1887, 24.

Nicolson, Rev. William (1655–1727): b. Plumbland, Cumberland? 1655; d. Derry, 14 Feb. 1726–7. B.A., Oxon., 1675–6; F.R.S., 1705; M.A., 1679. Rector of Salkeld, Cumb., 1682. Bp. of Carlisle, 1702; of Derry, 1718. Archbp. of Cashel, 1726–7. MS. 'Catalogus Plantarum Angliæ,' containing N. England localities, 1690. Dict. Nat. Biogr. xli. 55; Hodgson, Fl. Cumberland, xxiv. Portr. at Tullyhogna, Tyrone; copy at Queen's College, Oxford.

Noehden, Hans Adolphus (d. 1804): d. Göttingen, 1804. Brother of George Henry Noehden. 'Specimen . . . contra Hedwigii theoriam de generatione muscorum,' Gottingen, 1797. 'Pollen,' in Schrader's Journ. für Bot. i. 28. 'Botany in England,' id. vol. ii. & iii. (1800), partly translated in Journ. Bot. 1902, 319. Annals of Bot. ii. 206.

Norman, George (1823–82): b. Hull, 1823; d. Peebles, 5 July, 1882. Entomologist and microscopist. List of Hull *Diatomaceæ* in Trans. Microscop. Soc. viii. (1860). Worked at Yorkshire plants. R.S.C. iv. 643; viii. 517; x. 939; xiii. 541. Trans. Hull Field Nat. Club. i. 105 (portr.). *Pleurosigma Normani* Ralfs.

Paget, Sir James (1814–99): b. Yarmouth, 11 Jan. 1814; d. Regent's Park, London, 30 Dec. 1899; bur. Finchley. M.R.C.S., 1836. F.R.C.S., 1843. D.C.L., Oxon, 1868. LL.D., Camb., 1874. Baronet, 1871. F.R.S., 1851. F.L.S., 1872. 'Nat. Hist. Yarmouth,' 1834 (plants): contrib. to 'Top. Bot.' Journ. Bot. 1900, 62; 1904, 298; Proc. Linn. Soc. 1899–1900, 79; Dict. Nat. Biog. Supp. iii. 240. R.S.C. iv. 739; x. 981. 'Memoirs and Letters' by his son Stephen, 1901, w. 5 portraits. Bust by Boehm, 1885, at R. Coll. of Surgeons. Portr. by Millais at St. Bartholomew's Hospital. *Pagetia* F. Muell.

Paine, William (fl. 1732–8): Made collections in west and east of England; Herb. Sloane, 317 (chiefly of seaweeds), with autograph list. Sent seaweeds to Joseph Andrews. Journ. Bot. 1872, 174; 1904, 299.

Pamplin, William (1806–99): b. Lavender Hill, Wandsworth, 1806; d. Llandderfel, near Bala, N. Wales, 9 Aug. 1899. A.L.S., 1830. Bookseller and publisher of Soho. 'Cat. of rarer plants of Battersea and Clapham,' 1827. 'List of pl. of Streatley and Goring,' 1854. Contributed to 'Phytologist,' and published it from 1855–63. Helped in Fl. Middlesex and other local floras. Jacks. 589. R.S.C. iv. 748. Proc. Linn. Soc. 1899–1900, 80. Journ. Bot. 1899, 521 (portr.).

Pearce, Horace (1838–1900): b. Hadley Lodge, Salop, 21 Nov. 1838; d. Stourbridge, 19 Feb. 1900. F.L.S., 1876. Pres. Worcestersh. Field Club. Brit. plants in Herb. Mus. Brit. Proc. Linn. Soc. 1899–1900, 81.

Perrin, George Samuel (1849–1900): b. 1849; d. Ballarat, 24 Dec. 1900. F.L.S., 1885. Of Forest Dept., S. Australia, 1880 till death. Proc. Linn. Soc. 1900–1, 47.

Peter, Rev. John (1833–77): of Bala. 'William Salesbury fel Llysisnwr,' Traethodydd, vol. xxvii. (1873) pp. 156–181. "An enthusiastic botanist." Journ. Bot. 1898, 13.

Pierard, Francis (fl. 1834): H.E.I.C.S. subsequently (1831) at Kew. Sent plants to Calcutta Gardens. Roxb. Fl. Ind. ii. 255 (1832); Wall. Pl. Asiat. ii. 37. *Pierarda* Roxb. = *Baccaurea*. *Dendrobium Pierardi* Roxb.

Pollexfen, Rev. John Hutton (1813–99): b. Kirkwall, Orkney, 1813; d. Middleton Tyas, 5 June, 1899. M.D., Edin., 1835. B.A., Camb., 1843. Algologist. Correspondent of Harvey, Greville, Mrs. Griffiths, the Hookers, &c. Collection of algæ in possession of Dr. Batters. Journ. Bot. 1899, 438. *Pollexfenia* Harv.

Potts, Miss E. (fl. 1839): Of Chester. Contrib. to Hail's 'Flora of Liverpool'; specimens in Herb. Mus. Brit. "Pre-eminently the best lady botanist whose records are included in the present Flora." De Tabley, Fl. Ches. lxxxvii.

Powell, Miss (fl. 1820–1868): Of Henbury, Gloucestersh. Herbarium (in vols.) in Bristol Museum. Fl. Bristol Coalfield, ii.

Powell, Rev. Thomas (d. 1887): d. Penzance, 6 April, 1887. F.L.S., 1867. Missionary at Upolu, Samoa. Collected Mosses

in Samoa, described by W. Mitten in Journ. Linn. Soc. (Bot.) x. 166. Papers on Samoan Ferns and plant-names in Journ. Bot. 1867. Cryptogams at Brit. Mus. and Kew. R.S.C. viii. 654, xi. 57. *Powellia* Mitt.

Price, Rev. Rees (1807–1869): Of Cwmllynfell. 'Family Herbal' (in Welsh, 'Y Llysieu-lyfr Teuluaidd' (w. Rev. Evan Griffiths), 1849. Journ. Bot. 1898, 18.

Price, Thomas, "Carnhuanawe" (1787–1848): Of Cwmdu, near Crickhowell, Brecknock. Cultivated British pl. 'Literary Remains,' by Jane Williams, ii. 280. Journ. Bot. 1898, 16.

Priestley, Sir William Overend (1829–1900): b. Morley Hall, Leeds, 24 June, 1829; d. London, 11 April. 1900; bur. Warnham, Sussex. M.D. Edinb., 1853. LL.D., 1884. F.R.C.P., 1864. K.C.B., 1893. F.L.S., 1888. Obstetrician. 'British Species of *Carex*' in Trans. Bot. Soc. Edinb. iv. (1853); specimens in Herb. Mus. Brit. Proc. Linn. Soc. 1899–1900, 81. Dict. Nat. Biog. Supp. iii. 287. R.S.C. v. 20. Portr. by Rudolf Lehmann.

Prior, Richard Chandler Alexander (b. Alexander) (1809–1902): b. Corsham, Wilts, 6 Mar. 1809; d. London, 6 Dec. 1902. M.D., Oxon, 1837. F.R.C.P., 1840. F.L.S., 1851. In S. Africa, 1846–8; in Canada and Jamaica, 1849. Took name of Prior, 1849. 'Popular Names of Brit. Plants,' 1863; ed. 3, 1879. Plants at Brit. Mus. R.S.C. i. 43. Herbarium bequeathed to Kew. Urban, Symb. Antill. iii. 107. Gard. Chron. 1902, ii. 460; 1903, i. 137. Journ. Bot. 1903, 108. Pritz. 253. Jacks. 594. R.S.C. i. 43, 44. *Prioria* Griseb.

Pritchard, Stephen F. (fl. 1836). 'List of Plants of St. Helena,' Cape Town, 1836. Pritz. 253.

Ranade, N. B. (d. 1897): d. Poona, 15 Oct. 1897. Curator of Herbarium, Poona. Rept. Bot. Survey India, 1897–8, p. 10.

Rattray, John (1858–1900): b. Glack Sawmills, Dunkeld, Perthsh., 29 June, 1858; d. Perth, 9 Dec. 1900. M.A., Aberdeen, 1880. B. Sc. F.L.S., 1892. Diatomist. Journ. Bot. 1888 (*Aulacodiscus*). Papers in Journ. R. Microsc. Soc. i. 1888, Journ. Quekett Club, 1888–9, Proc. R. Soc. Edinb. xvi. (*Coscinodiscus*), Trans. Bot. Soc. Edinb. xvi. ('Algæ of Firth of Forth'). Prepared MS. Catalogue of Deby collection, now in Brit. Mus. *Rattrayella* De Toni.

Ravenscroft, Edward James (1816–90): b. Edinburgh, 1816; d. London, 15 Nov. 1890. Printer and publisher, Edinburgh. Compiled text and completed publication (parts 34–52) of Lawson's *Pinetum*. Gard. Chron. 1890, ii. 605; 1904, ii. 36.

Rawson, Sir Rawson William (1812–99): b. London, 8 Sept. 1812; d. South Kensington, 20 Nov. 1899. K.C.M.G., 1875. Colonial Secretary at Cape, 1859. Governor of Windward Islands, 1875. Pteridologist. 'Synopsis Filicum Africæ Australis' (w. Pappe), 1858. Contrib. to 'Phytol.' Ferns in Herb. Mus. Brit. Kew Bull. 1899, 221. Symb. Antill. iii. 108.

Journ. Bot. 1895, 118; 1900, 63. Flora Capensis, i. 67. *Rawsonia* Harv. & Sond.

Richardson, James (1806-51): b. Lincolnshire, 1806; d. Ungouratoua, Egypt, 4 March, 1851. African traveller. "Dates of Fezzan," Journ. Bot. 1850, 333. 'Mission to Central Africa, 1850–1.' Pritz. 263. R.S.C. v. 188. Dict. Nat. Biog. xlviii. 226. Portr. in his 'Travels in Sahara.'

Roberts, John (d. 1828): d. Bangor, 1828. Of Bangor. Had a herbarium. Griffith, Fl. Anglesey, pref. iii.

Rogers, Patrick Kerr (fl. 1802): b. Newtownstewart? Ireland. M.D., Pennsylvania. Went to Philadelphia when young. 'Properties of *Liriodendron*,' Philadelphia, 1802. Pritz. 267. Jacks. 198.

Rogers, Thomas (1827–1901): b. St. Helens, Lanc., 1827; d. Patterdale, Westmoreland, 30 May, 1901; bur. Patterdale. Of Manchester. Cryptogamist. Herbarium rich in Australian mosses. Journ. Bot. 1901, 395.

Ross, Sir James Clark (1800–62): b. London, 15 April, 1800; d. Aylesbury, 3 April, 1862. Arctic explorer. R.N. F.R.S., 1828. Knighted, 1844. D.C.L., Oxon. 1844. R.S.C. v. 295, nos. 2–4. Dict. Nat. Biog. xlix. 265. Portr. by Stephen Pearce and medallion by Bernard Smith in Nat. Portr. Gall.

Ruskin, John (1819–1900): b. London, 8 Feb. 1819; d. Brantwood, Cumberland, 20 Jan, 1900; bur. Coniston Churchyard. M.A., Oxon, 1843. Slade Professor, 1869. LL.D., Camb., 1867. D.C.L., Oxon, 1893. 'Proserpina: Studies of Wayside Flowers,' 1875–9. Dict. Nat. Biog. Supp. iii. 305, with list of portrs. Journ. Bot. 1900, 199. Jacks. 62.

Rylands, Thomas Glazebrook (1818–1900): b. Warrington, 24 May, 1818; d. Warrington, 14 Feb. 1900; bur. Thelwall. Wire manufacturer. F.L.S., 1862. Diatomist, &c. 'Varieties of Brit. Ferns,' Naturalist, 1839. Had a herbarium. R.S.C. v. 349. Proc. Linn. Soc. 1901–2, 41. Memoir w. portr. (privately printed) by R. D. Radcliffe.

Sabine, Sir Edward (1788–1883): b. Dublin, 14 Oct. 1788; d. Richmond, Surrey, 26 June, 1883; bur. Tewin, Herts. General, R.A., 1870. F.R.S., 1818. Pres.R.S., 1861–71. F.L.S. K.C.B., 1869. D.C.L., Oxon, 1855. Brother of Joseph Sabine. Astronomer to Ross's Arctic expedition, 1818; and Parry's expedition, 1819–20; collected in Melville Island and in Greenland. Appx. to Parry's 1st Voyage, cclxi; 2nd Voyage, 382. R.S.C. v. 351; viii. 805; xi. 251. Dict. Nat. Biog. l. 74. Portr. by G. Pearce and bust by J. Durham at Royal Soc.; portr. by G. F. Watts at Woolwich. *Pleuropogon Sabinii* Br.

Saunders, William Frederick (1834–1901): b. Wandsworth, 7 April, 1834; d. Clapham, 26 Dec. 1901. Son of Wm. Wilson Saunders (See Biogr. List, p. 150). F.L.S., 1858. Had a herbarium. Proc. Linn. Soc. 1901–2, 42.

Scott, Andrew (fl. 1736). Maryland plants with autograph letter in Hb. Sloane, cccxvi.

Shakespear, Roger (fl. 1777–82): Sent plants from Jamaica and S. America to Banks, now in Herb. Mus. Brit.

Sim, John (1824–1901): b. 1824; d. West Cults, Aberdeen, 24 June, 1901. Florist and fruit-grower. 'Botany of Scotston Moor,' 1868. Herbarium of Hepaticæ; see Ann. Scott. Nat. Hist. 1902, 179. Gard. Chron. 1901, ii. 13.

Slatter, John Whewell (1829–96): d. 6 Jan. 1896. B.A., Camb. Collected in Australia, 1870–80; plants in National Herbarium.

Smith. Rev. Colin (fl. 1831): Minister of Inverary. Sent Mosses to W. J. Hooker. 'Notice of Captain Dugald Carmichael,' Bot. Miscell. ii. 3.

Smith, Henry (1786–1868): b. Shanklin, I. Wight, 3 June, 1786; d. Southsea, Hants, 14 June, 1868; bur. Newport, I. W. Major, Royal Marines. Joined R. Marines, 1809; retired, 1848. Had good botanical library; made MS lists of Hants, Wilts, and Hull plants. See Marquand. Fl. Guernsey, 26.

Smith, M. R. (1740?–1819): b. 1740?; d. Silhet. 1819. Fifty years at Bot. Garden. Silhet. Collected in Bengal, 1810–16. Hort. Benghal. viii. Wall. Pl. Asiat. iii. passim. Wallich in Banks' Correspondence, xx.

Smith, Robert (1873–1900): b. Dundee, N.B., 11 Dec. 1873; d. Edinburgh, 28 Aug. 1900. B.Sc., Dundee, 1896. Assistant Zool. Mus. and Demonstrator in Bot., Dundee. 'Plant Associations of the Tay Basin.' in Proc. Perthsh. Soc. Nat. Sci., 1898–1900. Biog. in 'College Echoes,' Nov. 1900, and in Journ. Bot. 1901, 30 (portr.).

Soppitt, Henry Thomas (1858–99): b. Bradford, Yorksh., 21 June, 1858; d. Halifax, Yorksh., 1 April, 1899. Fungologist. Gard. Chron. 1899, i. 239 (portr.); Journ. Bot. 1899, 240. Naturalist, 1899, 157 (portr.). *Soppittella* Plowr.

Sowerby, James (1815–34): Grandson of James Sowerby (see Biogr. List, p. 159). "Mushroom and Champignon illustrated" (1832); plates adapted from his grandfather's 'English Fungi.'

St. Brody, Gustavus A. Ornano (1828–1901): b. France, 1828; d. Wallingford, Berks, 22 Nov. 1901. B.Sc., Paris; Ph.D., Göttingen. F.L.S., 1863. 'Fl. of Weston-super-Mare,' 1856. Discovered *Botrychium matricariæfolium*, 1887. Herb. at Gloucester Museum. Journ. Bot. 1902, 127.

Stirling, John Stirling (d. 1900): d. Gargunnock, Stirling, 18 May, 1900. Lieut.-Col. R.A. (served 23 years). Papers on Flora of Stirlingshire in Trans. Stirling Nat. Hist. and Arch. Soc. 1891–1899, of which Soc. he was Hon. President since 1883.

Storrie, John (1843–1901): b. Muiryett, Cambusnethan, Lanark, 2 June, 1843; d. Cardiff, 2 May, 1901. Curator, Cardiff Museum. A.L.S., 1899. 'Flora of Cardiff,' 1886. Proc. Linn. Soc. 1900–1, 50; Journ. Bot. 1901, 434.

Strickland, Charlotte (d. Apperley, Gloucestersh., 2 June, 1833, æt. 74) and **Julia Sabina** (d. Apperley, 21 Sept. 1849, æt. 84): bur. Deerhurst, Glos. Daughters of Sir George Strickland,

Bart. Drew plates for 'Select Specimens of Brit. Plants,' 1797–1809. "Certainly rank as artists in the first line," Smith in E. B. 637. Pritz. 112; Jacks. 233.

Stuart, Charles (1825–1902): b. Woodhall, Edinburgh, 30 March, 1825; d. Chirnside, Berwicksh., March, 1902. M.D., Edinb., 1846. F.R.S., Ed., 1884. F.B.S., Ed., 1884. Paper on Connemara in Hist. Berw. Nat. Club, xiii. 207. Trans. Bot. Soc. Ed. xix. 63: xxii. 191. Ann. Scott. Nat. Hist. 1902, 65, 126. *Erica Tetralix* subsp. *Stuarti* Macf.

Sutherland, Peter Cormack (1822–1900): b. Latheron, Caithness, 1822; d. Durban, Natal, 30 Nov. 1900. M.D., Aberdeen, 1847. Surveyor-General, Natal, 1855–1887. Sent pl. to Harvey. 'Journ. of Voyage in 1850–1 in search of "Erebus" and "Terror,"' 1852. Journ. Bot. 1901, 191; Fl. Capensis, i. 9*; R.S.C. v. 889; viii. 1047. Gard. Chron. 1901, i. 195. *Greyia Sutherlandi* Harv.

Synnot, W. (fl. 1825): Resided several years at the Cape, and collected plants; brought home many bulbs. Sweet, Fl. Gard. 1 ii. 138, 2 i. 39. *Synotia* (sphalm. *Synnetia*) Sweet.

Tate, Ralph (1840–1901): b. Alnwick, 1840; d. Adelaide, S. Australia, 20 Sept. 1901. Nephew of George Tate. Prof. Nat. Sci., Adelaide, 1875. 'Flora Belfastiensis,' 1863. 'Fl. of S. Australia,' 1890. Collected in Shetlands, 1865; at Chontales, Nicaragua, 1867; Arnhem's Land, 1882. 'Botany of Horn Expedition,' 1896. R.S.C. viii. 1061; xi. 555; xii. 721. Journ. Bot. 1902, 75; Victorian Naturalist, 1901. *Tatea* F. v. M.

Taylor, James (fl. 1856–63): Surgeon on whalers, 1856–61. Collected in Davis's Straits and Baffin's Bay; list in Trans. Bot. Soc. Ed. vii. 323. R.S.C. v. 920. Plants in Mus. Brit.

Tenison-Woods, Rev. Julian Edmund. See under Woods.

Thompson, Thomas (1798–1869): b. Echt, Aberdeenshire, Sept. 1798; d. Chiswick, Sept. 7, 1869. Pomologist. At Chiswick garden, 1824–68. Contrib. to Loudon's 'Gard. Mag.' and 'Encycl. Gardening,' 'Treasury of Bot.,' &c. R.S.C. v. 959; Gard. Chron. 1869, 989.

Traill, Catharine Parr, *née* Strickland (1802–99): b. London, 9 Jan. 1802; d. Lakefield, Ontario, Sept. 1899. Sister of Agnes Strickland; m. Lieut. T. Traill, and went to Canada, 1832. 'Studies of Plant Life in Canada,' 1885 (portr.). 'Pearls and Pebbles,' 1894 (portr. and biogr.). Journ. Bot. 1899, 448. Jacks. 366. *Aspidium marginale* var. *Traillæ* Lawson.

Tufnail, Frank (1861–99): b. Reading, 18 Feb. 1861; d. Reading, 3 June, 1899. F.L.S., 1897. Seed-grower. Contrib. to Fl. Berks; Fl. Berks, p. clxxxiii–v. Proc. Linn. Soc. 1899–1900, 83.

Wakefield, Rev. Thomas (1836–1901): b. Derby, 23 June, 1836; d. Southport, Lancashire, 15 Dec. 1901; bur. St. Cuthbert's, Southport. Methodist Free Church missionary in E. Equatorial Africa; sent plants to Kew, 1880 and 1884. Biography by E. S.

Wakefield, published 1904, w. portr. and lists of plants collected. *Turræa Wakefieldii* Oliv. Journ. Bot. 1904, 95.

Walker, George Warren [to replace J. T. Walker, p. 175] (d. 1844): Lieut.-Col. 21st Foot; Cornet, 1790. In India, 1803–14; D.A.G. in Ceylon, 1837 onwards. Collected in Ceylon (1830–37) and Penang. Plants and letters at Kew. Journ. Bot. 1834, 180; 1841, 189.

Wallace, Alexander (1829–99): b. London, 1829; d. Colchester, 7 Oct. 1899. M.A., Oxon, 1858. M.D., 1861. Notes on Lilies and their culture. Journ. Bot. 1899, 496. Gard. Chron., 3 S., xxvi. 303.

Watson, Forbes (1840–69): b. Mansfield, Notts, 7 Feb. 1840; d. Nottingham, 28 Aug. 1869. M.R.C.S., 1861. Surgeon to Nottingham Union. Pref. to ed. 2 of his 'Flowers and Gardens,' in which a portrait is given.

Watts, Henry (fl. 1862): Of Warnamboul, Victoria. Sent numerous algæ to Harvey. Phyc. Austral. iv. t. 233. *Wrangelia Wattsii* Harv.

Wellby, Montague Sinclair (1866–1900): b. 1866; d. Paardekop, S. Africa, 5 Aug. 1900. Capt. 18th Hussars, 1894. Collected in Tibet, 1896; in Abyssinia, 1898. Plants at Kew. Kew Bull. 1901, 171; Journ. Linn. Soc. (Bot.) xxxv. 152. *Saussurea Wellbyi* Hemsl.

West, William (1875–1901): b. Bradford, Yorks, 11 Feb. 1875; d. Mozufferpore, India, 14 Sept. 1901. B.A., Camb., 1896. Science demonstrator, Camb. Algologist. Contrib. to Journ. Bot. Naturalist, 1901, 303. Journ. Bot. 1901, 353.

Wharton, Henry Thornton (1846–95): b. Mitcham, 1846; d. Hampstead, 22 Aug. 1895. M.A., Oxon, 1874. M.R.C.S. Fungologist. Ornithologist. Dict. Nat. Biog. lx. 402. R.S.C. xi. 792.

White, Thomas, from 1776 **Thomas Holt White** (1724–97): b. Compton, Surrey, 19 Oct. 1724; d. Feb. 1797; bur. Harlow, Essex. Eldest brother of Gilbert White. F.R.S., 1777. Articles on 'Trees of Great Britain,' signed T. H. W., in Gent. Mag. Autotype, fr. oil-painting by Thos. Robinson in possession of the family, in 'Life and Letters of Gilbert White' (1901).

Whitehead, John (1860–99): b. Muswell Hill, London, 30 June, 1860; d. Hoi-Kow, China, 2 June, 1899. Ornithologist. Collected in Borneo, 1884–8, and the Philippines, 1893–6. Pl. in Herb. Mus. Brit. Dict. Nat. Biog. lxi. 104. Journ. Bot. 1896, 355; 1899, 526. *Rhododendron Whiteheadii* Rendle.

Wigham, Robert (d. before 1866): Of Norwich. Diatomist. Taught Frederic Kitton. Trimmer, Fl. Norfolk, viii.

Williams, Rev. Thomas (1550?–1620?): b. Arddu r' Mynaich Trefriw, Carnarvon. Physician and lexicographer. 'Llyfr Llysiau.' Rowland's 'Cambrian Bibliography,' p. 113. Dict. Nat. Biogr. lxi. 454. Journ. Bot. 1898, 13.

Willshire, William Hughes (1816?–1899): M.D., Edin., 1836, Lect. Bot. Charing Cross Hospital, 1838–47. Pres. Med. Soc.

London, 1855. 'Principles of Botany,' 1840. Pritz. 338; Jacks. 39. Brit. Med. Journ. 1899, i. 703.

Wilson, Nathaniel (1809–74): b. Scotland, 18 April, 1809; d. Clarendon, Jamaica, 2 May, 1874. "Island Botanist," Jamaica, 1846-67. Bull. Bot. Dept. Jamaica, viii. 182; Symb. Antill. iii. 140.

Wollaston, George Buchanan (1814–99): b. Clapton, Middlesex, 26 April, 1814; d. Chislehurst, Kent, 26 March, 1899. Pteridologist. Contrib. to 'Phytologist,' N. S. R.S.C. xi. 428. Journ. Bot. 1899, 447.

Yonge, Charlotte Mary (1823–1901): b. Otterbourne, Hants, 11 Aug. 1823; d. Otterbourne, 24 March, 1901. 'The Herb of the Field,' 1853; ed. ii. 1858. 'Lessons fr. the Vegetable Kingdom,' 1857. List of flowering pl. of Hursley and Otterbourne in 'Keble's Parishes,' 1898. Biography by Christabel Coleridge, 1903, w. portr. Journ. Bot. 1901, 192.

Young, Thomas (1773–1829): b. Milveston, Somerset, 13 June, 1773; d. London, 10 May, 1829. M.D., Camb., 1808. F.R.S., F.L.S., 1794. Described and drew *Opercularia paleata* in Linn. Trans. iii. 30. Dict. Nat. Biog. lxi. 393. Smithsonian Reports, 1869, 111–144. R.S.C. i. 470. 'Life,' by Peacock, 1855. Portr. at R. Soc.

SHORT NOTES.

Mimulus Langsdorfii in Bucks. — I am not sure whether this plant has been recorded for Bucks. I observed it this autumn in great abundance in the Wick as it runs through the Rye at High Wycombe, and it formed masses in the large mill-pond at Marsh Green. I am told it has been observed here for at least ten years, and that the Wick was so far blocked by it on one occasion that the plant had to be removed; it is also spreading up the little ditches and backwaters along the Wick.—James Britten.

Aster Linosyris in North Somerset.—In the *Flora of Somerset*, *Aster Linosyris* is said to be extinct. This autumn I had the pleasure of seeing it on a low range of carboniferous rocks in the neighbourhood of Weston-super-Mare, but not in the published locality. There were about a hundred plants in flower.—G. Claridge Druce.

Physospermum commutatum in Bucks.—In August last Mr. W. R. Sherrin brought to the National Herbarium specimens of *Physospermum commutatum* Spreng. (*P. cornubiense* DC.), which he had found in some quantity near Burnham Beeches. This is a remarkable extension of the range of the plant, but Mr. Sherrin considered indigenous in this new locality.—James Britten.

NOTICES OF BOOKS.

British Freshwater Algæ.

A Monograph of the British Desmidiacæ. By W. & G. S. West. Vol. I. Pp. xxxvi, 224. With 32 plates. London: the Ray Society, 1904. Price 25s. net.

A Treatise on the British Freshwater Algæ. By G. S. West. Pp. xv, 372. With 166 figures in the text and one plate. Cambridge University Press, 1904. Price 10s. 6d. net.

Since the time of Ralfs's *British Desmidieæ*, and Cooke's rather incomplete work on the same subject, no attempt has been made to put together all that is known about the British representatives of this beautiful group of Algæ. The name of West, on the title-page of this new work, is in itself an assurance that the attempt has been undertaken by those well qualified to carry it out successfully, and a brief perusal of the first volume of their monograph will make its value manifest to everybody. The illustrations, which must necessarily play an important part in the determination of the representatives of so large a group with such considerable diversity of form, have evidently received much care, and may, to our thinking, be described as the best of their kind as yet published. Large numbers of the figures are represented in colours, which are very true to nature, whilst in most cases each species is figured in several aspects. The descriptions of the plates are conveniently placed, so as to face the latter, and give references to the page in the text on which the form in question is described.

We could have wished the introductory remarks on the general features of Desmids to have been a little more extensive. Thus, the curious pores in the cell-wall, and the mucilage which is excreted from them, are only briefly touched upon, although they have been shown to vary considerably in structure in different genera, and might even be employed for systematic purposes. Nor are the movements of Desmids, in our opinion, treated as fully as they should be; some notice of Schroeder's recent work on the movements of *Closterium* and *Euastrum* by excretion of a mucilaginous stalk would not have been out of place. The mode of division of a Desmid is not quite clearly described in all details. The summary of the characters which are most liable to variation in a Desmid is interesting, but exception might be taken to the statement that "changes in the conditions of environment cannot affect the characters of a species unless they act for a long period of time." This remark is a little vague, and does not exactly agree with current ideas of variation. The *Desmidiaceæ* are regarded "as a degenerate family of unicellular Algæ evolved by retrogression from sexually differentiated, filamentous Conjugates," a view which has already previously been expressed by the authors; this theory has never appealed to us, and in our opinion all the arguments brought forward in its favour might just as well be reversed and made use of to prove the opposite. The filamentous Conjugates of the present day are certainly on a higher stage of differentiation, as

regards their sexual reproduction, than the majority of the Desmids, and there seems to us no evidence that the sexual process of the latter is secondary in origin.

The analytical key to all the known genera of Desmids is easy to comprehend, and will prove very useful to those commencing the study of this group. The systematic portion of the book, which includes a number of new forms, has been very carefully worked out; the descriptions of genera, species, and varieties, are ample, whilst the range of each species in Britain and throughout the world is given in detail. All the essential parts of the book are printed in large, clear type, and the excellence of the plates has already been sufficiently commented upon.

Prof. George West is to be warmly congratulated for issuing so exceedingly useful a book as the *Treatise on British Freshwater Algæ* is likely to be; and the want, so keenly felt in this country, for a book of this kind, has been satisfied in an adequate manner. Prof. West has not followed many of his predecessors in omitting the *Bacillarieæ*, and their clear treatment is not one of the least valuable features of the book. It is to be regretted that he did not see his way towards the inclusion of the *Peridineæ*, which certainly have several striking points in common with the Diatoms, although it must be granted that they diverge very widely from other groups of Algæ. The omission of the *Characeæ* scarcely calls for remark, as they appear to occupy a very specialised position in the vegetable kingdom. A book, dealing with Freshwater Algæ only, of course involves an artificial separation, but, apart from the fact that the main groups of Algæ dominant in fresh water are only feebly represented in the sea, any book dealing with the algal flora of a particular region must necessarily only contain a certain percentage of all the forms of Algæ known: why then should such a treatise not be further delimited, and be confined to the consideration of those forms, which inhabit fresh water? Such a delimitation is less artificial than the purely geographical one.

The first thirty-three pages of the book are devoted to general considerations, including useful information as to the occurrence, collection preservation, and cultivation of Freshwater Algæ, whilst the general discussion of the polymorphism of this group may be recommended to all interested in the subject. The section devoted to phylogeny and classification expresses the author's views, which are on the whole in accordance with those of other algologists of the present day. The Conjugates are, however, regarded as having originated from some other order of green Algæ (a possible affinity with *Microspora* being suggested), and not to be directly derived from the Flagellata, as Blackman and Bohlin are inclined to assume. There seems to us no real evidence of affinity with the other green Algæ (although there may be something in the comparison with *Chlamydomonas Braunii*), and, to our thinking, the Conjugatæ would be better treated apart from them, as Wille does. The group of the *Heterokontæ*, established by Luther, is made use of to include a number of green forms, which, in addition to other peculiarities, contain abundant xanthophyll in their chloroplasts;

the *Vaucheriaceæ* are, however, not included in this group, but are left in the *Siphoneæ*. Nor does Prof. West agree with the most recent views as to the direct origin of the *Œdogoniaceæ* from a Flagellate ancestor. The inclusion of the *Glaucocystaceæ* in the *Myxophyceæ* is also open to criticism; apart from the blue-green colour, their affinities seem to be very decidedly with the *Protococcoideæ*. After all, however, little can be said for or against these debatable points, which are largely of a hypothetical nature.

The main body of the book, which is provided with excellent illustrations, in great part original, contains a careful description of orders and genera in large type, the more important species of each genus, together with frequent remarks on their distribution, being added in small type; in a few cases a critical synopsis of all the British species of a genus is given. It is questionable as to whether it is advisable to begin the systematic portion with such a highly differentiated form as *Œdogonium*; it would seem better to start with a primitive series like that of the *Volvocineæ*, and to work up from them to the higher types. Prof. West introduces some older names to replace present ones (*Myxonema* for *Stigeoclonium*, *Tribonema* for *Conferva*, *Ankistrodesmus* for *Rhaphidium*, *Choaspis* for *Sirogonium*), which are regarded as having been fully established before the publication of the newer names. A valuable feature of the book is the key to the genera of each family.

The present volume is bound to appeal strongly to all interested in this field of botany, and to all such the remarks made by Prof. West in his preface are addressed, *viz.* the importance of a sound knowledge of the geographical distribution of the lowly types of Cryptogams, which must throw much light on the land-connections of previous periods.

F. E. Fritsch.

Morphologie und Biologie der Algen. Von Dr. Friedrich Oltmanns. Band I. Spezieller Teil. Pp. vi, 703; 467 figs. Jena, 1904. Price 20 Marks.

Since Falkenberg published his *Algen im weitesten Sinne* in Schenk's *Handbuch*, 1882, no book has till now appeared which embraces the recent researches on the morphology and biology of Algæ. Such a book has been much needed, and is now offered to us by Professor Oltmanns under the above title. While Engler and Prantl's *Natürliche Pflanzenfamilien* deals with the Algæ from the systematic standpoint, the present work treats it from the point of view of general morphology and biology. When completed it will consist of two volumes; the first, the subject of this review, treats of the separate families; the second and smaller one will deal with general considerations. As regards the plan of the first volume, the author explains in his preface that he has omitted the *Cyanophyceæ*, since he holds that their affinities lie rather with the Bacteria, and that they can only be properly understood when considered in conjunction with such genera as *Cladothrix*, *Beggiatoa*, &c. On the other hand, we find the Charales included, as well as the coloured Flagellatæ—the latter on account of their phylogenetic connection with the Algæ.

The classification differs in some respects from that of other authors. The main groups are: I. Chrysomonadineæ. II. Heterocontæ. III. Cryptomonadineæ. IV. Euglenaceæ. V. Dinoflagellata. VI. Acontæ. VII. Chlorophyceæ. VIII. Phæophyceæ. IX. Rhodophyceæ. Between Chlorophyceæ and Phæophyceæ are placed Charales, and between Phæophyceæ and Rhodophyceæ are placed Bangiales, but with doubt.

As regards the details of individual groups many points of interest arise, of which a few only can be mentioned here. It is satisfactory to find that a home, which promises to be a permanent one, has been found for that vagrant genus *Botrydium*. Professor Oltmanns places Botrydiaceæ in Heterocontæ, next to Confervaceæ. The view held by certain authors that Peridineæ are allied to Diatoms is not shared by Prof. Oltmanns, who places them in Dinoflagellata. Diatoms and Conjugatæ he unites under Acontæ, thus differing from Dr. Blackman, who reserves the Acontæ for Conjugatæ alone. In such a book as the present, which will certainly give the lead in such matters, it is satisfactory to find the old name Chlorophyceæ holding its own against the "Isocontæ" of some authors. The separation of Heterocontæ and Acontæ from Chlorophyceæ leaves behind a large but fairly well-defined group, the members of which resemble each other in their pure grass-green colour, and in the structure of the swarm-spores where these are present. On p. 306 a new genus is unostentatiously announced, containing two species of *Bryopsis*, under the name of *Pseudobryopsis* Berthold MS. The cause of the separation is connected with the position of the sporangia. It is to be hoped that a formal diagnosis may soon be published by the author. Phæophyceæ is divided into Phæosporeæ, Akinetosporeæ, and Cyclosporeæ, and the association of orders and genera under these divisions is somewhat unusual. The author takes a wide view of Ectocarpaceæ, which is made to include such different genera as *Ectocarpus*, *Dictyosiphon*, *Soranthera*, and *Splachnidium*—the last provisionally. The treatment of Fucaceæ is largely founded on the author's well-known *Beiträge z. Kenntniss der Fucaceen*, supplemented by the various papers of later authors. It may be noted that Prof. Oltmann's remarks concerning *Notheia anomala* are rather antiquated. The antheridia of that species were fully described and figured in a paper in the Journal of the Linnean Society, Nov., 1899, where the life-history was also worked out; and it was shown that *N. anomala* does not arise from a conceptacle of the host-plant, as has always been supposed, but that the young spore-filaments of the parasite penetrate at other points into the host, and give rise to a wedge-like thallus, which breaks its way out of the host. The Rhodophyceæ are ably treated on the lines of Schmitz, with special chapters on the methods of reproduction in various families and genera. It is refreshing to find our old friend *Gelidium corneum* revived and occupying its quondam position as representative of its genus, none the worse for its suppression by De Toni, or rather its partition under other specific names. The multitude of figures throughout the book adds greatly to its usefulness, the more so

since many of the figures are drawn from sources not easily accessible to most students. Some of the best are those that illustrate the structure of the cystocarp. These are in differential colours, and are taken from the author's paper on the development of the Florideæ. Of the original drawings, those of the structure of *Laminaria*, from preparations by Dr. Gruber, are excellent, but the same cannot be said for some of the figures representing the species in their natural size, for instance figs. 184, 227, 232, &c. That of *Dasycladus clavæformis*, on p. 274, lays itself specially open to criticism. To anyone who does not know the plant, the impression might easily be conveyed of a flattish thallus with a very thick midrib. It is just as well that a good figure is added on p. 275. It might be mentioned, that the specimen so well figured on p. 509, and described as *Turbinaria*, sp., is clearly *T. ornata*, the only species with a double row of spines on the vesicle.

Apart from what are really but minor faults, Prof. Oltmann's book is by far the finest and most thorough piece of algological work which has appeared for many years. The literature sifted must have entailed enormous labour; but the result attained is an invaluable digest, indispensable to all students of Botany.

E. S. Gepp.

BOOK-NOTES, NEWS, &c.

At the meeting of the Linnean Society on November 3rd, the Resolution of Council of June 2nd, "That the existing Bye-Laws of the Society be, and they are hereby, repealed, and that the following Bye-Laws be established in lieu thereof," was then introduced; the President, Prof. Herdman, explaining that under the Charters it was incumbent on the Council to present all new or changed Bye-Laws to the vote of the Fellows by ballot, after being twice read from the Chair; consequently no modification could take effect unless it passed through the stages indicated; further, that the Council had received certain suggestions which had been carefully considered, but thought not essential to the proper working of the proposed Bye-Laws, even though some were verbal improvements; the Council had, in the new Bye-Laws, made as few changes as possible, preserving the original text as far as practicable. He took the feeling of the meeting to be that the Bye-Laws should be voted upon, as a whole, and on that basis the ballot would be taken. The result was, in favour 72, against 4; whereupon the President declared the new Bye-Laws to be confirmed by a large majority. Mr. G. C. Druce showed specimens of a new British grass, *Koeleria valesiaca* Gaud., which he had found in the herbarium of Dillenius at Oxford, and recently refound in the original locality at Brent Down, Somersetshire. The Rev. John Gerard, S.J., brought specimens of *Plantago major*, showing paniculate prolification of the inflorescence, from the neighbourhood of Clitheroe, Lancashire. He drew attention to the figures of the plant in Lobel and Pena's *Adversaria* and Dodoens's *Pemptades*, which latter block reappeared in Lobel's *Observationes* and *Icones* and

Johnson's edition of Gerard's *Herbal* in 1633; the old herbalists spoke of it as the "Besome plantain with spoky tufts." He also drew attention to later figures in Masters's *Teratology* and the *Gardeners' Chronicle*, ser. 2, xiii. (1880), p. 364, figs. 65, 66. The point of interest seemed to be that this proliferous tendency was transmitted by seed, for a seedling of the original plant was passed round.

Mr. C. B. Clarke publishes in the *Journal of the Linnean Society* issued last month a paper entitled "List of the Carices of Malaya." The prefatory note states that "the material used is that in the Kew Herbarium," and as the only other material mentioned consists of "several types of Zollinger" sent from Vienna, we think the limited nature of the "List" should have been specified in the title. Mr. Clarke's explanation of his inability "to make any use of the fine collection in the British Museum" is curious rather than convincing. "To avail myself of these, I must have transported the whole of my MSS. thither; and it would have taken me more time than I can give to work out the specific names of the critical species for my own technical descriptions. Further, I do not think it would have strengthened this paper to have added such determinations; I should not have felt sure enough of the exact agreement of the plants. It would of course have been different if I could have laid the plants side by side, when the identification would have been more certain as well as more speedy." It seems to us that the difficulties which Mr. Clarke finds so insuperable are found and overcome by every monographer, and that his title should have been completed by the words "in the Kew Herbarium."

The part of the *Flora Capensis* issued in October confirms the suspicion expressed on p. 280 that "vol. iv." will really be two volumes, entitled respectively Sect. 1 and Sect. 2: this is doubtless now unavoidable, but it is to be regretted that it was not anticipated, as it must inevitably result in inconvenience. Mr. Hiern completes the *Scrophulariaceæ*; Dr. Stapf undertakes the *Lentibularieæ* and *Pedalineæ*, Mr. C. B. Clarke the *Gesneraceæ*, and Mr. T. A. Sprague the *Bignoniaceæ*; the last-named establishes a new genus, *Podranea*, for *Tecomaria Ricasoliana*. We note that Dr. Stapf publishes (as synonyms) two MS. names of Solander, which we do not think should have been printed. Mr. Clarke (p. 442) cites "Rand 1313" under two species of *Streptocarpus*; it belongs only to *S. Vandeleuri*: the list of garden hybrids at the end of this genus introduces a new and we think undesirable feature into the Flora.

The formal presentation to the Manchester Museum of Mr. J. Cosmo Melvill's herbarium took place on the 31st of October. The Museum has published an account of the herbarium, in which Mr. Melvill enumerates its principal contents, and estimates—at over half a million specimens, representing 36,000 species of phanerogams and 6000 cryptogams—the number of plants it contains. Among the names of contributors we observe with astonishment that of "the Prince of Mantua and Montferrat." We know something of the collections of the extraordinary impostor who called himself by the above name, and we cannot think that they add to the value of Mr. Melvill's fine collection.

Die Keimpflanzen der Gesneriaceen, by Dr. Karl Fritsch (8vo, pp. iv, 188, with 38 figs. in text) contains a description of the seedlings of a number of species from fourteen genera, including *Ramondia*, *Saintpaulia*, *Streptocarpus*, *Achimenes*, *Corytholoma*, and others, with special reference to points of anatomical interest, such as course of the vascular bundles, &c. The special descriptions are followed by a general part, which includes three sections. In the first the author makes a comparative study of the seedling and the adult plant. Section ii. deals with a few points of interest in the anatomy of the order, mainly hair-structures and the distribution of the colouring matter, anthocyan. The third section is a review of the morphology of *Streptocarpus*, and a comparison with the other Cyrtandroideæ, including a discussion of the systematic subdivision of the genus. The price of the book is 4½ marks. This, like the two preceding, is published by Messrs. Fischer, of Jena.

The fourth edition of Professor Engler's *Syllabus der Pflanzenfamilien* (Borntraeger, Berlin) is, except for a few corrections, alterations, and additions, similar to the third edition issued last year, and noticed in this Journal for 1903, p. 62. Among the alterations, which are concerned almost entirely with the lower plants, we note the inclusion of the *Dictyotales* under the section *Phæophyceæ*—in the previous edition they were regarded as forming a distinct section. The general plan of arrangement is identical with that followed in the last edition.

The *Quarterly Record* of the Royal Botanic Society of London publishes the papers read at the Conference held in connection with the Horticultural Exhibition held in June last. The "Botanical Section" seems to have had no papers before it, and the Chairman —Mr. Francis Darwin—seems to have been hard put to it to find something suitable for his audience. This is the kind of thing he gave them: "He could not help thinking as he came through the Gardens and saw the flowers and tents, and the entertainments in progress: What would be the impressions of the hypothetical inhabitant of Mars if he could look down and see how things went on in the world below him? He thought that he would be both surprised and pleased if he looked at the Gardens, and saw how admirably scientific pursuits and popular amusements were combined and carried on. And then at night, the constantly illuminated Gardens with their bright reflections would appeal to his sense of beauty; and if he further considered the great enjoyments of the crowds of people who were assembled, he would be struck with amazement at the happy union of elements apparently so diverse." Mr. Bottomley, in proposing a vote of thanks for this address, referred to Mr. Darwin as a "prince of science"; the "hypothetical inhabitant of Mars" might, we think, be "surprised" that an address of this kind should be delivered by one holding so distinguished a position.

We regret that pressure on our space compels us to hold over reviews of Mr. Townsend's *Flora of Hampshire*, Mr. Colgan's *Flora of Dublin*, and other reviews and articles. We hope next year to issue as a supplement Mr. Arthur Bennett's additions to the second edition of *Topographical Botany*.

INDEX.

For Classified Articles, see—County Records; Obituary; Reviews. New genera, species, and varieties published in this volume, as well as new names, are distinguished by an asterisk.

CORRECTIONS.

P. 3, l. 12 from bottom, for "laniflora" read "spuria."
P. 27, l. 18 from bottom, after "park" add "Oxon."
P. 59, l. 23 from top, for "*Monopatrinia*" read "*Monandropatrinia*."
P. 92, l. 3 from bottom, for "increase" read "decrease."
P. 95, l. 18 from bottom, for "Rogers" read "Powell."
P. 99, l. 17 from top, for "*Sternonitis*" read "*Stemonitis*."
P. 161, l. 15 from top, for "seaweed" read "seaward."
P. 214, l. 5 from bottom, for "Ellen" read "Ella."
P. 242, l. 32 from bottom, supply "W." before "B."
P. 260, l. 19 from bottom, for "*lobiferare*" read "*lobificans*."
P. 279, l. 16 from bottom, for "*Triglochium*" read "*Triglochin*."
P. 295, for l. 7 from bottom, substitute "Frederik Wilhelm Christian Areschoug."
P. 296, l. 16 from top, after "Leicestershire" add "[Northamptonshire]."
P. 297, l. 7 from bottom, for "1804" read "104."
P. 332, l. 18 from top, for "464" read "465."
P. 353, l. 4 from bottom, add "James Britten"; l. 6, for "1818" read "1838."

WEST, NEWMAN AND CO., PRINTERS, HATTON GARDEN, LONDON, E.C.

No. 493 JANUARY, 1904 Vol. XLII

THE

JOURNAL OF BOTANY

BRITISH AND FOREIGN

EDITED BY

JAMES BRITTEN, K.S.G., F.L.S.

CONTENTS

LONDON

WEST, NEWMAN & CO., 54, HATTON GARDEN, E.C.

DULAU & CO., SOHO SQUARE

Price One Shilling and Eightpence

THE JOURNAL OF BOTANY

BRITISH AND FOREIGN

EDITED BY

JAMES BRITTEN, K.S.G., F.L.S.

THE JOURNAL OF BOTANY was established in 1863 by Dr. Seemann. In 1872 the editorship was assumed by Dr. Henry Trimen, who, assisted during part of the time by Mr. J. G. Baker and Mr. Spencer Moore, carried it on until the end of 1879, when he left England for Ceylon. Since then it has been in the hands of the present Editor.

Without professing to occupy the vast field of general Botany, the Journal has from its inception filled a position which, even now, is covered by no other periodical. It affords a ready and prompt medium for the publication of new discoveries, and appears regularly and punctually on the 1st of each month. While more especially concerned with systematic botany, observations of every kind are welcomed. Especial prominence has from the first been given to British botany, and it may safely be said that nothing of primary importance bearing upon this subject has remained unnoticed.

Bibliographical matters have also received and continue to receive considerable attention, and the history of many obscure publications has been elucidated. Every number contains reviews of new and important books written by competent critics: in this as in every other respect a strictly independent attitude has been maintained. While in no way officially connected with the Department of Botany of the British Museum, the Journal has from the first been controlled by those whose acquaintance with the National Herbarium has enabled them to utilize its pages for recording facts of interest and importance regarding the priceless botanical collections which the Museum contains. In 1896 it became necessary to increase the size of the Journal, owing to the number of papers sent for publication: the number of plates was at the same time augmented.

Subscriptions (16s. post free) and advertisements (not later than the 24th of each month) should be sent to WEST, NEWMAN & Co., 54, Hatton Garden, London: communications for publication and books for review to THE EDITOR, 41, Boston Road, Brentford.

The volumes for 1884 to 1895 can still be had, price 14s. each, or £7 10s. the set: of some of these very few copies remain.

The volumes from 1896 to 1902 can be had at the usual price, £1 1s. each.

AUTHOR'S SEPARATE COPIES.—Contributors are presented with six copies of their papers as printed in the JOURNAL OF BOTANY. Authors who require more are requested to order from the publishers, and to notify this and state the number required at head of their MS.; otherwise the type may be distributed before the order is received. The charges for special separate copies are as under:—

2 pages	25 copies	4s.	4 pages	25 copies	5s.	8 pages	25 copies	8s. 0d.
,,	50 ,,	5s.	,,	50 ,,	6s.	,,	50 ,,	9s. 0d.
,,	100 ,,	7s.	,,	100 ,,	8s.	,,	100 ,,	10s. 6d.

A greater number of pages to be charged in equal proportion. Separate Titles, Wrappers, &c., extra.

For articles supplied as printed in the Journal, and not re-made up, the charge is considerably less.

London: WEST, NEWMAN & Co., 54, Hatton Garden.

Journal of Botany Reprints.

204 pp. Demy 8vo, Cloth extra, Price 6s. 6d. net.

BIOGRAPHICAL INDEX

OF

DECEASED BRITISH & IRISH BOTANISTS

BY

JAMES BRITTEN, K.S.G., F.L.S., & G. S. BOULGER, F.L.S.

Pp. 193–222, Price 1s. 6d. net.

First Supplement to the Above

(1893-97.)

"The utility and general accuracy of this compilation were rendered evident in the course of its publication in the *Journal of Botany*, and the favourable impression then received is amply confirmed now that the Index appears revised and complete up to date."—*Athenæum*, Dec. 30, 1893.

---

76 pp. Demy 8vo, Price 2s.

THE FLORA OF STAFFORDSHIRE.

By JAMES E. BAGNALL, A.L.S.

Demy 8vo, Price 1s. 6d.

KEY TO THE GENERA AND SPECIES

OF

BRITISH MOSSES.

By the Rev. H. G. JAMESON, M.A.

---

16 pp. Demy 8vo, Price 1s.

A KEY TO BRITISH HEPATICÆ.

By SYMERS MACVICAR, M.A.

Of the above, with the exception of the *Biographical Index*, very few copies remain. For these, early application should be made to the publishers.

London: WEST, NEWMAN & Co., 54, Hatton Garden.

No. 494 FEBRUARY, 1904 Vol. XLII

THE

JOURNAL OF BOTANY

BRITISH AND FOREIGN

EDITED BY

JAMES BRITTEN, K.S.G., F.L.S.

CONTENTS

LONDON

WEST, NEWMAN & CO., 54, HATTON GARDEN, E.C.

DULAU & CO., SOHO SQUARE

Price One Shilling and Eightpence

THE JOURNAL OF BOTANY

BRITISH AND FOREIGN

EDITED BY

JAMES BRITTEN, K.S.G., F.L.S.

THE JOURNAL OF BOTANY was established in 1863 by Dr. Seemann. In 1872 the editorship was assumed by Dr. Henry Trimen, who, assisted during part of the time by Mr. J. G. Baker and Mr. Spencer Moore, carried it on until the end of 1879, when he left England for Ceylon. Since then it has been in the hands of the present Editor.

Without professing to occupy the vast field of general Botany, the Journal has from its inception filled a position which, even now, is covered by no other periodical. It affords a ready and prompt medium for the publication of new discoveries, and appears regularly and punctually on the 1st of each month. While more especially concerned with systematic botany, observations of every kind are welcomed. Especial prominence has from the first been given to British botany, and it may safely be said that nothing of primary importance bearing upon this subject has remained unnoticed.

Bibliographical matters have also received and continue to receive considerable attention, and the history of many obscure publications has been elucidated. Every number contains reviews of new and important books written by competent critics: in this as in every other respect a strictly independent attitude has been maintained. While in no way officially connected with the Department of Botany of the British Museum, the Journal has from the first been controlled by those whose acquaintance with the National Herbarium has enabled them to utilize its pages for recording facts of interest and importance regarding the priceless botanical collections which the Museum contains. In 1896 it became necessary to increase the size of the Journal, owing to the number of papers sent for publication: the number of plates was at the same time augmented.

Subscriptions (16s. post free) and advertisements (not later than the 24th of each month) should be sent to WEST, NEWMAN & Co., 54, Hatton Garden, London: communications for publication and books for review to THE EDITOR, 41, Boston Road, Brentford.

The volumes for 1884 to 1895 can still be had, price 14s. each, or £7 10s. the set: of some of these very few copies remain.

The volumes from 1896 to 1902 can be had at the usual price, £1 1s. each.

AUTHOR'S SEPARATE COPIES.—**Contributors are presented with six copies of their papers** as printed in the JOURNAL OF BOTANY. Authors who require more are requested to order from the publishers, and to notify this and state the number required at head of their MS.; otherwise the type may be distributed before the order is received. The charges for special separate copies are as under:—

2 pages	25 copies	4s.	4 pages	25 copies	5s.	8 pages	25 copies	8s. 0d.
,,	50 ,,	5s.	,,	50 ,,	6s.	,,	50 ,,	9s. 0d.
,,	100 ,,	7s.	,,	100 ,,	8s.	,,	100 ,,	10s. 6d.

A greater number of pages to be charged in equal proportion. Separate Titles, Wrappers, &c., extra.

For articles supplied as printed in the Journal, and not re-made up, the charge is considerably less.

London: WEST, NEWMAN & Co., 54, Hatton Garden.

Journal of Botany Reprints.

204 pp. Demy 8vo, Cloth extra, Price 6s. 6d. net.

BIOGRAPHICAL INDEX

OF

DECEASED BRITISH & IRISH BOTANISTS.

BY

JAMES BRITTEN, K.S.G., F.L.S., & G. S. BOULGER, F.L.S.

Pp. 193–222, Price 1s. 6d. net.

First Supplement to the Above

(1893–97.)

"The utility and general accuracy of this compilation were rendered evident in the course of its publication in the *Journal of Botany*, and the favourable impression then received is amply confirmed now that the Index appears revised and completed up to date."—*Athenæum*, Dec. 30, 1893.

---

76 pp. Demy 8vo, Price 2s.

THE FLORA OF STAFFORDSHIRE.

By JAMES E. BAGNALL, A.L.S.

Demy 8vo, Price 1s. 6d.

KEY TO THE GENERA AND SPECIES

OF

BRITISH MOSSES.

By the Rev. H. G. JAMESON, M.A.

---

16 pp. Demy 8vo, Price 1s.

A KEY TO BRITISH HEPATICÆ.

By SYMERS MACVICAR, M.A.

Of the above, with the exception of the *Biographical Index*, very few copies remain. For these, early application should be made to the publishers.

London: WEST, NEWMAN & Co., 54, Hatton Garden.

No. 495 MARCH. 1904 Vol. XLII

THE

JOURNAL OF BOTANY

BRITISH AND FOREIGN

EDITED BY

JAMES BRITTEN, K.S.G., F.L.S.

CONTENTS

LONDON

WEST, NEWMAN & CO., 54, HATTON GARDEN, E.C.

DULAU & CO., SOHO SQUARE

Price One Shilling and Eightpence

THE JOURNAL OF BOTANY

BRITISH AND FOREIGN

EDITED BY

JAMES BRITTEN, K.S.G., F.L.S.

The Journal of Botany was established in 1863 by Dr. Seemann. In 1872 the editorship was assumed by Dr. Henry Trimen, who, assisted during part of the time by Mr. J. G. Baker and Mr. Spencer Moore, carried it on until the end of 1879, when he left England for Ceylon. Since then it has been in the hands of the present Editor.

Without professing to occupy the vast field of general Botany, the Journal has from its inception filled a position which, even now, is covered by no other periodical. It affords a ready and prompt medium for the publication of new discoveries, and appears regularly and punctually on the 1st of each month. While more especially concerned with systematic botany, observations of every kind are welcomed. Especial prominence has from the first been given to British botany, and it may safely be said that nothing of primary importance bearing upon this subject has remained unnoticed.

Bibliographical matters have also received and continue to receive considerable attention, and the history of many obscure publications has been elucidated. Every number contains reviews of new and important books written by competent critics: in this as in every other respect a strictly independent attitude has been maintained. While in no way officially connected with the Department of Botany of the British Museum, the Journal has from the first been controlled by those whose acquaintance with the National Herbarium has enabled them to utilize its pages for recording facts of interest and importance regarding the priceless botanical collections which the Museum contains. In 1896 it became necessary to increase the size of the Journal, owing to the number of papers sent for publication: the number of plates was at the same time augmented.

Subscriptions (16s. post free) and advertisements (not later than the 24th of each month) should be sent to West, Newman & Co., 54, Hatton Garden, London: communications for publication and books for review to

The Editor, 41, Boston Road, Brentford.

The volumes for 1884 to 1895 can still be had, price 14s. each, or £7 10s. the set: of some of these very few copies remain.

The volumes from 1896 to 1902 can be had at the usual price, £1 1s. each.

AUTHOR'S SEPARATE COPIES.—**Contributors are presented with six copies of their papers** as printed in the Journal of Botany. Authors who require more are requested to order from the publishers, and to notify this and state the number required at head of their MS.; otherwise the type may be distributed before the order is received. The charges for special separate copies are as under:—

2 pages	25 copies	4s.	4 pages	25 copies	5s.	8 pages	25 copies	8s. 0d.
,,	50 ,,	5s.	,,	50 ,,	6s.	,,	50 ,,	9s. 0d.
,,	100 ,,	7s.	,,	100 ,,	8s.	,,	100 ,,	10s. 6d.

A greater number of pages to be charged in equal proportion. Separate Titles, Wrappers, &c., extra.

For articles supplied as printed in the Journal, and not re-made up, the charge is considerably less.

London: WEST, NEWMAN & Co., 54, Hatton Garden.

Journal of Botany Reprints.

204 PP. DEMY 8VO, CLOTH EXTRA, PRICE 6S. 6D. NET.

BIOGRAPHICAL INDEX

OF

DECEASED BRITISH & IRISH BOTANISTS.

BY

JAMES BRITTEN, K.S.G., F.L.S., & G. S. BOULGER, F.L.S.

PP. 193–222, PRICE 1S. 6D. NET.

First Supplement to the Above

(1893-97.)

"The utility and general accuracy of this compilation were rendered evident in the course of its publication in the *Journal of Botany*, and the favourable impression then received is amply confirmed now that the Index appears revised and completed up to date."—*Athenæum*, Dec. 30, 1893.

---

76 PP. DEMY 8VO, PRICE 2S.

THE FLORA OF STAFFORDSHIRE.

BY JAMES E. BAGNALL, A.L.S.

DEMY 8VO, PRICE 1S. 6D.

KEY TO THE GENERA AND SPECIES

OF

BRITISH MOSSES.

BY THE REV. H. G. JAMESON, M.A.

Of the above, with the exception of the *Biographical Index*, very few copies remain. For these, early application should be made to the publishers.

London: WEST, NEWMAN & Co., 54, Hatton Garden.

PLATE 458 IS UNAVOIDABLY DELAYED.

No. 496 APRIL 1904 Vol. XLII

THE

JOURNAL OF BOTANY

BRITISH AND FOREIGN

EDITED BY

JAMES BRITTEN, K.S.G., F.L.S.

CONTENTS

LONDON
WEST, NEWMAN & CO., 54, HATTON GARDEN, E.C.
DULAU & CO., SOHO SQUARE

Price One Shilling and Eightpence

CAMBRIDGE UNIVERSITY PRESS.

THE CAMBRIDGE BIOLOGICAL SERIES.

General Editor—ARTHUR E. SHIPLEY, M.A., Fellow and Tutor of Christ's College, Cambridge.

Now ready, Second Edition, in One Volume.

A MANUAL AND DICTIONARY OF THE FLOWERING PLANTS AND FERNS. By J. C. WILLIS, M.A., Director of the Royal Botanic Gardens, Ceylon. Second Edition, Revised and Re-arranged. In One Volume, Crown 8vo, 10*s.* 6*d.*

Journal of Botany (of the First Edition).—"This is one of the most useful works on plants that has ever been produced. The author modestly admits it to be a mere compilation. But it is a compilation from the very best sources, with the matter well selected, and the information given in a clear and concise manner. Numerous cross references enable us to get the most out of the volume itself, and, if we want to know more, Mr. Willis tells us where to look for it."

GRASSES: A HANDBOOK FOR USE IN THE FIELD AND LABORATORY. By H. MARSHALL WARD, Sc.D., F.R.S., Fellow of Sidney Sussex College. Professor of Botany in the University of Cambridge. With 81 Figures. Crown 8vo, 6*s.*

Athenæum.—"Botanists and agriculturists alike have reason to thank Prof. Ward for this very serviceable addition to the literature of grasses."

THE ELEMENTS OF BOTANY. By FRANCIS DARWIN, M.A., M.B., F.R.S., Fellow of Christ's College. With 94 Illustrations. Crown 8vo. Second Edition. 4*s.* 6*d.*

PRACTICAL PHYSIOLOGY OF PLANTS. By FRANCIS DARWIN, M.A., F.R.S., and E. HAMILTON ACTON, M.A. Crown 8vo. With 45 Illustrations. Second Edition. 4*s.* 6*d.*

FOSSIL PLANTS: FOR STUDENTS OF BOTANY AND GEOLOGY. By A. C. SEWARD, M.A., F.R.S., Fellow of Emmanuel College. In Two Vols., Demy 8vo. Vol. I., 12*s.* *Vol. II. in the press.*

Prospectus will be forwarded on application.

London: C. J. CLAY & SONS, Cambridge University Press Warehouse, Ave Maria Lane.

A STORY OF TRAVEL AND ADVENTURE.

With 2 Coloured Plates, 32 Illustrations, including 2 Portraits of the Author, and a Sketch Map. Demy 8vo. 14s. net.

A NATURALIST IN THE GUIANAS

By EUGÈNE ANDRÉ, F.R.G.S., M.S.A., F.Z.S.,

With a Preface by Dr. SCOTT KELTIE, Secretary of the Royal Geographical Society.

St. James's Gazette.—"If the volume is important to the geographer and naturalist on account of the author's discoveries, it will prove of no less interest to the general reader on account of the thrilling story it tells."

Punch.—"A notable addition not only to geographical knowledge, but to rare information of hitherto unknown birds that swarm in the pathless forests of Venezuela."

London: SMITH, ELDER & CO., 15, Waterloo Place, S.W.

BOTANICAL DRYING PAPER

For Drying Flowering Plants, Ferns, & Sea-weeds.

16 in.	by	10	when folded,	15s.	per ream,	1s. 1d.	per quire,
18	,,	11	,,	19s.	,,	1s. 4d.	,,
20	,,	12	,,	23s.	,,	1s. 8d.	,,
20	,,	16	,,	30s.	,,	2s. 2d.	,,

London: WEST, NEWMAN & CO., 54, Hatton Garden, E.C.

Journal of Botany Reprints.

204 pp. Demy 8vo. Cloth extra, Price 6s. 6d. net.

BIOGRAPHICAL INDEX

OF

DECEASED BRITISH & IRISH BOTANISTS.

BY

JAMES BRITTEN, K.S.G., F.L.S., & G. S. BOULGER, F.L.S.

Pp. 193–222, Price 1s. 6d. net.

First Supplement to the Above

(1893–97.)

"The utility and general accuracy of this compilation were rendered evident in the course of its publication in the *Journal of Botany*, and the favourable impression then received is amply confirmed now that the Index appears revised and completed up to date."—*Athenæum*, Dec. 30, 1893.

---

76 pp. Demy 8vo, Price 2s.

THE FLORA OF STAFFORDSHIRE.

By JAMES E. BAGNALL, A.L.S.

Demy 8vo, Price 1s. 6d.

KEY TO THE GENERA AND SPECIES

OF

BRITISH MOSSES.

By the Rev. H. G. JAMESON, M.A.

---

16 pp. Demy 8vo, Price 1s.

A KEY TO BRITISH HEPATICÆ.

By SYMERS MACVICAR, M.A.

Of the above, with the exception of the *Biographical Index*, very few copies remain. For these, early application should be made to the publishers.

London: WEST, NEWMAN & Co., 54, Hatton Garden.

Plate 458, issued with this number, illustrates the first article in April number.

No. 497 MAY. 1904 Vol. XLII

THE JOURNAL OF BOTANY

BRITISH AND FOREIGN

EDITED BY

JAMES BRITTEN, K.S.G., F.L.S.

CONTENTS

LONDON

WEST, NEWMAN & CO., 54, HATTON GARDEN, E.C.

DULAU & CO., SOHO SQUARE

Price One Shilling and Eightpence

BERNARD QUARITCH, 15, Piccadilly, London.

A Natural History of the Riviera.

RIVIERA NATURE NOTES. A Popular Account of the more conspicuous Plants and Animals of the Riviera and the Maritime Alps. Second Edition, Revised and Enlarged. 1903. 1 Vol. Demy 8vo, pp. xv–402. With Frontispiece, 31 Plates, and 93 Illustrations in the Text. Cloth extra. 10*s*. 6*d*. net.

"The author of these delightful notes does not disclose his name. But there is abundance of internal evidence to show that it must be known to many who love the Riviera. Some of the more gifted of these have helped him in his good work. A vast company of others will, we predict, bless their anonymous benefactor. He has done them the inestimable service of teaching them to see. *J'observe et je suis la Nature; C'est mon sécret pour être heureux.* Borrowing his motto from Florian. he invites and almost compels the casual visitor to enter into the realm of bliss. For he is the most seductive of guides. He has spent twelve summers in the mountains and villages of the Maritime Alps, and, as he tells the story of the trees and flowers, the rocks and soils, the beetles and the butterflies, he seems to beckon away the loungers of the promenades and casinos to the higher joys. Above all things, he is human and catholic in his sympathies. That he is an Irishman he is almost at pains to proclaim; but he might safely have left the question of his nationality to the judgment of the percipient reader. He has his antipathies as well as his enthusiasms, and is never so palpably good-humoured as when he is railing at some pet aversion or crushing his favourite form of Philistine or Prig. His handsome volume is embellished with a number—we must adopt his own outspoken eulogy—of 'excellent illustrations of mountain scenery from the magnificent collection' of his friend Mr. Duddell, and some beautiful pictures of coast views and vegetation of the littoral zone, contributed by Miss E. Wilmott. These are only a few of his collaborateurs; yet, when all is said, it is the text, with its felicitous blending of a gossiping, almost rollicking, style, and the faithful revelation of the results of exact and loving observation, that constitutes the charm. . ."—*The Standard*, Feb. 9th, 1904.

The Standard Manual of Orchids.

WILLIAMS (B. S.)—THE ORCHID GROWERS' MANUAL, containing Descriptions of the Best Species and Varieties of Orchidaceous Plants in Cultivation. Seventh Edition, Enlarged and Revised to the Present Time, 1894. 1 Vol. Royal 8vo, pp. xix–796. With upwards of 300 Illustrations, Full-Page, Double-Page, and in the Text. Cloth Extra (£1 5*s*. net), reduced to 16*s*. net.

The Standard Iconography of Orchids.

—— **The ORCHID ALBUM,** comprising Coloured Figures and Descriptions of New, Rare, and Beautiful Orchidaceous Plants. Conducted by ROBERT WARNER, F.L.S., F.R.H.S., and HENRY WILLIAMS, F.L.S., F.R.H.S. The Coloured Figures by JOHN NUGENT FITCH. 1882–1897. 11 Vols. Royal 4to. With 528 Coloured Plates. Cloth extra (£36 6*s*. net), reduced to £16 net.

Only "Lindenia" can compare with this magnificent publication in importance. Sander's great book contains but 192 Plates, and "Lindenia," complete, is almost unobtainable. The illustrations are not idealised, but are true to nature.

—— **CHOICE STOVE and GREENHOUSE FLOWERING PLANTS**, comprising Descriptions of upwards of Thirteen Hundred Species and Varieties, accompanied by Instructions for their Cultivation and Mode of Management. 1883. 1 Vol. Crown 8vo, pp. viii–378. Profusely Illustrated. Cloth (7*s*. 6*d*. net). reduced to 4*s*. net.

—— **CHOICE STOVE and GREENHOUSE ORNAMENTAL LEAVED PLANTS**, comprising Descriptions of more than Nine Hundred Species and Varieties, accompanied by Instructions for their Cultivation and Mode of Management. 1876. 1 Vol. Crown 8vo, pp. x–350. Profusely Illustrated. Cloth (5*s*. net), reduced to 4*s*. net.

—— **SELECT FERNS and LYCOPODS: British and Exotic.** 1 Vol. Crown 8vo, pp. viii–353. Illustrated. Cloth (5*s*. net), reduced to 4*s*. net.

A hitherto little-known book on the Entomology of the Far East.

LEECH (J. H.).—BUTTERFLIES from CHINA, JAPAN, and COREA. 3 Vols. 4to. With Map, Views, and 43 Coloured Plates containing hundreds of Figures, 1892–94. In 11 Parts (£12 net), reduced to £5 net; or in 3 Vols. Half-Morocco extra, £7 10*s*. net.

The Subscription to the 'Journal of Botany' is 16s. post free, payable to West, Newman & Co., 54, Hatton Garden, London.

No. 498 JUNE, 1904 Vol. XLII

THE

JOURNAL OF BOTANY

BRITISH AND FOREIGN

EDITED BY

JAMES BRITTEN, K.S.G., F.L.S.

CONTENTS

LONDON

WEST, NEWMAN & CO., 54, HATTON GARDEN, E.C.

DULAU & CO., SOHO SQUARE

Price One Shilling and Eightpence

THE JOURNAL OF BOTANY

BRITISH AND FOREIGN

EDITED BY

JAMES BRITTEN, K.S.G., F.L.S.

The Journal of Botany was established in 1863 by Dr. Seemann. In 1872 the editorship was assumed by Dr. Henry Trimen, who, assisted during part of the time by Mr. J. G. Baker and Mr. Spencer Moore, carried it on until the end of 1879, when he left England for Ceylon. Since then it has been in the hands of the present Editor.

Without professing to occupy the vast field of general Botany, the Journal has from its inception filled a position which, even now, is covered by no other periodical. It affords a ready and prompt medium for the publication of new discoveries, and appears regularly and punctually on the 1st of each month. While more especially concerned with systematic botany, observations of every kind are welcomed. Especial prominence has from the first been given to British botany, and it may safely be said that nothing of primary importance bearing upon this subject has remained unnoticed.

Bibliographical matters have also received and continue to receive considerable attention, and the history of many obscure publications has been elucidated. Every number contains reviews of new and important books written by competent critics: in this as in every other respect a strictly independent attitude has been maintained. While in no way officially connected with the Department of Botany of the British Museum, the Journal has from the first been controlled by those whose acquaintance with the National Herbarium has enabled them to utilize its pages for recording facts of interest and importance regarding the priceless botanical collections which the Museum contains. In 1896 it became necessary to increase the size of the Journal, owing to the number of papers sent for publication: the number of plates was at the same time augmented.

Subscriptions (16s. post free) and advertisements (not later than the 24th of each month) should be sent to West, Newman & Co., 54, Hatton Garden, London: communications for publication and books for review to

The Editor, 41, Boston Road, Brentford.

The volumes for 1884 to 1895, bound in cloth, can still be had, price 14s. each, or £7 10s. the set. From 1896 to 1903, bound in cloth, can be had at £1 1s. each.

AUTHOR'S SEPARATE COPIES.—Contributors are presented with six copies of their papers as printed in the Journal of Botany. Authors who require more are requested to order from the publishers, and to notify this and state the number required at head of their MS.; otherwise the type may be distributed before the order is received. The charges for special separate copies are as under:—

2 pages	25 copies	4s.	4 pages	25 copies	5s.	8 pages	25 copies	8s. 0d.
,,	50 ,,	5s.	,,	50 ,,	6s.	,,	50 ,,	9s. 0d.
,,	100 ,,	7s.	,,	100 ,,	8s.	,,	100 ,,	10s. 6d.

A greater number of pages to be charged in equal proportion. Separate Titles, Wrappers, &c., extra.

For articles supplied as printed in the Journal, and not re-made up, the charge is considerably less.

London: WEST, NEWMAN & CO., 54, Hatton Garden, E.C.

The Subscription to the 'Journal of Botany' is 16s. post free, payable to West, Newman & Co., 54, Hatton Garden, London.

No. 499 **JULY, 1904** **Vol. XLII**

'THE JOURNAL OF BOTANY

BRITISH AND FOREIGN

EDITED BY

JAMES BRITTEN, K.S.G., F.L.S.

CONTENTS

LONDON

WEST. NEWMAN & CO., 54. HATTON GARDEN. E.C.

DULAU & CO., SOHO SQUARE

Price One Shilling and Eightpence

THE JOURNAL OF BOTANY

BRITISH AND FOREIGN

EDITED BY

JAMES BRITTEN, K.S.G., F.L.S.

THE JOURNAL OF BOTANY was established in 1863 by Dr. Seemann. In 1872 the editorship was assumed by Dr. Henry Trimen, who, assisted during part of the time by Mr. J. G. Baker and Mr. Spencer Moore, carried it on until the end of 1879, when he left England for Ceylon. Since then it has been in the hands of the present Editor.

Without professing to occupy the vast field of general Botany, the Journal has from its inception filled a position which, even now, is covered by no other periodical. It affords a ready and prompt medium for the publication of new discoveries, and appears regularly and punctually on the 1st of each month. While more especially concerned with systematic botany, observations of every kind are welcomed. Especial prominence has from the first been given to British botany, and it may safely be said that nothing of primary importance bearing upon this subject has remained unnoticed.

Bibliographical matters have also received and continue to receive considerable attention, and the history of many obscure publications has been elucidated. Every number contains reviews of new and important books written by competent critics: in this as in every other respect a strictly independent attitude has been maintained. While in no way officially connected with the Department of Botany of the British Museum, the Journal has from the first been controlled by those whose acquaintance with the National Herbarium has enabled them to utilize its pages for recording facts of interest and importance regarding the priceless botanical collections which the Museum contains. In 1896 it became necessary to increase the size of the Journal, owing to the number of papers sent for publication: the number of plates was at the same time augmented.

Subscriptions (16s. post free) and advertisements (not later than the 24th of each month) should be sent to WEST, NEWMAN & Co., 54, Hatton Garden, London communications for publication and books for review to

The Editor, 41 Boston Road, Brentford.

The volumes for 1884 to 1895, bound in cloth, can still be had, price 14s. each, or £7 10s. the set. From 1896 to 1903, bound in cloth, can be had at £1 1s. each.

AUTHOR'S SEPARATE COPIES.—Contributors are presented with six copies of their papers as printed in the JOURNAL OF BOTANY. Authors who require more are requested to order from the publishers, and to notify this and state the number required at head of their MS.; otherwise the type may be distributed before the order is received. The charges for special separate copies are as under:—

2 pages	25 copies	4s.	4 pages	25 copies	5s.	8 pages	25 copies	8s. 0d.
,,	50 ,,	5s.	,,	50 ,,	6s.	,,	50 ,,	9s. 0d.
,,	100 ,,	7s.	,,	100 ,,	8s.	,,	100 ,,	10s. 6d.

A greater number of pages to be charged in equal proportion. Separate Titles, Wrappers, &c., extra.

For articles supplied as printed in the Journal, and not re-made up, the charge is considerably less.

London: WEST, NEWMAN & CO., 54, Hatton Garden, E.C.

☞ *Plate 462 is unavoidably delayed, and will be issued in the September number.*

No. 500 AUGUST. 1904 Vol. XLII

JOURNAL OF BOTANY

BRITISH AND FOREIGN

EDITED BY

JAMES BRITTEN, K.S.G., F.L.S.

CONTENTS

LONDON

WEST, NEWMAN & CO., 54, HATTON GARDEN, E.C.

DULAU & CO., SOHO SQUARE

Price One Shilling and Eightpence

THE JOURNAL OF BOTANY

BRITISH AND FOREIGN

EDITED BY

JAMES BRITTEN, K.S.G., F.L.S.

The Journal of Botany was established in 1863 by Dr. Seemann. In 1872 the editorship was assumed by Dr. Henry Trimen, who, assisted during part of the time by Mr. J. G. Baker and Mr. Spencer Moore, carried it on until the end of 1879, when he left England for Ceylon. Since then it has been in the hands of the present Editor.

Without professing to occupy the vast field of general Botany, the Journal has from its inception filled a position which, even now, is covered by no other periodical. It affords a ready and prompt medium for the publication of new discoveries, and appears regularly and punctually on the 1st of each month. While more especially concerned with systematic botany, observations of every kind are welcomed. Especial prominence has from the first been given to British botany, and it may safely be said that nothing of primary importance bearing upon this subject has remained unnoticed.

Bibliographical matters have also received and continue to receive considerable attention, and the history of many obscure publications has been elucidated. Every number contains reviews of new and important books written by competent critics: in this as in every other respect a strictly independent attitude has been maintained. While in no way officially connected with the Department of Botany of the British Museum, the Journal has from the first been controlled by those whose acquaintance with the National Herbarium has enabled them to utilize its pages for recording facts of interest and importance regarding the priceless botanical collections which the Museum contains. In 1896 it became necessary to increase the size of the Journal, owing to the number of papers sent for publication: the number of plates was at the same time augmented.

Subscriptions (16s. post free) and advertisements (not later than the 24th of each month) should be sent to West, Newman & Co., 54, Hatton Garden, London Communications for publication and books for review to

The Editor, 41 Boston Road, Brentford.

The volumes for 1884 to 1895, bound in cloth, can still be had, price 14s. each, or £7 10s. the set. From 1896 to 1903, bound in cloth, can be had at £1 1s. each.

AUTHOR'S SEPARATE COPIES.—Contributors are presented with six copies of their papers as printed in the Journal of Botany. Authors who require more are requested to order from the publishers, and to notify this and state the number required at head of their MS.; otherwise the type may be distributed before the order is received. The charges for special separate copies are as under:—

2 pages	25 copies	4s.	4 pages	25 copies	5s.	8 pages	25 copies	8s. 6d.
,,	50 ,,	5s.	,,	50 ,,	6s.	,,	50 ,,	9s. 0d.
,,	100 ,,	7s.	,,	100 ,,	8s.	,,	100 ,,	10s. 6d.

A greater number of pages to be charged in equal proportion. Separate Titles Wrappers, &c., extra.

For articles supplied as printed in the Journal, and not re-made up, the charge is considerably less.

London: WEST, NEWMAN & CO., 54, Hatton Garden, E.C.

JUST PUBLISHED.

NEW EDITION OF BABINGTON'S BOTANY,

Revised and Enlarged from the Author's Manuscripts and other Sources.

MANUAL OF BRITISH BOTANY.

Containing the Flowering Plants and Ferns, arranged according to the Natural Orders. Ninth Edition. Edited by E. & J. GROVES. 12 mo, cloth. 9*s*. net. Thin paper, limp leather. 10*s*. 6*d*. net.

GURNEY & JACKSON, 10, PATERNOSTER ROW, LONDON.

RAY SOCIETY.

ANNUAL SUBSCRIPTION, ONE GUINEA.

Nearly Ready:—

THE BRITISH DESMIDIACEÆ, Vol. I.

By W. WEST, F.L.S., and Prof. G. S. WEST, M.A., F.L.S.

Demy 8vo, 324 pages, 32 plates (28 coloured).

This volume, in which upwards of 150 Species with many Varieties are described and figured, will be issued to the Subscribers to the Ray Society for the year 1904.

Subscriptions and all communications for the Society should be sent to the Secretary, JOHN HOPKINSON, F.L.S., Weetwood, Watford.

IN THE PRESS. **WILL BE READY SHORTLY.**

Crown 8vo. 64 pp. Price 1*s*. net. 1*s*. 2*d*. post free.

Hints on Collecting and Preserving Plants.

By STANLEY GUITON.

Chapters on Collecting and Equipment, Drying, Preserving a[nd] Arranging, Mounting, &c. Fully Illustrated.

---

204 PP. DEMY 8VO. CLOTH EXTRA, PRICE 6S. 6D. NET.

BIOGRAPHICAL INDEX OF DECEASED BRITISH & IRISH BOTANISTS.

BY

JAMES BRITTEN, K.S.G., F.L.S., & G. S. BOULGER, F.L.S.

PP. 193–222, PRICE 1S. 6D. NET.

First Supplement to the Above

(1893–97.)

London: WEST, NEWMAN & Co., 54, Hatton Garden.

The present issue contains, besides Plate 462, the portrait of Sir Joseph Hooker, accidentally omitted from the August number.

No. 501 SEPTEMBER, 1904 Vol. XLII

THE JOURNAL OF BOTANY

BRITISH AND FOREIGN

EDITED BY

JAMES BRITTEN, K.S.G., F.L.S.

CONTENTS

LONDON

WEST, NEWMAN & CO., 54, HATTON GARDEN, E.C.

DULAU & CO., SOHO SQUARE

Price One Shilling and Eightpence

THE JOURNAL OF BOTANY

BRITISH AND FOREIGN

EDITED BY

JAMES BRITTEN, K.S.G., F.L.S.

The Journal of Botany was established in 1863 by Dr. Seemann. In 1872 the editorship was assumed by Dr. Henry Trimen, who, assisted during part of the time by Mr. J. G. Baker and Mr. Spencer Moore, carried it on until the end of 1879, when he left England for Ceylon. Since then it has been in the hands of the present Editor.

Without professing to occupy the vast field of general Botany, the Journal has from its inception filled a position which, even now, is covered by no other periodical. It affords a ready and prompt medium for the publication of new discoveries, and appears regularly and punctually on the 1st of each month. While more especially concerned with systematic botany, observations of every kind are welcomed. Especial prominence has from the first been given to British botany, and it may safely be said that nothing of primary importance bearing upon this subject has remained unnoticed.

Bibliographical matters have also received and continue to receive considerable attention, and the history of many obscure publications has been elucidated. Every number contains reviews of new and important books written by competent critics: in this as in every other respect a strictly independent attitude has been maintained. While in no way officially connected with the Department of Botany of the British Museum, the Journal has from the first been controlled by those whose acquaintance with the National Herbarium has enabled them to utilize its pages for recording facts of interest and importance regarding the priceless botanical collections which the Museum contains. In 1896 it became necessary to increase the size of the Journal, owing to the number of papers sent for publication: the number of plates was at the same time augmented.

Subscriptions (16s. post free) and advertisements (not later than the 24th of each month) should be sent to West, Newman & Co., 54, Hatton Garden, London communications for publication and books for review to

The Editor, 41 Boston Road, Brentford.

Some volumes for 1884 to 1895, bound in cloth, can still be had, price 14s. each, or £7 [illegible] the set. From 1896 to 1903, bound in cloth, can be had at £1 1s. each.

AUTHOR'S SEPARATE COPIES.—Contributors are presented with six copies of their papers as printed in the Journal of Botany. Authors who require more are requested to order from the publishers, and to notify this and state the number required at head of their MS.; otherwise the type may be distributed before the order is received. The charges for special separate copies are as under:—

2 pages	25 copies	4s.	4 pages	25 copies	5s.	8 pages	25 copies	8s. 0d.
[illegible]	50 ,,	5s.	,,	50 ,,	6s.	,,	50 ,,	9s. 0d.
,,	100 ,,	7s.	,,	100 ,,	8s.	,,	100 ,,	10s. 6d.

A greater number of pages to be charged in equal proportion. Separate Titles. Wrappers, &c., extra.

For articles supplied as printed in the Journal, and not re-made up, the charge is considerably less.

London: WEST, NEWMAN & CO., 54, Hatton Garden, E.C.

The Subscription to the 'Journal of Botany' is 16s. post free, payable to West, Newman & Co., 54, Hatton Garden, London.

No. 502 **OCTOBER, 1904** **Vol. XLII**

THE JOURNAL OF BOTANY

BRITISH AND FOREIGN

EDITED BY

JAMES BRITTEN, K.S.G., F.L.S.

CONTENTS

LONDON

WEST, NEWMAN & CO., 54, HATTON GARDEN, E.C.

DULAU & CO., SOHO SQUARE

Price One Shilling and Eightpence

THE JOURNAL OF BOTANY

BRITISH AND FOREIGN

EDITED BY

JAMES BRITTEN, K.S.G., F.L.S.

The Journal of Botany was established in 1863 by Dr. Seemann. In 1872 the editorship was assumed by Dr. Henry Trimen, who, assisted during part of the time by Mr. J. G. Baker and Mr. Spencer Moore, carried it on until the end of 1879, when he left England for Ceylon. Since then it has been in the hands of the present Editor.

Without professing to occupy the vast field of general Botany, the Journal has from its inception filled a position which, even now, is covered by no other periodical. It affords a ready and prompt medium for the publication of new discoveries, and appears regularly and punctually on the 1st of each month. While more especially concerned with systematic botany, observations of every kind are welcomed. Especial prominence has from the first been given to British botany, and it may safely be said that nothing of primary importance bearing upon this subject has remained unnoticed.

Bibliographical matters have also received and continue to receive considerable attention, and the history of many obscure publications has been elucidated. Every number contains reviews of new and important books written by competent critics: in this as in every other respect a strictly independent attitude has been maintained. While in no way officially connected with the Department of Botany of the British Museum, the Journal has from the first been controlled by those whose acquaintance with the National Herbarium has enabled them to utilize its pages for recording facts of interest and importance regarding the priceless botanical collections which the Museum contains.

In 1896 it became necessary to increase the size of the Journal, owing to the number of papers sent for publication: the number of plates was at the same time augmented.

Subscriptions (16s. post free) and advertisements (not later than the 24th of each month) should be sent to West, Newman & Co., 54, Hatton Garden, London; communications for publication and books for review to

The Editor, 41 Boston Road, Brentford.

The volumes for 1884 to 1895, bound in cloth, can still be had, price 14s. each, or £7 10s. the set. From 1896 to 1903, bound in cloth, can be had at £1 1s. each.

AUTHOR'S SEPARATE COPIES.—**Contributors are presented with six copies of their papers** as printed in the Journal of Botany. Authors who require more are requested to order from the publishers, and to notify this and state the number required at head of their MS.; otherwise the type may be distributed before the order is received. The charges for special separate copies are as under:—

2 pages	25 copies	4s.	4 pages	25 copies	5s.	8 pages	25 copies	8s. 0d.
,,	50 ,,	5s.	,,	50 ,,	6s.	,,	50 ,,	9s. 0d.
,,	100 ,,	7s.	,,	100 ,,	8s.	,,	100 ,,	10s. 6d.

A greater number of pages to be charged in equal proportion. Separate Titles, Wrappers, &c., extra.

For articles supplied as printed in the Journal, and not re-made up, the charge is considerably less.

London: WEST, NEWMAN & CO., 54, Hatton Garden, E.C.

The Subscription to the 'Journal of Botany' is 16s. post free, payable to West, Newman & Co., 54, Hatton Garden, London.

No. 503 NOVEMBER, 1904 Vol. XLII

THE

JOURNAL OF BOTANY

BRITISH AND FOREIGN

EDITED BY

JAMES BRITTEN, K.S.G., F.L.S.

CONTENTS

LONDON

WEST, NEWMAN & CO., 54, HATTON GARDEN, E.C.

DULAU & CO., SOHO SQUARE

Price One Shilling and Eightpence

THE JOURNAL OF BOTANY

BRITISH AND FOREIGN

EDITED BY

JAMES BRITTEN, K.S.G., F.L.S.

THE JOURNAL OF BOTANY was established in 1863 by Dr. Seemann. In 1872 the editorship was assumed by Dr. Henry Trimen, who, assisted during part of the time by Mr. J. G. Baker and Mr. Spencer Moore, carried it on until the end of 1879, when he left England for Ceylon. Since then it has been in the hands of the present Editor.

Without professing to occupy the vast field of general Botany, the Journal has from its inception filled a position which, even now, is covered by no other periodical. It affords a ready and prompt medium for the publication of new discoveries, and appears regularly and punctually on the 1st of each month. While more especially concerned with systematic botany, observations of every kind are welcomed. Especial prominence has from the first been given to British botany, and it may safely be said that nothing of primary importance bearing upon this subject has remained unnoticed.

Bibliographical matters have also received and continue to receive considerable attention, and the history of many obscure publications has been elucidated. Every number contains reviews of new and important books written by competent critics: in this as in every other respect a strictly independent attitude has been maintained. While in no way officially connected with the Department of Botany of the British Museum, the Journal has from the first been controlled by those whose acquaintance with the National Herbarium has enabled them to utilize its pages for recording facts of interest and importance regarding the priceless botanical collections which the Museum contains. In 1896 it became necessary to increase the size of the Journal, owing to the number of papers sent for publication: the number of plates was at the same time augmented.

Subscriptions (16s. post free) and advertisements (not later than the 24th of each month) should be sent to WEST, NEWMAN & Co., 54, Hatton Garden, London; communications for publication and books for review to

The Editor, 41 Boston Road, Brentford.

The volumes for 1884 to 1895, bound in cloth, can still be had, price 14s. each, or £7 10s. the set. From 1896 to 1903, bound in cloth, can be had at £1 1s. each.

AUTHOR'S SEPARATE COPIES.—Contributors are presented with six copies of their papers as printed in the JOURNAL OF BOTANY. Authors who require more are requested to order from the publishers, and to notify this and state the number required at head of their MS.; otherwise the type may be distributed before the order is received. The charges for special separate copies are as under:—

2 pages	25 copies	4s.	4 pages	25 copies	5s.	8 pages	25 copies	8s. 0d.
,,	50 ,,	5s.	,,	50 ,,	6s.	,,	50 ,,	9s. 0d.
,,	100 ,,	7s.	,,	100 ,,	8s.	,,	100 ,,	10s. 6d.

A greater number of pages to be charged in equal proportion. Separate Titles, Wrappers, &c., extra.

For articles supplied as printed in the Journal, and not re-made up, the charge is considerably less.

London: WEST, NEWMAN & CO., 54, Hatton Garden, E.C.

OXFORD UNIVERSITY PRESS.

ANNALS OF BOTANY.

Edited by ISAAC BAYLEY BALFOUR M.A., M.D., F.R.S., of the University of Edinburgh; D. H. SCOTT, M.A., Ph.D., F.L.S., of the Royal Gardens, Kew; W. G. FARLOW, M.D., of Harvard University, U.S.A.; assisted by other Botanists.

Vol. XVIII. No. LXXII. Royal 8vo, paper covers. With 8 Plates and 7 Figures in the Text. 14s.

CONTENTS. — ENGLER, A., Plants of the Northern Temperate Zone in their Transition to the High Mountains of Tropical Africa. — TROW, A. H., On Fertilization in the Saprolegnieæ. — LANG, W. H., On a Prothallus provisionally referred to Psilotum. — BURNS, G. P., Heterophylly in Proserpinaca palustris, L. — FORD, Miss S. O., The Anatomy of Psilotum triquetrum. — WOLFE, J. J., Cytological Studies on Nemalion. — GANONG, W. F., An Undescribed Thermometric Movement of the Branches in Shrubs and Trees.—Notes.

London: HENRY FROWDE, Oxford University Press Warehouse, Amen Corner.

IN THE PRESS. **WILL BE READY SHORTLY.**

Crown 8vo. 64 pp. Price 1*s.* net. 1*s.* 2*d.* post free.

Hints on Collecting and Preserving Plants.

By STANLEY GUITON.

Chapters on Collecting and Equipment, Drying, Preserving and Arranging, Mounting, &c. Fully Illustrated.

London: WEST, NEWMAN & Co., 54, Hatton Garden.

Journal of Botany Reprints.

204 PP. DEMY 8VO, CLOTH EXTRA, PRICE 6S. 6D. NET.

BIOGRAPHICAL INDEX OF DECEASED BRITISH & IRISH BOTANISTS.

BY

JAMES BRITTEN, K.S.G., F.L.S., & G. S. BOULGER, F.L.S.

PP. 193–222, PRICE 1S. 6D. NET.

First Supplement to the Above

(1893–97.)

---

76 PP. DEMY 8VO, PRICE 2S.

THE FLORA OF STAFFORDSHIRE.

BY JAMES E. BAGNALL, A.L.S.

London: WEST, NEWMAN & Co., 54, Hatton Garden.

SUBSCRIPTIONS FOR 1904 HAVE EXPIRED.

No. 504 DECEMBER, 1904 Vol. XLII

THE JOURNAL OF BOTANY

BRITISH AND FOREIGN

EDITED BY

JAMES BRITTEN, K.S.G., F.L.S.

CONTENTS

LONDON

WEST, NEWMAN & CO., 54, HATTON GARDEN, E.C.

DULAU & CO., SOHO SQUARE

Price One Shilling and Eightpence

The Index and Title-page for 1904 are issued with this number.

THE JOURNAL OF BOTANY

BRITISH AND FOREIGN

EDITED BY

JAMES BRITTEN, K.S.G., F.L.S.

The Journal of Botany was established in 1863 by Dr. Seemann. In 1872 the editorship was assumed by Dr. Henry Trimen, who, assisted during part of the time by Mr. J. G. Baker and Mr. Spencer Moore, carried it on until the end of 1879, when he left England for Ceylon. Since then it has been in the hands of the present Editor.

Without professing to occupy the vast field of general Botany, the Journal has from its inception filled a position which, even now, is covered by no other periodical. It affords a ready and prompt medium for the publication of new discoveries, and appears regularly and punctually on the 1st of each month. While more especially concerned with systematic botany, observations of every kind are welcomed. Especial prominence has from the first been given to British botany, and it may safely be said that nothing of primary importance bearing upon this subject has remained unnoticed.

Bibliographical matters have also received and continue to receive considerable attention, and the history of many obscure publications has been elucidated. Every number contains reviews of new and important books written by competent critics: in this as in every other respect a strictly independent attitude has been maintained. While in no way officially connected with the Department of Botany of the British Museum, the Journal has from the first been controlled by those whose acquaintance with the National Herbarium has enabled them to utilize its pages for recording facts of interest and importance regarding the priceless botanical collections which the Museum contains. In 1896 it became necessary to increase the size of the Journal, owing to the number of papers sent for publication: the number of plates was at the same time augmented.

Subscriptions (16s. post free) and advertisements (not later than the 24th of each month) should be sent to West, Newman & Co., 54, Hatton Garden, London; communications for publication and books for review to

The Editor, 41 Boston Road, Brentford.

The volumes for 1884 to 1895, bound in cloth, can still be had, price 14s. each, or £7 10s. the set. From 1896 to 1903, bound in cloth, can be had at £1 1s. each.

AUTHOR'S SEPARATE COPIES.—Contributors are presented with six copies of their papers as printed in the Journal of Botany. Authors who require more are requested to order from the publishers, and to notify this and state the number required at head of their MS.; otherwise the type may be distributed before the order is received. The charges for special separate copies are as under:—

2 pages	25 copies	4s.	4 pages	25 copies	5s.	8 pages	25 copies	8s. 0d.
,,	50 ,,	5s.	,,	50 ,,	6s.	,,	50 ,,	9s. 0d.
,,	100 ,,	7s.	,,	100 ,,	8s.	,,	100 ,,	10s. 6d.

A greater number of pages to be charged in equal proportion. Separate Titles, Wrappers, &c., extra.

For articles supplied as printed in the Journal, and not re-made up, the charge is considerably less.

London: WEST, NEWMAN & CO., 54, Hatton Garden, E.C.